

# दुर्ग विश्वविद्यालय, दुर्ग (छ.ग.)



पाठ्यक्रम

परीक्षा – 2017–18

बी.ए.-1 (कोड-101) B.A.-I (Code- 101)

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## **REVISED ORDINANCE NO.11**

**(As per State U.G.C. Scheme)**

### **BACHELOR OF ARTS**

- 1 The three year course has been broken up in to three Parts.  
Part-I Examination: at the end of the first year.  
Part-II Examination: at the end of the second year and  
Part-III Examination: at the end of the third year.
- 2 A candidate who after passing (10+2) or intermediate examination of C.G. Board of Secondary Education, C.G. or any other examination recognized by the University or C.G. Board of Secondary Education as equivalent thereto, has attended regular course of study in an affiliated college or in the Teaching Department of the University for one academic year shall be eligible for appearing at the B.A. Part-I examination.
- 3 A candidate who after passing B.A. Part-I examination of the University or any other examination recognized by the University as equivalent thereto has attended regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.A. Part II Examination.
- 4 A candidate who after passing B.A. Part II examination of the University has completed a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.A. Part-III examination.
- 5 Besides regular students, subject to their compliance with this ordinance, ex-students and non-college students shall be eligible for admission to other examination as per provisions of Ordinance N. 6 relating to Examinations (General). Provided that non-college students can be admitted at such subjects/papers as are taught to the regular students at any of the University Teaching Department or College.
- 6 Every candidate for the Bachelor of arts examination shall be examined in:
  - A Foundation Course:
    - (i) Group A - Hindi Language
    - (ii) Group B - English Language
  - B Three course subjects: One subject from any three group out of the following six groups:
    - 1 Sociology / Ancient Indian History/Anthropology
    - 2 Political Science/Home Science / Drawing & Painting / Vocational Course.
    - 3 Hindi Literature/ Sanskrit Literature/Urdu Literature/Mathematics.
    - 4 Economics/Music/Defense Studies/Linguistics/ u`R;
    - 5 Philosophy/Psychology/ Geography/ Education/Management.
    - 6 History/English Literature/Statistics.
    - 7 Practicals (If Necessary) for each core subject.

- 7 Any candidate who has passed the B.A. examination of the University shall be allowed to present himself for examination in any of additional subject spres cribbed for the B.A. exami-nation and not taken by him at the degree examination. Such candidate will have to first appear and pass the B.A. PartI examination in the subject which he proposes to offer and then the B.A.PartII and PartIII examinationin the same subject. Successfull candidate will be given acertificate to that effect.
- 8 Inorder to pass atany part of the three year degree course examination, an examinee must obtain not less than33% of the total makrs in each subject/group of subjects .In subject /group of subjects, where both theory and practical examination are provided, an examinee must pass in both the ory and practical part so the examination separately.
- 9 Candidate will have to pass separately at the Part-I, Part II and part-III examination. No division shall be assigned on the result of the Part-I and Part-II examination. In deter mining the divison of the Final examination, total marks obtained by the examinees, in their Part-I,Part-II and Part-III examination in the aggregate shall be taken in to account. Candidate will not be allowed to change subjects after passing Part IExamination.  
Provided in case of candidate who has passed the examination through the supplementary examination having fail edin one subject only the total aggregate marks being carried over for determining the division shall in cluded the actual mark so btained in the subject in which he appeared at the supplementary examination.
- D Successful exminee sat the Part-III examination obtaining 60% or more marks shall be placed in the First division, those obtain in gless than 60% but not less than 45% marks in the Second division and other successful examinees in the third division.

## SCHEME OF EXAMINATION

Subject		Paper	Max. Marks	Min. Marks
A.	i) Environmental Studies		75	33
	Fild Work		25	
	Foundation Course			
	i) Hindi Language - I		75	26
	ii) English Language - II		75	26
B.	Three Core Subject :			
	1. Hindi Literature	I	75	50
		II	75	
	2. Sanskrit Literature	I	75	50
		II	75	
	3. English Literature	I	75	50
		II	75	
	4. Philosophy	I	75	50
		II	75	
	5. Economics	I	75	50
		II	75	
	6. Political Science	I	75	50
		II	75	
	7. History	I	75	50
		II	75	
	8. Ancient Indian History	I	75	50
	Culture & Archaeology	II	75	
	9. Sociology	I	75	50
		II	75	
	10. Geography	I	50	33
		II	50	
		Practical	50	17
	11. Mathematics	I	50	
		II	50	50
		III	50	
	12. Statistics	I	50	33
		II	50	
		Practical	50	17

	<b>Subject</b>	<b>Paper</b>	<b>Max. Marks</b>	<b>Min. Marks</b>
13.	Anthropology	I	50	33
		II	50	
		Practical	50	17
14.	Linguistics	I	75	50
		II	75	
15.	Music	I	50	33
		II	50	
		Practical	50	17
16.	Home Science	I	50	33
		II	50	
		Practical	50	17
17.	Education	I	75	50
		II	75	
18.	Psychology	I	50	33
		II	50	
		Practical	50	17
19.	Management	I	75	50
		II	75	
20.	Defence Studies	I	50	
		II	50	33
		Practical	50	17
21.	Urdu	I	75	50
		II	75	
22.	Dance	I	50	33
		II	50	
		Practical	50	17

### **USE OF CALCULATORS**

The Students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986-

1. Student will bring their own Calculators.
2. Calculators will not be provided either by the university or examination centres.
3. Calculators with, memory and following variables be permitted +, -, x, , square, reciprocal, expotentials log, square root, trigonometric functions, wize, sine, cosine, tangent etc. factiorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.

## Part - I

### SYLLABUS FORENVIRONMENTAL STUDIES AND HUMAN RIGHTS

(Papercode-0828)

MM. 75

इन्वारमेंटल साईंसे के पाठ्यक्रम को स्नातक स्तर भाग-एक की कक्षाओं में विश्वविद्यालय अनुदान आयोग के निर्देशानुसार अनिवार्य रूप से शिक्षा सत्र 2003-2004 (परीक्षा 2004) से प्रभावशील किया गया है। स्वशासी महाविद्यालयों द्वारा भी अनिवार्य रूप से अंगीकृत किया जाएगा।

भाग 1, 2 एवं 3 में से किसी भी वर्ष में पर्यावरण प्रश्न-पत्र उत्तीर्ण करना अनिवार्य है। तभी उपाधि प्रदाय योग्य होगी।

पाठ्यक्रम 100 अंकों का होगा, जिसमें से 75 अंक सैद्धांतिक प्रश्नों पर होंगे एवं 25 अंकक्षेत्रीय कार्य (Field Work) पर्यावरण पर होंगे।

**सैद्धांतिक प्रश्नों पर अंक – 75** (सभी प्रश्न इकाई आधार पर रहेंगे जिसमें विकल्प रहेगा)

- |                      |   |        |
|----------------------|---|--------|
| (अ) लघु प्रश्नोंत्तर | – | 25 अंक |
| (ब) निबंधात्मक       | – | 50 अंक |

**Field Work**— 25 अंकों का मूल्यांकन आंतरिक मूल्यांकन पद्धति से कर विश्वविद्यालय को प्रेषित किया जावेगा। अभिलेखों की प्रायोगिक उत्तर पुस्तिकाओं के समान संबंधित महाविद्यालयों द्वारा सुरक्षित रखेंगे।

उपरोक्त पाठ्यक्रम से संबंधित परीक्षा का आयोजन वार्षिक परीक्षा के साथ किया जाएगा।

पर्यावरण विज्ञान विषय अनिवार्य विषय है, जिसमें अनुत्तीर्ण होने पर स्नातक स्तर भाग-एक के छात्र/छात्राओं को एक अन्य विषय के साथ पूरक की पात्रता होगी। पर्यावरण विज्ञान के

सैद्धांतिक एवं फील्ड वर्क के संयुक्त रूप से 33: (तीस प्रतिशत) अंक उत्तीर्ण होने के लिए अनिवार्य होंगे।

स्नातक स्तर भाग-एक के समस्त नियमित/भूतपूर्व/अमहाविद्यालयीन छात्र/छात्राओं को अपना फील्ड वर्क सैद्धांतिक परीक्षा की समाप्ति के पश्चात् 10 (दस) दिनों के भीतर संबंधित महाविद्यालय/परीक्षा केन्द्र में जमा करेंगे एवं महाविद्यालय के प्राचार्य/केन्द्र अधीक्षक, परीक्षकों की नियुक्ति के लिए अधिकृत रहेंगे तथा फील्ड वर्क जमा होने के सात दिनों के भीतर प्राप्त अंक विश्वविद्यालय को भेजेंगे।

## **UNIT-I THE MULTI DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES**

### **Definition, Scope and**

### **Importance Natural Resources:**

### **Renewable and Nonrenewable Resources**

- (a) Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people and relevant forest Act.
- (b) Water resources: Use and over-utilization of surface and ground water, floods drought, conflicts over water, dam's benefits and problems and relevant Act.
- (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.
- (d) food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.
- (e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.
- (f) Land resources: Land as a resource, land degradation, man induced landslides soil erosion and desertification.

**(12 Lecture)**

## **UNIT-II ECOSYSTEM**

### **(a) Concept, Structure and Function of an ecosystem**

- Producers, consumers and decomposers.
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids.
- Introduction, Types, Characteristics Features, Structure and Function of Forest, Grass, Desert and Aquatic Ecosystem.

### **(b) Biodiversity and its Conservation**

- Introduction - Definition: genetic, species and ecosystem diversity
- Bio-geographical classification of India.
- Value of biodiversity: Consumptive use, productive use, social ethics, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as mega-diversity nation.
- Hot spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wild life conflict.
- Endangered and endemic species of India.
- Conservation of biodiversity: In situ and Ex-situ conservation of biodiversity.

### UNIT- III

**(a) Causes, effect and control measures of**

- Air water, soil, marine, noise, nuclear pollution and Human population.
- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Disaster Management: floods, earthquake, cyclone and landslides.

(12Lecture)

**(b) Environmental Management**

- From Unsustainable to sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people, its problems and concerns.
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
- Wasteland reclamation
- Environment protection Act: Issues involved in enforcement of environmental legislation.
- Role of Information Technology in Environment and Human Health.

## UNIT- IV

General background and historical perspective- Historical development and concept of Human Rights, Meaning and definition of Human Rights, Kind and Classification of Human Rights.

Protection of Human Rights under the UNO Charter, protection of Human Rights under the Universal Declaration of Human Rights, 1948.

Convention on the Elimination of all forms of Discrimination against women.

Convention on the Rights of the Child, 1989.

## UNIT-V

Impact of Human Rights norms in India, Human Rights under the Constitution of India, Fundamental Rights under the Constitution of India, Directive Principles of State policy under the Constitution of India, Enforcement of Human Rights in India.

Protection of Human Rights under the Human Rights Act, 1993- National Human Rights Commission, State Human Rights Commission and Human Rights court in India. Fundamental Duties under the Constitution of India.

## Reference/ Books Recommended

1. SK Kapoor- Human rights under International Law and Indian Law.
2. HO Agrawal- International Law and Human Rights
3. एस.के. कपूर –मानव अधिकार
4. जे.एन. पान्डेय – भारत का संविधान
5. एम.डी. चतुर्वेदी – भारत का संविधान
6. J.N.Pandey - Constitutional Law of India
7. Agarwal K.C. 2001 Environmental Biology, Nidi pub. Ltd. Bikaner
8. Bharucha Erach, the Biodiversity of India, Mapin pub. Ltd. Ahmedabad 380013, India, Email:mapin@icenet.net(R)
9. Bruinner R.C. 1989, Hazardous Waste Incineration. McGraw Hill Inc. 480p
10. Clark R.S. Marine pollution, Clanderson press Oxford (TB)
11. Cuningham, W.P. Cooper. T.H. Gorhani, E & Hepworth. M.T, 200
12. Dr. A.K.- Environmental Chemistry. Wiley Eastern Ltd.
13. Down to Earth, Center for Science and Environment (R)
14. Gloick, H.P. 1993 Water in crisis. Pacific Institute for Studies in Development, Environment & Security. Stockholm Eng. Institute. Oxford University, Press. m473p.
15. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Mumbai (R)
16. Heywood, V.H. & Watson, T.T. 1995 Global Biodiversity Assessment, Cambridge Univ. Press 1140p
17. Jadhav H. & Bhosale, V.H. 1995 Environmental Protection and Law. Himalaya pub. House, Delhi 284p
18. McKinney M.L. & School R.M. 1996, Environmental Science systems & solutions, web enhanced edition, 639p
19. Mhadkar A.K. Matter Hazardous, Techno-Science publication (TB)
20. Miller T.G. Jr. Environment Science, Wadsworth publication co. (TB)
21. Odum E.P. 1971, Fundamentals of Ecology, W.B. Saunders Co. USA, 574p
22. Rao M.N. & Datta, A.K. 1987, Waste water treatment. Oxford & IBH pub. co. Pvt. Ltd 345p
23. Sharma B.K. 2001, Environmental chemistry, Goel pub. House, Meerut
24. Survey of the Environment, The Hindu (M)
25. Townsend C. Harper J. And Michael Begon, Essentials of Ecology, Blackwell Science (TB)
26. Trivedi R.K. Handbook of Environment Laws, Rules, Guidelines, Compliances and Standards, Vol I and II, Environment Media (R)
27. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science publication (TB)
28. Wanger K.D. 1998, Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p



**आधार पाठ्यक्रम**  
**प्रश्न पत्र – प्रथम**  
**हिन्दी भाषा (पेपर कोड – 0101)**

पूर्णांक – 75

नोट:

1. प्रश्न पत्र 75 अंक के होगा ।
2. प्रश्न पत्र अनिवार्य होगा ।
3. इसके अंक श्रेणी निर्धारण के लिये जोड़े जावेंगे
4. प्रत्येक इकाई के अंक समान होंगे ।

**पाठ्य विषय—**

- इकाई –1** पल्लवन, पत्राचार तथा अनुवाद एवं परिभाषा शब्दावली ।
- इकाई –2** मुहावरे—लोकोक्तियां, शब्दशुद्ध, वाक्य शुद्धि, शब्द ज्ञान—पर्यायवाची, विलोम, अनेकार्थी, समश्रुत (समानोचित) अनेक शब्दों के लिए एक शब्द ।
- इकाई –3** देवनागरी लिपि की विशेषता, देवनागरी लिपि एवं वर्तनी का मानक रूप ।
- इकाई –4** कम्प्यूटर में हिन्दी का अनुप्रयोग, हिन्दी में पदनाम ।
- इकाई –5** हिन्दी अपठित, संक्षेपण, हिन्दी में संक्षिप्तीकरण ।

**पाठ्यक्रम के लिये पुस्तकें—**

- |                                      |   |                                    |
|--------------------------------------|---|------------------------------------|
| 1. भारतीयता के स्वर साधन धनंजय वर्मा | — | म.प्र. ग्रंथ अकादमी ।              |
| 2. नगरी लिपि और हिन्दी               | — | अनंत चौधरी—ग्रंथ अकादमी पटना ।     |
| 3. कम्प्यूटर और हिन्दी               | — | हरिमोहन — तक्षशीला प्रकाशन, दिल्ली |



## FOUNDATION COURSE

### PAPER - II

#### ENGLISH LANGUAGE (Paper Code-0102)

M.M. 75

**UNIT-1** Basic Language skills : Grammar and Usage.

Grammar and Vocabulary based on the prescribed text. To be assessed by objective / multiple choice tests.

(Grammar - 20 Marks  
Vocabulary - 15 Marks)

**UNIT-2** Comprehension of an unseen passage.

05

This should simply not only (a) an understanding of the passage in question, but also

(b) a grasp of general language skills and issues with reference to words and usage

within the passage and (c) the Power of short independent composition based on themes and issues raised in the passage.

To be assessed by both objective multiple choice and short answer type tests.

**UNIT-3** Composition : Paragraph writing

10

**UNIT-4** Letter writing (The formal and one Informal)

10

Two letters to be attempted of 5 marks each. One formal and one informal.

**UNIT-5** Texts :

15

Short prose pieces (Fiction and not fiction) short poems, the pieces should cover a range of authors, subjects and contexts. With poetry if may sometimes be advisable to include pieces from earlier periods, which are often simpler than modern examples. In all cases, the language should be accessible (with a minimum of explanation and reference to standard dictionaries) to the general body of students schooled in the medium of an Indian language.

Students should be able to grasp the contents of each place; explain specific words, phrases and allusions; and comment on general points of narrative or argument. Formal Principles of Literary criticism should not be taken up at this stage.

To be assessed by five short answers of three marks each.

### BOOKS PRESCRIBED -

English Language and Indian Culture - Published by M.P. Hindi Grant Academy Bhopal.

Dr. M. Chakraborty

Dr. S. Gupta

DR. MERILY ROY

**हिन्दीसाहित्य**  
**प्रथम-प्रश्न पत्र**  
**(प्राचीन हिन्दी काव्य)**  
**(पेपर कोड- 0103)**

**अंक 75**

**उद्देश्य एवं प्रस्तावना—**

प्राचीन से तात्पर्य है — आधुनिक काल से पूर्व का काल। सही अर्थ में हिन्दी भाषा और साहित्य का विकास आदिकाल से शुरू होता है। इसमें धार्मिक तथा ऐतिहासिक दो प्रकार का साहित्य मिलता है, जो प्रबंध, मुक्तक, रासा, फागु, चरित, सुभाषित आदि विविध। किंवदन्तियों में अभिव्यंजित है। मध्यकालीन साहित्य की पृष्ठभूमि के रूप में इसे प्रतिष्ठापित किया जाता है।

मध्यकालीन काव्य ते भक्तिकाव्य, जहां लोक जागरण को स्वर देने वाला है, वहीं रीतिकाल अपने लौकिक श्रृंगारिका, परिदृश्य में तत्कालिन सामाजिक, सांस्कृतिक, राजनीतिक स्थितियों को बेलौस अभिव्यंजित कराता है। अतः भाषा, संस्कृति, विचार, मानवता, काव्यत्व, काव्यरूपता, लौकिकता-परालौकिकता, आदि दृष्टियों से इसका अध्ययन अत्यावश्यक है।

**पाठ्य विषय—**

1. कबीर (कबीर-कांतिकुमार जैन प्रारंभिक 50 साखियां)
2. जायसी-संक्षिप्त पद्मावत-श्यामसुंदर दास नागमती वियोग वर्णन।
3. सूर (भ्रमर गीत सार — सं. आचार्य रामचन्द्र शुक्ल ) प्रारंभिक 25 पद।
4. तुलसी — 'रामचरित मानस' के अयोध्याकाण्ड से प्रारंभिक 25 दोहे चौपाई, छंद सहित।
5. घनानन्द ( घनानन्द- संत्र विश्वनाथ प्रसाद मिश्र ) प्रारंभिक 25 छंद द्रुत पाठ हेतु निम्नांकित तीन कवियों का अध्ययन किया जावेगा — जिसमें से किन्हीं दो पर लघूत्तरीय प्रश्न पुछे जायेंगे

- 
1. विद्यापति
  2. रहीम
  3. रसखान

**अंक विभाजन —**

- |                      |            |
|----------------------|------------|
| 1. 3 व्याख्याएं      | 30 प्रतिशत |
| 2. आलोचनात्मक प्रश्न | 30 प्रतिशत |
| 3. लघूत्तरीय प्रश्न  | 20 प्रतिशत |
| 4. वस्तुनिष्ठ प्रश्न | 20 प्रतिशत |

**हिन्दी साहित्य**  
**द्वितीय-प्रश्न पत्र**  
**(हिन्दी कथा साहित्य)**  
**(पेपर कोड- 0103)**

**अंक 75**

**उद्देश्य एवं प्रस्तावना—**

गद्य की प्रमुख विधाओं का इतना द्रुत विकास इनकी लोकप्रियता का प्रमाण प्रस्तुत करता है। इसमें आधुनिक जीवन, अपनर विविध कवियों के साथ यथार्थ रूप में अभिव्यंजित हुआ है। जीवन की अनुभूतियां, संवेदनाओं तथा विविध परिस्थितियों के सक्षात्कार के लिए इनका अध्ययन सर्वथा अपेक्षित है।

**पाठ्य विषय —**

व्याख्या एवं आलोचनात्मक प्रश्नों के लिए एक आठ कहानीकारों की एक-एक प्रतिनिधि कहानी का अध्ययन आवश्यक है।

उपन्यास	1.	गबन	—	प्रेमचंद
कहानी	1.	प्रेमचंद	—	कफन
	2.	जयशंकर प्रसाद	—	आकाश दीप
	3.	फणीश्वरनाथ रेणु	—	ठेस
	4.	मेहन राकेश	—	मलवे का मालिक
	5.	भीष्म साहनी	—	चीफ की दावत
	6.	राजेन्द्र यादव	—	बिरादरी बाहर
	7.	रागेय राघव	—	गदल

द्रुत पाठ के लिए निम्नांकित तीन कथाकारों का अध्ययन अपेक्षित है, जिनमें से किन्हीं दो पर लघुत्तरीय प्रश्न पूछे जावेंगे—

1. उपेन्द्रनाथ अशक, 2. बाल शौरि रेड्डी 3. शिवनी

अंक विभाजन —	3/ व्याख्याएं	30 प्रतिशत
	2/ आलोचात्मक प्रश्न	30 प्रतिशत
	5/ लघुत्तरीय प्रश्न	20 प्रतिशत
	20/ वस्तुनिष्ठ प्रश्न	20 प्रतिशत

## **B.A. Part-I**

### **ENGLISH LITERATURE**

There will be two literatures in English-1550-1750 Papers, each carrying

**Maximum marks-75.**

Nine questions are to be attempted in each paper. Each question carries the marks according to the scheme mentioned in each paper.

### **ENGLISH LITERATURE**

#### **PAPER - I**

#### **LITERATURE IN ENGLISH - 1550-1750 (Paper Code-0105)**

**M.M.75**

(i) Unit-1 of annotation is compulsory, and passages to be set from Units (II to V), at least one from each unit, 3 to be attempted.

3x5 = 15

(ii) Multiple choice/objective type questions to be set unit vii, 15 to be set 10 be attempted.

1x1 = 10

(iii) From Unit-II to VI-8 questions to be set at least one from each unit-5 to be attempted.

10x5 = 50

Word Limit for each answer 300 to 400 words.

#### **UNIT-1 ANNOTATIONS.**

#### **UNIT-2 POETRY**

- a) Shakespeare-Sonnet No. 1 From Fairest Creatures, Sonnet No. 154., The little Love God.
- b) Milton-How Soon Hath Time the Subtle Thief of Youth...
- c) John Donne - Sweetest Love I Don't go, This is my play's Last Scene.

#### **UNIT-3 POETRY**

- a) John Dryden - Portrait of Shadwell.
- b) Alexander-Pope-From An Essay on Criticism (True case in writing....) and the world's Victor stood subdued by sound.

#### **UNIT-4 PROSE**

- a) Bacon Of Studies, Of Health, Of Friendship
- b) Addison-Sir Roger at Home
- c) Steele Of the Club.

#### **UNIT-5 DRAMA**

Shakespeare - The Merchant of Venice

#### **UNIT-6 Fiction - Swift - The Battle of the Books.**

#### **UNIT-7 Historical and Literary Topics**

- i. The Renaissance.
- ii. Humanism.
- iii. Reformation.
- iv. The Restoration.
- v. The Earlier Drama
- vi. Petrarchism and the Sonnet Cycle.
- vii. The Influence of Seneca and Classical Dramatic Theory
- viii. The Elizabethan and Jacobean stage.
- ix. Restoration Drama
- x. The Rise of Periodical Essay

**BOOKS RECOMMENDED for Unit VII in Papers I and II**

Edward Albert	-	A History of English Literature.
Ifor Evans	-	A short History of English Literature.
Hudson	-	An Outline History of English Literature.

Both the papers of B.A.Part-I are included in the anthologies prescribed in the previous syllabus for B.A.Part-I and B.A.Part-II

Dr. M. C. Chakraborty

Dr. S. Gupta

DR. MERILY ROY

**ENGLISH LITERATURE  
PAPER - II**

**LITERATURE IN ENGLISH FROM 1750-1900 (Paper Code-0106)**

**Note-**

- i. Unit-1. of annotation is compulsory, 6 passages be set from Units (II to IV) at least one from each unit, 3 to be attempted.  
3x5 = 15
- ii. Multiple Choice/objective type questions to be set from unit-VII, 25 to be set 10 to be attempted.  
1x10 = 10
- iii. From Units I to VI-8 questions to be set at least one from each Unit-5 to be attempted.  
10x5 = 50

Word Limit for each answer 300 to 400 words.

**UNIT-1 ANNOTATIONS**

**UNIT-2 POETRY -**

- a) Blake-Tiger, Tiger Burning Bright.
- b) Wordsworth - Daffodils and Solitary Reaper.
- c) Coleridge-Frost at Midnight.

**UNIT-3 POETRY-**

- a) Shelley - Ode to a Skylark.
- b) Keats - Ode to Autumn.
- c) Tennyson - Crossing the Bar.
- d) Browning - Prospice.

**UNIT-4 PROSE**

- a) Lamb - Dream Children : A Reverie
- b) Hazlitt - On Actors and Acting

**UNIT-5 Fiction Jane Austen - Pride and Prejudice.**

**UNIT-6 Fiction Charles Dickens - David Copperfield**

**UNIT-7 Historical and Literary Topics.**

- i. The Reform Acts.
- ii. The Impact of Industrialization.
- iii. Colonialism And Imperialism.
- iv. Scientific thoughts and discoveries.
- v. Faith and Doubt.
- vi. Classical and Romantic Concepts of Imagination.
- vii. Varieties of Romantic and Victorian Poetry.
- viii. The Victorian Novel.
- ix. Realism and the Novel.
- x. Aestheticism.

*Dr. M. C. Chakraborty*

*Dr. S. Gupta*

*DR. MERILY ROY*

## PSYCHOLOGY

Pape	Name of the		Max. Marks	Dur
I	Basic	Processe	50	3hrs.
II	Psychopathology		50	3hrs.
III	Practical		50	4

### PAPER - I

#### BASIC PSYCHOLOGICAL PROCESSES (Paper Code-0119)

M.M.50

This Paper consists of 5 units.

From each unit a minimum of two questions would be set and candidates would be required to attempt one from each unit.

**UNIT-1** Introduction - Definition and goals of psychology; behaviouristic, cognitive and humanistic; cross-cultural perspective; Methods: Experimental, observation, interview, questionnaire and case study.

**UNIT-2** Biological bases of Behaviours : Genes and Behaviour, the nervous System : C.N.S., A.N.S. and peripheral Nervous system; Glands and Hormones, Emotions: Expression and control.

**UNIT-3** Sensory Perceptual Processes - Nature and types of sensation and Perception; Attentional Processes: Definition, types and determinants; Principles of Perceptual organisation; Thinking process : Nature and types.

**UNIT-4** Learning and Memory: Classical and Operant conditioning – Basic Processes; verbal and observation all learning; memory: Sensory, S-T.M., L.T.M. Forgetting : Process and theories.

**UNIT-5** Cognitive and non cognitive processes : Intelligence : Nature and types; motivation: Biogenic and Sociogenic motives; Personality: nature and determinants, Approaches to study personality : trait and types, Assessment of Personality.

#### BASIC BOOKS:

1. सामान्य मनोविज्ञान – अरुण कुमार सिंह, बनारसीदास प्रकाशन
2. प्रीति वर्मा – आधुनिक सामान्य मनोविज्ञान
3. Balon R.A., Barne D.A - Understanding behaviour Tokyo Halt Sounders
4. Zimbardo PG. & - Psychology New York Haper Collings college publishers Walser AL 1997
5. Lefton, L.A. 1985 - Psychology Bosten-Allyn & Baron

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**PAPER II**  
**PSYCHOPATHOLOGY(PAPERCODE-0120)**

**M.M.50**

**This paper consists of 5 units.**

From each unit a minimum of two questions would be set and candidates would be required to attempt one from each unit.

- UNIT-1** Introduction: the concept of normality and abnormality; models of psychopathology: Psychodynamic, behavioral and cognitive.
- UNIT-2** Assessment of psychopathology :- diagnostic tests, rating scales, clinical interview, projective tests.
- UNIT-3** Anxiety disorders :panic disorder, phobias, obsessive compulsive disorder, anxiety disorder, dissociative disorder.
- UNIT-4** Mood and personality disorders - manic - depressive episode, paranoid, schizoid, dependent personality, dysthymia, obesity.
- UNIT-5** Management of psychopathology :stress management; medico and psychosocial therapy : shock therapy, psychoanalysis, group therapy and behaviour therapy.

**Books -**

1. Lamm,A.(1997) - Lamm, A (1997) Introduction To Psychopathology, Sage,N.Y.
2. Buss, A.H.(1999) - Psychopathology N. Y. John Wiley
4. लाभ सिंह तथा तिवारी - असामान्य मनोविज्ञान - आगरा विनोद पुस्तक भण्डार
5. कपिल एच के. - असामान्य मनोविज्ञान - हरप्रसाद भार्गव, आगरा।

**PAPER - III**  
**PRACTICALS**

**M.M.50**

**Note: This paper consists of two parts:**

- (a) Comprises of laboratory Experiments.
- (b) Comprises of Psychological testing and understanding of self and others.

(a) Experiments - (any five of the following):-

- I. Effect of set on perception
- II. Effect of frustration on performance.
- III. Division of Attention.
- IV. Learning curve/Serial position curve.
- V. Retroactive inhibition.
- VI. S.T.M.
- VII. Concept formation.
- VIII. Judgement of emotions through facial expressions.

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(b) Psychological testing and understanding of self and others (any four of the following tests and maintenance of anecdotal records)

- (i) Verbal/ nonverbal intelligence test/ performance tests.
- (ii) E.P.I.
- (iii) Anxiety test.
- (iv) Depression Scale
- (v) Adjustment inventory.
- (vi) Achievement motivation.
- (vi) Stress tolerance test.

Anecdotal record :Each Student will be required to observe behaviour of pupil in different setting and select an anecdote to understand, judge and narrate it as objectively as possible, so as to reveal his/ her psychological insight in that anecdotal behaviour. This record constitutes a part of psychological assessment of the students. Introduction to measures of central tendency data in ungrouped Graphical presentation of data.

### **DISTRIBUTION OF MARKS**

- A Conduction of psychological experiment and reporting - 15marks
- B Administration of one psychological test and reporting - 15marks
- C Evaluation of Practical notebook and Anecdotal record - 10marks
- D Viva - Voce - 10marks

**Note:** No candidate will be allowed to appear in the practical examination unless his/her day to day practical work and the report are found satisfactory.

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**इतिहास**  
**प्रथम पत्र – प्रथम**  
**(भारत का इतिहास प्रारंभ से 1206 ई. तक)**

**HISTORY OF INDIA FROM THE BEGINNING TO 1206 A.D.**

**उद्देश्य**—इस पाठ्यक्रम का उद्देश्य को प्राचीन भारत के इतिहास के प्रमुख राजनीतिक, सामाजिक, आर्थिक एवं सांस्कृतिक पक्षों से परिचित कराना है जो कि यू.जी.सी. मानदंडों के अनुरूप है।

**इकाई-1**

1. भारतीय इतिहासों के स्रोतों का सर्वेक्षण।
2. भारत की भौगोलिक विशेषताएं
3. प्रागैतिहासिक – पुरुष पाषाण से नवपाषाण युग तक सभ्यता एवं संस्कृति
4. हड़प्पा सभ्यता— निर्माता, प्रसार, नगर योजना, राजनीतिक, सामाजिक, आर्थिक संरचना

**इकाई-2**

1. ऋग्वैदिक काल – राजनीतिक, आर्थिक, धार्मिक।
2. उत्तर वैदिक काल –राजनीतिक, सामाजिक, आर्थिक, धार्मिक।
3. महाकाव्य काल –सभ्यता एवं संस्कृति।
4. ईसा पूर्व छठवीं शताब्दी का भारत तथा बौद्ध एवं जैन धर्म

**इकाई-3**

1. मगध साम्राज्य का उदय।
2. सिकन्दर का आक्रमण और उसका प्रभाव।
3. मौर्य साम्राज्य की स्थापना – चन्द्रगुप्त मौर्य एवं अशोक के धम्म।
4. मौर्यकालिन प्रशासन अर्थव्यवस्था एवं कला तथा संस्कृति।

**इकाई-4**

1. मौर्योत्तरकाल— शुंग, मुषाण एवं सातवाहन।
2. संगमयुग— साहित्य, संस्कृति।
3. चौल एवं पाण्ड्य।
4. गुप्त साम्राज्य— प्रशासन, आर्थिक, सामाजिक दशा

**इकाई-5**

1. पल्लव, चालुक्य, वर्धन, वाकाटक, गुर्जर—प्रतिहार, पाल, सेन, राष्ट्रकूट।
2. भारत का दक्षिण पूर्व श्रीलंका से सम्बन्ध।
3. मोहम्मद बिन कासिम, गजनवी एवं गोरी का आक्रमण।
4. नारी की स्थिति – विवाह, सती प्रथा, परदा प्रथा, देवदासी प्रथा, जाति व्यवस्था, दास प्रथा

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**संदर्भ ग्रंथ –**

- |                                    |  |
|------------------------------------|--|
| 1. रतिभानु सिंह नाहर               | — प्राचीन भारतीय इतिहास एवं संस्कृति               |
| 2. शांता शुक्ला                    | — भारत का राजनीतिक इतिहास (राजपूत कालीन भारत)      |
| 3. द्विजेन्द्र नारायण एवं श्रीमाली | — प्राचीन भारत                                     |
| 4. ओम प्रकाश                       | — प्राचीन भारत                                     |
| 5. बी.एन.लुनिया                    | — प्राचीन भारतीय संस्कृति                          |
| 6. एस.आर.शर्मा                     | — प्राचीन भारत प्रगैतिहासिक युग से 1200ई. तक       |
| 7. K.L Khurana                     | — Ancient India from Earliest Time to 1206 A.D.    |
| 8. K.L Khurana                     | — History of India Form Earliest Time to 1526 A.D. |
| 9. Vincent Smith                   | — Oxford History of India.                         |
| 10. भार्गव                         | — प्राचीन भारत                                     |
| 11. L. Prasad                      | — Ancient India- India's Volley                    |
| Civilization to1200 A.D.           |  |

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**इतिहास**  
**प्रश्न पत्र – द्वितीय**  
**विश्व का इतिहास (1453 सं 1789 ई. तक)**  
**(पेपर कोड-0110)**

**इकाई- 1**

1. सामान्तवाद का पतन एवं आधुनिक युग का प्रारंभ
2. पुनर्जागरण
3. धर्म सुधार आन्दोलन
4. प्रति धर्म सुधार आन्दोलन

**इकाई- 2**

1. तीस वर्षीय कारण, परिणाम तथा प्रभाव
2. राष्ट्रीय राज्यों का उदय, स्पेन फ्रांस
3. राष्ट्रीय राज्यों का उदय, इंग्लैण्ड, रूस
4. पोलैण्ड का विभाजन

**इकाई- 3**

1. आधुनिक पाश्चात्य जगत के आर्थिक आधार
2. वाणिज्यवाद एवं व्यापारिक क्रान्ति
3. औद्योगिक क्रान्ति
4. उपनिवेशवाद का प्रारंभ

**इकाई- 4**

1. इंग्लैण्ड में गृह युद्ध : घटनाएं
2. इंग्लैण्ड में गृह युद्ध : कारण एवं परिणाम
3. गौरव पूर्ण क्रान्ति (1688)
4. केमलीन का शासन

**इकाई- 5**

1. लुई चतुर्दश : गृह नीति
2. लुई चतुर्दश : विदेश नीति
3. अमेरीका का स्वतंत्रता संग्राम
4. फ्रांस की क्रांति के कारण एवं नेशनल असेम्बली

**संदर्भ ग्रंथ –**

- |                       |                                 |
|-----------------------|---------------------------------|
| 1. बी. एन. मेहता      | — अर्वाचीन यूरोनढ़              |
| 2. बी. आई. पाल        | — आधुनिक यूरोप                  |
| 3- K.L Khurana        | - History of Modern World.      |
| 4- Khurana and Sharma | - Modern Europe 1453- 1789 A.D. |

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**ECONOMICS**  
**PAPER - I**  
**MICRO ECONOMICS**  
**(Paper Code-0111)**

**UNIT-1** Introduction - Definitions Nature and scope of Economics, Methodology in Economics.

Utility - Cardinal and Ordinal approaches, Indifference curve, Consumer's equilibrium (Hicks and Slutsky), Giffen goods, Compensated demand, Demand - Law of Demand,

Elasticity of demand - Price, income and cross, elasticity Consumer's surplus, Engel curve.

**UNIT-2** Theory of production and cost - Production decision, Production function, Iso-quant, Factor substitution, Law of variable proportions, Returns to scale, Economies of scale, Different concepts of cost and their interrelation, Equilibrium of the firm, expansion path.

**UNIT-3** Market structure-perfect and imperfect markets, Equilibrium of a firm-Perfect competition, Monopoly and price discrimination, Measure of monopoly power, Monopolistic competition, Duopoly, Oligopoly, Taxation and equilibrium of a firm, Notion of controlled and administered prices.

**UNIT-4** Factor pricing-Marginal productivity theory of distribution, Theories of wage determination, wages and collective bargaining, wage differentials, Rent - Scarcity Rent, differential rent, Quasi rent, Modern Rent Theory, Interest Classical and Keynesian Theories, Modern Theory, Profits - Innovation, Risk bearing and Uncertainty theories.

**UNIT-5** Welfare economics - Problems in measuring welfare, Classical welfare economics, Pareto's criteria, value judgement, Concept of a social welfare function, Compensation principle - Kaldor, Hicks.

**BASIC READING LIST -**

1. Bach, G. L. (1977) Economics, Prentice Hall of India, New Delhi.
2. Gauld, J.P. and Edward P. L. (1996), Microeconomic Theory, Richard Irwin, Homewood.
3. Henderson J. and R. E. Quandt (1980), Microeconomic Theory : A Mathematical Approach, McGraw Hill, New Delhi.
4. Heathfield and Wibe (1987), An Introduction to Cost and Production Functions, Macmillan. London.
5. Koutsoyiannis, A. (1990), Modern Microeconomics, Macmillan.
6. Lipsey, R. G. and K. A. Chrystal (1999) Principles of Economics (9th Edition), Oxford University Press, Oxford.

**PAPER - II**  
**INDIAN ECONOMY**  
**(Paper Code-0112)**

**UNIT-1** Towards a Market Economy - Changes in the land system. Commercialization of agriculture, Policy of discriminating protection and Industrial development, Monetary and currency developments, Central and Commercial Banking developments.

Indian Economy at the Time of Independence, Backward economy, Stagnant economy, Other salient features, planning exercises in India - National Planning Committee, Bombay Plan, People's Plan. Gandhian Plan, The Planning Commission.

**UNIT-2** Structure of Indian Economy - Basic features, Natural resources - Land, water and forest resources, Broad demographic features - Population size and growth rates, Sex composition, Rural - urban migration, Occupational distribution, Problem of over population, Population policy, Infra - structure development, National income.

**UNIT-3** Planning in India - Objectives, Strategy; Broad achievements and failures, Current Five Year Plan - Objectives, Allocation and targets, New Economic Reforms - Liberalization, Privatization and globalization. Agriculture - Nature and importance, Trends in agricultural production and productivity, Factors determining productivity, Land reforms, New agricultural strategies and green revolution, Rural credit, Agricultural marketing.

**UNIT-4** Industry - Industrial development during the planning period, Industrial policy of 1948, 1956, 1977 and 1991. Industrial licencing policy - MRTP Act, FERA and FEMA, Growth and problems of small scale industries, Role of public sector enterprises in India's industrialization.

**UNIT-5** External Sector - Role of foreign trade, trends in exports and imports, Composition and direction of India's foreign trade, Balance of payments crisis and the new economic reforms - Export promotion measures and the new trade policies. Important areas of concern - Poverty, inequality and unemployment, Rising Prices.

**BASIC READING LIST -**

1. Datt, R. and K. P. M. Sudharam (2001) Indian Economy S. Chand & Company Ltd. New Delhi.
2. Dhingra, I. C. (2001), The Indian Economy Environment and Policy, Sultan Chand & Sons. New Delhi.
3. Dutt, R. C. (1950) The Economic History of India Under Early British Rule. Low Price Publications. Delhi.
4. Kumar, D. (Ed.) (1982), The Cambridge Economic History of India, Volume II. 1957-1970. Orient Longman Ltd. Hyderabad.
5. Misra, S. K. and v. K. Puri (2001), Indian Economy - Its Development Experience, Himalaya Publication House, Mumbai.

The image shows several handwritten signatures and stamps at the bottom of the page. On the left, there is a signature that appears to be 'D. C. Dutt' with a date '10.11.2011' written below it. Next to it is a circular stamp with the text 'C.K. Bhattacharya' inside. To the right of this is another signature, possibly 'S. K. Misra', followed by a date '10.11.2011'. On the far right, there is a signature that looks like 'D. C. Dutt'.

## **GEOGRAPHY**

1. The B.A. Part-I Examination in geography will be of 150 marks. There will be two theory papers and one Practical each of 50 marks as follows :  
Paper – I Physical Geography-I (Elements of Geomorphology)  
Paper -II Introduction to Geography and Human Geography.  
Paper - III Practical Geography
2. Each theory paper shall be of three hours duration.
3. Candidates will be required to pass separately in theory and practical examinations.
4. Each theory paper is divided into five units.
5. (a) In the practical examination the following shall be the allotment of time and marks:
  - i) Lab. Work - 25 marks up to three hours.
  - ii) Field work (survey) - 15 marks two hours.
  - iii) Practical record and viva voce - 10 marks(b) The external and internal examiners shall jointly submit marks.  
(c) The candidates shall present at the time of the practical examination their practical record regularly, signed by the teachers concerned.

### **PHYSICAL GEOGRAPHY - I**

#### **PAPER - I**

#### **ELEMENTS OF GEOMORPHOLOGY**

**M.M. : 50**

**(Paper Code-0117)**

- UNIT-1** The nature and scope of Physical Geography; Inter relation of Physical Geography with other branches of earth science. The place of Geomorphology in Physical Geography, Geological Time scale.
- UNIT-2** Earth's interior, Wegner's theory of Continental Drift, Plate Tectonics. Earth movements:- orogenic and epeirogenic. Isostasy, Earthquakes and Volcanoes.
- UNIT-3** Rocks - Origin and composition of rocks, weathering, formation of regolith and soils, rocks and relief. Geomorphic agents and processes-erosion, transportation and deposition, mass wasting.
- UNIT-4** Evolution of Land scape, concept of cycle of erosion, interruption of cycle of erosion. Fluvial, Arid, Glacial, Karst and Coastal Landscapes.
- UNIT-5** Application of Geomorphology to Hydrology, Mining, Engineering works, Hazard management and urbanisation.



## PAPER - II

**INTRODUCTION TO GEOGRAPHY AND HUMAN GEOGRAPHY** M.M. : 50

**(Paper Code-0118)**

- UNIT-1** The Nature of Geography, objectives and relevance, Place of Geography in the classification of Sciences, Geography and other disciplines.

- UNIT-2** Geography as the study of environment, man - environment relationship; ecology and ecosystems. Environmental determinism possibilism Neo - determinism; Dualism in Geography - Systematic / Regional, Physical/Human, Complementarity.

- UNIT-3** Deliniton and scope of Human Geography.  
Human Races - Their characteristics and distribution.  
Human adaptation - To the environment; Eskimos, Bushman, Pigmy, Gond, Masai, and Naga.

- UNIT-4** Growth of Population; Distribution of Population, world distribution pattern  
- physical, economic and social factors influencing spatial distribution,  
concept of overpopulation under population and optimum population.  
Migration - internal and international Settlements - Types and patterns of  
settlements.

- UNIT-5** A brief historical overview of Geography as a discipline, recent trends in geography with special reference to India, imperatives for the future, career opportunities for geographers.

### PAPER - III

## PRACTICAL

## GEOGRAPHY

**M.M. : 50**

**SECTION A- CARTOGRAPHY AND STATISTICAL METHODS M.M. 25**

1. Scale - Plain, Time, Diagonal and Comparative.
2. Methods of showing relief - hachures, contours; Representation of different land forms by contours, Drawing of profiles - serial, superimposed, projected and composit.

3. Line graph & Bar graph (Simple & Compound)
4. Circle Diagram, Pie diagram, wind rose.
5. Population pyramid.
6. Mean, Median and Mode.

## SECTION B - SURVEYING -

**M.M. 15**

- ## 7. Chain and tape Survey.

## PRACTICAL RECORD AND VIVA VOCE

**M.M. 10**

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**SOCIOLOGY**  
**PAPER - I**  
**INTRODUCTION TO SOCIOLOGY**  
**(Paper Code-0115)**

**M.M. : 75**

- UNIT-1** The Meaning of Sociology - The Sociological perspective - Sociology and social sciences - The Scientific and humanistic Orientations of Sociological Study. Basic concepts - Society, Community, institution, association, group social structure, status and role.
- UNIT-2** Institution, Family and Kinship, religion, Education, Politics. The Individual and society - Society. Culture and socialisation - Relation between individual and society - Social control, norms, values.
- UNIT-3** Social Stratification and mobility Meaning forms and theories.
- UNIT-4** Social Change Meaning and type evolution and progress factors of social change.
- UNIT-5** Introduction to applied Sociology and Social Policy and action - Sociology and development, Sociology and professions.

**ESSENTIAL READINGS :-**

1. Bottomore T. B., Sociology - A guide to Problems and Literature, Bombay. George Allen and Unwin (India) 1972.
2. Inkeles, Alex, What is sociology ? New Delhi, Prentice Hall of India 1987.
3. Jayram, N., Introductory Sociology, Madras Macmillan India 1988.
4. Johnson Harry M., Sociology of systematic Introduction New Delhi Allied Publishers 1995.

**PAPER - II**  
**FOUNDATIONS OF SOCIOLOGICAL THOUGHT**  
**(Paper Code-0116)**

**M.M. : 75**

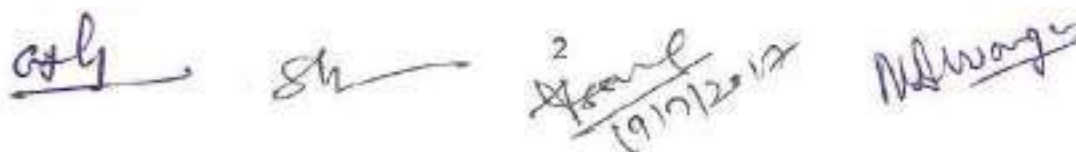
- UNIT-1** The Pioneers : emergence of Sociology.  
Comte : Positivism - Spencer - Social Darwinism, Superorganic evolution
- UNIT-2** The Classical tradition Durkheim - Social Solidarity and Suicide. Weber authority and the protestant Ethic and the spirit of capitalism.
- UNIT-3** Marx : Materialist Conception of history and class struggle.
- UNIT-4** Pareto : Circulation of elites and logical and nonlogical action.
- UNIT-5** Development of Sociological thought in India :-

Mahatma Gandhi Ahinsa, Satya Grah, Radha Kamal Mukerjee - The Concept Of Value.

**ESSENTIAL READINGS -**

- Barres H.E. : Introduction to the history of sociology Chicago the university of Chicago press 1959.
- Coser Lewis A : Master of sociological thought New York Harcourt Brace Jovanovich 1979.
- Singh, Yogendra - Indian sociology - social conditioning and emerging trends. New Delhi Vistaar 1986.
- Zeitlin, Irving - (Indian edition) Rethinking sociology : A critique of contemporary theory Jajpur Rawal 1998.

- - - - -

Handwritten signatures and date: 19/12/2012

**राजनीति विज्ञान**  
**प्रथम प्रश्न पत्र**  
**राजनीति सिद्धांतपूर्णांक**  
**(पेपर कोड – 0113)**

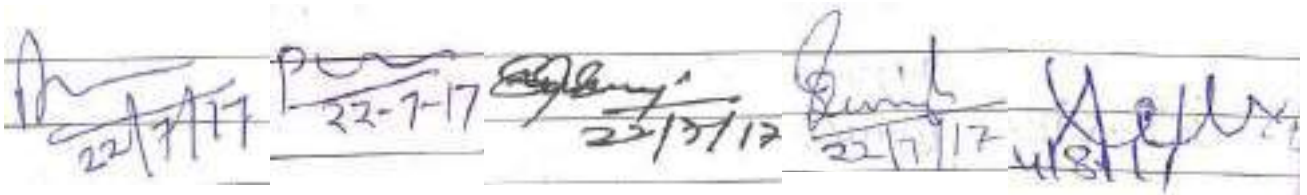
75

- इकाई –1 राजनीति विज्ञान** – परिभाषा प्रकृति, क्षेत्र, अध्ययन पद्धतियां, परम्परागत और व्यवहार परक स्वरूप राजनीति सिद्धांत, महत्व।  
**सत्ता एवं अधिकार** – अर्थ, परिभाषा, विशेषताएं एवं संबंध।
- इकाई –2 राज्य**– अर्थ, आवश्यक तत्व, राज्य की उत्पत्ति के विभिन्न सिद्धांत।  
**राज्य**– एक प्रभारी परिपक्ष्य में।
- इकाई –3 सम्प्रभुता**, अर्थ, विशेषताएं, सिद्धांत, महत्व।  
नागरीकता, अधिकार, स्वतंत्रता–अर्थ, परिभाषा, विशेषताएं एवं सिद्धांत।
- इकाई –4 समानता एवं न्याय** – अर्थ, परिभाषा, विशेषताएं एवं संबंध।
- इकाई –5 विकास एवं कल्याणकारी राज्य** – अवधारणा, विशेषताएं, कार्य, उपलब्धियां, चुनौतियां।  
**सामाजिक परिवर्तन के सिद्धांत**– अर्थ, परिभाषा, विशेषताएं।

**अनुगंसित पुस्तकें –**

1. जी.एन.सिंह– फंडामें. प्लस ऑफ पोलिटिकल साइंस एण्ड आर्गेनाइजेशन।
2. डी.हेल्ड – मॉडल्स ऑफ डेमोक्रेसी पोलिटिकल थ्योरी एवे मार्टन ट्रेड
3. आगी वार्म ई. – पोलिटिकल थ्योरी
4. डी. मिलर – सोशल जस्टिस, सिटीजनशिप एण्ड नेशनल आइडेंटिटीज
5. एस.एम. ओकिन – जस्टिस जेंडर एण्ड दी फैमली
6. हरिहर राय एवं सिंह – राजनीति शास्त्र के नये आयाम
7. डॉ. बाबूलाल फाड़िया– राजनीति शास्त्र के सिद्धांत
8. डॉ. ओम नागपाल – राजनीति विज्ञान के मूल तत्व
9. डॉ. बी. आर पुरोहित – राजनीति शास्त्र के मूल सिद्धांत
10. एस. गया ग्वाली – पोलिटिकल थ्योरी आइडियाज एण्ड कांसेप्ट

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The image shows a row of handwritten signatures and dates. From left to right, there are four distinct signatures. Below the first signature is the date '22/7/17'. Below the second signature is the date '22-7-17'. Below the third signature is the date '23/7/17'. Below the fourth signature is the date '22/7/17'. There is also a date '24/8/17' written at the far right of the row.

**द्वितीय प्रश्न पत्र**  
**राज्य शासन एवं राजनीति**  
**(पेपर कोड – 0114)**

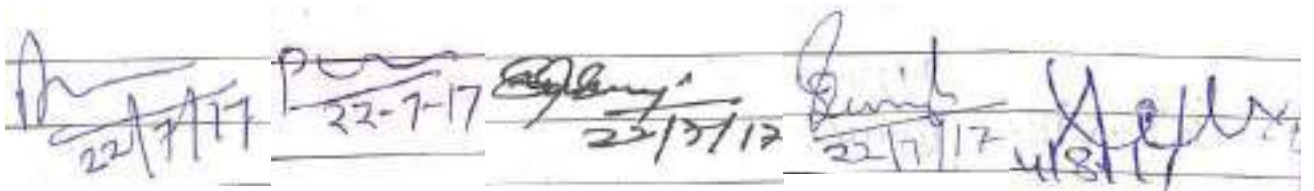
**अंक 75**

- इकाई –1** भारतीय संविधान का निर्माण एवं स्रोत – भारतीय संविधान की आधारभूत विशेषताएं, प्रस्तावना ।  
मूल अधिकार, मौलिक कर्तव्य एवं राज्य के नीति निर्देशक तत्व ।
- इकाई– 2** **केन्द्रीय शासन** – राष्ट्रपति, संसद, मंत्री मंडल एवं प्रधान मंत्री, गठन, नियुक्ति, अधिकार, शक्तियां एवं वास्तविक स्थिति ।
- इकाई– 3** **राज्य शासन** –राज्यपाल, मंत्री परिषद् एवं मुख्य मंत्रर नियुक्ति, गठन, अधिकार, शक्तियां एवं वास्तविक स्थिति केन्द्र राज्य संबंध – प्रशासनिक, न्यायिक एवं आर्थिक
- इकाई– 4** सर्वोच्च न्यायालय एवं संवैधानिक प्रक्रिया ।  
गठन, क्षेत्रीयकार वर्तमान परिपेक्ष्य में बदलता स्वरूप  
**राजनीतिक दल** – राष्ट्रीय एवं क्षेत्रीय अर्थ, परिभाषा, विशेषताएं एवं प्रकार  
निर्वाचन आयोग एवं निर्वाचकीय सुधार एवं अध्ययन ।  
गठन, कार्य अधिकार एवं निर्वाचकीय सुधार एवं अध्ययन ।
- इकाई– 5** भारतीय राजनीति के प्रमुख मुद्दे–  
जाति, धर्म, भाषा, क्षेत्र एवं गरीबी उन्मूलन ।

**अनुशंसित पुस्तकें–**

1. डी.डी. बसु – एन इंट्रोडक्शन दी कानस्टीट्यूशन आफ इंडियन
2. सी.पी.भांभरी – दी इंडियन स्टेट – 50 इयर्स
3. ग. चन्द्रा – फेडर्राज्म इन इंडिया द स्टडी ऑफ यूनियन स्टेट रिलेशन
4. बी. गल. पाडिया– स्टेट पालिटिल्स इन इंडिया
5. एस. कश्यप – अवर पार्लियामेंट
6. रजनी काठारी –राज्यों की राजनीति
7. डी. सी. जौहरी – भारतीय शासन एवं राजनीति
8. जैन फाडिया– भारतीय शासन एवं राजनीति
9. वीरकेशवर प्रसाद सिंह – भारतीय शासन
10. वी. कुप्पुग्याकी– सोशल चेंज इन इंडिया
11. इकबाल नारायण – स्टेट पॉलिटिक्स इन इंडिया ।

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## MUSIC

**Note : 1.** B. A.(General) three year degree course with the relative weight of practical and theory being in the proportion 50 and 50 respectively (Model curriculum, page No.21A) courses. Hence the Central Board of Studies decide the ratio as :-

Ist paper      40 marks (written or Theory) Revised as 50  
2nd paper     40 marks (written or Theory) Revised as 50

practical of 10 marks from which 10 marks are for the internal sessional work.  
B.A. General (as one of the optional objects).  
Hindustani Music (Vocal +Instrumental..)

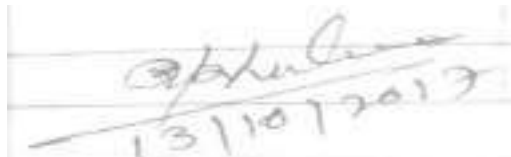
### THEORY

#### PAPER - I

**M.M. : 50**

**(Paper Code-0131)**

1. Definition and Illustrations :- Naad, Shruti, Swara, Saptak, Purvang, Uttarang, Vadi, Samvadi, Vivadi, Anuvadi, Alankar, That, Mind, Soota, Bol, Alap, Tan, Tihai, pakad.
2. General knowledge of the Musical Styles:-  
Dhrupad, Dhamar, khyal, Thumari, Tarana, Tappa, Hori, Chaturang, Geet, bhajan, Ghazal,
3. General Knowledge of the biographies and the contributions of the following Musicians:-  
Amir Khusro, Swami Haridas, Tansen, Nayak Baiju, Nayak Gopal, Tyagraja.
4. Merits and Demerits of Musicians according to the Shastras.
5. Study of the Theoretical details of prescribed Ragas for Practical Course as follows :- Yaman, Bhupali, Allahiya Bilawal, Bhairav, Kafi, Khamaj, Brindavani - sarang, Durga (Bilawal That).



**THEORY**  
**PAPER – II**  
**(Paper Code-0132)**

**M.M. : 50**

1. Hindustani Music and Karnataka Music, short history, similarities and Differences.
2. Study of Natation Systems - Pt. Bhatkhande and Pt. Paluskar.
3. Time Theory of the Ragas, Purva Raga, Utlar Raga, Sandhi Prakash Raga,
4. Formation of Ragas, Sampurna, Shadav, Audawa, Jati, That or Mel Theory.
5. Definition of Tala, Matra, Avartan, Bol, Vibhag, Khali, Bhari, Vilambit, Madhya and Drutlaya Writing of the Talas in Notation with Dugan

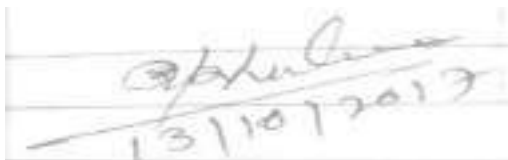
**PRACTICAL**

**M.M. : 50**

1. Alankar (Palta)
2. Study of the following Ragas :- Yaman, Bhupali, Alahaiya Bilawal, Bhairav, Kafi, Khamaj, Brindavani Sarang, Durga (Bilawal That)
3. Two Vilambit Khyalas or Masitkhani Gat in any two of the above mentioned Ragas.
4. Madhya Laya Khyalas or Razakhani Gat with Alap, Tan, Tora Jhala, in any five of the above Ragas.
5. Lakshan Geet, Saragam Geet in all the above Ragas.
6. Ability to demonstrate (orally by giving Tali and Khali of on hand) Talas Prescribed in course as follows :- Dadra, Kaharva, Teen Tal, Ektal, Chautal, Jhaptal.
7. One Dhrupad or Dhamar / one Gat other than teen Tal (Composition only)
8. One Bhajan, Ghazal, Geet, Patrioteec song and prayer.

**INTERNAL SCSSSIONAL WORK -**

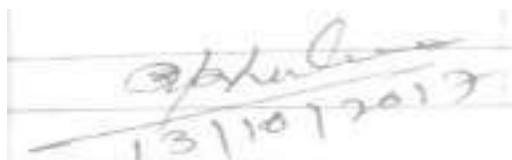
1. Ten Descriptions of Music Programmes (Radio and T. V. personally atlonded)



### **RECOMMENDED BOOK -**

1. Kramik Pustak Malika (Part I to Part IV) By pt. V.N. Bhatkhande.
2. Sangitanjali Part I to VI By Pt. Onkar Nath Thakur.
3. Sangeet Visharad (Hathras) By Vasant
4. Sangeet Bodh, By Dr. Sarad Cahndra Paranjape
5. Dhawani aur Sangeet, by Prof. L. K. Sing
6. Tan Malika, by Raja Bhaiya Pooovale
7. Hamare Sangeet Ratna, by Lakshmi Narayan Garg.
8. Rag Parichaya Part I to IV By Harish Chandra Shrivastava
9. All Journals and Magazenes of Music
10. Sitar Malika, (Hathra)
11. Tabla Vigyan, by Dr. Lalmani Misra
12. Swar aur Ragon ke Vikas me Vadyon ka Yogdan, By Prof. Indrani Chakrawarty.
13. Sangeet Manjusha By Prof. Indrani Chakrawarty.
14. Music - its methods and technique and teaching in Higher Education. By Prof. Indrani Chakrawarty.
15. Sangeetanjali Part I to V By Pt. Ramashraya Jha.

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## विषय – नृत्य (भरत नाट्यम)

बी.ए. भाग (1) के लिये इस विषय में प्रयोगिक और सैद्धांतिक दो भाग होंगे ।  
प्रायोगिक 50 अंक तथा सैद्धांतिक 100 अंक का होगा, जिस हेतु 50 अंक के दो प्रश्न पत्र होंगे । प्रत्येक वर्ष के पूर्णांक कुल मिलाकर 150 अंक के होंगे ।

क्रं	विवरण	पूर्णांक	उत्तीर्णांक
1	सैद्धांतिक प्रश्न पत्र : प्रथम	50	17
2	सैद्धांतिक प्रश्न पत्र : द्वितीय	50	17
3	प्रायोगिक	50	17
योग—		150	51

### प्रथम प्रश्न पत्र (पेपर कोड – 0153)

- नृत्य का इतिहास – सिंधु सभ्यता, वैदिक काल, रामायण एवं महाभारत काल ।
- पुराणों के आधार पर उमाशंकर की विभिन्न नृत्य संबंधी कथायें ।
- नटकर श्री कृष्ण की नृत्य संबंधी कथायें ।
- नाट्य की उत्पत्ति कथा (भरत नाट्य शास्त्र के प्रथम अध्याय में वर्णित)
- लोकधर्मी नाट्य परम्परा – निम्नांकित लोकधर्मी नाट्य परम्पराओं में किन्हीं दो की संक्षिप्त जानकारी –
  - रामलीला
  - रासलीला
  - भवाई
  - राई
  - माच

### द्वितीय प्रश्न पत्र (पेपर कोड – 0153)

- ताल की प्रारंभिक जानकारी – (1) ताल की व्याख्या, (2) लय— विलंबित, मध्य, द्रुत ।
- छत्तीसगढ़ के दो लोग नृत्यों का सामान्य परिचय – (पर्व एवं त्यौहारों के आधार पर ।
  - करसा,
  - ददरिया,
  - सुवा,
  - रीना ।
- संगीत की व्याख्या और नृत्य का उसमें स्थान ।
- नृत्य के अभ्यास से शारीरिक एवं उसमें स्थान ।
- भारतीय नाट्य परम्परा में गुरुवंदना का महत्व ।



### प्रायोगिक

1. मौखिक मुद्रा प्रदर्शन – (अभियण दर्पणम् के अनुसार)

- (1) शिवस्तुति
  - (2) शिरोभेद
  - (3) ग्रीवाभेद
  - (4) नेत्र संचालन
  - (5) असंयुक्त हस्तमुद्रा
  - (6) असंयुक्त हस्तमुद्रा
2. कार्यक्रम विभाग

(1) शारीरिक अभ्यास (2) अङ्क-05 अंग संचालन (पद संचालन+ हस्त संचालन) तीन काल में (3) पूजा नृत्य (4) अलारिपु (तिस्त्रजाति)



**HOME SCIENCE**  
**PAPER - I**  
**ANATOMY PHYSIOLOGY & HYGIENE**      **M.M. : 50**  
**(Paper Code-0121)**

**UNIT-1** Structure & functions of cell general introduction of Tissue and their functions skeletal system - Types of bones, classification general structure & functions of bones. Muscular system - General structure, types and function.

**UNIT-2** Circulatory system - General structure of organs and functions. composition of blood & function. Respiratory system - General structure of organs and functions.

**UNIT-3** Digestive system - General introduction of Nutrients, Liver and spleen organs of digestion their general structure and function. Excretory system- organs of excretion. Kidney & skin - structure & function.

**UNIT-4** Nervous system - Central nervous system structure and function. Senses and Sensory organs - ear and eye structure & function.

**UNIT-5** Hygiene - Personal Hygiene social Hygiene  
Enviromental and Industrial Hygiene  
Water - its importance and purification.  
Air - its importance and purification.  
First aid home nursing - Principles, qualities of nurse, Responsibilities, selection of sick room. care of the patient. Some common accidents and their aid, poision, bleeding, Burns and scalds, fracture sprain, dislocation.

*Asghar*  
22.07.17

*Don*  
22/7/17

*Debn*  
22.7

*Belin*  
22/7/17

*Rugh*  
22.7.17

## प्रायोगिक

कुल समय 3 घंटे

कुल अंक—50

### अंको का विभाजन

1. स्पेशल	10
2. प्राथमिक उपचार	10
3. गृह परिचर्या	15
4. शरीर रचना एवं स्वास्थ्य विज्ञान	15

स्पेशल : (परीक्षा के समय छात्राएँ प्रायोगिक नोट बुक एवं उपचार पेटी जमा करें ।)

प्रयोग क्रमांक —1 रिपोर्ट : कालेज की कक्षाओं का प्रतिदिन की सफाई एवं वायुविजन संबंधित निरीक्षण ।

प्रयोग क्रमांक — 2 स्वयं के परिवार में पीने के पानी के प्राप्ति के साधन, संग्रह के प्रकार एवं साधन पानी की शुद्ध एवं स्वच्छता के लिये प्रयुक्त विधि ।

प्रयोग क्रमांक —3 रिपोर्ट : स्वयं के परिवार एवं अन्य दो पड़ोसी परिचर्यवार के घर में अगस्त से दिसम्बर ( अनुमानत : पांच महीने) के दौरान हुई बीमारियों के संबंध में जानकारी ।

1. रोग का नाम ।
2. प्राथमिक उपचार— जो दिया गया ।
3. आहार (जो उपयोग में लाया गया )

प्रयोग क्रमांक — 4 प्राथमिक उपचार पेटी (आवश्यक सामान)

1. घाव धोने एवं बांधने का सामान ।
2. दर्द कम करने की दवाईयां ।
3. अपाचन— में प्रयुक्त दवाईयां ।

प्राथमिक उपचार पेटी छात्राएँ परीक्षा के समय अपना नाम एवं परिवार के सदस्यों की संख्या लिखकर प्रस्तुत करें ।

प्रयोग क्रमांक — 5 रोगी के लिये उपचारात्मक व्यंजनो का अध्यापक द्वारा करके बताना ।

1. सब्जियों का सूप ।
2. दाल का सूप ।
3. उबला अंडा ।
4. फटे दूध का पानी (व्हे वाटर)
5. सब्जी एवं फलों का स्ट्रू

इन व्यंजनो की विधि एवं उपयोगिता नोट बुक में अंकित की जावेगी ।

प्रयोग क्रमांक — 6 प्राथमिक उपचार

1. विभिन्न प्रकार की पट्टियां (तिकोनी, गोल)
2. घाव की देखभाल ।
3. कृत्रिम श्वसन ।

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प्रयोग क्रमांक – 7 गृह परिचर्चा

1. शरीर के तापमान का चार्ट
2. गरम एवं ठंडे पानी की थैली तैयार करना।
3. बिस्तर लगाना/चद्दर बदलना।

प्रयोग क्रमांक– 8 दृष्य श्रव्य यंत्र का बनाना।

महत्वपूर्ण निर्देश– प्रयोग क्रमांक 1, 2, 3 तथा 5 की रिपोर्ट छात्राओ द्वारा प्रायोगिक नोट बुक में लिखकर एवं अध्यापक द्वारा प्रति हस्ताक्षरित/प्रमाणित करवाकर परीक्षा के समय प्रस्तुत की जावेगी।

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*A. Singh*  
22.07.17

*Don*  
22/7/17

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*Don*  
22.7.17

**HOME SCIENCE**  
**Paper - II**  
**HOME SCIENCE - EXTENSION EDUCATION**  
**(Paper Code-0122)**

**UNIT-1 Introduction of Home Science Extension Education :**

- (A) Home Science - Concepts, goals and Areas of Home Science & their inter relationship with extension.
- (b) Principles and methods of home science extension education general concepts of extension work.
- (c) Objectives of extension education qualities of extension workers, extension education process.

**UNIT-2 Community Development problems and Role of Home Scientists :**

- (A) Principles of community development organization and function of community development.
- (B) Role of home scientists in community development, programmes of extension education for community. programmes of community development at central, state, district, block and village level.  
Family planning programme.  
Community problems, child marriage, Dowry system, parda pratha, rural indebtedness unemployment.

**UNIT-3 Teaching methods & aids :**

Methods of learning - Discussion, demonstration, observation and their application to home science teaching.

Extension Methods - their scope advantages and application. scope and use in Home Science teaching

Extension Methods - their scope advantages and application.

**UNIT-4 Attitude towards Home Science :**

Attitudes towards Home Science, Motivation towards Home Science. Application of Home Science towards improvement in family living. Job opportunities in Home Science National and International agencies and their collaboration with Home Science, Official organization Home Science Association of India, W.H.O. FAG,  
CARE, ICAR, ICDS, ICSSR, ICMR, IRDP, Adult education.

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A. S. Gopal 22.07.17  
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22.7.17

## UNIT-5 Curriculum Planning in Home Science :

Basic concept of curriculum planning components of curriculum planning implementation evolution and improvement required in the existing system of H.Sc. education policy and its relevance to H.Sc. Programme planning-concept, principles objectives and steps in programme planning.

### REFERENCE :

1. Extension education and community development by Dhama O. P.
2. Co-operative Extension Work by Kelsey, L.D. and Heame C. R.
3. Extension education, Shri Lakshmi press by Reddy A. A.
4. An Introduction to programme evaluation John Wiley - Fracklin, J. K. & Thrashe / J.H.

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A. S. / 22.7.17

**VIVA - VOCE**  
**SYALLABUS FOR THEORY AND PRACTICAL**  
**(Drawing and painting) (M.M.50)**

B.A. (Drawing and painting) course is divided into three parts : B.A. 1st year, B.A. IInd year, B.A. III Year, all Examination is conducted by University for all class Maximum marks will be 150 the three parts details are as under :-

**THEORY FUNDAMENTAL OF PAINTING (ART)**  
**The time of theory paper is three hours M.M. : 50**

1. Defination of Art
2. Classificaction of Art
3. Elements of painting - Line, Form, Colour, Tone, Texture, Space.
4. Shadang - Rupa Veda, Pramanani, Bhava, Labanya, Yojan, Sadrusya, Varnika Bhang.

**BOOK RECOMMENDED :**

- |                        |   |               |
|------------------------|---|---------------|
| 1. Still life Painting | - | Richmend.     |
| 2. Akar Kalpna         | - | Ranbir Saxana |
| 3. Chirta Sayanjan     | - | P. N. Choyal  |
| 4. Kala ke mull Tatya  | - | Dr. C. L. Jha |

**PRACTICAL**

There will be Two Practical Paper Evaluation will be made by the external and the internal examiners. Together, and Sessional Marking is made by the class Teacher.

\* The time of each paper is four hour's and there will be a half hour's recess in between.

**STILL LIFE**  
**(Paper Code-0150)**  
**PAPER - I**

Scheme of Examination  
Time - 4 Hours  
Paper - 1/4 Imp Size  
Meldium - Water Colour  
Sessional - Mark 10

Total Mark - 50  
Exmination - 40  
Sessional - 10

Class Work - Minimum work to be Submitted. Five Paining Size 1/4 IMP

Any type of still object will be dreown books, flower pot's Frouts etc.

**BASIC DESING**  
**(Paper Code-0150 A)**  
**PAPER - II**

Scheme of Examination  
Time - 4 Hours  
Paper - 1/4 Imp Size  
Meldium - Water Colour or Poster Colour  
Sessional - Mark 10

Total Mark - 50  
Exmination - 40  
Sessional - 10

Class Work - Minimum work to be Submitted. Five Paining Size 1/4 IMP

Form of netural element and object will be decoreted and repeated. Form like Flower, leaf, fruits, pot. Boll and Geometrial desing will be drown and painted with water colour and poster colour.



# दुर्ग विश्वविद्यालय, दुर्ग (छ.ग.)



## पाठ्यक्रम

बी.ए. भाग – 2

**B. A. Part - II**

**परीक्षा – 2017–18**



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## **REVISED ORDINANCE NO.11**

(As per State U.G.C. Scheme)

### **BACHELOR OF ARTS**

1. The three year course have been broken up into three Parts.  
Part-I Examination : at the end of the first year.  
Part-II Examination : at the end of the second year and  
Part-III Examination : at the end of the third year.
2. A candidate who after passing (10+2) or Intermediate Examination of C.G. Board of Secondary Education, Raipur or any other examination recognised by the University or C.G. Board of Secondary Education as equivalent thereto, has attended a regular course of study in an affiliated college or in the Teaching Department of the University for one academic year shall be eligible for appearing at the B.A. Part-I examination.
3. A candidate who after passing B.A. Part-I examination of the University or any other examination recognised by the University as equivalent thereto has attended a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.A. Part II Examination.
4. A candidate who after passing B.A. Part II examination of the University has completed a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.A. Part-III examination.
5. Besides regular students, subject to their compliance with this ordinance, ex-students and non-collegiate candidates shall be eligible for admission to the examination as per provisions of Ordinance N. 6 relating to Examinations (General). Provided that non-collegiate candidates shall be permitted to offer only such subjects/papers as are taught to the regular students at any of the University Teaching Department or College.

6. Every candidate for the Bachelor of arts examination shall be examined in :
- A. Foundation Course:
- I - Group - Hindi Language
  - II - Group - English Language
- B. Three Course subjects : One subject from any
- three groups out of the following six groups :
1. Sociology/Ancient Indian History Culture and Anthropology.
  2. Political Science/Home Science / Drawing & Painting / Vocational Course.
  3. Hindi Literature/Sanskrit Literature /Urdu Literature/Mathematics
  4. Economics/Music/Defence studies / Linguistics.
  5. Philosophy/Psychology/Geography/Education/Management.
  6. History/English Literature/Statistics.
  7. Practicals (if necessary) for each core subject.
7. Any candidate who has passed the B.A. examination of the University shall be allowed to present himself for examination in any of additional subjects prescribed for the B.A. examination and not taken by him at the degree examination. Such candidate will have to first appear and pass the B.A. Part I examination in the subject which he proposes to offer and then the B.A. Part II and Part III examination in the same subject. Successful candidate will be given a certificate to that effect.
8. In order to pass at any part of the three year degree course examination, an examinee must obtain not less than 33% of the total marks in each subject/group of subjects. In subject/group of subjects, where both theory and practical examination are provided, an examinee must pass in both theory and practical parts of the examination separately.
9. Candidate will have to pass separately at the Part-I, Part II and part-III examination. No division shall be assigned on the result of the Part-I and Part-II examination. In determining the division of the Final examination, total marks obtained by the examinees, in their Part-I, Part-II and Part-III examination in the aggregate shall be taken into account. Candidate will not be allowed to change subjects after passing Part I Examination.

Provided in case of candidate who has passed the examination through the supplementary examination having failed in one subject only the total aggregate marks being carried over for determining the division shall include the actual marks obtained in the subject in which he appeared at the supplementary examination.

10. Successful examinees at the Part-III examination obtaining 60% or more marks shall be placed in the First division, those obtaining less than 60% but not less than 45% marks in the Second division and other successful examinees in the third division.

- - - - -

# SCHEME OF EXAMINATION

Subject	Paper	Max. Marks	Min. Marks
i) Environmental Studies		75	
Fild Work		25	33
A. Foundation Course			
i) Hindi Language - I		75	26
ii) English Language - II		75	26
B. Three Core Subject :			
1. Hindi Literature	I	75	
	II	75	50
2. Sanskrit Literature	I	75	
	II	75	50
3. English Literature	I	75	
			50
	II	75	
4. Philosophy	I	75	
			50
	II	75	
5. Economics	I	75	
			50
	II	75	
6. Political Science	I	75	
	II	75	50
7. History	I	75	
	II	75	50
8. Ancient Indian History	I	75	
Culture & Archaeology	II	75	50
9. Sociology	I	75	
	II	75	50
10. Geography	I	50	
			33
	II	50	
	Practical	50	17
11. Mathematics	I	50	
	II	50	50
	III	50	
12. Statistics	I	50	
	II	50	33
	Practical	50	17
13. Anthropology	I	50	
			33
	II	50	
	Practical	50	17

14. Linguistics	I	75	50
	II	75	
15. Indian Music	I	50	33
	II	50	
	Practical	50	17
16. Home Science	I	50	33
	II	50	
	Practical	50	17
17. Education	I	75	50
	II	75	
18. Psychology	I	50	33
	II	50	
	Practical	50	17
19. Management	I	75	50
	II	75	
20. Defence Studies	I	50	33
	II	50	
	Practical	50	17
21. Urdu	I	75	50
	II	75	
22. Dance	I	50	33
	II	50	
	Practical	50	17
23. Vocational Course	I	50	33
	II	50	
	Practical	50	17

### USE OF CALCULATORS

The Students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986-

1. Student will bring their own Calculators.
2. Calculators will not be provided either by the university or examination centres.
3. Calculators with, memory and following variables be permitted +, -, x, , square, reciprocal, expotentials log, square root, trigonometric functions, wize, sine, cosine, tangent etc. factiorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.

बी.ए./बी.एस-सी./बी.काम./बी.एच.एच.सी.

भाग – दो, आधार पाठ्यक्रम

प्रश्न पत्र – प्रथम (हिन्दी भाषा)

(पेपर कोड –0171)

पुर्णांक-75

- खण्ड-क** निम्नलिखित 5 लेखकों के एक-एक निबंध पाठ्यक्रम में सम्मिलित होंगे। अंक-30
1. महात्मा गांधी – सत्य और अहिंसा
  2. विनोबा भावे – ग्राम सेवा
  3. आचार्य नरेन्द्र देव – युवको का समाज में स्थान
  4. वासुदेवशरण अग्रवाल – मातृ-भूमि
  5. भगवतशरण उपाध्याय – हिमाचल की व्युत्पत्ति
  6. हरिठाकुर- डॉ. खूबचंद बघेल
- खण्ड-ख** हिन्दी भाषा और उसके विविध रूप अंक-20
- कार्यलयीन भाषा
  - मीडिया की भाषा
  - वित एवं वाणिज्य की भाषा
  - मशीनी भाषा
- खण्ड-ग** अनुवाद व्यवहार : अंग्रेजी से हिन्दी में अनुवाद अंक-25
- हिन्दी की व्यवहारिक कोटियां-
  - रचनागत प्रयोगगत उदाहरण, संज्ञा, सर्वनाम, विशेषण, क्रिया विशेषण, समाज, संधि एवं संक्षिप्तियां, रचना एवं प्रयोगगत विवेच।

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**PAPER - II**  
**ENGLISH LANGUAGE (Paper Code-0172)**

The question paper for B.A./B.Sc./B.Com./B.H.Sc., English Language and cultural values shall comprise the following units :

- |                 |  |             |
|-----------------|--|-------------|
| <b>UNIT-I</b>   | Short answer questions to be asked by (Five short answer questions of three marks each)  | 15 Marks    |
| <b>UNIT-II</b>  | (a) Reading comprehension of an unseen passage<br>(b) Vocabulary   | 05 Marks    |
| <b>UNIT-III</b> | Report-Writing   | 10 Marks    |
| <b>UNIT-IV</b>  | Expansion of an idea   | 10 Marks    |
| <b>UNIT-V</b>   | Grammar and Vocabulary based on the prescribed text book.  | 20+15 Marks |
| <b>Note :</b>   | Question on all the units shall be asked from the prescribed text which will comprise specimens of popular creative/writing and the following in any               |             |
|                 | (a) Matter & technology  |             |
|                 | (i) State of matter and its structure  |             |
|                 | (ii) Technology (Electronics Communication, Space Science)   |             |
|                 | (b) Our Scientists & Institutions  |             |
|                 | (i) Life & work of our eminent scientist Arya Bhatt. Kautilya, Charak, Shusruta, Nagarjuna, J.C. Bose and C.V. Raman, S. Ramanujam, Homi J. Bhabha, Birbal Sahani. |             |
|                 | (ii) Indian Scientific Institutions (Ancient & Modern)   |             |

**Books Prescribed :**

Foundation English for U.G. Second Year - Published by M.P. Hindi Granth Academy, Bhopal.

Dr. M. C. Chakraborty

Dr. S. Gupta

DR. MERILY ROY



**हिन्दी साहित्य**  
**प्रश्न पत्र – प्रथम**  
**अर्वाचीन हिन्दी काव्य**  
**(पेपर कोड-0174)**

**अंक-75**

**प्रस्तावना**— आधुनिक काव्य आधुनिकता की समस्त विशेषताओं को समेटे हुए हैं । स्वतंत्रता प्राप्ति के पूर्व की भाव-भाषा, शिल्प, अन्तर्वस्तु संबंधी समस्त विकास धारा यहां सजीव रूप में देखी जा सकती है । इसे अनदेखा करना मनुष्य की विकास यात्रा को नजर अंदाज करना है । इस यात्रा के साक्षात्कार के लिए आधुनिक काव्य का अध्ययन अनेक्षित ही नहीं अपितु अनिवार्य है ।

**पाठ्य विषय –**

1. मैथिलीशरण गुप्त – भारत- भारती की कविताएं
  2. सूर्यकांत त्रिपाठी निराली –
    1. सखि बसन्त आया ।
    2. वर दे, वीणा वादिनी वर दे ।
    3. हिन्दी के सुमनों के प्रति पत्र
    4. तोड़ती – पत्थर ।
    5. राजे ने अपनी रखवाली की ।
  3. सुमित्रानंदन पंत—
    1. बादल ।
    2. परिवर्तन 2 पद  
(1. खोलता इधर जन्मलोचन 2. आज का दुख कल का आल्हाद)
    3. ताज ।
    4. झंझा में नीम ।
    5. भारत माता ।
  4. माखन लाल चतुर्वेदी –
    1. बलि पंथी से ।
    2. सांझ और ढोलक की थापें ।
    3. मैं बेच रही हूं दही ।
    4. उलाहना ।?
    5. निःशस्त्र सेनानी ।
  5. स.ही. वात्स्यायन अज्ञेय –
    1. सबरे उठा तो धूप खिली थी ।
    1. सामाग्री का नैवेद्य दान ।
    2. घर
    3. चदनी जी लो ।
    4. दूर्वाचल ।
- द्रुतपाठ हेतु कवियों का अध्ययन किया जाएगा, जिन पर लघुत्तरीय प्रश्न पूछे जायेंगे—
1. अयोध्या सिंह उपाध्याय “हरिऔध” ।
  2. सुभद्रा कुमारी चौहान ।
  3. श्रीकांत वर्मा ।

अंक विभाजन –

3 व्याख्याएं	– 21 अंक
2 आलोचनात्मक प्रश्न	– 24 अंक
5 लघुत्तरीय प्रश्न पत्र	– 15 अंक
15 वस्तुनिष्ठ/अति लघुत्तरीय प्रश्न	– 15 अंक
<b>कुल</b>	<b>– 75 अंक</b>

इकाई विभाजन –

इकाई-1	व्याख्या
इकाई-2	गुप्त, निराला
इकाई-3	पंत, चतुर्वेदी, अज्ञेय
इकाई-4	द्रुतपाठ के कवि एवं आधुनिक काव्य धारा का इतिहास (राष्ट्रीय काव्य धारा, छायावाद, प्रगतिवाद, प्रयोगवाद, नई कविता)
इकाई-5	वस्तुनिष्ठ/लघुत्तरीय प्रश्न (सम्पूर्ण पाठ्यक्रम से)

**हिन्दी साहित्य**  
**द्वितीय प्रश्न पत्र**  
**हिन्दी निबंध तथा गद्य विधाएं**  
**(पेपर कोड-0174)**

**अंक-75**

**पाठ्य विषय —**

व्याख्या एवं आलोचनात्मक प्रश्नों के लिए एक नाटक, पांच प्रतिनिधि और पांच एकांकी का निर्धारण किया गया है।

**नाटक—** अंधेरी नगरी—भारतेन्दु हरिश्चन्द्र  
**निबंध**

1. क्रोध —आचार्य रामचन्द्र शुक्ल
2. वसन्त — डॉ. हजारी प्रसाद द्विवेदी।
3. उस अमराई ने राम—राम कही है — डॉ. विद्यानिवास मिश्र।
4. काव्येषु नाट्यम् रम्यम् — बाबू गुलाब राय।
5. बेईमानी की परत — हरिशंकर परसाई।

**एकांकी—**

1. औरगंजेब की आखिरी रात — डॉ. रामकुमार वर्मा
2. स्ट्राईक — भुनेश्वर
3. एक दिन — लक्ष्मीनारायण मिश्र
4. दस हजार — उदयशंकर भट्ट
5. मम्मी ठकुराईन — डॉ. लक्ष्मीनारायण लाल

द्रुतनाट के लिए तीन गद्यकारों के अध्ययन किया जायेगा, जिन पर लघुत्तरीय प्रश्न पूछे जायेंगे।

1. राहुल सांकृत्यायन
2. महादेवी वर्मा
3. हबीब तनवीर

**अंक विभाजन —**

3	व्याख्याएं	—	21 अंक
2	आलोचनात्मक प्रश्न	—	24 अंक
5	लघुत्तरीय प्रश्न	—	15 अंक
15	वस्तुनिष्ठ/अति लघुत्तरीय प्रश्न	—	15 अंक

**कुल — 75 अंक**

**इकाई विभाजन —**

- इकाई-1** व्याख्या
- इकाई-2** अंधेरी नगरी एवं क्रोध, वसन्त, उस अमराई ने राम—राम कही है।
- इकाई-3** औरगंजेब की आखिरी रात, स्ट्राईक, एक दिन, दस हजार, मम्मी ठकुराईन
- इकाई-4** द्रुतपाठ के गद्यकार—राहुल सांकृत्यायन, महादेवी वर्मा, हबीब तनवीर
- इकाई-5** वस्तुनिष्ठ/अति लघुत्तरीय प्रश्न (समग्र पाठ्य विषय से)

**ENGLISH LITERATURE**  
**PAPER-I**  
**MODERN ENGLISH LITERATURES (Paper Code-0175)**

**M.M. 75**

**All Questions are compulsory.**

- Note :
1. Unit-I is compulsory. Two passages from each of the units I to V to be set and three to be attempted. (3 x 5 = 15)
  2. Short answer questions from unit VII, seven to be set and five to be attempted. (5 x 2 = 10)
  3. Long answer questions from unit II to VI. Five questions from each unit with internal choice to be set. (5 x 2 = 10)  
(Words limit for each answer is 300-400 words)

**UNIT-I** Annotations

**UNIT-II (Poetry)**

W.B. Yeats - 'A Prayer for My Daughter, The Second Coming'  
T.S. Eliot - 'Love Song of J. Alfred Prufrock'

**UNIT-III (Poetry)**

Dylan Thomas - 'Lament, 'A Refusal to Mourn the Death  
Larkin - 'Toads', At Grass'

**UNIT-IV (Prose)**

Bertrand Russell - On the Value of Scepticism  
Oscar Wilde - Happy Prince

**UNIT-V (Drama)**

G.B. Shaw - Pygmalion

**UNIT-VI (Fiction and short-stories)**

Rudyard Kipling-Kim  
Short-Stories  
Katherine mansfield - A Cup of Tea

- UNIT-VII**
1. Elegy,
  2. Sonnet,
  3. Ode,
  4. Morality & Miracle Play,
  5. One Act Play,
  6. Interlude

**BOOKS RECOMMENDED :**

1. An Introduction to the study of English Lit. B. prasad
2. A Glossart of Literary Terms - M.H. Abrahamas
3. Prose of Today - M. Millan Pub
4. Short stories of Yesterday and To day - M. Millan

*Dr. M. Chakraborty*

*Dr. S. Gupta*

*DR. MERILY ROY*

**PAPER - II**  
**MODERN ENGLISH LITERATURES (Paper Code-0176)**

**M.M. 75**

**All question are compulsory.**

- Note :** 1. Unit I is compulsory. Two passages from each of the units II to V to be set and three to be attempted. (3x5 = 15)
2. Short answer questions from unit VII, seven to be set and five to be attempted. (5x2 = 10)
3. Long-answer questions from unit II to VI. Five questions from each unit with internal choice to be set. (5x2 = 10)  
(Words limit for each answer is 300-400 words)

**UNIT-I** Annotation

**UNIT-II (Poetry)**

Sasson - At the Grove of Henry Vaughan.

Owen, W.H. - Strange Meeting

**UNIT-III (Poetry)**

Auden - Seascape

Ted Hughes - The Howling of Wolves

**UNIT-IV (Prose)**

Robert Lynd - Forgetting

H. Belloc - A conversation with A Reader

**UNIT-V (Drama)**

John Galsworthy - Strife

**O R** J.M. Synge - Riders of the Sea

**UNIT-VI** William Golding - Lord of the Flies (Fiction)

**UNIT-VII** 1. Simile 2. Metaphor 3. Alliteration 4. Onomatopoeia 5. Ballad 6. Epic 7. Dramatic Monologue.

**BOOK RECOMMENDED -**

1. Golden Treasury - Palgrave
2. A Glossary of Literary Terms - M.H. Abrams
3. An Introduction to the study of English literature - B.Prasad

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Dr. M. Chakraborty

Dr. S. Gupta

DR. MERILY ROY

**राजनीति शास्त्र**  
**प्रथम प्रश्न पत्र**  
**पाश्चात्य राजनीतिक चिंतन**

(पेंपर कोड – 0183)

**इकाई-1**

1. प्लेटो – आदर्श राज्य की अवधारणा के विशेष संदर्भ में, शिक्षा, साम्यवाद, दर्शनिक शासक।
2. अरस्तू – राज्य, संविधानों का वर्गीकरण, दासता, क्रांति संबंधी विचार।

**इकाई- 2**

1. मेम्याविली – मेम्याविली का राज्य एवं शासन, धर्म, नैतिकता संबंधी विचार एवं राजदर्शन को देन।
2. हाब्स – सामाजिक समझौता संबंधी विचार
3. लांक – का सामाजिक समझौता संबंधी विचार
4. रूसो – रूसो का सामाजिक समझौता संबंधी विचार, सामान्य इच्छा का सिद्धांत

**इकाई-3**

1. बेंथम का उपयोगितावाद
2. जे.एस.मिल. – राज्य, स्वतंत्रता, अधिकार एवं प्रतिनिधि शासन संबंधी विचार

**इकाई-4**

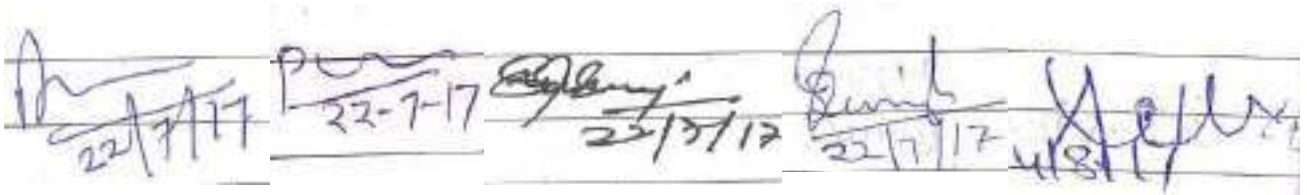
1. हीगल – हीगल कि राज्य संबंधी विचार, द्वंद्ववाद
2. टी.एच. ग्रीन – राज्य, स्वतंत्रता, राजदर्शन को देन

**इकाई-5**

1. मार्क्स – का द्वंद्ववात्मक भौतिकवाद, वर्ग संघर्ष का सिद्धांत, अतिरिक्त मूल्य का सिद्धांत, इतिहास की आर्थिक व्याख्या, मार्क्स की देन।

**संदर्भ ग्रंथ :**

1. के. एन. बर्मा – राजदर्शन
2. प्रभुदत्त शर्मा – पाश्चात्य एवं आधुनिक राजनीतिक चिंतन का इतिहास
3. जीवन मेहता – राजनीतिक चिंतन का इतिहास
4. बाबुलाल फाडिया – राजनीतिक चिंतन का इतिहास
5. गेटल – हिस्ट्री ऑफ पॉलिटिकल प्वाइंट
6. फोस्टर एण्ड जोन्स – मास्टर ऑफ पॉलिटिकल प्वाइंट, पार्ट 1: 2
7. वेकर – रिसेन्ट पॉलिटिकल प्वाइंट
8. एस. मुकर्जी एवं एस. रामास्वामी – ए हिस्ट्री ऑफ पॉलिटिकल प्वाइंट, प्लेटो टू मार्क्स
9. बार्कर – ग्रीक पॉलिटिकल ब्यौरी
10. सेबाइन – हिस्ट्री ऑफ पॉलिटिकल ब्यौरी

The image shows a row of handwritten signatures and dates, likely from examiners. The dates are 22/7/17, 22-7-17, 23/7/17, 22/7/17, and 24/8/17. The signatures are in blue ink and are somewhat stylized.

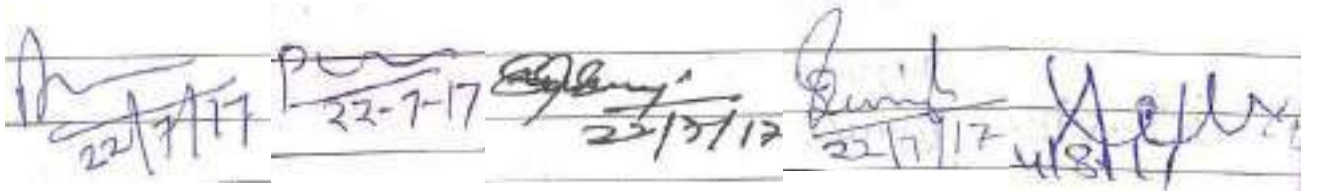
राजनीति शास्त्र  
प्रथम पत्र – द्वितीय  
तुलनात्मक शासन एवं राजनीति  
(पेपर कोड-0184)  
(ब्रिटेन, अमेरिका, चीन, स्विटजरलैंड के विशेष संदर्भ में)

पूर्णांक – 75

- इकाई – 1** तुलनात्मक राजनीति का अर्थ, प्रकृति, क्षेत्र एवं समस्याएँ।  
तुलनात्मक राजनीति के अध्ययन के उपागम : राजनीतिक व्यवस्था का उपागम—  
डेविड ईस्टन एवं आमण्ड एवं पावेल के अनुसार।  
संवैधानिक परम्पराएँ एवं संविधान की विशेषताएँ।
- इकाई – 2** संवैधानिक संरचना—कार्यपालिका का अर्थ, प्रकार, कार्य शक्तियों का केन्द्रण,  
तुलनात्मक विवेचन।
- इकाई – 3** संवैधानिक संरचना—विधायिका—संगठन, कार्य, द्विसदनीय व्यवस्थापिका का पक्ष विपक्ष,  
तुलनात्मक अध्ययन।
- इकाई – 4** संवैधानिक संरचना—न्यायपालिका संगठन, कार्य, स्वतंत्रता, महत्व, विधि का शासन  
एवं न्यायिक पुनरावलोकन।
- इकाई – 5** राजनीतिक, संस्कृति एवं राजनैतिक।  
समाजीकरण की आवश्यकता, राजनीतिक दल—विशेषताएं एवं महत्व, दबाव समूह, अर्थ  
प्रकार, परिभाषा एवं महत्व।  
राजनीतिक प्रक्रिया में नारी की भूमिका।

**संदर्भ ग्रंथ—**

1. जैन एवं फाडिया – तुलनात्मक शासन एवं राजनीति
2. प्रभुदत्त शर्मा – तुलनात्मक राजनीति
3. एस.सूरी – तुलनात्मक राजनीति के सिद्धांत
4. आशा गुप्ता – तुलनात्मक शासन एवं राजनीति
5. जे.सी. जौहरी – तुलनात्मक राजनीति
6. सी.बी. ग्रेना – तुलनात्मक राजनीति एवं राजनैतिक संस्थाएं
7. राय एवं सिंह – तुलनात्मक राजनीति
8. एस.आर. माहेश्वरी — तुलनात्मक राजनीति
9. आर. बी. एस. जैन – तुलनात्मक राजनीति
10. जे.सी.जौहरी – कम्परेटिव्ह पॉलिटिक्स
11. विद्या भूषण – कम्परेटिव्ह पॉलिटिक्स
12. डि. डियोन – कम्परेटिव्ह गवर्नमेंट एण्ड पॉलिटिक्स
13. एस. ई. फाइनर – कम्परेटिव्ह गवर्नमेंट
14. एच. फाइनर – ब्योरी एण्ड प्रेक्टिस ऑफ मॉडर्न गवर्नमेंट

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## **SOCIOLOGY**

### **PAPER - I**

#### **SOCIETY IN INDIA (Paper Code-0185)**

**UNIT-I** View about Indian Society.

The Classical views: Varna, Ashram Karma and  
Dharma Field views : M.N. Shrinivas and S.C. dubey  
Significance and interface of classical and field  
views

**UNIT-II** The Structure and Composition of Indian Society

Structure : Villages, Towns, Cities and Rural - urban,  
Linkage composition : Tribes, Dalits, Women and  
Minorities

**UNIT-III** Basic Institutions of Indian Society.

Caste system, kinship, family, family marriage class, changing dimensions.

**UNIT-IV** Familial Problems

Dowry, domestic violence, divorce, intra-intergenerational conflict problem of  
elderly

**UNIT-V** Social Problems.

Casteism, Regionalism, Communalism, corruption, youth unrest.

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19/12/2017

M. W. Singh



## **SOCIOLOGY**

### **PAPER - II**

#### **CRIME AND SOCIETY (Paper Code-0186)**

- UNIT-I** Conception and types of crime  
Early Explanation - Classical, Positives, psychological.
- UNIT-II** Social structure and Anomie criminality - suicide  
Organized crime, white collar crime  
Causes, consequences and remedies of Terrorism.
- UNIT-III** Indian Social Problems  
Nature of Social change and crime in India Social Disorganization. Alcoholism.  
Drug Addiction, beggary.
- UNIT-IV** Punishment - Objectives and forms. Major theories of punishment  
Modern correctional concepts probation, parole open prison.
- UNIT-V** Correctional process-  
Role of police and Judiciary in India Development of Jail reforms in India  
Sociology of Prison.

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Harsh  
19/12/2017

MSWang

**ECONOMICS**  
**PAPER - I**  
**MACRO ECONOMICS**  
**(Paper Code-0181)**

- UNIT-I** National Income & Social Accounts Concept and Measurement of National Income; National Income identities with government and international trade; Sectors of National Accounts; Green accounting Say's Law of Markets and the classical theory of employment; Keynes's objection to the classical theory; Aggregate demand and aggregate supply functions; The principle of effective demand.
- UNIT-II** Consumption function - Average and marginal propensity to consume; Factors influencing consumption spending; The investments multiplier and its effectiveness in LDCs; Theory of investment - Autonomous and induced investment; Marginal efficiency of capital; Rate of interest classical savings theory & Investment - ex-post and ex-ante, Equality & Equilibrium.
- UNIT-III** Nature and characteristics of trade cycle; Hawtrey's monetary theory; Hayek's over investment theory; Keynes' view on trade cycle; The concept of accelerator; Samuelson and Hicks multiplier, accelerator model, Control of trade cycles.
- UNIT-IV** International Trade - Inter-regional and international trade, Comparative advantage and opportunity Cost, Heckscher Ohlin Theory its main feature assumptions & limitations. Term of Trade. Tariffs & Quotas concept of optimum tariff.  
Balance of trade & Balance of Payment- Concept & Components of BOP, Equilibrium & disequilibrium in BOP Various measures to correct deficit in BOP, Relative merits & demerits of devaluation. Foreign Trade Multiplier.
- UNIT-V** Functions of IMF, World Bank and WTO, Reform of the international monetary system with special reference to India.  
Foreign Trade in India recent Changes in the Composition and direction of foreign trade. Causes & effects of persistent deficit in Bop the Measures adopted by the government to correct the deficit after 1991 Partial & Full Convertibility of Rupee, Instruments of export promotion & Recent Export & Import Policies of India & Role of Multinational Corporations in India.

The image shows four handwritten signatures and one circular stamp. From left to right: a signature that appears to be 'D. S. Singh', a signature that appears to be 'J. K. Singh' with '(L.K. Singh)' written below it, a signature that appears to be 'Rajendra' with '(Rajendra)' written below it, and a signature that appears to be 'Sham' with a horizontal line underneath it. There is also a circular stamp in the center, but its details are not clearly legible.

### **BASIC READING LIST -**

- Ackley, G. (1976) - Macro Economics; Theory and Policy, Mcmillan Publishing Company, Newyork.
- Day, A.C.L. (1960) - Outline of Monetary Economics, Oxford University Press Oxford.
- Gupta, S.B. (1994)- Monetary Economics, S. Chand and Co., Delhi
- Heijdra, B.J. and F.V. Ploeg (2001) - Foundations of Modern Macro-economics, Oxford University Press, Oxford.
- Lewis, M.K. and P.D. Mizan (2000) - Monetary Economics, Oxford University Press, New Delhi.
- Shapiro, E. (1996) - Macroeconomic Analysis, Galgotia Publications, New Delhi .

### **READING LIST -**

- Ackley, G. (1976), Macroeconomics : Theory and Policy, Macmillan publishing Company, New York.
- Day, A.C.L. (1960) - Outline of Monetary Economics, Oxford University Press Oxford.
- Gupta, S.B. (1994)- Monetary Economics, S. Chand and Co., Delhi
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- Dillard, D. (1960)- The Economics of John Mayanand Keynes, Crossby Lockwood and Sons, London.
- Hanson, A.H. (1953), A Guide to Keynes, McGraw Hill, New York.
- Higgins, B. (1963), Economic Development; Principles, Problems and Policies, Central Book Depot, Allahbad.
- Keynes, J.M. (1936), the General Theory of Employment, Interest and Money, Macmillan, London.
- Kindleberger, C.P. (1958), economics Development, McGraw Hill Book company, New York.
- Lucas, R. (1981), Studies in Business Cycle Theory, MIT Press, Cambridge, Massachusetts.
- Mier, G.M. and R.E. Baldwin (1957), Economic Development; Theory, History and Policy Wiley & Sons Inc. ; New York.
- Powelson, J.P.C. (1960), National Income and Flow of Funds Analysis, McGraw Hill, New York.

Handwritten signatures and names at the bottom of the page, including "D. S. S.", "J. K. Bhattacharya", "S. K. Bhattacharya", and "S. K. Bhattacharya".

**ECONOMICS**  
**PAPER - II**  
**MONEY, BANKING AND PUBLIC FINANCE**  
**(Paper Code-0182)**

**UNIT-I** Basic concepts : Money - meaning and functions, Gresham's law; Role of money in Capitalist, Socialist and Mixed economics; Quantity theory of money- Cash transaction and cash balance approaches; Value of Money, Inflation, deflation and reflation definition, types, causes and effects of inflation on different sectors of the economy; Demand pull and cost push inflation; Measures to control inflation. Trade off between inflation & unemployment.

**UNIT-II** Commercial banking- meaning and types; Functions of commercial banks The process of credit creation purpose and limitations; Liabilities and assets of banks;  
Evolution of commercial banking in India after independence; A critical appraisal of the progress of commercial banking after Nationalization; Recent reforms in banking sector in India. Functions of a central bank; Quantitative and qualitative methods of credit control; Bank rate policy; Open market operations; Variable reserve ratio and selective methods. Role and functions of the Reserve bank of India; Objectives and limitations of monetary policy with special reference to India.

**UNIT-III** Meaning and scope of public finance; Distinction between private and public finance; public goods v/s private goods; The principle of maximum social advantage; Market failure; Role of the government; Public expenditure - Meaning, classification and principles of public expenditure; Trends in public expenditure and causes of growth of public expenditure in India.

**UNIT-IV** Sources of Public revenue; taxation - Meaning, Canons and classification of taxes; Division of tax burden. The benefit and ability to pay approaches; Impact and incidence of taxes; Taxable capacity; Effects of taxation; Characteristics of a good tax system; Major trends in tax revenue of the Central and State Government in India.

**UNIT-V** Public debt and financial administration : Sources of public borrowing effects of public debt. Methods of debt redemption. The public budget- Kinds of budget, Economic and functional classification of the budget; Preparation and passing of budget in India.

The image shows four handwritten signatures or initials in blue ink. From left to right: the first is a stylized signature; the second is 'Jmm' with '(L.K. Bhatnagar)' written below it; the third is 'shy' with '(M. V. Narayana)' written below it; and the fourth is a signature that appears to be 'Sharma'.

### READING LIST -

- Ackley G. (1978), Macroeconomics : Theory and Policy, Macmillan Publishing Co., New York.
- Bhargavas B.H. (1981), The Theory and Working of Union Finance in India, chaitanya Publishing House Allaybad.
- Gupta, S.B. (1994), Monetary Economics S. Chand & Company, New Delhi.
- Houghton. E.W. (Ed.) (1988), Public Finance. Pengum, Battinore
- Jha R. (1998), Modorn Public Economics. Routledge, London.
- Mithani, D.M. (1981), Modern Public Finance, Himalaya Publishing House, Mumbai.
- Musgrave, R.A. and P.B. Musgrave (1976), Public Finance in Theory and Practice McGraw Hill, Kogakusha, Tokyo.
- Shapiro, E. (1996), Macroeconomics Analysis, Galgotia Publications, New Delhi.

### ADDITIONAL READING LIST-

- Day, A.C.L. (1960), Outline of Monetary Economics, Oxford University Press, Oxford.
- De Kock, M.H. (1960), Central Banking. Staples Press, London.
- Due, J.E. (1963), Government Finance, Irwin, Homewood.
- Government of India, Economimc Survey (Annual), New Delhi
- Halm, G.N. (1955), Monetary Theory, Asia Publishing House, New Delhi.



Handwritten signatures and initials of the faculty members, including 'D. Singh', 'J. K. Bhatnagar', 'S. K. Bhatnagar', and 'S. K. Bhatnagar'.

**इतिहास**  
**प्रश्न पत्र – प्रथम**  
**(भारत का इतिहास सन् 1206 से 1761 ई. तक)**  
**(पेपर कोड – 0179)**

**उद्देश्य –** इस पाठ्यक्रम का उद्देश्य विद्यार्थियों को मध्यकालिन भारत के इतिहास के प्रमुख राजनीतिक, सामाजिक, आर्थिक एवं सांस्कृतिक पक्षों से परिचित कराना है जो कि यू.जी.सी. मानदंडों के अनुरूप है ।

**इकाई- 1**

1. सल्तनत कालिन एवं मुगलकालिन इतिहास के स्रोत
2. दास वंश- ऐबक, इल्तुतमिश, रजिया, बलबन
3. खिलजी वंश – अलाउद्दीन खिलजी  
तुगलक वंश – मोहम्मद बिन तुगलक, फिरोजशाह तुगलक
4. तैमूर का भारत आक्रमण ।

**इकाई- 2**

1. मुगल साम्राज्य की स्थापना – बाबर  
शेरशाह सूरी की प्रशासन व्यवस्था
2. अकबर की राजपूत नीति
3. मुगल शासनों की धार्मिक नीति – अकबर से औरंगजेब तक
4. राजनीतिक संस्थाएं एवं प्रशासन

**इकाई- 3**

1. सल्तनत कालीन सामाजिक, आर्थिक दशा
2. मुगल कालीन सामाजिक, आर्थिक दशा
3. धार्मिक एवं सांस्कृतिक दशा – भक्ति आन्दोलन
4. सूफीवाद

**इकाई- 4**

1. सल्तनत कालीन कला एवं स्थापत्य
2. मुगलकालीन कला एवं स्थापत्य
3. सल्तनतकालीन शिक्षा एवं साहित्य
4. मुगलकालीन शिक्षा एवं साहित्य

**इकाई- 5**

1. विजय नगर राज्य – कृष्णदेव राय
2. बहमनी राज्य
3. शिवजी प्रशासन
4. तृतीय पानीपत युद्ध – कारण एवं परिणाम

*Wazir*  
20/7/17

*Ram*

### अनुशंसित ग्रंथ—

1. श्रीवास्तव ए.एल. — भारत का इतिहास (अंग्रेजी अनुवाद)
2. श्रीवास्तव ए.एल. — दिल्ली सल्तनत (अंग्रेजी अनुवाद)
3. श्रीवास्तव ए.एल. — मुगलकालीन भारत (अंग्रेजी अनुवाद)
4. हबीबुल्लाह — भारत में मुस्लिम शासन की बुनियाद
5. मजूमदार, राय चौधरी एवं दत्त — भारत का वृहत इतिहास खंड — 2
6. पंजाबी बी. के. — भारत का इतिहास (1206—1761) (म.प्र. हिन्दी ग्रंथ अकादमी, भोपाल)
7. हबीब एवं निजामी — दिल्ली सल्तनत
8. वर्मा हरिशचन्द्र — मध्यकालीन भारत (750—1540)
9. शर्मा कालूराम एवं व्यास प्रकाश — मध्यकालीन भारतीय संस्कृति
10. सक्सेना आर.के. — दिल्ली सल्तनत
11. राधेशरण — भारत की सामाजिक एवं आर्थिक संरचना और संस्कृति के मूल तत्व (आदिकाल से 1950 ईस्वी तक) (म.प्र. हिन्दी ग्रंथ अकादमी भोपाल)
12. पाण्डेय ए.बी. — पूर्व मध्यकालीन भारत
13. पाण्डेय ए.बी. — उत्तर मध्यकालीन भारत
14. ईश्वरी प्रसाद — मुगलकालीन भारत
15. श्रीवास्तव एच.एस. — मुगलकालीन शासन व्यवस्था
16. सरदेसाई जी. एस. — मराठों का नवीन इतिहास खंड — 2
17. सरकार जे.एन. — शिवजी और उनका युग
18. त्रिपाठी आर. पी. — मुगल साम्राज्य का इतिहास और पतन
19. मित्तल ए.के. — युनीफाइड इतिहास (प्रारंभ से 1761 ई. तक)
20. मित्तल ए.के. — युनीफाइड इतिहास प्राचीन काल से 1950 ईस्वी तक
- 21- Dey, U.N – Mugal Government
- 22- Habibulla, A.D.M. – Foundation of Muslim Rule in India
- 23- Habib & Nizami – Comprehensive History of India
- 24- Majumdar, Roy Choudhary – An Advanced History of India VOI-II & Dutt
- 25- Mehta – Advanced Study in the Medieval History of India
- 26- Pandey A.B.- Early Medieval India
- 27- Pandey A. B. – Medieval India
- 28- Prasad Ishwari – Medieval India
- 29- Sarkar, J. N. – Shivaji and his Time

Kamal  
20/7/17



**इतिहास प्रश्न पत्र – द्वितीय**  
**(विश्व का इतिहास, सन् 1789 से 1871 ई. तक**  
**(पेपर कोड – 0180)**

**उद्देश्य –** इस पाठ्यक्रम का उद्देश्य विद्यार्थियों को विश्व इतिहास की प्रमुख घटनाओं के अवगत कराना है ।

**इकाई– 1**

1. फ्रांस की क्रांति – नेशनल कन्वेंशन से आंतक का राज्य तक
2. डायरेक्टरी शासन
3. नेपोलियन बोनापार्ट का उत्थान एवं उपलब्धियां
4. नेपोलियन बोनापार्ट का पतन

**इकाई– 2**

1. वियना कांग्रेस, यूरोप की संयुक्त व्यवस्था
2. अनुदारवाद – मेटर्निक
3. 1830 की क्रांति – कारण एवं परिणाम
4. 1848 की क्रांति – कारण एवं परिणाम

**इकाई– 3**

1. औद्योगिक क्रांति
2. इंग्लैण्ड में उदारवाद – 1832 के सुधार
3. 1867 के सुधार
4. चार्टिस्ट आंदोलन

**इकाई– 4**

1. नेपोलियन तृतीय की उपलब्धियां
2. पूर्वी समस्या – उदय के कारण
3. यूनान का स्वतंत्रता संग्राम
4. कीमिया युद्ध

**इकाई– 5**

1. रूस – जार अलेक्जेंडर द्वितीय
2. इटली का एकीकरण
3. जर्मनी का एकीकरण
4. मेईनी पुनर्स्थापना – 1868

**संदर्भ ग्रंथ –**

1. हेजन – आधुनिक यूरोप का इतिहास
2. बी.आई. पाल – आधुनिक यूरोप का इतिहास
- 3- HAL Fisher – A History of Europe
- 4- Christopher – From Reformation to Industrial Revolution
- 5- A.J.P. Taylor – The Origins of the second war
- 6- David Thompson – Europe , Nepelean
7. पी.एन. मेहता – आधुनिक यूरोप (1789–1871)
8. दीनानाथ वर्मा – आधुनिक यूरोप का इतिहास
9. मथुरालाल वर्मा –आधुनिक यूरोप का इतिहास
- 10- Fidher – A Hidtory of Europe
11. दीनानाथ वर्मा एवं शिवकुमार सिंह – विश्व इतिहास का सर्वेक्षण

Karnaf  
20/7/17

[Signature]



## **G E O G R A P H Y**

1. The B.A. Part-II examination in Geography will be of 150 marks. There will be two theory papers and one practical each of 50 marks as follows :

**Paper-I** Physical Geography-II (Climatology and Oceanography)

**Paper-II** Regional Geography with special reference to North America

**Paper-III** Practical Geography

2. Each theory paper shall be of three hours duration.
3. Candidates will be required to pass separately in theory and practical examinations.
4. Each theory paper is divided into five units.
5. (a) In the practical examination, the following shall be the allotment of time and marks.

(i) Lab work	- 25 marks	upto three hours.
(ii) Field work (survey)	- 15 marks	Two hours
(iii) Practical Record and viva-voce	- 10 marks	
- (b) The external and internal examiners shall jointly submit marks.
- (c) The candidates shall present at the time of the practical examination their practical records, regularly signed by the teachers concerned.

### **PAPER - I**

#### **PHYSICAL GEOGRAPHY - II**

**(CLIMATOLOGY AND OCEANOGRAPHY) (Paper Code-0187)**

#### **A. CLIMATOLOGY**

**UNIT-I** Weathers and climate; definition and significance of climatology. Elements of weather and climate; their causes. Composition and structure of the atmosphere. Atmospheric Temperature : Insolation and Global energy budget, vertical, horizontal and seasonal distribution of temperature.

Atmospheric pressure and winds : Vertical and horizontal distribution of pressure; planetary, periodic and local winds.

**UNIT-II** Atmospheric moisture : humidity, evaporation; and condensation; hydrological cycle; types of precipitation, world patterns of rainfall : regional and seasonal distribution. Atmospheric disturbances : tropical and temperate cyclones; thunderstorms and tornadoes.

**UNIT-III** Climatic classification, basis of Köppen's classification and types-distribution, characteristics and related plant and animal life.

Role of climate in human life; Atmospheric pollution and global warming general causes, consequences and measures of control.

#### **B. OCEANOGRAPHY**

**UNIT-IV** Relevance of oceanography in earth and atmospheric science. Definition of oceanography, Surface configuration of the ocean floor, continental shelf, continental slope, abyssal plain, mid-oceanic ridges and oceanic trenches. Relief of Atlantic, Pacific and Indian oceans. Distribution of temperature and salinity of oceans and seas.

**UNIT-V** Circulation of oceanic waters ; Waves, tides and currents, currents of the Atlantic, Pacific and Indian ocean as storehouse of resources for the future.



## **READINGS- CLIMATOLOGY**

1. Barry, R.G. & Chorley, R.J. Atmosphere, Weather and Climate, Routledge, 1998.
2. Critchfield, H. : General Climatology, Prontice-Hall, New York 1975.
3. Das, P.K. The Monsoons, National Book Trust, New Delhi 1968
4. Lydolph, Paul, E. : The climate of the Earth, Rowman and Allanheld, Totowa ..... 1985
5. Mather, J.R. : Climatology, McGraw-Hill, New York, 1974.
6. Patterson, S. Introduction of Meteorology, McGraw-Hill Book Co., London, 1969.
7. Stringer, E.T. : Foundation of Climatology, Surjeet Publications, Delhi, 1982.
8. Trewartha, G.t. : An Introduction to Climate : Inernational Students edition, cGraw Hill, New York, 1980.

## **OCEANOGRAPHY**

1. Anikouchine, W.A. and Sternberg, R.W. : The World Oceans - An Introduction to Oceanography Englewood Cliffs : N.J. 1973.
2. Grald, S. : General Oceanography- An Introduction, John Wiley & Sons, New York, 1980.
3. Garrison, T. Oceanography : Wardsworth. com., U.S.a. 1998.
4. King C.A.M. Benches and Coasts, E. Arnold, London, 1972.
5. King C.A.M. : Oceanography for Geographers E. Arnold, London, 1976.
6. Sharma, R.C. Vatel M., Oceanography for Geographers : Chetnya Publishing House, Allahabad, 1970.
7. Shepard, F.P. : Submarine Geology, Harper & Sons, New York, 1948.
8. Thurman, H.B. Introductory Oceanography, Charlos Webber E. Marril Publishing Co., 1984.
9. Weisberg, J. and Howard : Introductory Oceanography, McGraw-Hill Book Co., New York, 1976.



**PAPER-II (Paper Code-0188)**

**REGIONAL GEOGRAPHY WITH SPECIAL REFERENCE TO NORTH AMERICA**

**UNIT-I** Regional concept ; Bases of regionalization ; North America-structure, relief, climate and soils.

**UNIT-II** Forests, Distribution and Production of Mineral and Energy Resources (Iron ore, Manganese, Copper, Coal, Petroleum and Hydro-electricity) of North America.

**UNIT-III** Major Crops ; Agricultural belts, Live stock and Dairy Farming in North America.

**UNIT-IV** Industries of North America - Localization, development & production (Iron & Steel, Cotton textile, Heavy Engineering Industries), Industrial Regions, Population ; Trade and Transport.

**UNIT-V** Detailed study of the following regions of North America : California valley, New England Region, Lake Region, Alaska, Prairie Region and St. Lawrence valley.

**PAPER-III**

**PRACTICAL GEOGRAPHY**

**UNIT-I** Distribution Maps : Dot, Choropleth & Isopleth

**UNIT-II** Map Projections : Definition and classification, Cylindrical projections-simple, equal area, Gall's, Mercator's.

**UNIT-III** Interpretation of weather maps : Use of meteorological instruments.

**UNIT-IV** Statistical Methods : Quartile : Mean deviation, standard deviation and Quartile deviation ; Relative variability and co-efficient of variation.

**UNIT-V** Surveying-Prismatic Compass Survey : open and closed traverse, correction of bearing, calculation of interior angles.

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## PSYCHOLOGY

### PAPER - I

#### SOCIAL PSYCHOLOGY (Paper Code-0189) M.M. 50

- UNIT-I** Nature, goal and scope of social psychology, methods of social psychology :experimental, survey, interview, observation, sociometry. Approaches to study of social behaviour : psychoanalytic, cognitive, behavioural.
- UNIT-II** Social Perception: Perception of self and others, impression formation and its determinant, prosocial behaviour : co-operation and helping, personal, situational and socio-cultural determinants.
- UNIT-III** Stereotypes: Nature, determinants, prejudice : nature and determinants, Attitudes: nature and measurements, interpersonal attraction and its determinants.
- UNIT-IV** Group Structure and function, social facilitation, conformity, cohesiveness. Group Norms. Leadership : Nature types characteristics and functions.
- UNIT-V** Social issues : Aggression, determinants, prevention and control. Population Explosion: nature and consequences, socio, cultural pollution : corruption, mob behaviour, gender discrimination and child labour.

#### REFERENCES:

सिंह अरुण कुमार – समाज मनोविज्ञान की रूपरेखा, मोतीलाल बनारसोदा।  
मिश्रा, जी जैन – समान मनोविज्ञान के मूल आधार म.प्र. हिन्दी ग्रंथ अकादमी।  
त्रिपाठी लालबचन – समाज मनोविज्ञान की रूपरेखा हरप्रसाद भार्गव।

Boron R.A. & Byrne - Social psychology New Delhi : Prentice second, P.F. & Backman, C.W. (1994) - social psychology Magraw-Hill.

U. Chhabra  
1.8.17

1/8/17

1.8.17

**PAPER - II**  
**PSYCHOLOGICAL ASSESSMENT (Paper**  
**Code-0190)**

**M.M. 50**

- UNIT-I** Psychological Assessment : Concept, difference between physical and psychological assessment, levels of assessment, barriers to psychological assessment, Unidimensional and multidimensional assessment.
- UNIT-II** Psychological Test : Concept, characteristics, types, standardized and non-standardised, group, performance and verbal, uses of psychological tests.
- UNIT-III** Test Construction : Steps in test construction, Reliability : Test-retest, split-half, factors affecting reliability, validity : Content and predictive, factor affecting validity. Norms-age and grade.
- UNIT-IV** Cognitive and noncognitive tests : cognitive-introduction to intelligence, aptitude, achievement testing. Noncognitive : Introduction to personality, interest, value testing.
- UNIT-V** Psychological Testing in applied aspects of life : education, occupation, social, health and organization, socio-cultural factors in psychological assessment.

**REFERENCE -**

Anastasi (1997) Psychological testing, New York : Mac Hill Ciminero, A.R. (1986) Hand book of Behavioural assessment, New York : John Wiley.

Gupta, S.P. (2001) : आधुनिक मापन एवं मुल्यांकन, शारदा पुस्तक भण्डार, वाराणसी ।

U. W. Chaturvedi  
1.8.17

T. S. Chaturvedi  
1/8/17

S. P. Gupta  
1.8.17

**PAPER - III**  
**PSYCHOLOGY PRACTICALS**

This paper carries 50 Marks. It has two parts of equal marks. Part A Comprises of laboratory experiments and psychological testing, while part B is devoted to field work.

**Part A : Note :** Conduction of any 5 experiments and administration of any 4 psychological tests of the following is compulsory.

**Experiments :**

1. Effect of group on decision making
2. Social facilitation
3. Effect of social setting on sociometry
4. Sterio Types
5. Effect of order of information on person-perception
6. Effect of leadership on performance
7. Effect of cognitive dissonance on attitude change
8. Effect of communicator's credibility on suggestibility.

**Tests :**

- (i) Aggression
- (i) Deprivation
- (i) Self-concept
- (iv) Dependence proneness scale
- (v) Value
- (vi) Vocational interest
- (vii) Attitude scale
- (viii) Creativity

**Part B. Field Work**

Each student will be required to visit the hospital/Industrial organisation/educational institution etc. under departmental supervision and shall be preparing his/her observation report, revealing his/her psychological insight about group dynamics that is operation in the unit. This record constitutes a part of assessment of field visit.

Measures of central tendency in group data correlation Rank order.

Distribution of Marks :

- |  |           |
|--|-----------|
| A. Conduction of psychological experiment and reporting  | 15 marks. |
| B. Administration of one sychological test and reporting | 15 marks. |
| C. Evaluation of Practical note book of field work       | 10 marks. |
| D. Viva-Voce   | 10 marks. |

*U. K. Chhabra*  
1.5.17

*1/8/17*

*1.8.17*

**प्राचीन भारतीय इतिहास, संस्कृति एवं पुरातत्व**  
**प्रथम प्रश्न पत्र**  
**(पेपर कोड— 0203)**  
**भारत का राजनीतिक इतिहास (319 ई. से 1300 ई. सन् तक) पूर्णांक — 75**

**उद्देश्य :** पाठ्यक्रम का उद्देश्य विद्यार्थियों को संबंधित कालखण्ड के राजनीतिक इतिहास का समुचित ज्ञान प्रदान करना है।

**इकाई— 1**

1. गुप्तों की उत्पत्ति एवं प्रारंभिक इतिहास
2. चन्द्रगुप्त प्रथम, रामगुप्त, समुद्रगुप्त
3. कुमार गुप्त प्रथम, स्कन्दगुप्त
4. वाकाटक राजवंश, गुप्त-वाकाटक सम्बन्ध

**इकाई— 2**

1. परवर्ती गुप्त राजवंश
2. मौरवरी
3. वर्धन राजवंश और हर्ष का प्रशासन

**इकाई— 3**

1. बादामी के चालुक्य
2. कांची के पल्लव
3. चोल तथा उनका प्रशासन

**इकाई— 4**

1. गुर्जर प्रतिहार
2. राष्ट्रकूट
3. पाल
4. गाहड़वाल

**इकाई— 5**

1. चन्देल
2. परमार
3. चाहमान
4. त्रिपुरी के कलचुरि
5. रतनपुर के कलचुरि

**अनुशासित पुस्तकें —**

1. उदयनारायण राय : गुप्त राजवंश तथा उसका इतिहास (नया संस्करण) 1988.
2. श्री राम गोयल : भारत का राजनैतिक इतिहास भाग 2 एवं 3.
3. श्री राम गोयल : गुप्त साम्राज्य का इतिहास
4. Ashvini Agrawal : Rise and Fall of the imperial Gupta
5. विशुद्धानंद पाठक : उत्तर भारत का राजनीतिक इतिहास
6. अवध बिहारी लाल अवस्थी : राजपूत राजवंश
7. डी.सी. गांगुली : परमार राजवंश
8. भगवती प्रसाद पांथरी : मौखरी और पुष्यभूमि राजवंश
9. डॉ. के.ए. नीलकंठ शास्त्री : दक्षिण भारत का इतिहास
10. डॉ. बैजनाथ शर्मा — हर्षवर्धन

20/7/17

[Signature]

11. R.C. Majumdsar Pusalkar (ED)& A.D. : The Classical Age. "The age of Imperial Unity" The Struggle for Empire.
12. Majumdar, Ray Choudhary: An Advanced History of India. Vol.I
13. H.C.Ray : Dynastic History of Northern India, Vol.II
14. A.S.Altekar : Gupta-Vakataka Age, Gupta-Vakataka Yug(Hindi)
15. YajdaniG. : Early History of the Deccan
16. Devanuti : Harsha-A Political Study
17. K.A.Neelkantha Shastry : The History of South India the Cholas.
18. Dasaratha Sharma : Lectures on Rajput History

Karnaf  
20/7/17





**द्वितीय प्रश्न पत्र**  
**(अ) प्राचीन भारतीय धर्म और दर्शन**  
**(पेपर कोड – 0204)**  
**(वैदिक काल से 1300 ई. तक)**

**उद्देश्य :** पाठ्यक्रम में धार्मिक और दार्शनिक विचारों के विकास की प्रमुख प्रवृत्तियों का आधारभूत अध्ययन अपेक्षित है।

**इकाई— 1**

1. वैदिक धर्म का उद्भव एवं विकास
2. बौद्ध धर्म का उद्भव एवं विकास
3. जैन धर्म का उद्भव और सिद्धांत

**इकाई— 2**

1. शैव धर्म — उद्भव और विकास
2. वैष्णव धर्म — उद्भव और विकास

**इकाई— 3**

1. शाक्त धर्म — उद्भव और विकास
2. दक्षिण भारत में भक्ति आंदोलन— अलवार और नयनार

**इकाई— 4**

1. औपनिषदिक दर्शन
2. गीता का दर्शन
3. चार्वाक दर्शन
4. सांख्य दर्शन

**इकाई— 5**

1. योग दर्शन
2. न्याय दर्शन
3. वैशेषिक दर्शन
4. मीमांसा दर्शन

**अनुशासित पुस्तकें —**

1. डॉ. गोविन्द चन्द्र पाण्डे : बौद्ध धर्म के विकास का इतिहास
2. आर.जी. भण्डारकर (अनुवाद) : वैष्णव शैव एवं अन्य धार्मिक मत
3. बलदेव उपाध्याय : भागवत सम्प्रदाय
4. यदुवंशी : शैवमत
5. एस.एन. राय : पौराणिक धर्म एवं समाज
6. सुस्मिता पाण्डेय : समाज आर्थिक व्यवस्था एवं धर्म
7. एम. हिरियन्ना : भारतीय दर्शन की रूपरेखा
8. बलदेव उपाध्याय : भारतीय दर्शन
9. एस. राधाकृष्णन : भारतीय दर्शन भाग —1 एवं 2
10. डॉ. उमेश मिश्रा : भारतीय दर्शन
11. R.K.Mission(Ed.) : Cultural Heritage of India, Vols. I and II
12. A.B.Keith : Religion and Philosophy of the Vedas and the Upanishadas
13. Dr. G.C. Pande : Foundation of Indian Culture, Vol-I Spiritual Vision & Symbolic forms in Ancient India
14. S.R.Goyal : A. Religious History of India, Vols. I & II
15. Suvira Jayaswal : Origin and Development of Vaishnavism
16. S.Pande : Birth of Bhakti in Indian Religions & Art

17. G.C.Pandey	:	Studies in the origin of Buddhism
18. TreverLing	:	Buddhism(Pelican)
19. LalmanJoshi	:	Introduction to Indian Religions
20. SudhakarChattopadhyaya	:	Hindu Religions, Sects
21. S.N.Ray	:	Historical and cultural study of the Puranas
22. A.MacDonnel	:	Vedic Mythology
23. S.N.Dasgupta	:	History of Indian Philosophy, 5 Vols.
24. Maxmuller	:	Six systems of Indian Philosophy
25. Mahadevan, T.M.P.	:	Invitation to Indian Philosophy
26. S.Radhakrishnan	:	Indian Philosophy, 2 Vols.

अथवा

### द्वितीय प्रश्न पत्र

(ब) प्राचीन भारतीय राजनय तथा प्रशासन  
(पेपर कोड – 0205)

पूर्णांक : 75

- इकाई –1 राज्य की उत्पत्ति, प्रकार, स्वरूप तथा कार्य ।  
 इकाई –2 राजपद, मंत्रिपरिषद्-संगठन एवं कार्य, सप्तांग सिद्धांत ।  
 इकाई –3 गणराज्य : संगठन, शासन, पद्धति, गुण-दोष ।  
 इकाई –4 अंतर्राष्ट्रीय संबंध, मण्डल सिद्धांत, षाडगुण्य सिद्धांत, दूत व्यवस्था, गुप्तचर व्यवस्था ।  
 इकाई –5 विभिन्न राजवंशों की प्रशासन व्यवस्था:  
 मौर्य, गुप्त, रतनपुर कलचुरि वंश की प्रशासन व्यवस्था, राष्ट्रकूट एवं चोलवंश ।

अनुशासित पुस्तकें –

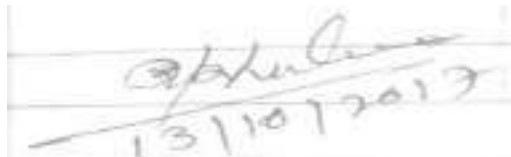
1. अनंत सदाशिव अल्तेकर : प्राचीन भारतीय शासन पद्धति
2. काशी प्रसाद जायसवाल : हिन्दु राजतंत्र, भाग 1. 2
3. डॉ. रवीन्द्रनाथ अग्रवाल : मध्यप्रदेश क्षेत्र के अंतर्राष्ट्रीय संबंधों का अध्ययन
4. सत्यकेतु विद्यालंकार : प्राचीन भारतीय शासन व्यवस्था एवं राज्य शास्त्र
5. मरोरमा जौहरी : प्राचीन भारत में राज्य और शासन व्यवस्था
6. हरिश्चन्द्र शर्मा : प्राचीन भारतीय राजनीतिक विचारक एवं संस्थाएं
7. राधाकृष्ण चौधरी : प्राचीन भारतीय राजनीति एवं शासन व्यवस्था

*Narap*  
20/7/17

*Pran*

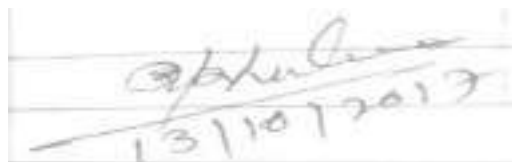
**MUSIC**  
**PAPER - I**  
**THEORY OF INDIAN MUSIC. VOCAL \ INSTRUMENTAL**  
**(Paper Code-0201)**

- UNIT-I (a) Definitions and study of the following terms : Graha, Ansha, Nayas Swara, Paryayansha Swara, Alpatava-Bahutva, Aavirbhava-Tirobhava, Gandharva-Gan, Nibaddha-Anibaddha Gan, Jamjama, Ghaseet, Krintan, Shuddha, Chayalag, Sankirna Raga.
- (b) Swasthan Niyam, Ragalap, Aalapti, Akshiptika, Samvadatva.
- UNIT-II Short Biographics and contributions of the Musicians :- Sharangdeva, Acharya Bharat, Aahobal, Venkatmakhi, Sadarang-Adarang. Aalauddin Khan, Faiyaz Khan, Imdad Khan, Pt. Ravi Shankar.
- UNIT-III Notation of Talas with Dugun and Chaugun Layakaries :-  
Roopak, Teevra, Sultal, Deepchandi, Jhumra, Adachautal, Dhamar, Tilwara.
- UNIT-IV (a) Study of Karnatak Taal System,  
(b) Comparative study of Karnatak and Hindustani Taal System.
- UNIT-V Definition of Vaggeyakar, Uttam Vageyakar, Adham Vaggeyakar, Classification of Instruments :- Tat, Vitat, Ghan, Shushir

  
13/10/2017

**PAPER - II**  
**THEORY OF INDIAN MUSIC VOCAL.INSTRUMENTAL M.M. : 50**  
**(Paper Code-0202)**

- UNIT-I Elementry of Medium-Sound, Musical Sound and Noice, Vibratory motions, Frequency, Pitch, Magnititude and Timber, Major Tone, Minor Tone, Semi Tone.
- UNIT-II Study of Melas or Thatas as follows :
- (a) 72 Melas of Venkat Mukhi
  - (b) 32 Thatas of V.N. Bhatkhande
- UNIT-III History of Indian Music as follows :
- (a) Origin of Music
  - (b) Vedic, Pauranik and Gupta Period a short survey
- UNIT-IV (a) Explanation of the following terms :
- Kajari, Chaiti, Rabindra Sangeet, Tribal Music, Lawani, Garba, Baul, Bhatiyali, Mand
  - (b) Merits of a good listener, Qualities of a good listener to make any music programme a success.
- UNIT-V (a) Study of theoritical details of Ragas prescribed for practical course : Bihag, Kedar, Desh, Bageshwari, Malkauns, Jaunpuri, Bhairavi, Hameer, Kalingda, Kamod, Chhayanat.
- (b) Writing in notation of songs (Bandish) or gats prescribed in practical course of Second year.
  - (c) Writing of a critical appreciation of Radio or T.V. Music (Classical) Programme.

  
13/10/2017

**PRACTICAL  
VOCAL/INSTRUMENT**

**M.M. : 50**

1. Study of the following Ragas : Bihag, Kedar, Desh, Bageshwari, Malkauns, Jaunpuri, Bhairavi, Hameer, Kalingda, Kamod, Chhayana .
2. Two Vilambit Khayalas/Maseet Khani Gat, with Alap and Tanas or Todas. One Choice of the candidate and one vilambit asked by the examiner. 10 marks
3. Sargam geet and Lakshan geet in all the above Ragas. Playing of a Gat in Jhaptal and Rupak Tal. 3 + 3 = 6
4. Drut Khayal or Raza Khani Gat with Tanas or Todas in any five of the above mentioned Ragas. 4 + 4 = 8
5. Singing of a Dhrupad Dhamar with Layakaris or playing a Gat in other than Teen Tal. 8 marks
6. Study of the following Talas :  
    Roopak, Teevra, Sooltaal, Deepchandi, Jhumra, Adachautal, Dhamar, Tilwara.  
    Demonstration of Talas with Dugun Chaugun. 4 marks  
    Singing of Tarana/Playing of Bol or Jhala 4 marks

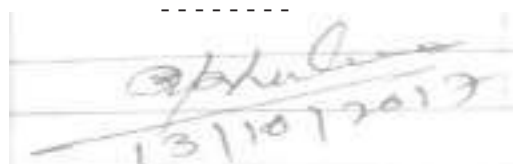
**SESSIONAL WORK**

**M.M. : 10**

1. Keeping up to date Practical and Theory note books. Attendance in Class and performance in college classes.
2. Ten descriptions of Music Programmes in Radio, T.V. or Personally attended. Participation in Departmental activities.

**BOOKS RECOMMENDED -**

1. Hindustani Sangeet Paddhati Kramik Pustak Malika (Part-1-4) By V.N. Bhatkhande.
2. Sangeet Visharad, by Vasant.
3. Sangeet Bodh, by S.S. Paranjape.
4. Sangeet Shastra Darpan, By Shanti Govardhan Part I + II
5. Rag Bodh, By B.R. Deodher Part I, II, III
6. Bharatiya Sangeet, Ka Itihass by Umesh Joshi. By Dr. S.S. Paranjape.
7. Sangeet Shastra 1 + 2 + 3 by Mahesh Narayan Saxena.
8. Sangeet Shastra 1, 2, 3 by V.N. Bhatkhande.
9. Sangeetanjali, by Pt. Omkar Nath Thakur.
10. Sitar Malika, by Bhagwat Sharan Sharma.
11. Taal Prakash by Bhagwat Saran.
12. Dhvani Aur Sangeet by Lalit Kishore Singh.

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**गृह विज्ञान**  
**प्रश्न पत्र – 1**  
**तंतु एवं वस्त्र विज्ञान**  
**(पेपर कोड – 0191)**

इस परीक्षा में दो प्रश्न पत्र होंगे । जिसमें से प्रत्येक तीन घंटे की अवधि तथा 50 अंकों का होगा । एक प्रायोगिक परीक्षा 50 अंकों की होगी । जिसमें से 10 अंक सत्रीय कार्य के लिये सुरक्षित रहेंगे । कुल अंक 150 होंगे । परीक्षार्थियों को लिखित एवं प्रायोगिक परीक्षा में पृथक-पृथक उत्तीर्ण होना अनिवार्य –

- इकाई – 1** तन्तु विज्ञान का परिचय – तन्तुओं का वर्गीकरण, विशेषतायें, भौतिक एवं रासायनिक परीक्षण ।
- इकाई – 2** वस्त्र बुनाई (Weaver) : के प्रकार – सादी ट्विल सेटिन जैकार्ड, पाइल । आधारभूत परिसज्जाएँ, विशेष परिसज्जाएँ । रंगों का वर्गीकरण एवं विभिन्न तंतुओं के लिये उनकी उपयुक्तता ।
- इकाई – 3** छपाई—प्रकार, ब्लाक, स्टेन्सिल, स्क्रीन, डिसचर्ज रोलर । प्रत्येक प्रकार की छपाई की विधियाँ । टाई एंड डाई—विशेषता, विधि ।
- इकाई – 4** धुलाई : जल, साबुन, शुष्क धुलाई, कलफ तथा नील । धब्बे छुड़ाना, विभिन्न प्रकार के वस्त्र धोना ।
- इकाई – 5** परिधान – परिधान एवं व्यक्तित्व, परिधान का चुनाव, ड्रापिंग की विधि, सीवर (प्रकार) परिधान में पूर्णता (डार्ट, प्लीट्स, टक्स, गेदर्स) प्लैक्ट ओपनिंग, फासनर ।

**स्वीकृत पुस्तकें –**

1. वस्त्र विज्ञान एवं परिधान : छॉ. प्रमिला
2. वस्त्र विज्ञान के मूल सिद्धांत : डॉ. जी.पी. शैरी
3. हाउसहोल्ड फिसिक्स : डॉ. कुल श्रेष्ठ
4. गृह व्यवस्था एवं गृह सज्जा : श्रीमती के. बक्शी
5. गृह व्यवस्था एवं गृह सज्जा : चन्द्रकांता मांडलिक
6. गृह व्यवस्था एवं गृह कला : जी.पी. शैरी
7. गृह व्यवस्था एवं गृह कला : श्रीमति कांति पांडेय
8. पारिवारिक परिधान एवं व्यवस्था – मंजु पाटनी व सपना हेनरी
9. गृह व्यवस्था : छॉ. करुणा शर्मा

*Handwritten signatures and dates:*  
22/7/17  
22/7/17  
22/7/17  
22/7/17

**गृह विज्ञान**  
**प्रश्न पत्र – 2**  
**पारिवारिक संसाधन प्रबंधन**  
**(पेपर कोड – 0192)**

**पूर्णांक – 50**

- इकाई – 1** गृह प्रबंध : गृह प्रबंध की परिभाषा, गृह प्रबंध प्रक्रिया, परिवार में गृहणी के कर्तव्य एवं उत्तरदायित्व – मूल्य, लक्ष्य स्तर-अर्थ विशेषता वर्गीकरण एवं विकाय, निर्णय प्रक्रिया।
- इकाई – 2** गृह सज्जा : कला के सिद्धांत एवं कला के तत्व । नमूना-रचनात्मक एवं अलंकारमय नमूना, नमूने के सिद्धांत।  
रंग-रंग के महत्व एवं प्रभाव, फर्नीचर का चुनाव एवं महत्व, गृह सज्जा के उपसाधन । पुष्प सज्जा, प्रकार सिद्धांत, उपयोग।
- इकाई – 3** पारिवारिक साधन : पारिवारिक साधन, वर्गीकरण, विशेषतायें, उपयोग को प्रभावित करने वाले तत्व, समय-अवधारणा, समय, व्यवस्थापन के साधन । समय व्यवस्थापन की प्रक्रिया ।  
शक्ति- अवधारणा, विभिन्न घेरलू कार्यों में शक्ति व्यवस्थापन की प्रक्रिया ।  
आय के साधन एवं प्रकार, पारिवारिक बजट, व्यय बचत, रहन सहन का स्तर , आय व्यय का लेखा जोखा (एकाउंट कीपिंग)
- इकाई – 4** रसोई घर : आधुनिक रसोई घर, प्रकार, रसोई-घर के कार्यक्षेत्र, ईंधन के गैर परम्परागत स्रोत, सौर ऊर्जा, जल वितरण प्रणाली, वायुबीजन, प्रकाश की व्यवस्था, संग्रह व्यवस्था।
- इकाई – 5** कार्य का सरलीकरण – अर्थ, कार्य, विधियां एवं आदतों में सुधार की तकनीक, प्रोसेस चार्ट, पाथवे चार्ट, परिवर्तन की श्रेणियां । समय शक्ति एवं श्रम बचत के उपकरण।

**प्रायोगिक कार्य :**

1. सिलाई – ब्लाउज, बेबी फ्राक, झबला, बाबा सूट, पंजाबी कुरता, सलवार, पेटीकोट, पुष्प सज्जा।
2. धुलाई- विभिन्न वस्त्रों की धुलाई, धब्बे छुड़ाना, बांधनी का कार्य ।
3. पुष्प सज्जा।

**अंक वितरण –**

सत्रीय : 10

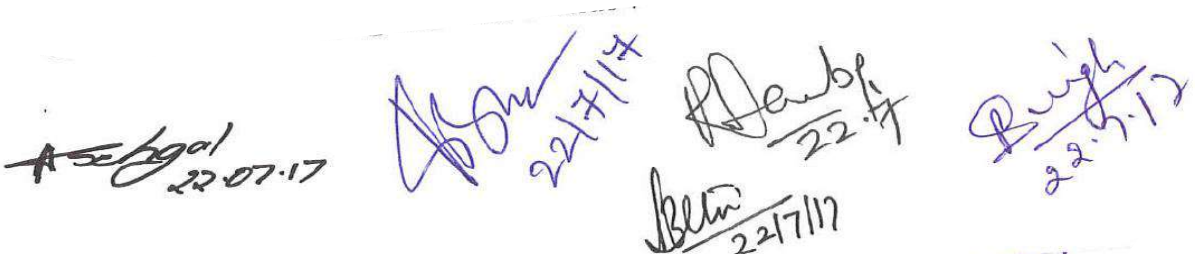
सिलाई : 20

धुलाई : 15 (धुलाई कार्य, बांधनी – 10 , धब्बा छुड़ाना 5)

पुष्प सज्जा : 5

**स्वीकृत पुस्तकें :**

- |                                   |   |                          |
|-----------------------------------|---|--------------------------|
| 1. वस्त्र विज्ञान एवं परिधान      | : | डॉ. प्रमिला              |
| 2. वस्त्र विज्ञान के मूल सिद्धांत | : | डॉ. जी.पी. शेरी          |
| 3. हाउसहोल्ड फिजिक्स              | : | डॉ. कुलश्रेष्ठ           |
| 4. प्रारंभिक कृषि विज्ञान         | : | राजेन्द्र प्रसाद         |
| 5. उद्यान विज्ञान                 | : | डॉ. एस.एस. श्रीवास्तव    |
| 6. गृह व्यवस्था एवं गृह सज्जा     | : | श्रीमती के. बक्शी        |
| 7. गृह व्यवस्था एवं गृह सज्जा     | : | चन्द्रकांता मांडलिक      |
| 8. गृह व्यवस्था एवं गृह कला       | : | जी.पी. शैरी              |
| 9. गृह व्यवस्था एवं गृह कला       | : | श्रीमति कांति पांडेय     |
| 10. कृषि विज्ञान                  | : | कृपाल सिंह भिंडर         |
| 11. उद्यान शास्त्र                | : | बसंत इंगाले              |
| 12. पारिवारिक परिधान एवं व्यवस्था | : | मंजु पाटनी व सपना हेनरी। |

  
22/7/17  
22/7/17  
22/7/17  
22/7/17

**B.A. II nd Year**  
**HISTORY OF INDIAN PAINTING**  
**(Paper Code-0219)**

**Marks : 50**

- (1) The time of theory paper is three hours.

pre-historic to Middle age.

**\* Pre-Historic Painting :**

Mirjapur	-	(U.P.)
Shinghanpur	-	(M.P.)
Housangabad	-	(M.P.)
Vimbatka	-	(M.P.)

**\* Proto Historic Painting :**

Jogimara  
Bayha  
Ajanta

**\* Middle age : Rajthani Painting -**

Mewad  
Style  
Kishan garh  
Bundi  
Mural  
Painting  
Akbar  
Jahangir  
Sahajahan

**\* Pahadi Painting :**

Basholi  
Kangda  
Chamba

**LIST OF THE BOOK RECOMENDED FOR THEORY :**

Bharatiya Kala Ka Itihas	:	Shayam Bihari Aggrawal
Bharatiya Chitra Kala Ka Vikas	:	C.L.Jha
Kala Vilas	:	R.A.Aggrawal





## **PRACTICAL**

There will be two practical paper evaluation will be made by the external and the internal examiner. Together and sessional marking is made by the class Teacher.

The time of each paper is four hour's and there will be a half hour's recess in between.

### **PORTRAIT FROMHEAD**

#### **PAPER - I**

Scheme of Examination.

Total Mark - 50

Time - Four Hour's

Examination-40

Size - 1/2 Imp. paper

Sessional - 10

Medium - Pencil or pastel

Sessional marking - 10

**Class work** - Minimum work to be submitted Five painting size 1/2 Imp Paper portrait from plaster or cement head will be drawn with light and shadow.

### **COMPOSITION**

#### **PAPER - I**

Scheme of Examination

Total Mark - 50

Time - Four hour's

Examination - 40

Size - 1/4 Imp Paper

Sessional -10

Medium - Poster colour

Sessional Marks - 10

**Class work** -

Minimum work to be submitted. Five painting size 1/4 Imp.

**Composition** -

Minimum two human figure and Maximum four human figure will be composed.

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## नृत्य (भारत नाट्यम)

इस विषय में दो सैद्धांतिक प्रश्न पत्र एक प्रायोगिक परीक्षा होगी । पूर्णांक एवं उत्तीर्णांक — होगा ।

क्रं	विवरण	पूर्णांक	अत्तीर्णांक
1	सैद्धांतिक प्रश्न पत्र प्रथम	50	17
2	सैद्धांतिक प्रश्न पत्र द्वितीय	50	17
3	प्रायोगिक	50	17
योग		150	51

### प्रथम प्रश्न पत्र (पेपर कोड — 0220)

1. पाणिनी काल से गुप्त काल तक नृत्य का इतिहास ।
2. नृत्य अभिनय के भेद — आंगिक, वाचिक, आहार्य एवं सात्विक अभिनय ।
3. विभिन्न भारतीय शास्त्रीय नृत्य प्रणालियों का संक्षिप्त परिचय ।
4. दक्षिण भारतीय ताल पद्धति ।
5. लोकधर्मी नाट्य परम्परा — संक्षिप्त जानकारी तीन की —  
1. जात्रा 2. कीर्तनेया 3. तमाशा 4. गरबा 5. डांडियारास 6. करमा 7. माड़िया

### द्वितीय प्रश्न पत्र (पेपर कोड — 0221)

1. नृत्य संबंधी निबंध ।
2. संक्षिप्त टिप्पणीयां — 1 मंगलाचरण 2. पुष्पांजलि 3. नृत्य कलाकार के आवश्यक गुण व दोष ।
3. भरत नाट्यम पद्धति के कर्मों का संक्षिप्त विवरण—  
1. अलारिपु 2. गतिस्वरम्
4. किसी वरिष्ठ नृत्य कलाकार की संक्षिप्त जीवनी —  
1. श्रीमति गौरी अम्मा 2. श्री मीनाक्षी सुदंरम् पिल्लई
5. संक्षिप्त टिप्पणी — नटन, नट, नट्य, नृत्य, नृत्त ।

### प्रायोगिक

#### 1. मौखिक मुद्रा प्रदर्श —

1. एक हाथ की प्रथम दस मुद्राओं का विनियोग (असंयुक्त हस्त मुद्रा विनियोग)
2. छेव हस्त
3. बंधु—बांधव हस्त

#### 2. कार्यक्रम विभाग—

1. बस अड़ऊ (अंग संचालन) का चार काल में प्रयोग ।
2. जतिस्वरम् प्रदर्शन ।
3. शब्दम् या श्लोकन् प्रदर्शन ।

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# दुर्ग विश्वविद्यालय, दुर्ग (छ.ग.)



पाठ्यक्रम

परीक्षा – 2017–18

बी.ए. भाग-3

**B.A. Part-III**

**B.A./B.A. (CLASSICS) PART-III**  
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## **REVISED ORDINANCE NO.11**

(As per State U.G.C. Scheme)

### **BACHELOR OF ARTS**

1. The three year course have been broken up in to three Parts.  
Part-I Examination : at the end of the first year.  
Part-II Examination : at the end of the second year and  
Part-III Examination : at the end of the third year.
2. A candidate who after passing (10-2) or intermediate examination of C.G. Board of Secondary Education, Raipur or any other examination recognised by the University or C.G. Board of Secondary Education as equivalent thereto, has attended a regular course of study in an affiliated college or in the Teaching Department of the University for one academic year shall be eligible for appearing at the B.A. Part-I examination.
3. A candidate who after passing B.A. Part-I examination of the University or any other examination recognised by the University as equivalent thereto has attended a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.A. Part II Examination.
4. A candidate who after passing B.A. Part II examination of the University has completed a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.A. Part-III examination.
5. Besides regular students, subject to their compliance with this ordinance, ex-students and non-collegiate candidates shall be eligible for admission to the examination as per provisions of Ordinance N. 6 relating to Examinations (General). Provided that non-collegiate candidates shall be permitted to offer only such subjects/papers as are taught to the regular students at any of the University Teaching Department or College.
6. Every candidate for the Bachelor of Arts examination shall be examined in : A.  
Foundation Course :
  - i) Group B - Hindi Language
  - ii) Group C - English LanguageB. Three Core subjects : One subject from any three groups out of the following six groups :
  1. Sociology/Ancient Indian History/Anthropology.
  2. Political Science/Home Science/Vocational Course.

3. Hindi Literature/Sanskrit Literature/Urdu Literature/Math.
  4. Economics/Music/Linguistics/Defence studies.
  5. Philosophy/Psychology/Geography/Education/Management.
  6. History/English Literature/Statistics.
  7. Practicals (if necessary) for each core subject.
7. Any candidate who has passed the B.A. examination of the University shall be allowed to present himself for examination in any of additional subjects prescribed for the B.A. examination and not taken by him at the degree examination. Such candidate will have to first appear and pass the B.A. Part I examination in the subject which he proposes to offer and then the B.A. Part II and Part III examination in the same subject. Successful candidate will be given a certificate to that effect.
8. In order to pass at any part of the three year degree course examination, an examinee must obtain not less than 33% of the total marks in each subject/group of subjects. In subject/group of subjects, where both theory and practical examination are provided, an examinee must pass in both theory and practical parts of the examination separately.
9. Candidate will have to pass separately at the Part-I, Part II and part-III examination. No division shall be assigned on the result of the Part-I and Part-II examination. In determining the division of the Final examination, total marks obtained by the examinees, in their Part-I, Part-II and Part-III examination in the aggregate shall be taken into account. Candidate will not be allowed to change subjects after passing Part I Examination.
- Provided in case of candidate who has passed the examination through the supplementary examination having failed in one subject only the total aggregate marks being carried over for determining the division shall include the actual marks obtained in the subject in which he appeared at the supplementary examination.
10. Successful examinees at the Part-III examination obtaining 60% or more marks shall be placed in the First division, those obtaining less than 60% but not less than 45% marks in the Second division and other successful examinees in the third division.

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**SCHEME OF EXAMINATION**

	<b>Subject</b>	<b>Paper</b>	<b>Max. Marks</b>	<b>Min. Marks</b>
<b>A. Compulsory Subject - Foundation Course :</b>				
	Hindi Language	I	75	26
	English Language	I	75	26
<b>B. Three Core Subject :</b>				
1.	Hindi Literature	I	75	150
		II	75	
2.	Sanskrit Literature	I	75	150
		II	75	
3.	English Literature	I	75	150
		II	75	
4.	Philosophy	I	75	150
		II	75	
5.	Economics	I	75	150
		II	75	
6.	Political Science	I	75	150
		II	75	
7.	History	I	75	150
		II	75	
8.	Ancient Indian History Culture & Archaeology	I	50	100
		II	50	
			Practical	50
9.	Sociology	I	75	150
		II	75	
10.	Geography	I	50	100
		II	50	
			Practical	50
11.	Mathematics	I	50	150
		II	50	
		III	50	
12.	Statistics	I	50	100
		II	50	
			Practical	50

	Subject	Paper		Max. Marks	Min. Marks
13.	Anthropology	I	50	100	33
		II	50		
			Practical	50	17
14.	Linguistics	I	75	150	50
		II	75		
15.	Indian Music	I	50	100	33
		II	50		
			Practical	50	17
16.	Home Science	I	50	100	33
		II	50		
			Practical	50	17
17.	Education	I	75	150	50
		II	75		
18.	Psychology	I	50	100	33
		II	50		
			Practical	50	17
19.	Management	I	75	150	50
		II	75		
20.	Defence Studies	I	50	100	33
		II	50		
			Practical	50	17
21.	Urdu	I	75	150	50
		II	75		

### USE OF CALCULATORS

The Students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986-

1. Student will bring their own Calculators.
2. Calculators will not be provided either by the university or examination centres.
3. Calculators with, memory and following variables be permitted +, -, x,  $\div$ , square, reciprocal, expotentials log, square root, trigonometric functions, wize, sine, cosine, tangent etc. factiorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.

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**हिन्दी भाषा**  
**(पेपर कोड-0231)**  
**प्रथम प्रश्न पत्र**

**पूर्णांक – 75**

(बी.ए., बी.एस.सी., बी.एच.एस.सी., बी.काम., तृतीय वर्ष के पुनरीक्षण एकीकृत आधार पाठ्यक्रम एवं पाठ्य सामग्री का संयोजन 2000-2001 से लागू है)

**॥ सम्प्रेषण कौशल, हिन्दी भाषा और सामान्य ज्ञान ॥**

आधार पाठ्यक्रम की संरचना और अनिवार्य पाठ्य पुस्तक—हिन्दी भाषा एवं समसामयिकी— का संयोजन इस तरह किया गया है कि सामान्य ज्ञान की विषय वस्तु— विकासशील देशों की समस्याओं— के माध्यम, आधार और साथ-साथ हिन्दी भाषा का ज्ञान और उसमें सम्प्रेषण कौशल अर्जित किया जा सके । इसी प्रयोजन से व्याकरण की अन्तर्वस्तु को विविध विधाओं की संकलित रचनाओं और सामान्य ज्ञान की पाठ्य सामग्री के साथ अन्तर्गुर्क्षित किया गया है । अध्ययन—अभ्यापन के लिए पूरी पुस्तक की पाठ्य सामग्री है और अभ्यास के लिये विस्तृत प्रश्नावली है । यह प्रश्नपत्र भाषा का है अतः पाठ्य सामग्री कर व्याख्यात्मक या आलोचनात्मक अध्ययन अपेक्षित नहीं है । पाठ्यक्रम अरैर पाठ्य सामग्री का संयोजन निम्नलिखित पांच इकाइयों में किया जाता है । प्रत्येक इकाई दो भागों में विभक्त किया गया है ।

- इकाई —1** (क) भारत माता : सुमित्रानंदन पंत, परशुराम की प्रतीज्ञा : रामधारी सिंह  
दिनकर, बहुत बड़ा सवाल : मोहन राकेश, संस्कृति और राष्ट्रीय  
एकीकरण : योगेश अटल
- (ख) कथन की शैलियां : रचनागत उदाहरण और प्रयोग ।
- इकाई —2** (क) विकासशील देशों की समस्याएँ, विकासात्मक पुनर्विचार, और  
प्रौद्योगिकी एवं नगरीकरण ।
- (ख) विभिन्न संरचनाएं ।
- इकाई—3** (क) आधुनिक तकनीकी सभ्यता, पर्यावरण प्रदूषण तथा धारणीय  
विकास ।
- (ख) कार्यालयीन पत्र और आलेख ।
- इकाई—4** (क) जनसंख्या : भारत के संदर्भ में और गरीबी तथा बेरोजगारी ।
- (ख) अनुवाद ।
- इकाई—5** (क) ऊर्जा अरैर शक्तिमानता का अर्थशास्त्र ।
- (ख) घटनाओं, समारोहों आदि का प्रतिवेदन और विभिन्न प्रकार के  
निमंत्रण—पत्र ।

**मूल्यांक योजना :** प्रत्येक इकाई से एक-एक प्रश्न पूछा जायेगा । प्रत्येक प्रश्न में आंतरिक विकल्प होगा । प्रत्येक प्रश्न के 15 अंक होंगे । प्रत्येक इकाई दो-दो खण्ड (क्रमशः 'क' और 'ख' में) विभक्त है, इसलिए प्रत्येक प्रश्न के भी दो भाग, (क्रमशः 'क' और 'ख' में) होंगे । 'क' अर्थात् पाठ एवं सामान्य ज्ञान से संबंधित प्रश्न के अंक 8 एवं 'ख' अर्थात् भाषा एवं सम्प्रेषण कौशल से संबंधित प्रश्न के अंक 7 होंगे । इस प्रकार पूरे प्रश्न के पूर्णांक 75 होंगे ।



**PART - II**  
**ENGLISH LANGUAGE**  
**(Paper Code-0232)**

**M.M. 75**

The question paper for B.A./B.Sc./B.Com./B.H.Sc. III Foundation course, English Language and General Answers shall comprise the following items :

Five question to be attempted, each carrying 3 marks.

<b>UNIT-I</b>	Essay type answer in about 200 words. 5 essay type question to be asked three to be attempted.	15
<b>UNIT-II</b>	Essay writing	10
<b>UNIT-III</b>	Precis writing	10
<b>UNIT-IV</b>	(a) Reading comprehension of an unseen passage	05
	(b) Vocabulary based on text	10
<b>UNIT-V</b>	Grammar Advanced Exercises	25

**Note :** Question on unit I and IV (b) shall be asked from the prescribed text. Which will comprise of popular create writing and the following items. Minimum needs housing and transport Geo-economic profile of M.P. communication Educate and culture. Women and Worm in Empowerment Development, management of change, physical quality of life. War and human survival, the question of human social value survival, the question of human social value, new Economic Philosophy Recent Diberalisation Method) Demoration docontralisation (with reference to 73, 74 constitutional Amendment.

**Books Prescribed :**

Aspects of English Language And Development - Published by M.P. Hindi Granth Academy, Bhopal.

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Dr. M. C. Chakraborty

Dr. S. Gupta

DR. MERILY ROY

**हिन्दी साहित्य**  
**प्रथम प्रश्न पत्र**  
**जनपदीय भाषा—साहित्य (छत्तीसगढ़ी)**  
**(पेपर कोड 0233)**

**प्रस्तावना—**

हिन्दी केवल खड़ी बोली नहीं है, बल्कि एक बहुत बड़ा भाषिक समूह है। हिन्दी जगत में अनेक विभाषाएं बोलियां और उपबोलियां विद्यमान हैं जिनमें पुष्कल साहित्य सम्प्रदा है। इनके सम्बन्धित अध्ययन और अन्वेषण की आवश्यकता है। जनपदीय भाषा छत्तीसगढ़ी निरन्तर विकास की ओर अग्रसर हो रही है। अस्तु, इस भाषा और इसमें रचित साहित्य का इतिहास—विकास स्पष्ट करतक हुए इनसे संबंधित प्रमुख रचनाकारों का आलोचनात्मक अनुशीलन करना हिन्दी के वृहत्तर हित में होगा। छत्तीसगढ़ी भाषा का पाठ्यक्रम निम्न बिन्दुओं पर आधारित है—

- (क) छत्तीसगढ़ी भाषा का इतिहास — विकास।
- (ख) छत्तीसगढ़ी भाषा में रचित साहित्य का इतिहास।
- (ग) छत्तीसगढ़ी भाषा के प्रमुख प्राचीन एवं अर्वाचीन रचनाओं की कृतियों का अध्ययन।

**पाठ्य विषय—**

**रचनाएं—**

- (1) प्राचीन कवि संत धर्मदास के 3 पद
  - 1. गुरु पड़्या लागों नाम लखा दीजो हो।
  - 2. नैन आगे ख्याल घनेरा।
  - 3. भजन करौ भाई रे, अइसन तन पाय के।  
(संदर्भ— धर्मदास के शब्दावली से उद्धृत)
- (2) लखनलाल गुप्त का गद्य—
  - 1. सेनपान  
(गद्य— पुस्तक “सेनपान” के उद्धृत)
- (3) अर्वाचीन रचनाकार  
डॉ. सत्यभामा आडिल रचित गद्य
  - 1. सीख सीख के गोठ  
(गद्य— पुस्तक “गोठ” के उद्धृत)
- (4) डॉ. विनय पाठक की कविताएं—
  - 1. तंय उठथस सुरुज उथे
  - 2. एक किसिम के नियाव  
(“अकादसी और अनचिन्हार” पुस्तक से उद्धृत)



(5)

मुकुन्द कौशल— छत्तीसगढ़ गजल

“ छै बित्ता के मनखे देखों ..... से —मछरी मन लाख लेथे” तक

(पुस्तक “ छत्तीसगढ़ गजल” के पृष्ठ 17 से उद्धृत)

द्रुतपाठ के रचनाकार — (व्यक्तित्व एवं कृतित्व)

1. सुन्दर लाल शर्मा
2. कविलनाथ कश्यप
3. रामचन्द्र देशमुख (रंगकर्मी)

#### अंक विभाजन

3 व्याख्याएं	—	21 अंक
2 आलोचनात्मक प्रश्न	—	24 अंक
5 लघुत्तरी प्रश्न	—	15 अंक
15 वस्तुनिष्ठ/अति लघुत्तरी प्रश्न	—	15 अंक
कुल	—	75 अंक

#### इकाई विभाजन

इकाई एक	—	व्याख्या
इकाई दो	—	प्राचीन एवं अर्वाचीन रचनाकार
इकाई तीन	—	(अ) छत्तीसगढ़ भाषा का इतिहास (ब) छत्तीसगढ़ साहित्य का इतिहास
इकाई चार	—	द्रुतपाठ के तीन रचनाकार
इकाई पांच	—	वस्तुनिष्ठ/ अतिलघुत्तरीय प्रश्न (सम्पूर्ण पाठ्यक्रम से)



**द्वितीय प्रश्न पत्र**  
**हिन्दी भाषा—साहित्य का इतिहास तथा काव्यांग विवेचन**  
**(पेपर कोड – 0234)**

**प्रस्तावना—**

हिन्दी भाषा का इतिहास जितना प्राचीन है, उतना ही गुढ़-गहन भी । इसमें रचित साहित्य ने लगभग डेढ़ हजार वर्षों का इतिहास पूरा कर लिया है । इसलिए हिन्दी भाषा और साहित्य के ऐतिहासिक विवेचन की बड़ी आवश्यकता है । इसी के साथ-साथ हिन्दी ने अपना जो स्वतंत्र साहित्य शास्त्र निर्मित किया है, उसे भी रूपायित करने की आवश्यकता है । इसके संज्ञान द्वारा विद्यार्थी की मर्मग्राहिणी प्रतिभा का विकास होगा और ऐतिहासिक परिप्रेक्ष्य में शुद्ध साहित्यिक विवेक का सन्निवेश होगा ।

**पाठ्य विषय—**

(क) हिन्दी भाषा का स्वरूप विकास — हिन्दी की उत्पत्ति, हिन्दी की मूल आकर भाषाएं तथा विभिन्न विभाषाओं का विकास । हिन्दी भाषा के विभिन्न रूप—

1. बोलचाल की भाषा
2. रचनात्मक भाषा
3. राष्ट्रभाषा
4. राजभाषा
5. सम्पर्क भाषा
6. संचार भाषा

हिन्दी का शब्द भण्डार — तत्सम, तद्भव, देशज, आगत शब्दावली ।

(ख) हिन्दी साहित्य का इतिहास :— आदिकाल, पूर्व मध्यकाल, उत्तर मध्यकाल और आधुनिक काल की सामाजिक, सांस्कृतिक पृष्ठभूमि, प्रमुख युग प्रवृत्तियां, विशिष्ट रचनाकार और उनकी प्रतिनिधि कृतियां, साहित्यिक विशेषताएं ।

(ग) काव्यांग — काव्य का स्वरूप एवं प्रयोजन ।

रस के विभिन्न भेद, विभिन्न अंग, विभावादि तथा उदाहरण ।

प्रमुख 5 छंद—दोहा, सोरठा, चौपाई, कुण्डलियां, सवैया ।

शब्दालंकार— अनुप्रास, यमक, श्लेष, वक्रोक्ति, पुनरुक्ति प्रकाश ।

अर्थालंकार— उपमा, रूपक, उत्प्रेक्षा, अतिशयोक्ति, भ्रांतिमान ।

संदर्भ ग्रंथ — (1) हिन्दी साहित्य का इतिहास

संपादक — डॉ. सुशील त्रिवेदी व बाबूलाल शुक्ल । (प्रकाशक — म.प्र. उ.शि. अनुदान आयोग)

(2) राजभाषा हिन्दी — मलिक मोहम्मद (प्रभात प्रकाशन दिल्ली)

(3) हिन्दी भाषा — डॉ. भोलानाथ तिवारी ।

**अंक विभाजन—**

4 आलोचनात्मक प्रश्न	—	44 अंक
4 लघुउत्तरीय प्रश्न	—	16 अंक
15 वस्तुनिष्ठ प्रश्न	—	15 अंक
<b>कुल अंक</b>	<b>—</b>	<b>75 अंक</b>

**इकाई विभाजन—**

इकाई — 1	हिन्दी भाषा का स्वरूप — विकास— (खण्ड—‘क’)
इकाई — 2	हिन्दी का शब्द भण्डार (खण्ड—‘क’ का अंतिम भाग)
इकाई — 3	हिन्दी साहित्य का इतिहास (खण्ड—‘ख’)
इकाई — 4	काव्यांग — रस, छंद, अलंकार (खण्ड—‘ग’)
इकाई — 5	लघुउत्तरीय एवं वस्तुनिष्ठ प्रश्न (सम्पूर्ण पाठ्यक्रम से)



**ENGLISH LITERATURE**  
**PAPER - I**  
**INDIAN WRITING IN ENGLISH**  
**(Paper Code-0235)**

**M.M.: 75**

All questions are compulsory.

- Note : 1. Unit - I is compulsory. Two passages from each of the units II to V to be set and three to be attempted. (3x5 = 15)
2. Short answer questions from unit VII, seven to be set and five to be attempted. (5x2 = 10)
3. Long-answer questions from unit II to VI. Five questions from each unit with internal choice to be set. (5x10 = 50)

**UNIT-I** Annotations and short answer questions.

**UNIT-II Poetry -**

- |                           |    |                                |
|---------------------------|----|--------------------------------|
| Toru Dutt                 | -  | 'Our Casurina Tree'            |
| Tagore                    | -  | Songs 1 & 103 from 'Gitanjali' |
| Sarojini Naidu            | -  | 'The Ecstasy', 'The Lotus'     |
| <b>UNIT-III</b> Kamla Das | -  | 'The old playhouse'            |
| Gauri Deshpandey          | Or | 'The female of the species'    |
| Jayant Mahapatra          | -  | 'Dawn at Puri'                 |
| K.N. Daruwala             | Or | 'Death by Burial'              |
| Shiv K. Kumar             | -  | 'Indian Women'                 |

**UNIT-IV Prose -**

- |                      |   |                            |
|----------------------|---|----------------------------|
| Nirad C. Choudhary   | - | My Birth Place.            |
| Dr. S. Radhakrishnan | - | The call of the suffering. |

**UNIT-V Drama -**

- |               |    |                                    |
|---------------|----|------------------------------------|
| Girish Karnad | -  | Hayavadana                         |
|               | Or |                                    |
| Tendulkar     | -  | Silence ! The Court is in session. |

**UNIT-VI Fiction -**

- |              |   |       |
|--------------|---|-------|
| R.K. Narayan | - | Guide |
|--------------|---|-------|

**UNIT-VII** 1. Lyric, 2. Subjective poetry, 3. Couplet, 4. Fable, 5. Hymn, 6. Allegory, 7. Autobiography,

**BOOK RECOMMENDED :**

1. Indian Poetry in English, Ed. Hari Mohan Prasad, Sterling Publication.
2. An Introduction to the study of English Literature, B. Prasad.
3. A Glossary of Literary Terms - M.H. Abrams.
4. Prose of To day - M.C. Millan.

*Dr. M. C. Chakraborty*

*Dr. S. Gupta*

*DR. MERILY ROY*

**PAPER - II**  
**(A) AMERICAN LITERATURE**  
**(Paper Code-0236)**

All questions are compulsory.

- Note :
1. Unit-I is compulsory. Two passages from each of the units II to V to be set and three to be attempted. (3x5 = 15)
  2. Short answer questions from unit VII, seven to be set and five to be attempted. (5x2 = 10)
  3. Long-answer questions from unit II to VI. (word limit for each answer is 300-400 (words) internal choice to be set. (5x10 = 50)

**UNIT-I** Annotations and short answer question.

**UNIT-II Poetry -**

Waiter Whitman	-	O Captain ! My Captain, when the Lilacs Last in the Dooryard Bloomed.
Carl Sandberg	-	'Who Am I ?', 'I am the People, The Mob'
<b>UNIT-III</b> Emily Dickinson	-	'Hope is the thing with Feather' I Felt a funeral in My Brain'
E.E. Cummings	-	'The Cambridge Ladies'
	-	'As Freedom is a Breakfast food'

**UNIT-IV Prose -**

William Faulkner	-	Nobel Award Acceptance Speech
W. Carlos Williams	-	In the American Grain
Walt Whitman	-	Preface to "Leaves of Grass"

**UNIT-V Drama -**

Miller	-	All My Sons
	Or	
Eugene O'Neill	-	The Hairy Ape

**UNIT-VI Fiction -**

E. Hemingway	-	A Farewell to Arms
	Or	
W. Faulkner	-	The Sound and the Fury

**UNIT-VII** 1. Naturalism, 2. Realism, 3. Art for Art's sake, 4. Poetic-Drama, 5. Symbolism, 6. American Renaissance, 7. Existentialism.

**BOOK RECOMMENDED :**

1. American Literature, An Anthology, Ed. Fr. Egbert S. Oliver.
2. A Glossary of Literary Terms - M.H. Abrams.

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Dr. S. Gupta

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**PAPER - II**  
**(B) 20TH CENTURY LITERATURE IN ENGLISH**  
**(Paper Code-0237)**

The paper will be taught as an optional paper to Paper-II(A) which is a paper on American Literature. The Principle focus will be to probe the students a general background and cultural history of this period and also to make them aware of the Literary trends of the twentieth century. The Paper will comprise six units and in all six questions are to be attempted, one from each unit.

**UNIT-I** The following historical and literary topics will be included in this unit. Students are required to write short notes of not more than three hundred words on any two of the following topics. **(10 Marks)**

- i) The Two world wars.
- ii) The Russian Revolution.
- iii) The Great Depression.
- iv) The Vietnam war.
- v) Freudian Thought
- vi) Existentialism.
- vii) Absurdism.
- viii) Modernism and Post Modernism.
- ix) New Development in fiction and Drama.

**UNIT-II** Ten objective type questions on the life History and major poetical works of the following poets of the twentieth century will be asked in this unit. **(10 Marks)**

- i) W.B. Yeats (1865-1939)
- ii) Siegfried Sassoon (1886-1967)
- iii) Rupert Brooke (1887-1915)
- iv) T.S. Eliot (1888-1965)
- v) Wilfred Owen (1893-1918)
- vi) W.H. Auden (1907-1937)
- vii) Louis Macneice (1907-1963)
- viii) Stephen Spender (1909-)
- ix) Dylan Thomas (1914-1953)
- x) Philip Larkin (1922-1985)

**UNIT-III** (15 marks)

T.S. Eliot	-	'The Waste Land'
	Or	
Wilfred Owen	-	'Disabled'
Siegfried Sassoon	-	'Attack', 'Falling Asleep'
Rupert Brooke	-	'The Hill'
W.H. Auden	-	'Miss Gee'

**UNIT-IV** (15 marks)

Joseph Conrad	-	'Heart of Darkness'
	Or	

**UNIT-V** (10 marks)

Chinua Achebe	-	'Things Fall Apart'
(Non Fictional Prose)		
Virginia Woolf	-	'The Death of the Moth'
Graham Greene	-	'The Lost Childhood'

**UNIT-VI** (15 marks)

(Drama)		
Bernard Shaw	-	'Pygmalion'
	Or	
Samuel Beckett	-	'Waiting for Godot'

Dr. M. C. Chakraborty

Dr. S. Ghosh

DR. MERILY ROY



**राजनीति विज्ञान**  
**प्रश्न नत्र-प्रथम**  
**अंतर्राष्ट्रीय राजनीति**  
**( पेपर कोड- 0244)**

**पूर्णांक – 75**

- इकाई –1** अंतर्राष्ट्रीय राजनीति का अर्थ, प्रकृति, क्षेत्र, अंतर्राष्ट्रीय राजनीति के अध्ययन के उपागम।
- इकाई-2** अंतर्राष्ट्रीय राजनीति के विभिन्न सिद्धांत – शक्ति, परिभाषा, तत्त्व।  
शक्ति संघर्ष, शक्ति संचय, शक्ति वृद्धि, शक्ति प्रदर्शन।
- इकाई-3** शक्ति सन्तुलन की अवधारणा – सैद्धांतिक लाभ एवं मुल्यांकन।  
शांति एवं सुरक्षा की आवश्यकता – सामूहिक सुरक्षा का सिद्धांत।
- इकाई –4** राजनय परिभाषा, प्रकार, कार्य, उद्देश्य एवं साधन निःशस्त्रीकरण – अर्थ, परिभाषा एवं विकास, निःशस्त्रीकरण के मार्ग की बाधाएं एवं निराकरण
- इकाई-5** अंतर्राष्ट्रीय राजनीति के नए प्रतिमान :  
1. पर्यावरणवाद,  
2. वैश्वीकरण,  
3. मानव अधिकार,

**संदर्भ ग्रन्थ –**

1. महेन्द्र कुमार – अन्तर्राष्ट्रीय राजनीति के सैद्धांतिक पत्र
2. विजय कुमार अरोरा – अन्तर्राष्ट्रीय राजनीति
3. दीनानाथ वर्मा – अन्तः संबंध – ज्ञानदर प्रकाशन, दिल्ली
4. मथुरालाल शर्मा – अन्तः संबंध – 1945 से, कॉलेज बुक डिपो, जयपुर
5. डी.सी. चतुर्वेदी – अन्तः संबंध – 1945 से, वर्तमान तक, रस्तौगी प्रकाशन, मेरठ
6. रमेश भारद्वाज – नवीन विश्व व्यवहार और भारती विदेश नीति
7. पंत एवं जैन – अन्तर्राष्ट्रीय संबंध, मीनाक्षी प्रकाशन, मेरठ
8. बी.के. खन्ना एवं अरोरा – भारतीय विदेशनीति के नये आयाम, डी. के. प्रकाशन, नई दिल्ली
9. Palmar and Prkins - International Relations.
10. R. Aron - Peace & war - A theory of International Relations, London.
11. Organski - World Politics
12. C.P. Schliccher - International Relations, Co-operation and Competition.
13. J. Frankel - The making of Foreign policy, london, 1963.
14. H.J. Morgenthau - Politics Among Nations, 6th addition, New York, 1985.
15. K.N. Waltz - Theory of International Politics, Addison - Wesley, 1979.

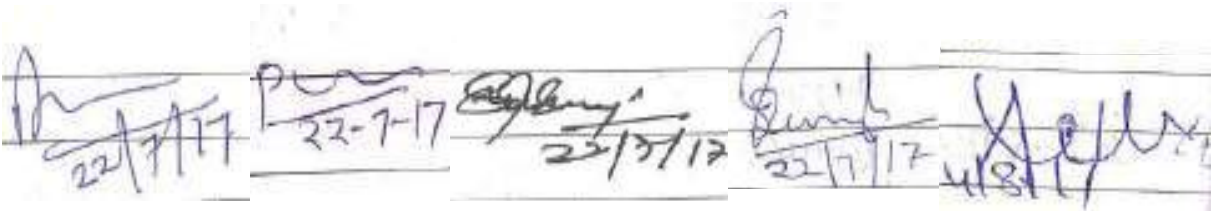
**प्रश्न पत्र— द्वितीय**  
**लोक प्रशासन**  
**(पेपर कोड – 0245)**

**पूर्णांक – 75**

- इकाई –1** लोकप्रशासन का अर्थ, प्रकृति एवं क्षेत्र  
एक अनुशासन के रूप में लोक प्रशासन का मुल्यांकन लोक प्रशासन एवं व्यक्तिगत प्रशासन में समानताएं एवं व्यक्तिगत प्रशासन में समानताएं एवं असमानताएं।
- इकाई –2** लोक प्रशासन के अध्ययन की पद्धति एवं उपागम,  
नवीन लोक प्रशासन।
- इकाई– 3** राजनीति एवं लोकप्रशासन  
प्रशासनिक व्यवहार— नेतृत्व, निर्णय, निर्माण यंचार, जवाबदेही।
- इकाई–4** नौकरशाही एवं बजट प्रक्रिया  
वैश्वीकरण एवं उदारीकरण के युग में लोक प्रशासन के नये आयाम।
- इकाई –5** प्रशासन पर विधायी नियंत्रण,  
प्रशासन पर न्यायिक नियंत्रण।

**संदर्भ ग्रंथ –**

- |                          |  |
|--------------------------|--|
| 1. सी.पी. भाम्भरी        | — लोक प्रशासन की सिद्धांत                                  |
| 2. पी.डी. शर्मा          | — भारत में लोक प्रशासन                                     |
| 3. खान एवं वर्मा         | — प्रशासनिक विचारधाराएं, भाग 1, 2                          |
| 4. इन्द्रीजीत कौर        | — लोक प्रशासन, साहित्यभवन, आगरा                            |
| 5. जे. पह शर्मा          | — लोक प्रशासन रायपुर                                       |
| 6. आर. बसु               | — लोक प्रशासन, नई दिल्ली, जवाहार पब्लिशर्स                 |
| 7. बी. एल. फातिया        | — लोक प्रशासन – सहित्य भवन, आगरा                           |
| 8. निशा वशिष्ठ           | — भारत में नौकरशाही की कार्यप्रणाली                        |
| 9. सी.एन. चतुर्वेदी      | — तुलनात्मक लोक प्रशासन, जयपुर (कॉलेज बुक डिपो)            |
| 10. Pfittner J.M.        | — Public Administration.                                   |
| 11. White L.D.           | — Introduction to the Principles of Public Administration. |
| 12. Bhambhari C.P.       | — Bureaucracy and Politics in India, Delhi Vikas 1971.     |
| 13. Bhattacharya M.      | — Public Administration.                                   |
| 14. Maheshwari S.R.      | — Indian Administration system.                            |
| 15. Awasthi & Maheshwari | — Public Administration.                                   |

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**ECONOMICS**  
**PAPER - I**  
**DEVELOPMENT AND ENVIRONMENTAL ECONOMICS** **M.M. 75**  
**(Paper Code-0242)**

**UNIT-I** Economic Growth and Development - Factors affecting economic growth, Capital and Technology Development & under development, Population of Under-developed Countries, Poverty - Absolute & Relative, Measuring development and Underdevelopment, gap per capita income, inequality of income and wealth.

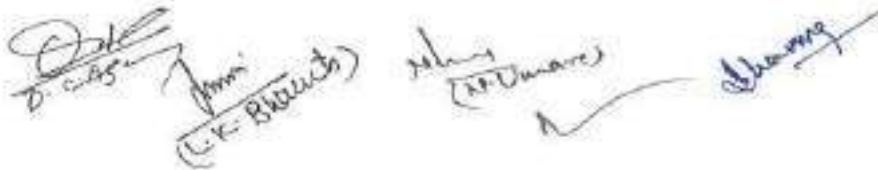
Human Development index GDI, GEM, Poverty Index of development & Quality of life.

**UNIT-II** Population problem and growth, pattern of population. Theory of demographic transition. Population poverty & Environment. Theory of Social Change Immutable laws of Capital Development - Crisis in capitalism. Karl Marx - Theory of Development, Mahalanobis four sectoral Model. Schumpeter's development in Capitalistic economy, Big-Push Balance and unbalanced Growth, Critical Minimum Effort thesis, Low Income Equilibrium Trap-Dualism : Technical, Behavioural & Social.

**Unit-III** Harrod and Domar Growth Model, Neo Classical models, Solow, Meade & Mrs. Joan Robinson's Growth model, Unlimited supply of Labour.

**UNIT-IV** Environment and Ecology : Economic linkage, Environment as a necessary and luxury, Population environment linkage, Environmental use & environmental disruption as an allocation problem. Market failure for environmental goods, environment as a public good, the Common problem. Property Human right approach to environmental problem, valuation of environmental damages-land, water, air & forest Pollution Control-Prevention. Control and abatement of pollution Choice of policy instruments in developing Countries, Environmental legislation Indicators of Sustainable Development, environmental accounting.

**UNIT-V** Concept of Intellectual Capital - Food Security, Education Health & Nutrition, Efficiency & Productivity in Agriculture New Technology & Sustainable Agriculture, Globalization & Agriculture growth, the Choice of Technique & appropriate technology & employment. Role of Monetary & Fiscal policies in developing Countries.



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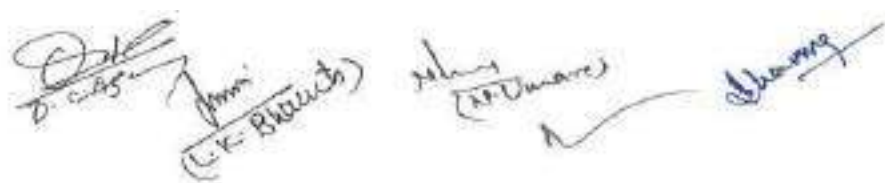
**PAPER - II**  
**STATISTICAL METHODS**  
**(Paper Code-0243)**

**M.M. 75**

- UNIT-I** Statistical Methods Statistics - Definition Statistical Data, Statistical Methods, Functions of Statistics. Importance of Statistics, Limitations of Statistics. Statistical Survey & Report writing. Collection of Data, Primary & Secondary Data, Sampling & Sampling Designs. Sampling Errors, Frequency Distribution, Diagrammatic & Graphic Presentation.
- UNIT-II** Central Tendency. Measurement of Mean, Median, Mode, Geometric Mean & Harmonic Mean and their uses.
- UNIT-III** Dispersion : Meaning of Dispersion, Properties good measure of Variation - Methods of Dispersion Range, Quartiles Deviation - Mean Deviation, Standard Deviation, Coefficient of Variation, Lorenz Curve, Skewness & Kurtosis.
- UNIT-IV** Coefficient of Correlation - Karl Pearson's Method, Probable Error, Spearman's Rank Correlation Coefficient.
- UNIT-V** Index Number - Construction of Index Numbers Simple & weighted Index Number's-Fisher's Ideal Index Number & Reversal Test. Consumer Price Index Numbers and Time Series Analysis - components of Time-Series.
- Measurement of Trend - Graphic Method, Semi Average Method. Moving averages, Least Square Method, Measuring Trend by logarithms.

**BOOK RECOMMENDED:**

1. Salvalore, D.L. (1997), International Economics, Prentice Hall, Upper Saddle River, N.J.
2. Sodersten, Bo (1991), International Economics, Macmillan Press Ltd. London.
1. Aggarwal, M.R. (1979), Regional Economic Cooperation in South Asia, S. Chand and Co. New Delhi.
2. Bhagwati J. (Ed.) (1981), International Trade, Selected Readings, Cambridge University Press, Mass.
3. Creckjell A. (1982), International Money, Issue and Analysis, E.I.B.S and Nelson, London.
4. Greenaway, D. (1983) International Monetary Economics, Prentice Hall India.
5. Joshi V. and I.M.D. Little (1998), India's Economic Reforms, 1999-2001, Oxford University Press, Delhi.
6. Panchmukhi, V.R. (1978) Trade Policies of India : A Quantitative Analysis, Concept Publishing Company. New Delhi.
7. Patel, S.J. (1995) Indian Economy Towards the 21st Century. University Press Ltd. India.
8. Singh M. (1964), India Export Trends and the Prospects for sustained growth Oxford University Press, Oxford.

The image shows several handwritten signatures and stamps at the bottom of the page. On the left, there is a signature that appears to be 'D. S. Singh' with a date '20.11.2020' written below it. Next to it is a circular stamp with the text 'Joshi' and 'C.K. Bhattacharya' written inside. To the right of this is another signature that looks like 'S. J. Patel' with the date '20.11.2020' written below it. On the far right, there is a signature that appears to be 'M. Singh'.

**इतिहास**  
**प्रश्न-पत्र प्रथम**  
**भारत का इतिहास सन् 1761 ई. से 1950 ई. तक**  
**(पेपर कोड-0240)**

**पूर्णांक 75**

**उद्देश्य :** इस पाठ्यक्रम का उद्देश्य आधुनिक काल में भारत के राजनीतिक, सामाजिक आर्थिक एवं सांस्कृतिक इतिहास से विद्यार्थियों को अवगत कराना है ।

**इकाई-1**

1. ब्रिटिश साम्राज्य का विस्तार एवं सुदृढीकरण – युद्ध एवं कुटनीति – कनार्टक युद्ध
2. ब्रिटिश साम्राज्य का विस्तार एवं सुदृढीकरण – प्लासी एवं बक्सर
3. सहायक संधि एवं हड़प् नीति (व्यपगत का सिद्धांत)
4. ब्रिटिश प्रशासन एवं सुधार – बेंटिंग, लिटन, रिपन, कर्जन

**इकाई-2**

1. वाणिज्यवाद – उद्योगों का पतन
2. वाणिज्यवाद – व्यापार का पतन
3. कृषि का ह्रास एवं कृषक आन्दोलन
4. भूराजस्व व्यवस्थाएं – स्थाई बन्दोबस्त, रैयतवाड़ी, महालवाड़ी

**इकाई-3**

1. भारतीय पुनर्जागरण – ब्रह्म समाज, आर्य समाज, प्रार्थना समाज,
2. श्रामकृष्ण मिशन, थियोसोफिकल सोसायटी, अलीगढ़ आन्दोलन
3. पाश्चात्य शिक्षा का विकास एवं प्रेस
4. विभिन्न सामाजिक वर्ग – कृषक, मजदूरी, मध्यम वर्ग एवं महिलाएं

**इकाई-4**

1. राष्ट्रवाद का उदय एवं 1857 की क्रांति
2. भारतीय राष्ट्रीय कांग्रेस – उदारवादी, उग्रवादी
3. क्रान्तिकारी आन्दोलन गांधीवादी आन्दोलन

**इकाई-5**

1. साम्प्रदायिकता : उदय एवं विकास
2. सुभाषचन्द्र बोस एवं आजाद हिन्द सेना
3. भारत का संवैधानिक विकास : 1919 ई. – द्वैध शासन 1935 – प्रान्तीय स्वायत्तता
4. भारत की स्वतंत्रता तथा भारतीय संविधान की विशेषताएं।

**संदर्भ ग्रंथ :**

- |                    |   |  |
|--------------------|---|--|
| 1. Sarkar and Dutt | — | Modern India (English and Hindi Version)   |
| 2. Singh, Nihal    | — | Landmarks in Indian Constitutional Development and National Movement.  |
| 3. Agrawal R.C.    | — | Indian Constitutional Development and National Movement in India.  |
| 4. राधेशरण         | — | भारत की सामाजिक एवं आर्थिक संरचना और संस्कृति के मूल तत्व (आदिकाल से 1950 ई. तक) (म.प्र. हिन्दी ग्रंथ अकादमी का प्रकाशन) |

2017/17

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5. मिश्रा जे.पी	—	आधुनिक भारत का इतिहास
6. नागौरी एस.एल. लाल	—	आधुनिक भारत का इतिहास
7. गोवर बी.एल.	—	आधुनिक भारत का इतिहास
8. दुबे सत्यनारायण	—	आधुनिक भारत का इतिहास
9. मजूमदार दत्त राय चौधरी	—	भारत का वृहत इतिहास
10. जैन एम.एस.	—	आधुनिक भारत का इतिहास
11. सिंह प्रपात	—	आधुनिक भारत का सामाजिक एवं आर्थिक इतिहास
12. सिंह प्रपात	—	आधुनिक भारत (1858—1919)
13. सिंह प्रपात	—	आधुनिक भारत (1919—1950)
14. दिल्ली विश्वविद्यालय प्रकाशन	—	आधुनिक भारत का इतिहास
15. दिवाकर ब्रज मोहन	—	आधुनिक भारत
16. छाबड़ा जी. एस.	—	आधुनिक भारत का इतिहास (तीन खण्डों में)
17. नगपाल ओभ	—	भारत का राष्ट्रीय आन्दोलन और.....
18. सीता राम शर्मा	—	उन्नीसवीं सदी भारतीय धार्मिक तथा सामाजिक जागरण
19. डॉ. सीताराम जी 'श्याम '	—	भारतीय स्वतंत्रता संग्राम की रूपरेखा
20. विपिन चन्द्रा	—	भारत का स्वतंत्रता संग्राम
21. रामलखन शुक्ल	—	आधुनिक भारत
22. रमेशचन्द्र दत्त	—	ब्रिटिश भारत का आर्थिक इतिहास
23. डॉ. आयोध्यासिंह	—	भारत का मुक्ति संग्राम
24. डॉ. एग्नेस ठाकुर	—	आधुनिक भारत का इतिहास

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**प्रश्न- पत्र द्वितीय**  
**विश्व इतिहास – सन् 1871 ई. से 1945 ई. तक**  
**(पेपर कोड – 0241)**

**पूर्णांक 75**

**उद्देश्य :** इस पाठ्यक्रम का उद्देश्य विश्व इतिहास की प्रमुख घटनाओं से विद्यार्थियों को अवगत कराना है साथ ही अन्तर्राष्ट्रीय परिदृश्य का ज्ञान भी इन्हें देना है ।

**इकाई-1**

1. फ्रांस का तृतीय गणतंत्र
2. बिस्मार्क – सह एवं विदेश नीति
3. विलियम द्वितीय की विदेश नीति
4. अफ्रीका का विभाजन

**इकाई-2**

1. जापान का आधुनिकीकरण
2. रूस – जापान युद्ध : कारण एवं परिणाम
3. चीन की क्रान्ति – कारण एवं परिणाम
4. डाफ. सन-यत-सेन

**इकाई-3**

1. पूर्वी समस्या- बलिदान कांग्रेस, युवा तुर्क आन्दोलन
2. बाल्कन युद्ध : कारण एवं परिणाम
3. प्रथम विश्व युद्ध : कारण एवं परिणाम
4. रूस की क्रान्ति 1917

**इकाई-4**

1. वर्साई की संधि
2. फासीवाद – मुसोलिनी
3. नजीवाद – हटलर
4. जपान का सैन्यवाद – तोजो

**इकाई-5**

1. राष्ट्रसंघ : स्थापना एवं विल्सन के 14 सूत्र
2. द्वितीय विश्वयुद्ध – कारण एवं परिणाम
3. संयुक्त राष्ट्र संघ – स्थापना एवं संगठन
4. संयुक्त राष्ट्र संघ – उपलब्धियां

**अनुशंसित ग्रंथ :**

- |                         |   |
|-------------------------|---|
| 1. Grant and Temperley  | - Europe in the 19th and 20th Century (also Hi-- Version) |
| 2. Kettelby             | - History of the Modern Times                             |
| 3. Moon                 | - Imperialism in World Politics                           |
| 4. Plamor & Parkins     | - International Politics                                  |
| 5. Parks, Hengy Bamford | - The United States of America A History                  |

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|-----|----------------------------------|---|
| 6.  | Panikkar K.M.                    | - Asia and Western Dominance  |
| 7.  | Schuman                          | - International politics  |
| 8.  | Taylor, A.J.P.                   | - Struggle for Mastery over Europe  |
| 9.  | Vinacke, H.M.                    | - A History of Far East in Modern Times   |
| 10. | Fay                              | - Origins of the World War  |
| 11. | Robert. Engong                   | - Europe since waterloo   |
| 12. | Manazir Ahmad                    | - Europe ka Itihas (in Hindi)   |
| 13. | Satyaketu Vidyalkar              | - Sudurpurva ka Itihas (in Hindi)   |
| 14. | Deonath Verma                    | - Aungla ka Itihas (in Hindi)   |
| 15. | वर्मा भगवान सिंह                 | — विश्व इतिहास की प्रमुख धारायें (1871—1956)<br>(म.प्र. हिन्दी ग्रंथ अकादमी का प्रकाशन) |
| 16. | शर्मा भथुरालाल एवं बघेला हेतसिंह | — युरोप का इतिहास (1789—1945) : एक शोध पूर्ण<br>अध्ययन एवं माधुर कौशिक इत्यादि          |
| 17. | अहमद लइक                         | — आधुनिक विश्व का इतिहास  |

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## **G E O G R A P H Y**

1. The B.A. Part III Examination in Geography will be of 150 marks. There will be two theory papers and one practical each of 50 marks as follows :  
Paper – I            Resource and Environment  
Paper – II            Geography of India (with special reference to Chhattisgarh)  
Paper – III           Practical Geography
2. Each theory paper shall be of three hours' duration.
3. Candidates will be required to pass separately in theory and practical examinations.
4. Each theory paper is divided into five units.
5. (a) In the practical examination the following shall be allotment of time and marks.

i) Lab work	-	20 marks	up to three hours
ii) Survey	-	10 marks	Two hours
iii) Field Report	-	10 marks	
iv) Practical Record and viva-voce	-	10 marks	

(b) The external and internal examiners shall jointly submit marks.

(c) The candidates shall present at the time of the practical examination their practical records regularly signed by the teachers concerned.

### **PAPER - I**

#### **RESOURCES AND ENVIRONMENT**

**M.M. 50**

**(Paper Code-0248)**

#### **A. Resources**

**UNIT-I** Meaning, nature and components of resources and environment. Resources and environment interface. Classification of resources : renewable and nonrenewable : biotic (forests, wild-life, live-stock, fisheries, agricultural crops) and abiotic (land, water, mineral)

**UNIT-II** Distribution and utilization of water mineral and energy resources, their economic and environmental significance and conservation. Types and distribution of forests, fauna and fisheries, their economic, and environmental significance and conservation. Major soil types and their distribution; problems of soil erosion and soil conservation.

**UNIT-III** Number, density, growth and distribution of population; population pressure and resource utilization.

#### **B. Environment**

**UNIT-IV** Classification of environment: Natural and Human. Man environment interrelations with respect to population size, types of economy and technology; exploitation of natural resources and environmental hazards.

**UNIT-V** Emerging environmental issues - population explosion; food security; deforestation; global warming, conservation of bio-diversity; sustainable development.

**PAPER - II**  
**GEOGRAPHY OF INDIA**  
**(With Special reference to Chhattisgarh)**  
**(Paper Code-0249)**

**M.M. 50**

**UNIT - I** Physical features : Structure, Relief and Physiographic regions, Drainage, Climate-origin and mechanism of monsoon, and regional and seasonal variation.

**UNIT-II** Natural resources : Soils - types, their distribution and characteristics. Water resources (major irrigation and hydel power projects); Forests-types, distribution, economic significance and conservation. Mineral and Power resources-Iron-ore, Manganese, Copper, Coal, Petroleum and Natural gas, Non conventional sources of energy.

**UNIT-III** Cultural Features : Agriculture - Major crops, impact of green revolution and agricultural regions; Industries - Iron and steel, Cotton Textile, Cement, Sugar, Population - growth, density and distribution. Transport, Foreign Trade.

**UNIT-IV** Chhattisgarh :

Physical Features : Structure, Physiography, Drainage, Climate, Soils, Natural vegetation, Water resources - availability and development. Mineral and Power resources, Power projects.

**UNIT-V** Chhattisgarh :

Cultural features : Agriculture, Industries, Population - growth, distribution and density, social groups, literacy and sex-ratio, urbanisation. Major tribes-their habitat, economy and society. Transport and Tourism.

**SUGGESTED READING :**

1. Sharma, T.C. and Coutinho, O. : Economic and Commercial Geography of India, Vikas Pub. House, New Delhi, 1988.
2. Singh, R.L. (Ed.) : India : A regional Geography, Nat. Geog. Soc. of India, Varanasi, 1971.
3. Spate, O.H.K. and Learmonth, A.T.A. India and Pakistan : A General and Regional Geography, Methuen & Co. Ltd. London, 1967.
4. Tiwari, R.C. : Geography of India, Prayag Pustak Bhawan. Allhabad, 2003.
5. प्रमीला कुमार (सम्पादक) : मध्यप्रदेश का प्रादेशिक भूगोल, म.प्र. हिन्दी ग्रंथ अकादमी, भोपाल
6. अग्रवाल प्रेमचंद : भारत का भौतिक भूगोल



**PAPER - III**  
**PRACTICAL GEOGRAPHY**

**M.M. 50**

**UNIT-I** Band graph, Hythergraph and Climograph. Square root, cube-root and vernier scales.

**UNIT-II** Map Projection : Conical Projection : one standard parallel, two standard parallels, Bonne's, Ployconic, Polar Zenithal Projections; Gnomonic, Stereographic and Orthographic.

**UNIT-III** Study and Interpretation of Indian topographical sheets : classification and numbering system, Interpretation of topographical sheets with respect to cultural and physical features.

**UNIT-IV** Surveying - Plane Table Survey, Basic Principles of plane table surveying, Plane table survey including intersection and resection.

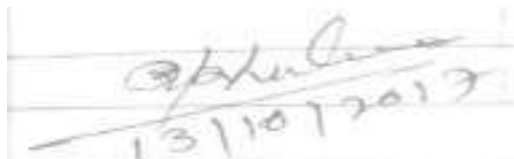
**UNIT-V** Importance of field work in Geography. Field work and field report : physical, social and economic survey of a micro-region.

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**MUSIC**  
**PAPER - I**  
**THEORY OF INDIAN MUSIC, VOCAL/INSTRUMENTAL**      **M.M.:50**  
**(Paper Code-0264)**

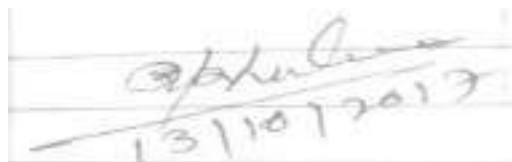
- I. Definitions and Elementary Knowledge of the following terms : Shruti, Gram, Murchana, Jaati, Sadaj-Pancham Bhav, Sadaj-Madhyam Bhav, Sada-jantar Bhav, Chatuh Sarana by acharya Bharat, Praman Shruti, Kaku Bhed, Jhala, Razakhani gat, Maseetkhani gat, Toda.
- I. Introduction of Harmony and Melody Characteristics and comparative study of Harmony and Melody.
- III. Methods of Placement of swars :
  - (a) Method of placing shudha and Vilkrit Swaras on Veena by Ahobal, Pt. Srinivas and Pt. V.N. Bhattachande.
  - (b) Shruti Swar system of different granthakars (authors) Ancient, Medieval and Modern period.
- IV. Evolution and Development of Swar Saptaka of western and Indian scales :
  - (a) Phthogorian Scale.
  - (b) Scale from Sadaj-Pancham Bhav,
  - (c) Scale from Sadaj-Madhyam Bhav,
  - (d) Equally tempered Scale
  - (e) Diatonic Scale
  - (f) Mean tempered Scale
  - (g) Concept of Acharya Bharat and Bilawal Thata.
  - (h) Chromatic Scale.
- V. Definition and prime elements of Gharana and their history.  
Gwalior, Agra, Kirana, Patiyala, Jaipur, Senia Gharana of Instrumental Music.
- VI. Difinition of Gram and Gram Bhed -  
Sadaj Gram, Madhyam Gram, Gandhar Gram and their Swaras.
- VII. Writing of Talas in Natation with Dugun and Chaugun layakaris in all the Talas prescribed in Ist and IInd Year.

  
13/10/2017

**PAPER - II**  
**THEORY OF MUSIC, VOCAL/INSTRUMENTAL**  
**(Paper Code-0265)**

**M.M.:50**

1. Study of Theoretical details of Ragas prescribed for practical course and their comparative study.
2. Writing in notation of Bandish / Gat of prescribed Ragas.
3. Biographics and contributions of the musicians : Haddu - Hassu khan, Inayat Kan, Pandit Omkar Nath Thakur, Matang, Ramamatya, Srinivas, Lochan, Hrideya Narayan Dev, Somnath, Bhav Bhatta.
4. History of Indian Music : Medieval and Modern period; Analytical study of the styles, position and effects of granthkaras and eminent musician of medieval and modern Period.
5. Classical Music and Folk Music : Comparative study of Classical and Folk music. Intensive study of the Folks of Chhattisgarh.
6. Voice-Culture : Definition, Importance and utility of voice-culture. Construction of throat and production of sound. General scientific methods of voice-culture.
7. Guided listening to Radio and T.V. national Programmes of Indian classical Music and ability to write their critical appreciation.
8. Essay on topics related to music.

  
13/10/2017

**PRACTICAL  
VOCAL/INSTRUMENTAL**

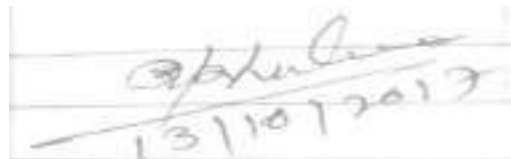
- I. Study of Eight Ragas from the following :  
Ramkali, Jaijaiwanti, Miyan ki Malhar, Pooriya, Basant, Bahar, Darbavi Kanhada, Miyan ki Todi, Adana, Kalavati, Hansdhwani, Shuddhkalyan, Pooriyadhamashri, Marwa.
1. Two Vilambit Khayalas / Maseethkhani Gats in any of the above mentioned Ragas with Alap and Tanas / Todas.  
One Vilambit Khayalas / Maseethkhani / Gat choice Raga and one asked by the examiner.  
(5+5 = 10 marks)
3. Lakshan Geets, Sargams, Madhayalaya Khyals / Razakhani Gats with Tanas / Todas in all the eight Ragas. (5+5 = 10 marks)
4. Study of One Dhrupad and one dhamar with Dwigun, Trigun Chaugun / study of Two Madhayata gats in other than Trital out of the Ragas prescribed in the course. 8 marks
5. Study of one Tarana, One Bhajan / One Dhun. 4 marks
6. Ability to demonstrate (orally by given Tali Khali on hand) Talas prescribed in 1st year and IInd year Matta Tala, Panjabi Trital, Ganesh Tal, Rudra Tala. 4 marks

**SESSIONAL WORK**

1. Keeping upto date practical and theory note Books. Attendance and activities in the class and college.
2. Ten descriptions of Music programmes of Radio, T.V. or personally attended.

**BOOK RECOMMENDED:**

1. Kramik pustak Malika Part I, II, III, IV by Pt. V.N. Bhatkhande.
2. Sangeetanjali Part I, II, III, IV, V, VI by Pt. Omkarnath Thakur.
3. Raga Vigyan Part I, II, III, IV, V by Pt. V.N. Patvardhan.
4. Rag Bodh. B.R. Devdhar, Part I, II & III.
5. Sitar Vadan, S.G. Vyas.
6. Sangeet Visharad, Vasant
7. Sangeet Bodh - S.C. Paranjape
8. Sangeet Darshika - Navigopal Banerjee
9. Sangeet Shastra Darpan - Shanti Gowardhan Part I, II & III
10. Dawadhavi and Sangeet - Lalit Kishore singh
11. Shrimallakshay Sangeetam - Chatur Pandit.



**PSYCHOLOGY**  
**PAPER - I**  
**PSYCHOLOGICAL STATISTICS**  
**M.M.:50**

**(Paper Code-0250)**

**UNIT-I** Statistics: Meaning and application in Psychology, nature of score, categorical and continuous variables, frequency distribution, Graphic representation of data.

**UNIT-II** Measures of Central Tendency : Mean, Median and mode of group and un group data, Measures of variability : Range, S.D., Q.D., A.D., applications of measures of central tendency and variability.

**UNIT-III** Nature and characteristics of normal probability curve : concept of skewness and Kurtosis, Correlation : Concept, Types and methods - rank difference and product moment (in ungrouped data), Biserial and Tetrachoric coefficient.

**UNIT-IV** Inferential statistics: Concept of null Hypothesis, level of significance, type I error & type II error, T-test (uncorrelated data)

**UNIT-V** Distribution free statistics: Chi-square, Median and sign test, applications of computer in psychological statistics.

**REFERENCES:**

1. Siegel S., (1994) Non parametric statistics New York : Mcgraw Hill  
Garret: Statistics in Psychology and Education Times of India Publisher.
2. कपील एस. के. – सांख्यिकी के मूल तत्व  
गैरेट— मनोविज्ञान एवं शिक्षा में सांख्यिकी

*U. Chhabra*  
*1.8.17*

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*1/8/17*

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**PAPER - II (Optional)**  
**(A) HUMAN DEVELOPMENT**  
**(Paper Code-0251)**

**M.M.:50**

Candidate has to opt. any one of the following Optional papers.

**UNIT-I** Concept of Human Development, Theories of Human Development: Psychoanalytical and Maslow, Determinants of Human Development - Biological, social, cultural factors, Approaches to study human developments: Longitudinal and cross - sectional.

**UNIT-II** Socialisation : Role of family, peers and school, Media and socialisation, Ecological factors in Human Development, Cognitive Development : Theoretical Perspectives Piaget, Information Processing, Vygotsky.

**UNIT-III** Self and Identity : Emergence of self, Development of personal identity, identity crises, Physical and sexual maturation, Sequential development of emotions.

**UNIT-IV** Development of morality and self concept, Development of gender differences and gender roles. Role of marriage, family and occupation in Human Development.

**UNIT-V** Problems of Aging - Cognitive, conative, affective, Developmental Disabilities.

**BOOK RECOMMENDED :**

1. Berk L.E. (1989) Child Development. Boston : Allyn and Bacon.
2. Santrock J.W. (1999) Lifespan development. New York McGraw Hill.
3. E.B. Hurlock (1997) Development Psychology : A life span approach. V, edition.
4. शाह गोवर्धण — विकासारात्मक मनोविज्ञान





**PAPER - II (Optional)**  
**(B) ENVIRONMENTAL PSYCHOLOGY**  
**(Paper Code-0252)**

**M.M.:50**

**UNIT-I** Evaluating environmental ethics from values about nature in the ancient India systems. Earth as a living system, Psychological approaches to environment : Eco cultural Psychology (Berry), Bio-social Psychology (Dawson), Ecological Psychology (Berkar) Person Environment Transactions (Sokol, Itelson)

**UNIT-II** Effects of environment on behaviour : Noise pollution chemical Pollution, crowding and personal space. Effect of behaviour on environment : Perception, Preferences and awareness of environment.

**UNIT-III** Human Nature and environmental problems : Pro-social and pro environment behaviours, Eco-systems and their components Demography : Mortality and fertility, Resource Use : Common Property resources, Sustainable Development, Ecology : Acculturation and Psychological adaptation.

**UNIT-IV** Methods : Naturalistic observation and field surveys. Environmental Assessment : Naturalistic observation and field surveys Socio - Psychological dimensions of environments impact Environmental deprivation : Nature and consequences, Creating environmental awareness - Social Movements : Chipko, Tehri Narmad.

**UNIT-V** Application of Psychology in man environment fit : Education - Classroom environment, Industry - Industrial / Organisational effectiveness, Health - Physical, mental and spiritual, Social - Communal harmony and National integration.

**REFERENCES :**

1. Goldsmith E. (1991) - The way : The ecological world vic Boston : Shambhala.
2. Jain U (1987) The Psychological consequences of crowding New Delhi : Sage.
3. Mishra R.C. Sinha D & Berry, J.W. (1996) Ecology, Community and life style, New Delhi.

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## PSYCHOLOGY PRACTICALS

M.M.:50

This paper carries 50 marks. It comprises of two parts. Part A comprises of psychological experiments and testing while part B comprises of completion of Project Report.

### PART - A

**Note :** From the following experiment any 5 are to be done-

1. Bilateral transfer of training.
2. Measurement of Illusion.
3. Habit interference.
4. Effect of need priority on selection of Advertising material.
5. Effect of mental fatigue upon performance.
6. Reaction Time
7. Effect of frustration on learning.
8. Depth Perception.

**Note :** From the following tests any 4 are to be done-

1. Level of aspiration
2. Need for guidance
3. Maturity scale
4. Attitude Scale.
5. Classroom environment scale.
6. Mental health
7. Family environment test
8. Test of Moral values.

### PART - B

The candidate will be allotted a topic of project by the departmental committee. He/she is required to carry out a small scale project based on small sample. He/she is required to complete the project and submit its report. 15-20 pages, covering all major steps of scientific enquiry under the supervision of the departmental teacher. This will be the part of practical work. The suggested areas for the project work are as under Mental health, sibling rivalry, deprivation, identity crises, drug abuse, aging, media effect, woman employment, Job satisfaction, stress, stress management, problems of adolescent etc.

### DISTRIBUTION OF MARKS

Conduction of Experiment	-	10 marks
Administration of test	-	10 marks
Evaluation of Project Report and Practical record	-	10 marks
Viva - Voce	-	10 marks

**Note :** Candidate is required to attend practical work regularly. His/Her attendance should not be less than 75%. If his / her practical work performance is not satisfactory, he / she shall be debarred from the examinations.

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**SOCIOLOGY**  
**PAPER - I**  
**SOCIOLOGY OF TRIBAL SOCIETY**  
**(Paper Code-0246)**

**M.M. 75**

- UNIT-I** The concept of Tribe.  
Characteristics of Tribal society Distinction in Tribe and Caste.
- UNIT-II** Classification of Tribal people :-  
Food gatherers and hunters, shifting cultivates, nomads, peasants settled agriculturists, artisans.
- Sociocultural profile - Kinship, marriage and family, religions beliefs cultural traditions.
- UNIT-III**
- UNIT-IV** Social mobility and change sensitization.  
Schemes of Tribal Development Various tribal movements.
- UNIT-V** Problems of Tribal people -  
Poverty, illitracy, indebtedness, agrarian issues, exploitation study of tribal immunities in Chhattisgarh with special reference to "oraon", "Kanwar" and "Gond".

**PAPER - II**  
**SOCIAL RESEARCH METHODS**  
**(Paper Code-0247)**

**M.M. 75**

- UNIT-I** Meaning and significance of Social Research.  
Hypothesis and its formulation Scientific method and its applicability.
- UNIT-II** Positivism  
Ethnography, observation, case study, content analysis.
- Unit-III** Types of Research -  
Historical, descriptive, comparative exploratory, experimental.
- UNIT-IV** Techniques of data collection - survey sampling, Questionnaire, Interview schedule and Interview guide.
- UNIT-V** Meaning, importance and limitations of social statistics.  
Graphs, diagrams and measures of central tendency - mean mode, mediaJ correlation.

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*19/12/2012*

*M. Wangar*

### नृत्य (भारत नाट्यम)

इस विषय में दो सैद्धांतिक प्रश्न पत्र एक प्रायोगिक परीखा होगी। पूर्णांक एवं उत्तीर्णांक इस प्रकार होंगे—

क्रं	विवरण	पूर्णांक	उत्तीर्णांक
1	सैद्धांतिक प्रश्न पत्र प्रथम	50	17
2	सैद्धांतिक प्रश्न पत्र द्वितीय	50	17
3	प्रायोगिक	50	17
योग		150	51

#### विस्तृत पाठ्यक्रम – सैद्धांतिक

##### प्रथम प्रश्न पत्र

(पेपर कोड – 0287)

1. गुप्त काल में आधुनिक काल तक नृत्य का इतिहास
2. नृत्य का परम्परागत परिवर्तन।
3. नृत्य विषय संबंधी निबंध।
4. नवरा विवरण।
5. भारतीय प्रेक्षागृहों की जानकारी (भरत नाट्यमशास्त्र के द्वितीय अध्ययन के अनुसार)

##### द्वितीय प्रश्न पत्र

(पेपर कोड – 0288)

1. ताण्डव और लाक्ष्य नृत्य का परिचय
2. (1) लेकधर्मी नाट्य परम्परा— किन्ही तीन की संक्षिप्त जानकारी — यक्षमान, कुचिपुड़ी, ..... ओट्टनदुल्लन।  
(2) लोक नृत्य परिचय—  
(अ) कोलाट्टम्,  
(ब) पिन्नल कोला पट्टम्,  
(स) कोरतीकुम्मी,  
(द) कुचिपूड़ी,  
(इ) भांबडा (कोई भी चार)
3. नायक — नायिका भेद निरूपण।
4. भारतीय नृत्य में ताल का महत्व।
5. नृत्य कलाकारों की जीवनी—  
(1) रुक्मिणी देवी अरुण्डेल, (2) श्रीमति वाला सरस्वती,  
(3) श्री शंभू महाराज, (4) श्री लच्छू महाराज।
6. संक्षिप्त टिप्पणियाँ—  
(1) कीर्तनम्, (2) जावली, (3) वर्जम्,  
(4) तिल्लाना, (5) प्रलीकत्।

#### प्रायोगिक

1. मौखिक मुद्रा प्रदर्शन—  
(1) समस्त असंयुक्त हरत मुद्राओं का विनियोग एवं पांच संयुक्त हस्त..... विनियोग  
(2) जाति हस्त  
(3) दशावतार हस्त।
2. सप्ततालों का जाति के अनुसार प्रयोग।
3. देहाभ्यास — कूदना, झकना, अरमंडी (अर्धबैठक) मुरुमंडी, नड्य आदि।
4. अष्टपदी या कीर्तनम् पदम् या जावली का प्रदर्शन।

**HOME SCIENCE**  
**Paper - I**  
**"HUMAN DEVELOPMENT"**  
**(Paper Code-0253)**

- UNIT-I**
1. Development-meaning of child growth and development. Defferent aspects of growth, principles of development, factors affecting child development, heredity and environment.
  2. Stages of development -
    1. Physiology of pregnancy
    2. Prenatal
      - (a) Reproductive system
      - (b) Prenatal development
    3. Infancy
      - (a) Early infancy
      - (b) Babyhood
    4. Childhood
      - (a) Early childhood
      - (b) Late childhood
    5. Adolescence
      - (a) Early adolescence
      - (b) Late adolescence
    - (i) Prenatal growth and development -
      - (a) Sources of studing prenatal life
      - (b) Stages of growth prenatal and development
      - (c) Factors affecting prenatal and development growth
        - (1) Mother's food
        - (2) Health of mother
        - (3) Narcotics
        - (4) Age of parents
        - (5) Effect of season
        - (6) Emotion of mother
- UNIT-2**
1. Effect of normal and scissoring delivery.
  2. Adjustment to new environment -
    - (a) Temperature
    - (b) Respiration
    - (c) Food consumption
    - (d) Excretion
  3. Physical development of infant-
    - (a) Physical proportion
    - (b) Height
    - (c) Weight
    - (d) Pulse rate
    - (e) Respiration rate
    - (f) Body temperature
    - (g) Frequency of hunger.

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4. Sensory development of infant
  - (b) Light
  - (c) Sound
  - (d) Taste
  - (e) Smell
  - (f) Skin sensitivity
5. Motor activity of infants -
  - (a) Mass activities
  - (b) Specific activities -
    - (i) Reflex activities
    - (i) Advanages of reflex action
6. Emotions of infants -
  - (a) Types of emotions
  - (b) Significance of emotions
7. Characteristics of infant behaviour -
  - (a) Dependancy
  - (b) Individual difference
  - (c) Adjustment

**UNIT-3** Childhood : Adolescence.

1. Characterstics of this stage.
2. Factors affecting growth and development during childhood and adolescence.
3. Physical growth height, weight, body proportion, teeth
4. Growth and development of internal organs (a) Nervous (b) Mental (c) Circulatory system (d) Digestive system, (e) Respiratory system (f) Tissues and muscles systems.
5. Development of motor abilities (i) Types of motor abilities (ii) importance and characteristics of motor abilities in childhood (iii) Development of motor skills, Types of motor skills (iv) Delayed motor development.

- UNIT-4**
6. Development of emotional behaviour-characteristics special emotions (affection, anger, fear, jealousy and worries) factors affecting emotional behaviour.
  7. Social developments stages - (a) during infancy, (b) nursery school period (c) elementary school period (d) Factor affecting social development.
  8. Development of intelligence - Types according to throndyke, theories regarding intellegence.

- UNIT-5**
9. Play meaning of play, work and play, theories of play, characteristics of children's play, types of play, factors effecting play and importance of play.

10. Habits :

1. Definition.
2. Functions performed by habits.
3. Habits and learning
4. Laws of habit formation-identical to laws of learning.
5. Habit formation.
  - (a) Principles of habit formation.
  - (b) Rules for habit formation.

11. Children delinquency-Types causes and remedial measures.

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**द्वितीय पेपर**  
**आहार एवं पोषण विज्ञान**  
**(पेपर कोड – 0254)**

**पुर्णांक– 50**

**यूनिट– 1 पोषक**

1. पेषण की परिभाषा।
2. कार्यो के आधार पर पौष्टिक तत्वों का वर्गीकरण।  
(अ) उष्मा प्रदान करने वाले कार्बोज, वसा।  
(ब) शरीर का निर्माण करने वाले—प्रोटीन, खनिज तत्व।  
(स) सुरक्षा व नियमन करने वाले जल, जीवन तत्व।
3. कार्बोज— परिभाषा, कार्य पाचन, अभिपोषण, चरापचय, रक्त शर्करा स्तर व इसके नियतन अधिकता का प्रभाव प्राप्ति का साधन एवं दैनिक आवश्यकता।
4. वसा — परिभाषा, कार्य, वर्गीकरण, पाचन, अभिशोषण, चयानचय, संतुप्त व असंतुप्त वसीय अम्ल, आवश्यक वसीय अम्ल, कोलेस्टेरोल कमी व अधिकता के प्रभाव एवं दैनिक आवश्यकता।
5. प्रोटीन — परिभाषा, कार्य, वर्गीकरण, पाचन, अभिशोषण, चयानचय, नाइट्रोजन संतुलन, प्रोटीन का जैविक मूल्य, प्रोटीन का पूरक मूल्य, प्रोटीन व कैलोरी कुपोषण, प्राप्ति के साधन एवं दैनिक आवश्यकता।
6. खनिज तत्व— सामान्य वर्गीकरण व कार्य, कार्य, अभिपोषण को प्रभावित करने वाले तत्व कमी व अधिकता के प्रभाव, साधन (कैल्शियम, फास्फोरस, लौहलवण, आयोडीन सोडियम, व क्लोराईड)
7. विटामिन्स — (जीवन तत्व) सामान्य वर्गीकरण व कार्य, कमी व अधिकता के प्रभाव, प्राप्ति के साधन, (जीवन सत्व ए.बी.सी.डी.ई. के)
8. जल— सामान्य कार्य, जल का संतुलन अधिकता के प्रभाव व निर्जलीकरण।

**यूनिट– 1 आहार**

1. आहार का वर्गीकरण व कार्य, आधारीय चार—भोज्य समूह व सात—भोज्य समूह
2. आनाज — प्रकार, रचना, संगठन, पकाने से पहले की प्रक्रिया — मौलिंग, पालिशिंग, पारवाईलिंग, फनोरिंग, पारचिंग, आनाज को उपयोग करने के विभिन्न तरीके, आनाज—ताप, क्षार खमीरीकरण व ब्रीडिंग के प्रभाव।
3. दालें — प्रकार, संलग्न, अंकुरण, व खमीरीकरण के प्रभाव।
4. दुध — प्रकार, संगठन, दुध से बने पदार्थ — दही, मकखन, चीज आदि पाश्चुराइलेशन एवम् होमोजीनाइजेशन।
5. फल व सब्जियां — वर्गीकरण, संगठन, वर्णक, प्रोटीन का महत्व, परिपक्व होने की प्रक्रिया।
6. अण्डा — संगठन, पकाने का प्रभाव।
7. मांस मछली, पोल्ट्री — संगठन, पकाने से होने वाले परिवर्तन।
8. शक्कर, गुड, शहद — संगठन, प्रकार, विधियों में उपयोग।
9. पेय पदार्थ — वर्गीकरण, पोषण की दृष्टि से महत्व, आत्यधिक उपयोग का प्रभाव।
10. मसाले — प्रकार, संगठन, पोषण की दृष्टि से महत्व।

*Asghar*  
22.07.17

*Asghar*  
22/7/17

*Asghar*  
22/7/17

*Asghar*  
22.7.17

### यूनिट- 3

1. खाद्य संरक्षण — उद्देश्य, विधियां, घेरलू संरक्षण, औद्योगिक संरक्षण।
2. खाद्य पदार्थों में सड़द — कारण, प्रकार, पहचान, उपचारात्मक विधिया।
  1. भोज्य विषाक्तता — कारण, प्रकार, पहचान, उपचारात्मक तरीकें।
  2. खाद्य मिलावट — आवश्यकता, प्रकार, महत्वपूर्ण मिलावटी पदार्थ, मिलावटी पदार्थों को पहचानने की सरल विधिया।
  3. टाहार, स्वास्थ्य व स्वच्छता — प्रकार, उपचारात्मक तरीकें।
  4. खाद्य संग्रहण — आवश्यकता, प्रकार, उपयोग में होने वाले महत्वपूर्ण रसायन।

### यूनिट- 4 आहार नियोजन :

1. महत्व — आहार नियोजन के सिद्धांत प्रतिदिन की निर्धारित मात्रा (आर.टी.ए.), आहार आजोयन को प्रभावित करने वाले तत्व समय व शक्ति बचाने वाले आहार का आयोजन करना—
  - (अ) पहले से योजना बनाना
  - (ब) क्रय करने की योजना बनाना
  - (स) सरल आहार तालिकाआर्थिक स्तर के आधार पा आहार का आयोजन करना। चुनाव संग्रहण पूरक पदार्थों का उपयोग, बचे खाद्य पदार्थों का उपयोग।
2. शिशु विभिन्न आयु में पौष्टिक तत्वों च खाद्य पदार्थों की आवश्यकता, आहार माता का दूध, फार्मूला फीडिंग।
3. बालाक का पोषण — आयु समूह की विशेषताएं, पौष्टिक तत्व एवे आहार को आवश्यकता, शालेय आहार कार्यक्रम—प्रकार, महत्व, कीमत, पोषण स्तर, आहारित व लवक्षण शरीर मापन विधियां।
4. गर्भावस्था व छात्रावस्था में पोषण — शारीरिक, पौष्टिक तत्वों की आवश्यकता। असामान्य परिस्थितियां,
5. वृद्धावस्था में आहार एवम् पोषण — शारीरिक परिवर्तन, पौष्टिक तत्वों की आवश्यकता। असामान्य स्थितियां।

### यूनिट- 5 उपचारात्मक पोषण — परिभाषा

सामान्य आहार परिवर्तन — तरलता, पौष्टिक तत्व, गंध की उपस्थिति/अनुपस्थिति, कुछ खाद्य पदार्थों का सम्मिलित न करना।

### चयापचयी रोग—

1. मधुमेय — परिभाषा, लक्षण, कारण, इन्सुलेशन के प्रकार, आहार का प्रभाव, हाइपोग्लोसेकिक दवाईयां, मधुमेय में आसामान्य स्थितियां, मधुमेय व गर्भावस्था, मधुमेय व बाल्यावस्था।
2. अधिक वनज/कम वनज — परिभाषा, कारण, उपचारात्मक तरीकें, असामान्य स्थितियां। पौष्टिक तत्वों की कमी से होने वाले रोग—
  1. रक्तहीनता — प्रकार, कारण, पहचान, आहार।
  2. ए — विटामीनोसिस — प्रकार, कारण, आहार।
  3. प्राटिन कैलोरी कुपोषण — कारण, उपचारात्मक तरीकें। रोग जिसमें आहारीय चिकित्सा सम्मिलित है—
  4. यकृत के रोग — प्रकार, कारण, आहार, (पौष्टिक तत्वों की आवश्यकता)

### आमाशय के रोग—

1. पेटिक अल्सर — कारण, लक्षण, आहार (पौष्टिक तत्वों की आवश्यकता)
2. अपचन — कारण, पौष्टिक तत्वों की आवश्यकता।
3. अतिसार — प्रकार, कारण, आहार।
4. कब्ज — प्रकार, कारण, आहार।
5. उक्त रक्तचाप — कारण, आहार।

*[Signature]*  
22/7/17

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22/7/17

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22/7/17

*[Signature]*  
22/7/17



गृह विज्ञान  
प्रायोगिक

पूर्णांक : 50

1. आनाज – दालें, अण्डा, दुध, मेवे, सब्जियां, फलो के उपयोग तैयार करना, हर भोज्य पदार्थ की कोई भी तीन पात्र विधियों के प्रायोगिक रिकार्ड बुक में लिखना। कैलोरी एवं प्रोटीन की गणना।
2. आहार आयोजन –
  - (अ) गर्भावती महिला
  - (ब) कब्ज की स्थिति
  - (स) मधुमेह रोग
  - (द) अधिक वजन की स्थिति
3. विभिन्न आर्थिक स्थिति में आहार योजनाएं
4. खाद्य संरक्षण कोई भी चार विधि से बनायी जाये।
5. सम्पूर्ण भोजन – आयोजन, गणना।
6. व्यक्तिव मापन विधि
7. बुद्धियापन विधि

प्रायोगिक परीक्षा अंको का विभाजन

सेशनल	10
योजना	10
तैयारी	10
गणना	10
मैखिक प्रश्न	10
कुल अंक	50

REFERENCES BOOKS:

Normal & Therapeutic Nutrition.

- |     |                   |   |  |
|-----|-------------------|---|--|
| 1   | C.H.Robinson      | - | Normal & Therapeutic Nutrition.                  |
| 2   | F.P.Antia         | - | Clinical Nutrition & Dietetics.                  |
| 3   | M.Swaminathan     | - | Essentials of Nutrition Vol. I & II.             |
| 4   | P.Rajalaxmi       | - | Applied Nutrition.                               |
| 5   | C.Gopalan-et al   | - | The Nutrition value of Indian Foods. ICHR. 1991. |
| 6   | Mangode Konge     | - | Normal & Therapeutic Nutrition (In Hindi).       |
| 7   | Jyoti Kulkarni    | - | Normal & Therapeutic Nutrition.                  |
| 8   | Geeta Pushpa Shaw | - |  |
| 9   | Kreusel M.N.      | - | Food Nutrition & Diet Therapy.                   |
| 10  | आहार एवं पोषण     | - | डॉ. अरुणा पल्ला, शिवा प्रकाशन, इन्दौर            |
| 11. | खाद्य परिक्षण     | - | डॉ. अमिता सहगल, शिवा प्रकाशन, इन्दौर।            |

*Handwritten signatures and dates:*  
A. S. Gopal 22.07.17  
22/7/17  
22.7  
22.7.17

**THEORY**  
**HISTORY OF INDIAN PAINTING (Paper Code-0286)**

**(Bangal School to Modern age)**

**50 Marks**

**Bangal School**            -    Abanendra Nath Tagor  
                                     Rabindra Nath Tagor  
                                     Gaganendra Nath Tagor  
                                     Nandalal Bose

**Modern Age**            -    Raja Ravi Varma  
                                     Amrita Sher Gil  
                                     Yamini Ray

**Progresive Art      Group**  
**Souza**                    -    M.F. Husain  
                                     S.H. Raza  
                                     N.S. Bendra  
                                     K.K. Hebber

**List of Book Recomendaded for theory :**

- Bharatiya Chitrakala Ke Itihas - Shym Bihari Agrawal
- Kala Vilas - R.A. Agrawal

**PRACTICAL**

There will be two practical paper. Evalution will be made by the external and the internal examiners togather, and sessional marking is made by the class teacher.

The time of each paper is four hour's and there will be a half hour's recess in between.

**PAPER - I**

**Copy from Indian meniature painting**

**Total Mark - 50**

**Scheme of examination**

**Examination - 40**

Time - 4 Hours

Sessional - 10

Paper - 1/4 Imp size

Medium - Water colour or potter colour

Sessional mark - 10

Minimum class work to be submitted five painting size 1/4 Imp paper Copying

from the Indian miniature painting style Mugal. Pahadi, Rajsthani.



**PAPER - II**  
**CREATIVE COMPOSITION**

Scheme of examination

Total Mark - 50

Time Four hour's

Examination - 40

Size 1/2 Imp. paper

Sessional - 10

Medium - Water, Oil, acrylic or any

Sessional mark - 10

Minimum Class work to be submitted -

Five painting size 1/2 Imp.

Student will be experimented ith any media and form.

Above syllabus based on the syllabus of following Universities.

1. Vikram University, Ujjain
2. Rani Durgavati Vishwavidyalaya, Jabalpur.
3. Indira Kala Sangeet Vishwavidyalaya, Khairagarh.

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# दुर्ग विश्वविद्यालय, दुर्ग (छ.ग.)



बी.कॉम. प्रथम वर्ष

हेतु

पाठ्यक्रम

मुख्य परीक्षा – 2018 हेतु

*[Handwritten signatures and marks]*

## B.Com. - I

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**REVISED ORDINANCE NO.-23**

**(As per State U.G.C. Scheme)**

**BACHELOR OF COMMERCE**

- 1 The three year course has been broken up into three Parts.  
Part-I known as B. Com. Part-I Examination at the end of first year. Part-II Examination at the end of the second year, and,  
Part-III Examination at the end of the third year.
- 2 A candidate who after passing (10+2) Higher Secondary or Intermediate examination of Chhattisgarh Board of Secondary Education, Raipur or any other examination recognized by the University or Chhattisgarh Board of Secondary Education as equivalent there to has attended a regular course of study in an affiliated college or in the Teaching Department of the University for one academic year, shall be eligible for appearing at the B.Com. Part-I examination.
- 3 A candidate who after passing B.Com. Part-I examination of the University or any other examination recognized by the University as equivalent thereto has attended a regular course of study for one academic year in an affiliated College or in the Teaching Department of the University, shall be eligible for appearing at the B.Com. Part-II Examination.
- 4 A candidate who after passing B.Com. Part-II examination of the University has completed a regular course of study for one academic year in an affiliated College or in the Teaching Department of the University, shall be eligible for appearing at the B.Com. Part-III examination.
- 5 Besides regular students, subject to their compliance with this ordinance, ex-students and non-collegiate students shall be eligible for admission to the examination as per provision of Ordinance No. 6 relating to examinations (General).
- 6 Provided that non-collegiate candidates shall be permitted to offer only such subject/ papers as are taught to the regular students at any of the University Teaching Department or College.
- 7 Every candidate for B.Com. Examination shall be examined in subjects as mentioned in the marking scheme and course or studies.
- 8 A candidate who has passed the B.Com. Part-III examination of the University shall be

allowed to present him of examination in any of the additional subjects prescribed for the B.Com. Examination and not taken by him at the degree examination. Such candidate will have to first appear and pass the B. Com. Part-I examination in the subject which he proposes to offer then the B.Com. Part-II and Part-III examination in the same subject. Successful candidates will be given a certificate to that effect.

9. In order to pass at any part of the three year degree course examination, an examinee must obtain not less than 33% of the total marks in each paper/group of subjects. In group where both theory and practical examinations are provided an examinee must pass in both theory and practical parts of examination separately.
10. Candidate will have to pass separately at the Part-I, Part-II and Part-III examination. No division shall be assigned on the result of the Part-I and Part-II examinations In determining the division of the Final examination, total marks obtained by the examinees in their Part-I, Part-II and Part-III examination in the aggregate shall be taken into account. Candidate will not be allowed to change subjects after passing Part-I examination.
11. Provided in case of candidate who has passed the examination through the supplementary examination having failed in one subject/group only, the total aggregate mark being carried over for determining the division, shall include actual marks obtained in the subject/group in which he appeared at the supplementary examination.
12. Successful examinees at the Part - III examination obtaining 60% or more marks shall be placed in the First Division, those obtaining less than 60% but not less than 45% marks in the Second Division and other successful examinees in the Third Division.

The bottom of the page features several handwritten signatures and a circular official stamp. The signatures are in dark ink and appear to be of varying lengths and styles. The stamp is partially obscured by the signatures and is located towards the center-right of the bottom section.

**B.COM. PART-I**  
**SCHEME OF EXAMINATION**

			Max. Marks	Min. Marks
I.	Environmental Studies	75	100	33
	Field Work	25		
<b>A. FOUNDATION COURSE</b>				
I.	Hindi Language - I		75	26
II.	English Language - II		75	26
नोट : प्रत्येक खंड में से 2 प्रश्न हल करने होंगे । सभी प्रश्न समान अंक के होंगे ।				
<b>B. THREE COMPULSORY GROUPS</b>				
<b>GROUP - I</b>				
Accounting:				
I.	Financial Accounting-I	75		
II.	Business Mathematics-II	75	150	50
<b>GROUP - II</b>				
Business Management:				
III.	Business Communication-I	75		
IV.	Business Reg. Framework-II	75	150	50
<b>GROUP - III</b>				
Applied Economics:				
I.	Business Environment-I	75		
II.	Business Economics-II	75	150	50

**USE OF CALCULATORS**

The students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986.





- 1 Student will bring their own Calculators.
- 2 Calculators will not be provided either by University or examination centres.
- 3 Calculators with, memory and following variables be permitted  $+$ ,  $-$ ,  $\times$ ,  $\div$ , square reciprocal, exponentials, log squares, root, trigonometric functions viz, sine, cosine tangent etc. factorial summation,  $xy$ ,  $yx$  and in the light of objective approval of merits and demerits of the viva only will be allowed.

The image shows three handwritten signatures in blue ink. The first signature on the left is 'alme'. The middle signature is a stylized 'J' followed by a circle containing a cross. The third signature on the right is 'm'. Below the middle signature is a circular official stamp, partially obscured by the signature.

**Part - I**  
**SYLLABUS FOR ENVIRONMENTAL STUDIES AND HUMAN RIGHTS**  
**(Paper code-0828)**

MM. 75

इन्वारमेंटल साईंसेस के पाठ्यक्रम को स्नातक स्तर भाग—एक की कक्षाओं में विश्वविद्यालय अनुदान आयोग के निर्देशानुसार अनिवार्य रूप से शिक्षा सत्र 2003—2004 (परीक्षा 2004) से प्रभावशील किया गया है। स्वशासी महाविद्यालयों द्वारा भी अनिवार्य रूप से अंगीकृत किया जाएगा।

भाग 1, 2 एवं 3 में से किसी भी वर्ष में पर्यावरण प्रश्न—पत्र उत्तीर्ण करना अनिवार्य है। तभी उपाधि प्रदाय योग्य होगी।

पाठ्यक्रम 100 अंकों का होगा, जिसमें से 75 अंक सैद्धांतिक प्रश्नों पर होंगे एवं 25 अंक क्षेत्रीय कार्य (Field Work) पर्यावरण पर होंगे।

सैद्धांतिक प्रश्नों पर अंक — 75 (सभी प्रश्न इकाई आधार पर रहेंगे जिसमें विकल्प रहेगा)

- |     |                  |   |        |
|-----|------------------|---|--------|
| (अ) | लघु प्रश्नोंत्तर | — | 25 अंक |
| (ब) | निबंधात्मक       | — | 50 अंक |

**Field Work** — 25 अंकों का मूल्यांकन आंतरिक मूल्यांकन पद्धति से कर विश्वविद्यालय को प्रेषित किया जावेगा। अभिलेखों की प्रायोगिक उत्तर पुस्तिकाओं के समान संबंधित महाविद्यालयों द्वारा सुरक्षित रखेंगे।

उपरोक्त पाठ्यक्रम से संबंधित परीक्षा का आयोजन वार्षिक परीक्षा के साथ किया जाएगा।

पर्यावरण विज्ञान विषय अनिवार्य विषय है, जिसमें अनुत्तीर्ण होने पर स्नातक स्तर भाग—एक के छात्र/छात्राओं को एक अन्य विषय के साथ पूरक की पात्रता होगी। पर्यावरण विज्ञान के सैद्धांतिक एवं फील्ड वर्क के संयुक्त रूप से 33: (तीस प्रतिशत) अंक उत्तीर्ण होने के लिए अनिवार्य होंगे।

स्नातक स्तर भाग—एक के समस्त नियमित/भूतपूर्व/अमहाविद्यालयीन छात्र/छात्राओं को अपना फील्ड वर्क सैद्धांतिक परीक्षा की समाप्ति के पश्चात् 10 (दस) दिनों के भीतर संबंधित महाविद्यालय/परीक्षा केन्द्र में जमा करेंगे एवं महाविद्यालय के प्राचार्य/केन्द्र अधीक्षक, परीक्षकों की नियुक्ति के लिए अधिकृत रहेंगे तथा फील्ड वर्क जमा होने के सात दिनों के भीतर प्राप्त अंक विश्वविद्यालय को भेजेंगे।

## **UNIT-I THE MULTI DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES**

### **Definition, Scope and**

### **Importance Natural Resources:**

#### **Renewable and Nonrenewable Resources**

- (a) Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people and relevant forest Act.
- (b) Water resources: Use and over-utilization of surface and ground water, floods drought, conflicts over water, dam's benefits and problems and relevant Act.
- (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.
- (d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.
- (e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.
- (f) Land resources: Land as a resource, land degradation, man induced landslides soil erosion and desertification.

**(12 Lecture)**

## **UNIT-II ECOSYSTEM**

### **(a) Concept, Structure and Function of and ecosystem**

- Producers, consumers and decomposers.
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids.
- Introduction, Types, Characteristics Features, Structure and Function of Forest, Grass, Desert and Aquatic Ecosystem.

### **(b) Biodiversity and its Conservation**

- Introduction - Definition: genetic. species and ecosystem diversity
- Bio-geographical classification of India.
- Value of biodiversity: Consumptive use. Productive use, social ethics, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as mega-diversity nation.

- Hot spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wild life conflict.
- Endangered and endemic species of India.
- Conservation of biodiversity: In situ and Ex-situ conservation of biodiversity.

**(12 Lecture)**

### **UNIT- III**

#### **(a) Causes, effect and control measures of**

- Air water, soil, marine, noise, nuclear pollution and Human population.
- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Disaster Management: floods, earthquake, cyclone and landslides.

**(12 Lecture)**

#### **(b) Environmental Management**

- From Unsustainable to sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people, its problems and concerns.
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
- Wasteland reclamation
- Environment protection Act: Issues involved in enforcement of environmental legislation.
- Role of Information Technology in Environment and Human Health.

## **UNIT- IV**

General background and historical perspective- Historical development and concept of Human Rights, Meaning and definition of Human Rights, Kind and Classification of Human Rights. Protection of Human Rights under the UNO Charter, protection of Human Rights under the Universal Declaration of Human Rights, 1948. Convention on the Elimination of all forms of Discrimination against women. Convention on the Rights of the Child, 1989.

## **UNIT- V**

Impact of Human Rights norms in India, Human Rights under the Constitution of India, Fundamental Rights under the Constitution of India, Directive Principles of State policy under the Constitution of India, Enforcement of Human Rights in India. Protection of Human Rights under the Human Rights Act, 1993- National Human Rights Commission, State Human Rights Commission and Human Rights court in India. Fundamental Duties under the Constitution of India.

### **Reference/ Books Recommended**

1. SK Kapoor- Human rights under International Law and Indian Law.
2. HO Agrawal- International Law and Human Rights
3. एस.के. कपूर – मानव अधिकार
4. जे.एन. पान्डेय – भारत का संविधान
5. एम.डी. चतुर्वेदी –भारत का संविधान
6. J.N.Pandey - Constitutional Law of India
7. Agarwal K.C. 2001 Environmental Biology, Nidi pub. Ltd. Bikaner
8. Bharucha Erach, the Biodiversity of India, Mapin pub. Ltd. Ahmedabad 380013, India, Email: mapin@icenet.net(R)
9. Bruinner R.C. 1989, Hazardous Waste Incineration. McGraw Hill Inc.480p
10. Clark R.S. Marine pollution, Clanderson press Oxford (TB)
11. Cuningham, W.P.Cooper. T.H.Gorhani, E & Hepworth. M.T,200
12. Dr. A.K.- Environmental Chemistry. Wiley Eastern Ltd.
13. Down to Earth, Center for Science and Environment (R)
14. Gloick, H.P. 1993 Water in crisis. pacific institute for studies in Deve. Environment & Security. Stockholm Eng. Institute. Oxford University, Press. m 473p.
15. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Mumbai (R)

16. Heywood, V.H. & Watson, T.T.1995 Global Biodiversity Assessment, Cambridge Univ. Press 1140p
17. Jadhav H. & Bhosale, V.H. 1995 Environmental Protection and Law. Himalaya pub. House, Delhi 284p
18. Mckinney M.L.& School R.M.1996, environmental Science systems & solutions, web enhanced edition, 639p
19. Mhadkar A.K. Matter Hazardous, Techno-Science publication(TB)
20. Miller T.G.Jr. Environment Science, Wadsworth publication co. (TB)
21. Odum E.P.1971, Fundamentals of Ecology, W.B. Saunders Co. USA,574p
22. Rao M.N. & Datta, A.K. 1987, Waste water treatment. Oxford & IBH pub.co.pvt. Ltd 345p
23. Sharma B.K. 2001, Environmental chemistry, Goel pub. House, Meerut
24. Survey of the Environment, The Hidu(M)
25. Townsend C. Harper J. And Michael Begon, Essentials of Ecology, Blackwell Science(TB)
26. Trivedi R.K.Handbook of Environment Laws, Rules, Guidlines, Compliances and Standards, Vol land II, Environment Media(R)
27. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science publication (TB)
28. Wanger K.D.1998, Environmental Management. W.B. Saunders Co. Philadelphia, USA 499

आधार पाठ्यक्रम

प्रश्न पत्र – प्रथम

हिन्दी भाषा

(पैपर संख्या 1111)

नोट:-

01. प्रश्न पत्र 75 अंक का होगा।
02. प्रश्न पत्र अनिवार्य होगा।
03. इसके अंक श्रेणी निर्धारण के लिए जोड़े जावेंगे।
04. प्रत्येक इकाई के अंक समान होंगे।

पाठ्य विषय:-

इकाई – 1. पल्लवन, पत्राचार तथा अनुवाद एवं पारिभाषिक शब्दावली।

इकाई – 2 मुहावरे – लोकोक्तीयां, शब्दशुद्धि, वाक्य शुद्धि, शब्द ज्ञान- पर्यायवाची, विलोम, अनेकार्थी समश्रुत

(समानोचरित) अनेक शब्दों के लिए एक शब्द।

इकाई – 3 देवनागरी लिपि की विशेषता, देवनागरी लिपि एवं वर्तनी का मानक रूप।

इकाई – 4 कम्प्यूटर में हिन्दी का अनुप्रयोग, हिन्दी में पदनाम।

इकाई – 5 हिन्दी अपठित, संक्षेपण, हिन्दी में संक्षिपतीकरण।

पाठ्यक्रम के लिए पुस्तकें –

- |                                       |   |                                    |
|---------------------------------------|---|------------------------------------|
| 01. भारतीयता के स्वर साधन धनंजय वर्मा | – | म.प्र.ग्रंथ अकादमी                 |
| 02. नागरी लिपि और हिन्दी              | – | अनंत चौधरी – ग्रंथ अकादमी पटना।    |
| 03. कम्प्यूटर और हिन्दी               | – | हरिमोहन- तक्षशिला प्रकाशन, दिल्ली। |

**FOUNDATION COURSE  
PAPER - II  
ENGLISH LANGUAGE**

**M.M. 75**

**UNIT-1** Basic Language skills: Grammar and Usage.

Grammar and Vocabulary based on the prescribed text.

To be assessed by objective / multiple choice tests.

(Grammar – 20 Marks Vocabulary - 15 Marks)

**UNIT-2** Comprehension of an unseen passage.

05

This should simply not only

(a) An understanding of the passage in question, but also

(b) A grasp of general language skills and issues with reference to words and usage

Within the passage and

(c) The Power of short independent composition based on themes and issues raised in the passage.

To be assessed by both objective multiple choice and short answer type tests.

**UNIT-3** Composition: Paragraph writing

10

**UNIT-4** Letter writing (The formal and one Informal)

10

Two letters to be attempted of 5 marks each. One formal and one informal.

**UNIT-5** Texts:

15

Short prose pieces (Fiction and not fiction) short poems, the pieces should cover a range of authors, subjects and contexts. With poetry if may sometimes be advisable to include pieces from earlier periods, which are often simpler than modern examples. In all cases, the language should be accessible (with a minimum of explanation and reference to standard dictionaries) to the general body of students schooled in the medium of an Indian language.

Students should be able to grasp the contents of each piece; explain specific words, phrases and allusions; and comment on general points of narrative or argument. Formal Principles of Literary criticism should not be taken up at this stage.

To be assessed by five short answers of three marks each.

**BOOKS PRESCRIBED -**

English Language and Indian Culture-Published by M.P. Hindi Granth Academy Bhopal.



**GROUP - I**  
**FINANACIAL ACCOUNTING**  
**(Paper Code-1113)**  
**PAPER – I**

M.M. 75

**OBJECTIVE**

To Impart basic accounting knowledge as applicable to business

**COURSE INPUTS**

**UNIT-I** Meaning and Scope of Accounting: Need, development, and definition, objectives of accounting, difference between Book-keeping and accounting; Branches of accounting; Accounting Principles, Accounting Standard: International accounting Standard only outlines, Accounting standard in India.  
Accounting Transaction: Accounting cycles Journal Rules of debit & Credit, Compound Journal Entry opening Entry Relationship between Journal & ledger, Capital & Revenue: Classification of Income & Expenditure and Receipt.

**UNIT-II** Final accounts; Trial balance; Manufacturing account; Trading account; Profit and loss account; Balance sheet; Adjustment entries.  
Rectification of errors; Classification of errors; Location of errors; Rectification of errors; Suspense account; Effect on profit.

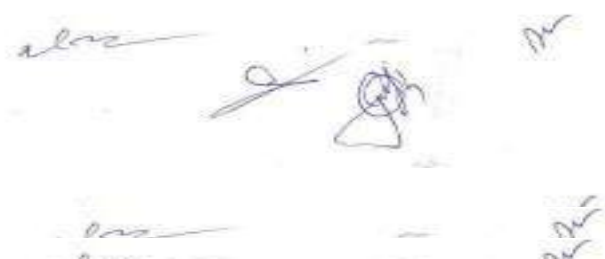
**UNIT-III** Depreciation, Provisions, and Reserves: Concept of depreciation; Causes of depreciation; Depreciation, depletion amortization, Depreciation accounting; Methods of recording depreciation; Methods for providing depreciation; Depreciation of different assets; Depreciation of replacement cost; Depreciation policy; as per Indian accounting Standard : Provisions and Reserves. Accounts of Non-Trading Institutions

**UNIT-IV** Special Accounting Areas:

Branch Accounts: Dependent branch: Debtors system, stock and debtor System; Hire-purchase and installment purchase system ; Meaning of hire-Purchase contract; Legal provision regarding hire-purchase contract; Accounting records for goods of substantial sale values, and accounting Records for goods of small values; Installment purchase system ; After sales Service.

**UNIT-V** a. Partnership Accounts: Essential characteristics of partnership; Partnership deed: Final accounts; Adjustments after closing the accounts ; Fixed fluctuating capital ; Goodwill ; AS-10 ; Joint Life Policy ; Change in Profit Sharing Ratio.

b. Reconstitution of a partnership firm-Admission of a partner ; Retirement of a partner; Death of a partner; Dissolution of a firm; Accounting Entries; Insolvency of partnership firm-Modes of dissolution of a firm; Accounting entries; Insolvency of partners distribution.



## **SUGGESTED READINGS:**

- 1 Anthony, R.N. and Reece, J.S.: Accounting Principles; Richard Irwin Inc.
- 2 Gupta, R.L. and Radhaswamy, M: Financial Accounting; Sultan chand and Sons, New Delhi.
- 3 Monga J.R. Ahuja Girish, and Sehgal Ashok: Financial Accounting; Mayur Paper Back, Noida.
- 4 Shukla. M.C., Grewal T.S., and Gupta, S.C.: Advanced Accounts; S.Chand & Co. New Delhi.
- 5 Compendium of Statement and Standards of Accounting: The Institute of Chartered Accountants of India, New Delhi.
- 6 Agrawala A.N. Agrawala K.N.: Higher Sciences of Accountancy: Kitab Mahal, Allahabad.
- 7 उच्चातर लेखांकन: राणा एवं अन्य : म.प्र.हिन्दी ग्रंथ अकादमी, भोपाल
- 8 उच्चातर लेखांकन: वसु एवं दास : अंग्रेजी
- 9 उच्चातर लेखांकन: हनीफ एवं मुखर्जी अंग्रेजी
- 10 वित्तीय लेखांकन : एस.एम. शुक्ला : साहित्य भवन आगरा



# **BUSINESS MATHEMATICS**

(Paper Code-1114)

PAPER - II

M.M. 75

## **OBJECTIVE**

The objective of this course is to enable the students to have such minimum knowledge of mathematics as is applicable to business and economic situations.

## **COURSE INPUTS**

**UNIT- I** Calculus (Problem and theorems involving trigonometrically ratios are not to be done). Differentiation: Partial derivatives up to second order ; Homogeneity of function and Euler's theorem; Maximum and Minimum; cases of one variable involving second or higher order Derivatives; Logarithm's

**UNIT -II** Matrices and Determinants: Definition of a matrix, Types of matrices, Algebra of Matrices; Properties of Determinants; Calculation of values of determinants up to third order; Ad joint of a matrix; elementary Row or column operations; Finding inverse of a Matrix through adjoin and elementary Row or column Operations; Solution of a system of linear equations having unique solution and involving not more than Three variables.

**UNIT-III** linear programming Formulation of LPP: Graphical method of solution ; Problems relating to two variables Including the case of mixed constraints; Cases having no solutions, unbounded solution and redundant Constraints. Transports problem, Ratio & Proportion.

**UNIT- IV** Compound interest and Annuities : Certain different type of interest rates; Concept of present value and Amount of a sum; Type of annuities; Present value and debentures, Problems relating to sinking funds.

**Unit – V** Averages, percentages, commission brokerage, profit and loss.



BUSINESS COMMUNICATION

(Paper Code-1115)

PAPER – I

M.M. 75

OBJECTIVE

The Objective of this course is to develop effective business communication skills among the students.

COURSE INPUTS

UNIT-I Introducing Business Communication: Definitions, concept and Significance of communication, Basic forms of communicating; Communication models and process principles of effective communication; Theories of communication; Audience analysis.

Self-Development and Communication: Development of positive personal attitudes, SWOT analysis; Vot's model of interdependence; Whole communication.

UNIT-II Corporate Communication: Formal and informal communication networks; Grapevine; Miscommunication (Barriers); Improving communication.

Practices in business communication: Group discussions; Mock interviews; Seminars; Effective listening exercises; Individual and group presentations and reports writing.

UNIT-III Writing Skills : Planning business messages; Rewriting and editing; The first draft; Reconstructing the final draft; Business letters and memo formats; Appearance request letters; Good news and bad new letters; Persuasive letters; Sales letters; Collection letters; Office memorandum.

UNIT-IV Report Writing: Introduction to a proposal, short report and formal report, report preparation.

Oral Presentation: Principles of oral presentation, factors affecting presentation, sales presentation, training presentation, conducting surveys, speeches to motivate, effective presentation skills.



## UNIT-V Non-Verbal Aspects of Communicating.

Body language: Kinesics, Proxemics, Para language..

Effective listening: Principles of effective listening; Factors affecting listening exercises; Oral, written, and video sessions.

Interviewing Skills: Appearing in interviews; conducting interviews; Writing resume and letter of application .

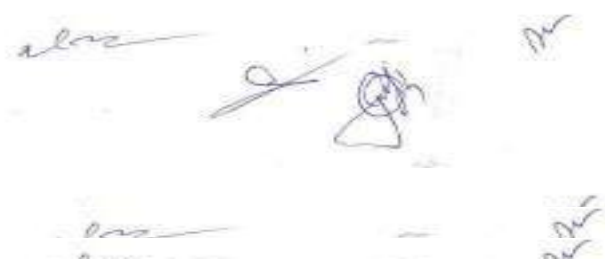
Modern Forms of Communicating: Fax; E-mail; Video conferencing; etc.

International Communication: Cultural sensitiveness and cultural context; Writing and presenting in international situations; Inter-cultural factors in interactions; Adapting to global business

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## SUGGESTED READINGS:

- 1 Bovee and Thill: Business Communication Today; Tata McGraw Hill, New Delhi.
- 2 Ronald E. Dulek and John Fielder: Principles of Business Communication; Macmillan Publishing Company, London.
- 3 Randall E. Magors; Business Communication: Harper and Row New York.
- 4 Webster's Guide to Effective letter writing; Harper and Row, New York.
- 5 Balasubramanyam: Business Communications; Vikas Publishing House, Delhi.
- 6 Kaul: Business Communication; Prentice Hall, New Delhi.
- 7 Kaul: Effective Business Communication: Prentice Hall, New Delhi.
- 8 Patri VR: Essentials of Communication; Greenspan Publications, New Delhi.
- 9 Senguin J: Business Communication; The Real World and Your Career, Allied Publishers, New Delhi.
- 10 Robinson, Netrakanti and Shintre: Communicative Competence in Business English ; Orient Longman, Hyderabad.



## BUSINESS REGULATOR FRAME WORK (Paper Code-1116)

### PAPER - II

M.M. 75

#### OBJECTIVE

The objective of this course is to provide a brief idea about the framework of Indian business laws.

#### COURSE INPUTS

UNIT-I Law of Contract (1872) : Nature of contract; Classification; Offer and acceptance; Capacity of parties to contract, free consent, Considerations, Legality of object; Agreement declared void; Performance of contract; Discharge of contract; Remedies for breach of contract.

UNIT-II Special Contracts: Indemnity; Guarantee; Bailment and pledge; Agency.

UNIT-III Sale of Goods Act 1930: Formation of contracts of sale; Goods and their Classification, price, Conditions, and warranties; Transfer of property in goods; Performance of the contract of sales; Unpaid seller and his rights, sale by auction; Hire purchase agreement.

UNIT-IV Negotiable Instrument Act 1881: Definition of negotiable instruments; Features; Promissory note; bill of exchange & cheque; Holder and holder in the due course; crossing of a cheque, types of crossing; Negotiation; Dishonor and discharge of negotiable instrument.

UNIT-V The Consumer Protection Act 1986: Sailable features; Definition of consumer; Grievance redressal machinery;  
Foreign Exchange Management Act 2000: Definitions and main provisions, Right to Information Act 2005 (Main Provisions).

#### SUGGESTED READINGS:

- 1 Desai T.R. Indian Contract Act, Sale of Goods Act and Partnership Act; S.C. Sarkar & Sons Pvt. Ltd. Kolkata.
- 2 Khergamwala J.S.: The Negotiable Instruments Act; N.M.Tripathi Pvt. Ltd. Mumbai.
- 3 Singh Avtar: The Principles of Mercantile Law; Eastern Book Company, Lucknow.
- 4 Kuchal M.C. Business Law; Vikas Publishing House, New Delhi.
- 5 Kapoor N.D. Business Laws, Sultan Chand & Sons, New Delhi.
- 6 Chandha P.R.: Business Law; Galgotia, New Delhi.

**GROUP - III**  
**BUSINESS ENVIRONMENT**

(Paper Code-1117)

PAPER - I

M.M. 75

**OBJECTIVE**

This course aims at acquainting the students with the emerging issues in business at the national and international level in the light of the policies of liberalization and globalization.

**COURSE INPUTS**

**UNIT-I Indian Business Environment: Concept, components, and importance**

Economic Trends (overview): Income; Savings and investment; Industry; Trade and balance of payments, Money; Finance; Prices.

**UNIT-II Problems of Growth: Unemployment; Poverty; Regional imbalances; Social injustice; Inflation; Parallel economy; Industrial sickness.**

**UNIT-III Role of Government: Monetary and fiscal policy; Industrial policy; Industrial licensing. Privatization; Devaluation; Export-Import policy; Regulation of foreign investment; Collaborations in the light of recent changes.**

**UNIT-IV Review of Precious Plans, the current five Year Plan, major Policy, Resources Allocation.**

**UNIT-V International Environment : international trading environment (overview); Trends in world trade and the problems of developing countries; Foreign trade and economic growth; International economic groupings; International economic institutions - GATT, WTO World Bank, IMF; FDI, Counter trade.**

**SUGGESTED READINGS:**

- 1 Sundaram & Black: The International Business Environment; Prentice Hall, New Delhi.
- 2 Agrawal A.N.: Indian Economy; Vikas Publishing House, Delhi.
- 3 Khan Farooq A: Business and Society: S. Chand., Delhi.
- 4 Dutt R. and Sundaram K.P.M.; Indian Economy: S. Chand, Delhi.
- 5 Misra S.K. and Puri V.K.: Indian Economy: Himalaya Publishing House, New Delhi.
- 6 Hedge Lan : Environmental Economics; Macmillan, Hampshire.
- 7 Dutt Ruddar : Economic Reforms in India - A Critique : S. Chand, New Delhi.



## BUSINESS ECONOMICS

(Paper Code-1118)

### PAPER - II

M.M. 75

#### OBJECTIVE

This course is meant to acquaint the students with the principles of Business Economics as are applicable in business.

#### COURSE INPUTS

UNIT-I Introduction: Basic problems of an economy; Working of price mechanism.

Elasticity of Demand: Concept and measurement of elasticity of demand; Price, income and cross elasticity' s; Average revenue, marginal revenue, and elasticity of demand; Determinants of elasticity of demand; Importance of elasticity of demand.

UNIT-II Production Function: Law of variable proportions; Iso-quants; Expansion path; Returns to scale; Internal and external economies and diseconomies.

UNIT-III Theory of Costs: Short-run and long-run cost curves - traditional and modern approaches.

Market Structures I Market structures and business decisions; Objectives of a business firm.

- a Perfect Competition: Profit maximization and equilibrium of firm and industry; Short-run and long run supply curves; Price and output determination. Practical applications.
- b Monopoly: Determination of price under monopoly; Equilibrium of a firm; Comparison between perfect competition and monopoly; Multi-plant monopoly; Price discrimination. Practical applications.

UNIT-IV Market Structures

- a Monopolistic Competition : Meaning and characteristics; Price and output determination under monopolistic competition; Product differentiations ; Selling costs; Comparison with perfect competition; Excess capacity under monopolistic competition.
- b Oligopoly: Characteristics, indeterminate pricing and output; Classical models of oligopoly; Price leadership; Collusive oligopoly.

UNIT-V Factor Pricing-I: Marginal Productivity theory and demand for factors; Nature of supply of factor inputs; Determination of wage rates under perfect competition and monopoly; Exploitation of labor.

Factor pricing-II: Rent concept, Ricardian and modern theories of Rent, interest. Interests-concept and theories of interest; Profit-nature, concepts and theories of profit.

#### SUGGESTED READINGS:

1. John P. Gould, Jr. and Edward P. Lazear: Micro economic Theory; All India Traveller, Delhi.
2. Browning Edger K, and Browning Jacqueniece M: Microeconomic Theory and Applications; Kalyani, New Delhi.
3. Watson Donald S. and Getz Molcolm: Price Theory and its Uses; Khosla Publishing House, New Delhi.
4. Koutsoyianni A.: Modern Microeconomics: Macmillan, New Delhi.
5. Richard G, Lipsey: An Introduction to Positive Economics; ELBS, Oxford.
6. Stigler G: The Theory of Price; Prentice Hall of India.
7. Nellis & Parker: The Essence of Business Economics; Prentice Hall, New Delhi.
8. Forgeson P.R. and Rothschild R., and Forgeson G.J.: Business Economics; MacMillan Hampshire.
9. Ahuja H.I: Business Economics; S.Chand & Co., New Delhi.

## **B. COM.-I YEAR (COMPUTER APPLICATION)**

### **MARKS DISTRIBUTION**

THEORY PAPER	PAPER - I	TOTAL MARKS - 50
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	PAPER - II	TOTAL MARKS - 50
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Every unit of theory paper will consists of 10 marks.

PRACTICAL PAPER	TOTAL MARKS - 50
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Practical Marks Distribution	VIVA - 10
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INTERNAL - 15
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PRACTICAL - 25
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Practical Test will consist of 3 hrs.

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TOTAL MARKS - 150
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### **Syllabus of B. Com - I (Computer Application)**

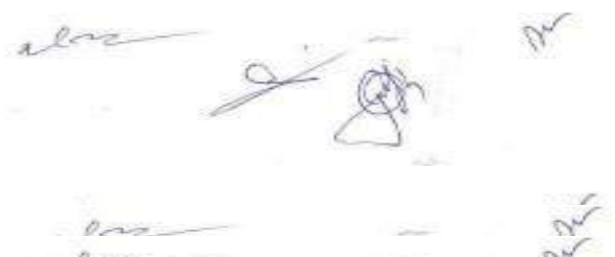
#### **PAPER - I**

#### **(COMPUTER FUNDAMENTALS AND OFFICE AUTOMATION) (Paper Code-1119)**

##### **UNIT-I Introduction to Computers**

Computer System Characteristics and Capabilities: Speed, Accuracy, Reliability, Memory capability, Repeatability. Computer Hardware and Software: Block Diagram of Computer, Different Types of Software. Data Processing: Data, Data Processing System, Storing Data, Processing Data. Types of Computers: Analog, Digital, Hybrid General and Special Purpose Computers. Computer Generations: Characteristics of Computer Generations Computer Systems - Micro, Minis & Main-Frame

Introduction to a PC: The IBM Personal Computer Types of PC systems PC, XT & AT Pentium PC's. Prevailing computer configurations. Various types of computer peripherals and memory devices. Limitations of Micro Computer.



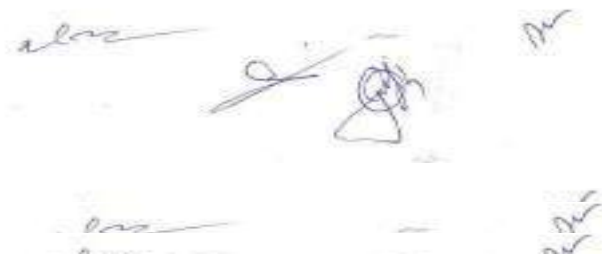
## UNIT-II Computer Software and Application

System Software: System software Vs. Application Software, Types of System Software, Introduction and Types of Operating Systems programs, Booting Loader, Diagnostic Tests, BIOS, Utility Programs, File Maintenance, Language Processors, Assembler, Compiler & Interpreter. Types of operating systems- MS DOS, WINDOWS, UNIX/Linux. Application Software: Microcomputer Software, Interacting with the System, Trends in PC software, Types of Application Software, Difference between Program and Packages.

## UNIT-III Operating System

Fundamentals of DOS: Physical Structure of the Disk, Compatibility of drives, Disks & DOS versions, Preparing Disks for use, Device Names. Getting Started with DOS Booting Process, System Files and Command com, Internal DOS Commands - DIR, MD, CD, COPY, DEL, REN, VOL, DATE, TIME, CLS, PATH, TYPE. Files & Directories, Elementary External DOS Commands - CHKDSK, MEM, XCOPY, PRINT, DISKCOPY, DISKCOMP, DOSKEY, HELP, TREE, SYS, LABEL, ATTRIB, Creating a Batch Files, Additional Commands - ECHO, PROMPT, MODE, GRAPHICS, EDIT, FORMAT, FDISK, BACKUP, RESTORE, MORE, SORT, APPEND. Windows Concepts, Features, Structure , Desktop, Taskbar, Start Menu, My Computer, Recycle bin, Accessories: Calculator, Notepad, Paint, WordPad, Character Map. Explorer: Creating folders and other Explorer facilities. Internet explorer basics, navigating the web.

UNIT-IV Ms Word - Creating & editing word documents, Formatting documents - aligning documents, indenting paragraphs, changing margin, formatting pages, formatting paragraph, printing labels, working with tables, formatting text in tables, inserting & deleting cells, rows & Columns, use Bulleted & numbering.



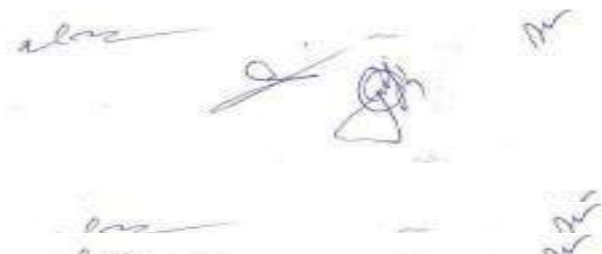
Checking spelling & Grammar, Finding synonyms, Working with long documents, working with header & Footer, adding page no & footnote, working with Graphics, inserting ClipArt, working templates, Creating templates, working with Mail - Merge, Writing the Form letter, Merging Form documents, Merging to label, Working with Mailing lists and Data Sources, Selecting Merge Records, Creating Macro, Running Macro.

Presenting with power point : Creating presentation, working with slides, Different type of slides, setting page layout, selecting background & applying design, adding Graphics to slide, adding sound & Movie, working with table, creating chart & Graph, playing a slide show, slide transition, advancing slides, setting time, rehearsing timing, animating slide, animating objects, running the show from windows.

UNIT-V Working with Excel - Introducing Excel, Use of Excel sheet, saving, opening & printing workbook, Apply formats in cell & text, Divide worksheet into pages, setting page layout, adding Header & Footer. Using multiple documents, arranging windows i.e. (Cascade, Tiled, Split), protecting your work, password protection. Working with Functions & Formulas, using absolute reference, referencing cell by name, using cell label, Giving name to cell and ranges, working with formulas (Mathematical & Trigonometric, Statistical, Date time, Most recently used), Working with Excel Graphics, creating chart & graphs. Working with lists & database, sorting a database, Filtering a database, using auto filter, Criteria Range, Calculating total & Subtotal, Creating Pivot table, Goal seek, Recording & Playing Macros, Deleting & Selecting Macro location, Use of Freeze option.

#### SUGGESTED BOOKS:

- 1 Office 2000 Made Easy - Alan Neibauer, Tata McGraw Hill.
- 2 Operating System (Incl. DOS & UNIX) : C. Ritchie [BPB]



## **PAPER - II**

### **COMPUTERIZED FINANCIAL ACCOUNTING (Paper Code-1120)**

UNIT-I Introduction to Data Base Management System, Introduction to FoxPro. Creating Data Base Files, list, display, edit browse replace, delete, pack, recall, locate-continue seek and find, sort, index, display structure, modify structure, memo field.

UNIT-II Memory variables, store, date and time function, printing reports and labels, mathematical function - sum, average, count, sort(), min(), max(), between(), len(), Floor(), int(), log(), sign(), character function - left(), right(), at(), stuff(), is upper(), is lower(), is alpha(), is digit(), replicate(). Great ion of Macros, Array.

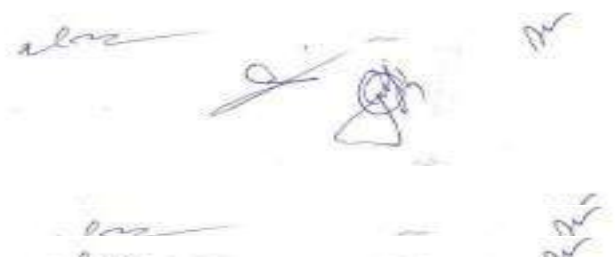
UNIT-III Programming with fox pro : modify command, using do while-end do, making decision with if-end if, scan-end, text-end text, do...case-end...case, for-end for, accept, input, wait, set relation, update, join, @ say, get command with read, pictures and functions with @.Windows, menus and popus-creating menu define menu, defining and using popups and popups features, creating simple menu with @ prompt, defining and using windows.

UNIT-IV Introduction to Accounting Software [Ex.-Tally], Creation of Company, Ledgers & Groups. Advance features of Accounting Software. Accounting Transactions: Operating Cycle, Journal, Concept of Accounts Receivable and payable, Compound Journal entry, Opening entry of Ledger.

UNIT-V Voucher Entry : Types of Voucher, Capital and Revenue, Income, Expenditure, Receipts Preparation of Trial Balance, Profit & Loss Account & Balance Sheet. Depreciation, Provisions and Reserves, Methods of Depreciation, Depreciation of assets, Depreciation of replacement cost.

#### **SUGGESTED REFERENCES:**

1. Foxpro made simple by R.K. Taxali.
2. Foxpro 2.5 by Charies Seigal.
3. Tally 5.4 by Vishupuriya Singh.
4. Implementry tally 1.4 by K.K. Nadhni.



### **PAPER - III**

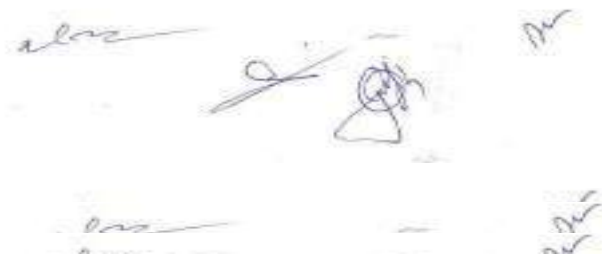
#### **PRACTICAL EXERCISES BASED ON PAPER I&II**

Following practical's (from s.no. 1 to 7) to be done using any financial accounting S/w (like Tally)

- Setting up Ledger & Groups.
- Study of recording of transactions in the 'Voucher'. (According to Golden rules)
- Study of 'Final A/C preparation & displaying in different mode/format.
- Study of alteration & Deletion of ledger/Groups.
- Study of cash & find flow, day book, sales register, purchase register, bills receivable/ Payable etc.
- Study of data security & backing up data.
- Outline of entry of Income Tax, ED, VAT, ST/CST, PF, Gratuity, Bonus, Loans & Depreciation etc.
- Creating label, report and screen files using database file with all types of fields.
- Making of Macros for creating new data base functions.
- Programming in FoxPro which covers menus, Conditional branching & looping, array, memory variable, hyperlink.
- Study of working with two or more data bases using join, Set relation, update.
- Sending circular letter to all organization using mail merge.
- Practical that covers all Graphs.
- Create conditional Batch file for selection of copying, deleting, renaming & exit file.
- Practice of all internal & External Dos commands.

Creating Sheet which covers sorting. Grouping, Freeze, auto sum, subtotal, Max, Min, Goal seek function.

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# दुर्ग विश्वविद्यालय, दुर्ग (छ.ग.)



बी.कॉम. द्वितीय वर्ष

हेतु

पाठ्यक्रम

मुख्य परीक्षा – 2018 हेतु



## **B. Com. - II**

### **INDEX**

1. Revised Ordinance No.-23	-	3
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8. Computer Application	-	13

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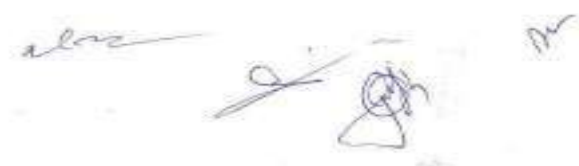
**REVISED ORDINANCE NO. - 23**

**(As per State U. G. C. Scheme)**

**BACHELOR OF COMMERCE**

- 1 The three year course has been broken up into three Parts.  
Part-I known as B. Com. Part-I Examination at the end of first year. Part-II Examination at the end of the second year, and Part-III Examination at the end of the third year.
- 2 A candidate who after passing (10+2) Higher Secondary or Intermediate examination of
- 3 C.G. Board of Secondary Education, C.G. or any other examination recognized by the University or C.G. Board of Secondary Education as equivalent thereto has attended a regular course of study in an affiliated college or in the Teaching Department of the University for One Academic Year, shall be eligible for appearing at the B.Com. Part-I examination.
- 4 A candidate who after passing B.Com. Part-I examination of the University or any other examination recognized by the University as equivalent thereto has attended a regular course of study for one academic year in an affiliated College or in the Teaching Department of the University, shall be eligible for appearing at the B.Com. Part-II Examination.
- 5 A candidate who after passing B.Com. Part-II examination of the University has completed a regular course of study for one academic year in an affiliated College or in the Teaching Department of the University, shall be eligible for appearing at the B.Com. Part-III examination.
- 6 Besides regular students, subject to their compliance with this ordinance, ex-students and non-collegiate students shall be eligible for admission to the examination as per provision of Ordinance No. 6 relating to examinations (General).

Provided that non-collegiate candidates shall be permitted to offer only such subject/ papers as are taught to the regular students at any of the University Teaching Department of College.

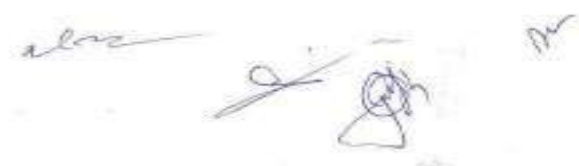
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7. Every candidate for B.Com. Examination shall be examined in subjects as mentioned in the marking scheme and course or studies.
8. A candidate who has passed the B.Com. Part-III examination of the University shall be allowed to present him of examination in any of the additional subjects prescribed for the B.Com. Examination and not taken by him at the degree examination. Such candidate will have to first appear and pass the B. Com. Part-I examination in the subject which he proposes to offer then the B.Com. Part-II and Part-III examination in the same subject. Successful candidates will be given a certificate to that effect.
9. In order to pass at any part of the three year degree course examination, an examinee must obtain not less than 33% of the total marks in each paper/group of subjects. In group where both theory and practical examinations are provided an examinee must pass in both theory and practical parts of examination separately.

Candidate will have to pass separately at the Part-I, Part-II and Part-III examination. No division shall be assigned on the result of the Part-I and Part-II examinations In determining the division of the Final examination, total marks obtained by the examinees in their Part-I, Part-II and Part-III examination in the aggregate shall be taken into account. Candidate will not be allowed to change subjects after passing Part-I examination.

Provided in case of candidate who has passed the examination through the supplementary examination having failed in one subject/group only, the total aggregate mark being carried over for determining the division, shall include actual marks obtained in the subject/group in which he appeared at the supplementary examination.

- n. Successful examinees at the Part - III examination obtaining 60% or more marks shall be placed in the First Division, those obtaining less than 60% but not less than 45% marks in the Second Division and other successful examinees in the Third Division.

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**B.COM. PART - II**  
**SCHEME OF EXAMINATION**

Subject			Max. Marks	Min. Marks
i	Environmental Studies	75	100	33
	Field Work	25		
<b>A. FOUNDATION COURSE</b>				
i.	Hindi Language - I		75	26
ii.	English Language - II		75	26
<b>B. THREE COMPULSORY GROUPS :</b>				
<b>GROUP – I Accounting:</b>				
i.	Corporate Accounting	75	150	50
ii.	Cost Accounting	75		
<b>GROUP – II</b>				
<b>Business Management:</b>				
i.	Principles of Business Management	75	150	50
ii.	Company Law	75		
<b>GROUP - III</b>				
<b>Applied Economics:</b>				
i.	Business Statistics	75	150	50
ii.	Fundamentals of	75		

**USE OF CALCULATORS**

The students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986.

- 1 Student will bring their own Calculators.
- 2 Calculators will not be provided by University or examination centres.
- 3 Calculators with, memory and following variables be permitted +,-,\*,/, square reciprocal, exponentials, log squares, root, trigonometric functions viz, sine, cosine tangent etc. factorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.



**हिन्दी भाषा**  
**भाग –दो, आधार पाठ्यक्रम**

**प्रश्न पत्र – प्रथम**  
**(पेपर कोड 1131)**

**खण्ड—क**

निम्नलिखित 5 लेखकों के एक – एक निबंध पाठ्यक्रम में सम्मिलित होंगे—

- |                         |   |                          |
|-------------------------|---|--------------------------|
| 01. महात्मा गांधी       | — | सत्य और अहिंसा           |
| 02. विनोबा भावे         | — | ग्राम सेवा               |
| 03. आचार्य नरेन्द्र देव | — | युवकों का समाज में स्थान |
| 04. वासुदेव शरण अग्रवाल | — | मातृ— भूमि               |
| 05. भगवतशरण अपाध्याय    | — | हिमाचल की व्युत्पत्ति    |
| 06. हरि ठाकुर           | — | डॉ. खूबचंद बघेल          |

**खण्ड – ख**

हिन्दी भाषा और उसके विविध रूप

- कार्यालकीन भाषा
- मीडिया की भाषा
- वित्त एवं वाणिज्य की भाषा
- मशीनी भाषा

**खण्ड—ग**

अनुवाद व्यवहार : अंग्रेजी से हिन्दी से अनुवाद

हिन्दी की व्यवहारिक कोटियाँ —

रचनागत प्रयोगगत उदाहरण, संज्ञा, सर्वनाम, विशेषण, समास, संधि एवं संक्षिप्तियाँ,  
रचना एवं प्रयोगगत विवेचन।

ENGLISH LANGUAGE (Paper Code-1132)

B.A. / B.Sc. /B.COM. /B.H. Sc. - II

M.M.75

The question paper for B.A. /B.Sc./B.Com./B.H.Sc., English Language and cultural values shall comprise the following units:

UNIT-I Short answer questions to be passed by (Five short answer questions of three marks each) 15 Marks

UNIT-II (a) Reading comprehension of an unseen passage 05 Marks  
(b) Vocabulary

UNIT-III Report-Writing 10 Marks

UNIT-IV Expansion of an idea 10 Marks

UNIT-V Grammar and Vocabulary based on the prescribed text book. 20+15Marks

Note: Question on all the units shall asked from the prescribed text which will  
Comprise Specimens of popular creative/writing and the following it any

a Matter & technology

- i. State of matter and its structure
- ii. Technology (Electronics Communication, Space Science)

b Our Scientists & Institutions

- I. Life & work of our eminent scientist Arya Bhatt. Kaard  
Charak Shusruta, Nagarjuna, J.C. Bose and C.V. Raman, S.  
Rmanujam, Homi J. Babha Birbal Sahani.
- II. Indian Scientific Institutions (Ancient & Modern)

Books Prescribed:

Foundation English for U.G. Second Year - Published by M.P. Hindi Granth  
Academy, Bhopal.



## **COMPULSORY**

### **Group - I - Accounting**

#### **PAPER - I**

#### **CORPORATE ACCOUNTING**

(Paper Code-1133)

Max. M. 75

Min. M. 25

#### **OBJECTIVE**

This course enables the students to develop awareness about corporate accounting in conformity with the provisions of companies Act.

#### **COURSE INPUT**

UNIT- I Issue, Forfeiture, and Re-issue of Shares: Redemption of preference shares; Issue and redemption of debentures.

UNIT-II Final Accounts; Excluding computation of managerial remuneration, and disposal of profit, Liquidation of Company.

UNIT-III Valuation of Good will and Shares.

UNIT-IV Accounting for Amalgamation of Companies as per Indian Accounting Standard 14; Accounting for internal reconstruction - excluding intercompany holdings and re- construction schemes.

UNIT-V Consolidated Balance Sheet of holding companies with one subsidiary only. Final Account of Banking Companies.

#### **SUGGESTED READINGS:**

- 1 Gupta R.L., Radhaswamy M; Company Accounts; Sultan Chand & Sons, New Delhi.
- 2 Maheshwari S.N. Corporate Accounting; Vikas Publishing House, New Delhi.
- 3 Monga J.R., Ahuja, Girish and Sehgal Ashok: Financial Accounting; Mayur Paper Backs, Noida.
- 4 Shukla M.C., Grewal T.S. and Gupta S.C.: Advanced Accounts; S. Chand & Co., New Delhi.
- 5 Moore C.L. and Jaedicke R.K.: Managerial Accounting; South Western Publishing Co. Cincinnati, Ohio.
- 6 Dr. S.M. Shukla, Sahitya Bhawan Agra.
- 7 Dr. Hanif & Mukerjee - Published Mac Millan.
- 8 Dr. Mangal Mehta & Agrawal Published - Indore.
- 9 Dr. Karim Khanuja - Published - Agra.

**OBJECTIE**  
**COMPULSORY**  
**Group - I - Accounting**  
**PAPER - II**  
**COST ACCOUNTING**  
**(Paper Code-1134)**

Max. M. 75

This course exposes the students to the basic concepts and the tools used in cost accounting.

COURSE INPUTS

**UNIT-I**

Introduction: Nature and scope of cost accounting; Cost concepts and classification; Methods and techniques; Installation of costing system; Concept of cost audit. Accounting for Material: Material Control; Concept and techniques; Pricing of material issues; Treatment of material losses.

UNIT-II Accounting for Labour: Labour cost control procedure; Labour turnover; Idle time and overtime; Methods of wage payment - time and piece rates; Incentive schemes. Accounting for overheads; Classification and departmentalization; Absorption of overheads; Determination of overhead rates; under and over absorption, and its treatment.

UNIT-III Cost Ascertainment: Unit costing; Job, batch and contract costing.

UNIT-IV Operating costing; Process Costing - excluding inter - process profits, and joint and by - products.

UNIT-V Cost Records: Intergal and non - integral system; Reconciliation of cost and financial accounts; Break Even Point.

**SUGGESTED READINGS:**

- 1 Arora M.N.: Cost Accounting - Principles and Practice; Vikas, New Delhi.  
Jain S.P. and Narang K.L.: Cost Accounting; Kalyani New Delhi.
- 2 Anthony Robert, Reece, etal: Principles of Management Accounting; Richard D. Irwin Inc. Illinois.





- 3 Horngren, Charles, Foster and Datar: Cost Accounting - A Managerial Emphasis; Prentice
- 4 Hall of India, New Delhi.
- 5 Khan M.Y. and Jain P.K; Management Accounting; Tata McGraw Hill.
- 6 Kaplan R.S. and Atkinson A.A.: Advanced Management Accounting; Prentice India International .
- 7 Tulsian P.C.; Practical costing: Vikas, New Delhi.
- 8 Maheshwari S.N.: Advanced Problems and Solutions in Cost Accounting; Sultan Chand, New Delhi.
- 9 M.L. Agrawal: Sahitya Bhawan Agra.

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COMPULSORY  
Group - II - Business Management  
PAPER - I  
PRINCIPLES OF BUSINE MANAGEMENT  
(Paper Code-1135)

Max. M. 75

**OBJECTIE**

This Course familiarizes the students with the basics of principles of management.

**COURSE INPUTS**

UNIT-I Introduction: Concept, nature, process, and significance of management; management roles (Mintzberg); an overview of functional areas of management; Development management thought; Classical and neo-classical systems; Concept approaches.

UNIT-II Planning: Concept, process and types. Decision making - concept and Bounded rationality; Management by objectives; corporate planning; Environment analysis and diagnosis; Strategy formulation.

UNIT-III Organizing: Concept, nature, process and significance; Authority and resident relationships; Centralization and decentralization; Depart mentation; Organization structure - forms and contingency factors.

UNIT-IV Motivating and Leading People at work: Motivation - concept; Theories Herzberg, McGregor, and Ouchi; Financial and non- financial incentives.

Leadership - concept and leadership styles; Leadership theories (Tannenb Schmidt.); Likert's System Management;

Communication - nature, process, networks, and barriers, Effective

1 Communication.

UNIT-V Managerial Control: Concept and process; Effective control system; Technical control - traditional and modern.

Management of Change: Concept, nature, and process of planned Resistance to change; emerging horizons of management in a environment.

**SUGGESTED READINGS:**

1 Drucker peter F: Management Challenges for the 21st Century; Butterworth Heinemann, Oxford.



- 2 Wehrich and Koontz, et al: Essentials of Management; Tata McGraw Hill, New Delhi.
- 3 Fred Luthans : Organization Behaviour; McGraw Hill, New York.
- 4 Louis A Allen: Management and Organisation; McGraw Hill, Tokyo.
- 5 Ansoff H.I.: Corporate Strategy; McGraw Hill, New York.
- 6 Hampton. David R.: Modern Management; McGraw Hill, New York.
- 7 Dr. R.C. Agrawal, Agra.
- 8 Dr. S.C. Saxena, Agra

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COMPULSORY  
Group - II - Business Management  
PAPER - II  
COMPANY LAW  
(Paper Code-1136)

OBJECTE

This objective of this course is to provide basic knowledge of the provisions Companies Act. 1956, along with relevant case law.

COURSE INPUTS

(The Companies Act, excluding provisions relating to accounts and audit sections, a agents and secretaries and treasurers Sections 324 - 388E, arbitration, compare arrangements and reconstructions - section 389-396.)

UNIT-I Corporate personalities; Kinds of Companies, Nature & Scope, promotion on and incorporation of companies.

UNIT-II Memorandum of Association; Articles of Association; Prospectus, Shares; share capital - transfer and transmission.

UNIT-III Capital management -borrowing powers, mortgages and charges, debentures. Directors - Managing Director, whole time director, Appointment, Remuneration, and duties.

UNIT-IV Company meetings - kinds, Notice, quorum, voting, proxy, resolutions, minutes.

UNIT-V majority powers and minority rights; Prevention of oppression and mismanagement. Winding up - kinds and conduct.

SUGGESTED READINGS:

- 1 Gower L.C.B.: Principles of Modern Company Law; Stevens & Sons, London.
- 2 Ramaiya A.: Guide to the companies Act; Wadhwa & Co. Nagpur.
- 3 Singh Avtar: Company Law; Eastern Book Co., Lucknow.
- 4 Kuchal M.C.: Modern India Company Law; Shri Mahavir Books, Noida.
- 5 Kapoor N.D.: Company Law - Incorporating the Provisions of the companies Amendment Act, 2000 Chand & Sons, New Delhi.
- 6 Bagrial A.K.: Company Law; Vikas Publishing House, New Delhi.
- 7 Dr. S.M. Shukla
- 8 Dr. R.C. Agrawal .

COMPULSORY  
Group - III - Applied Economics  
PAPER - I  
BUSINESS STATISTICS  
(Paper Code-1137)

Max. M. 75

OBJECTIVE

It enables the students to gain understanding of statistical techniques as are applicable to business.

COURSE INPUTS

UNIT-I Introduction : Statistics as a subject; Descriptive Statistics - compared to Inferential Statistics; Types of data; Summation operation; Rules of Sigma E operations, Analysis of University Data; Construction of a frequency distribution; Concept of central tendency.

UNIT-II Dispersion - and their measures; Partition values; Moments; Skewness and measures; Kurtosis and measures.

UNIT-III Analysis of Bivariate Data: Linear regression two variables and correlation.

UNIT-IV Index Number; Meaning, types, and uses; Methods of Constructing price and quantity indices (simple and aggregate); Tests of adequacy; Chain - base index numbers; Base shifting, splicing and deflating; Problems in constructing index numbers; Consumer price index. Analysis of Time Series : Cause of Variation in time series data; Components of a time series; Decomposition - Additive and Multiplicative models; Determination of trend - Moving Averages Method and method of least squares (including linear, second degree, parabolic, and exponential trend); Computation of seasonal indices by simple averages, ratio - to - trend, ratio - to - moving average, and link relative methods.

UNIT-V Forecasting and Methods: Forecasting - concept, types and importance; General approach to forecasting; Methods of forecasting; demand; Industry Vs Company sales forecast; Factors affecting company sales. Theory of Probability : as a concept; The three approaches to defining probability; Addition and multiplication laws of probability; Conditional Probability; Bayes' Theorem; Expectation and Variance of a random variable

COMPULSORY  
Group - III - Applied Economics  
PAPER - II  
FUNDAMENTALS OF ENTREPRENEURSHIP  
(Paper Code-1138)

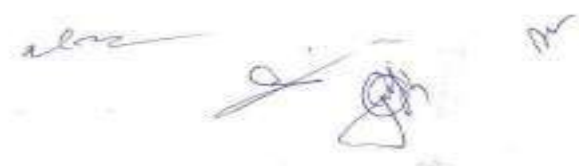
It provides exposure to the students to the entrepreneurial culture and industrial growth so as to preparing them to set up and manage their own small units.

COURSE INPUTS

- UNIT-I Introduction : The entrepreneur; Definition; Emergence of entrepreneurial class; Theories of entrepreneurship; Role of socio - economic environment; Characteristics.
- UNIT-II Promotion of a Venture; Opportunities analysis; External environmental analysis economic, social and technological; Competitive factors; Legal requirements for establishment of a new unit, and raising of funds; Venture capital sources and documentation required.
- UNIT-III Entrepreneurial Behavior: Innovation and entrepreneur; Entrepreneurial behavior and Psycho - Theories, Social responsibility.
- UNIT-IV Entrepreneurial Development Programs (EDP): EDP, their role, relevance, and achievements; Role of Government in organizing EDPs; Critical evaluation.
- UNIT-V Role of Entrepreneur : Role of an entrepreneur in economic growth as an innovator, generation of employment opportunities, complementing and supplementing economic growth, bringing about social stability and balanced regional development of industries; Role in export promotion and import substitution, forex earnings, and augmenting and meeting local demand.

SUGGESTED READINGS:

- 1 Tandon B.C.: Environment and Entrepreneur; Chugh Publications, Allahabad .
- 2 Siner A David: Entrepreneurial Megabooks; John Wiley and Sons, New York.
- 3 Srivastava S.B.: A Practical Guide to industrial Entrepreneurs; Sultan Chand and Sons, New Delhi.
- 4 Prasanna Chandra: Project Preparation, Appraisal, Implementation; Tata McGraw Hill, New Delhi.
- 5 Pandey I.M.: Venture Capital - The Indian Experience; Prentice Hall of India.
- 6 Holt: Entrepreneurship - New Venture Creation; Prentice Hall of India.



## COMPUTER APPLICATION

### MARKS DISTRIBUTION

Theory Paper      Paper - I      Total Marks - 50

Paper - II      Total Marks - 50

Every unit of theory paper will consists of 10 marks.

Practical paper

Practical Marks Distribution:

Viva      - 10

Internal      - 15

Practical      - 25

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Total Marks - 150

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Practical Test will consist of 3 Hrs.

Syllabus of B.Com.-II (Computer Application )

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PAPER - I  
INTERNET APPLICATION & E-COMMERCE  
(Paper Code-1139)

UNIT - I Introduction to HTML

Introduction to Internet & World Wide Web

Internet - Indian and the Internet, Profile of Indian Surfer, History of the Internet, Indian Internet History, Technological Foundation of Internet, Application in Internet Environment, Movement of files/data between two computers, TCP/IP, IP Addresses, Domain Name System, Domain Name Services, allocation of second level domains in India, Internet & India.

World Wide Web (WWW) – www consortium browsing and information retrieval, exploring the www; address: URL

UNIT – II Introduction to HTML & Designing Web Page

Concept to Website, Web standards, What is HTML, HTML documents / file, HTML Editor, Explanation of the structure of Homepage, Elements in HTML Documents, HTML Elements, HTML Tags & Basic HTML Tags, viewing the source of web page & downloading the web page source, Extensible HTML, CSS, XML, XSL.

HTML Document Structure - Head Section Illustration of Document Structure, Mark-up elements within the Head: BASE, ISINDEX, LINK, META, TITLE, SCRIPT

UNIT - III HTML Document Structure & HTML Forms

Body Section - Illustration, Body elements, Background, TEXT BODY element, ADDRESS, BLOCKQUOTE, TABLE, COMMENTS, CHARACTER Emphasis modes, Logical styles, Physical Styles, FONT, BASEFONT and CENTER.

Image, Internal and External Linking Between Web Pages - IMG Elements, HEIGHT, WIDTH, ALT, ALLIGN, Illustration of IMG elements, Hypertext Anchors, NAME attribute in Anchor.

HTML Forms - Forms, Form tag, Form Structure, Input types, Drop down menu or select menu tags, image buttons.



#### UNIT – IV Introduction to E-Commerce & Business Strategy in Electronic Age

E-Commerce - Scope & definition of language, E-commerce & Trade cycle, E-markets, E-Data Interchange, Internet Commerce, E-commerce in Perspective.

Business Strategy - The value chain, competitive advantage, business strategy, Case-Study: e-commerce in Passenger Air Transport.

#### UNIT – V B to B e-Commerce & B to C e-Commerce

Business to Business e-Commerce -Inter-organizational Transactions, Electronic markets, Electronic Data Interchange (EDI) - the nuts and bolts, EDI and business, Inter organizational e-Commerce.

Business to Consumer e-Commerce - Consumer trade transactions.

The elements of e-Commerce - elements, e-visibility, e-shop online payments, delivering the goods, after sales service, Internet e-Commerce Security A web site evaluation model.

e-Business - Introduction, Internet Bookshops, Software Supplies & support, e- newspapers, internet banking, virtual auctions, online share dealing, gambling on net, e-diversity.

#### TEXT BOOKS:

1. An Introduction to HTML -Dr. Kamlesh N. Agarwala, Dr. O.P. Vyas, Dr.Prateek Agarwala
2. E-Commerce strategy, technologies & applications - David Whiteley.

#### REFERENCE BOOKS :

1. Business on the Net - Dr. Kamlesh N. Agarwala (Macmillan India Ltd.)



PAPER - II  
RELATIONAL DATABASE MANAGEMENT SYSTEM

(Paper Code-1140)

UNIT - I

DATABASE SYSTEM CONCEPT & ENTITY RELATIONSHIP MODEL:

Operational data, why database, data independence, an Architecture for a Data base system, DDL & DML, Data Dictionary, Data Structures and Corresponding Operators, Data Models, The Relational approach, The Network approach, DBMS storage structure and access method. Entity-Relationship model as a tool for conceptual design-entities attributes and relationships. ER diagrams; strong and weak entities Generalization; Specialization and aggregation. Converting and ER-model into relational.

UNIT - II

Relational Database Management System

Relational Model: Structure to Relational Database, Relational Algebra, The Domain Relational, Calculus, Extended Relational- Algebra Operation, Modification of database, Views. Relational Database Design :- Pitfalls in Relational Database Design, Decomposition, Functional Dependencies, Normalization : 1NF, 2NF, BCNF, 3NF, 4NF, 5NF operations not involving cursors, Operations involving cursors, dynamic statements, security & integrity security specification in SQL.

UNIT - III

RELATIONAL DATABASE DESIGN:

Relational Algebra, Traditional Set Operations, Attributes Names for Derived Relations, special relational operations, further normalization, functional dependence. First, second and third normal forms, BCNF Forms, relations with more than one candidate key, Good and bad decompositions, fourth normal form, fifth normal form, De-normalization.



## UNIT - IV

### Introduction to RDBMS Software - Oracle

- a Introduction: Introduction to personnel and Enterprises Oracle, Data Types, Commercial Query Language, SQL, SQL \* PLUS.
- b DDL and DML : Creating Table, Specify Integrity Constraint, Modifying Existing Table, Dropping Table, Inserting, Deleting and Updating Rows in as Table, Where Clause, Operators, ORDER BY, GROUP Function, SQL Function, JOIN, Set Operation, SQL Sub Queries. Views: What is Views, Create, Drop and Retrieving data from views?

## UNIT - V

- a Security: Management of Roles, Changing Password, Granting Roles & Privilege, with drawing privileges.
- b PL/SQL : Block Structure in PL/SQL, Variable and constants, Running PL/SQL in the SQL\*PLUS, Data base Access with PL/SQL, Exception Handling, Record Data type in PL/S!L, Triggers in PL/SQL.

### SUGGESTED BOOKS:

- 1 Data base system : Korth & Siberschatz.
- 2 An Introduction to Data base System : C.J. Date

## PAPER - III

### PRACTICAL EXERCISES BASED ON PAPER I & II

#### Practical's to be done:

- 2 Creating simple Web-pages using html.
- 3 Designing business web-sites using HTML features (e.g. html forms)
- 4 [Each student should study the existing business web-sites and do at least 05 exercises to create business websites using various html features]



- 5 Should perform various queries using SQL.
- 6 [Each student should create ER diagrams for various business scenarios, and convert it into tables, using any RDBMS Software (i.e. Oracle / Access)
- 7 Practical using various aspects of Oracle.
- 8 At least 10 practical-exercises covering the contents of paper-III]

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# दुर्ग विश्वविद्यालय, दुर्ग (छ.ग.)



बी.कॉम. तृतीय वर्ष  
हेतु  
पाठ्यक्रम

मुख्य परीक्षा – 2018 हेतु

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### B.Com.- III

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REVISED ORDINANCE NO.-23

(As per State U. G. C. Scheme)

BACHELOR OF COMMERCE

1. The three year course has been broken up into three Parts.  
Part-I known as B. Com. Part-I Examination at the end of first year. Part-II Examination at the end of the second year, and,  
Part-III Examination at the end of the third year.
2. A candidate who after passing (10+2) Higher Secondary or Intermediate examination of C.G. Board of Secondary Education, C.G. or any other examination recognized by the University or M.P. Board of Secondary Education as equivalent thereto has attended a regular course of study in an affiliated college or in the Teaching Department of the University for One Academic Year, shall be eligible for appearing at the B.Com. Part-I examination.
3. A candidate who after passing B.Com. Part-I examination of the University or any other examination recognized by the University as equivalent thereto has attended a regular course of study for one academic year in an affiliated College or in the Teaching Department of the University, shall be eligible for appearing at the B.Com. Part-II Examination.
4. A candidate who after passing B.Com. Part-II examination of the University has completed a regular course of study for one academic year in an affiliated College or in the Teaching Department of the University, shall be eligible for appearing at the B.Com. Part-III examination.
5. Besides regular students, subject to their compliance with this ordinance, ex-students and non-collegiate students shall be eligible for admission to the examination as per provision of Ordinance No. 6 relating to examinations (General).  
Provided that non-collegiate candidates shall be permitted to offer only such subject/ papers as are taught to the regular students at any of the University Teaching Department of College.
6. Every candidate for B.Com. Examination shall be examined in subjects as mentioned in the marking scheme and course or studies.
7. A candidate who has passed the B.Com. Part-III examination of the University shall be allowed to present him of examination in any of the additional subjects prescribed for the B.Com. Examination and not taken by him at the degree examination. Such candidate will have to first appear and pass the B. Com. Part-I examination in the subject which he proposes to offer then the B.Com. Part-II and Part-III examination in the same subject. Successful candidates will be given a certificate to that effect.
8. In order to pass at any part of the three year degree course examination, an examiner.

9. Must obtain not less than 33% of the total marks in each paper/group of subjects. In group where both theory and practical examinations are provided an examinee must pass in both theory and practical parts of examination separately.
10. Candidate will have to pass separately at the Part-I, Part-II and Part-III examination. No division shall be assigned on the result of the Part-I and Part-II examinations in determining the division of the Final examination, total marks obtained by the examinees in their Part-I, Part-II and Part-III examination in the aggregate shall be taken into account. Candidate will not be allowed to change subjects after passing Part-I examination.

Provided in case of candidate who has passed the examination through the supplementary examination having failed in one subject/group only, the total aggregate mark being carried over for determining the division, shall include actual marks obtained in the subject/group in which he appeared at the supplementary examination.

11. Successful examinees at the Part - III examination obtaining 60% or more marks shall be placed in the First Division, those obtaining less than 60% but not less than 45% marks in the Second Division and other successful examinees in the Third Division.



B.COM. PART-III  
SCHEME OF EXAMINATION

Subject	Max. Marks	Min. Marks
A. FOUNDATION COURSE-		
(a) Hindi Language -	75	26
(b) English Language -	75	26
B. COMPULSORY CORE COURSE:		
I. Income Tax	75	25
II. Indirect Tax	75	25
III. Management Accounting	75	25
IV. Auditing	75	25
And any one of the following Continuation Optional Group.		
OPTIONAL GROUP - A		
I. Financial Management	75	25
II. Financial Market	75	25
OPTIONAL GROUP - B		
Principal of Marketing	75	25
I. International Marketing	75	25
OPTIONAL GROUP - C		
i. Information Technology and its Applications in Business	75	25
ii. Essential of E-Commerce	75	25
OPTIONAL GROUP - D		
i. Fundamentals of Insurance	75	25
ii. Money & Banking System	75	25

USE OF CALCULATORS

The students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986.

1. Student will bring their own Calculators.
2. Calculators will not be provided by University or examination centres.
3. Calculators with, memory and following variables be permitted +, -, \*, /, square reciprocal, exponentials, log squares, root, trigonometric functions viz, sine, cosine tangent etc. factorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.

**आधार पाठ्यक्रम  
हिन्दी भाषा  
(पेपर कोड -0891)**

**प्रथम प्रश्न पत्र**

(बी. ए. बी. एस. सी., बी. काम., तृतीय वर्ष के पुनरीक्षित  
एकांक त आधार पाठ्यक्रम एवं पाठ्य सामग्री का संयोजन)  
।। सम्प्रेषण कौशल, हिन्दी भाषा और सामान्य ज्ञान ।।

आधार पाठ्यक्रम की संरचना और अनिवार्य पाठ्य पुस्तक -हिन्दी भाषा एवं समसामयिकी - का संयोजन इस तरह किया गया है कि सामान्य ज्ञान की विषय वस्तु - विकाशशील देशों की समस्याओं - के माध्यम और साथ -साथ हिन्दी भाषा का ज्ञान और उसमें सम्प्रेषण कौशल अर्जित किया जा सके । इसी प्रयोजन से व्याकरण को अन्तर्वस्तु को विविध विधाओं की संकलित रचनाओं और सामान्य ज्ञान की पाठ्य सामग्री के साथ अन्तर्गुम्फित किया गया है । अध्यापक के लिए पूरी पुस्तक की सामग्री है और अभ्यास के लिए विस्तृत प्रश्नावली है । यह प्रश्नपत्र भाषा का है अतः पाठ्य सामग्री का व्याख्यात्मक या आलोचनात्मक अध्ययन अपेक्षित नहीं है । पाठ्यक्रम और सामग्री का संयोजन निम्नलिखित पाँच इकाइयों में किया जाता है । प्रत्येक इकाई को दो भागों में विभक्त किया गया है ।

**इकाई - 1** (क) भारत माता : सुमित्रानंदन पंत, परसुराम की प्रतीज्ञा: रामधारी सिंह दिनकर,  
बहुत बड़ा सवाल: मोहन राकेश, संस्कृति और राष्ट्रीय एकीकरण : यागेश अटल ।  
(ख) कथन की शैलियों : रचनागत उदाहरण और प्रयोग ।

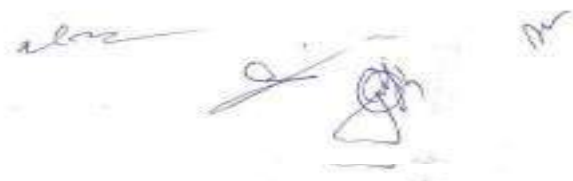
**इकाई -2** (क) विकासशील देशों की समस्याएँ, विकासात्मक पुनर्विचार, और प्रौद्योगिकी एवं  
नगरीकरण ।  
(ख) विभिन्न संरचनाएँ ।

**इकाई -3** (क) आधुनिक तकनीकी सभ्यता, पर्यावरण प्रदूषण तथा धारणीय विकास ।  
(ख) कार्यलयीन पत्र और आलेख ।

**इकाई -4** (क) जनसंख्या: भारत के संदर्भ में और गरीबों तथा बेरोजगारी ।  
(ख) अनुवाद

**इकाई -5** (क) ऊर्जा और शक्तिमानता का अर्थशास्त्र ।  
(ख) घटनाओं, समारोहों आदि का प्रतिवेदन और विभिन्न प्रकार के निमंत्रण -पत्र

**मूल्यांक योजना :** प्रत्येक इकाई से एक-एक प्रश्न पूछा जायेगा । प्रत्येक प्रश्न में आंतरिक विकल्प होगा । प्रत्येक प्रश्न के 15 अंक होंगे । प्रत्येक दो-दो खंड (क्रमशः 'क' और 'ख' में) विभक्त हैं , इसलिए प्रत्येक प्रश्न के भी दो भाग, (क्रमशः 'क' और 'ख') होंगे । 'क' अर्थात् पाठ एवं सामान्य ज्ञान से संबंध प्रश्न के अंक 8 एवं 'ख' अर्थात् भाषा एवं सम्प्रेषण कौशल से संबंध प्रश्न के अंक 7 होंगे । इस प्रकार पूरे प्रश्न पत्र के पूर्णांक 75 होंगे ।



Foundation Course - III English  
Language (Paper Code-1152)  
B.A./B.Sc./B.Com./B.H.Sc./III

M.M. 75

The question paper for B.A./B.Sc./B.Com./B.H.Sc. III Foundation course, English Language and General Answers shall comprise the following items :

Five question to be attempted, each carrying 3 marks.

UNIT-I Essay type answer in about 200 words. 5 essay type question to be asked three to be attempted.	15
UNIT-II Essay writing	10
UNIT-III Precise writing	10
UNIT-IV (a) Reading comprehension of an unseen passage	05
(b) Vocabulary based on text	10
UNIT-V Grammar Advanced Exercises	25

Note: Question on unit I and IV (b) shall be asked from the prescribed text. Which will comprise of popular create writing and the following items. Minimum needs housing and transport Geo-economic profile of M.P. communication Educate and culture. Women and Worm in Empowerment Development, management of change, physical quality of life. War and human survival, the question of human social value survival, the question of human social value, new Economic Philosophy Recent Diberlialiation Method) Demoration decentralization (with reference to 73, 74 constitutional Amendment.

Books Prescribed:

Aspects of English Language and Development - Published by M.P. Hindi Granth Academy, Bhopal.



COMPULSORY CORE COURSE

PAPER - I

INCOME TAX

(Paper Code-1153)

OBJECTIVE

It enables the students to know the basics of Income Tax Act and its implications.

COURSE INPUTS

UNIT-I Basic Concepts : Income, agricultural Income, casual income, assessment year, previous year, gross total income, total income, person.

Basis of charge: Scope of total income, residence and tax liability, income which does not form part of total income.

UNIT-II Heads of Income: Salaries; Income from house property.

UNIT-III Profit and gains of business or profession, including provisions relating to specific business; Capital gains, Income from other sources.

UNIT-IV Computation of Tax Liability: Set-off and carry forward of losses; Deduction from gross total income.

Aggregation of income; Computation of total income and tax liability of and individual, H.U.F., and firm.

UNIT-V Tax Management: Tax deduction at source; Advance payment of tax; Assessment procedures; Tax planning for individuals.

Tax evasion, Tax Avoidance and Tax planning.

Tax Administration: Authorities, appeals, penalties.

Suggested Reading:

1. Singhanian V.K.: Students Guide to Income Tax; Taxmann, Delhi.
2. Prasad, Bhagwati: Income Tax Law & Practice; Wily Publication, New Delhi.
3. Mehrotra H.C.: Income Tax Law & Accounts: Sahitya Bhawan, Agra.
4. Girish Ahuja and Ravi Gupta: Systematic approach to income tax: Sahitya Bhawan Publications, New Delhi.
5. Chandra Mahesh and Shukla D.C.: Income Tax Law and Practice; Pragati Publications, New Delhi.
6. R.K. Jain : Income Tax & Law (Hindi & English) Shahitya Bhavan, Publication, Agra,



PAPER - II  
INDIRECT TAXES  
(Paper Code-1154)

M.M. 75

OBJECTIV

This course aims at imparting basic knowledge about major indirect taxes.

UNIT-I Central Excise: Nature and scope of Central Excise; Important terms and definitions under the Central Excise Act; General procedures of central excise; Clearance and excisable goods; Concession to small scale industry under Central Excise Act.

UNIT-II State Excise, CENVAT.

Detail study of State Excise during calculation of Tax.

UNIT-III Customs : Role of customs in international trade; Important terms and definitions goods; Duty; Exporter; Foreign going vessel; Aircraft goods; Import; Import Manifest; Importer; Prohibited goods; Shipping bill; Store; Bill of lading; Export manifest; Letter of credit; Kinds of duties - basic, auxiliary, additional or countervailing; Basics of levy- advalorem, specific duties; Prohibition of export and import of goods, and provisions regarding notified & specified goods; Import of goods - Free import and restricted import; Type of import - import of cargo, import of personal baggage, import of stores.

Clearance Procedure - For home consumption, for warehousing for re-export; Clearance procedure for import by post; Prohibited exports; Canalized exports; Export against licensing; Type of exports export of cargo, export of baggage; Export of cargo by land, sea, and air routes.

UNIT-IV Central Sales Tax : Important terms and definitions under the Central Sales Tax Act 1956 - Dealer, declared good, place of business, sale, sale price, turnover, year, appropriate authority; Nature and scope of Central Sales Tax Act; Provisions relating to inter-state sales; Sales in side a state; Sales/purchase in the course of imports and exports out of India. Registration of dealers and procedure thereof; Rate of tax; Exemption of subsequent sales; Determination of turnover.

UNIT-V State Commercial Tax (Chhattisgarh) Definition, Registration, Tax liability, Procedure of Computation & Collection of Tax, Penalties & Prosicution calculation of Tax. VAT- Preliminary Knowledge.

Suggested Reading:

- 1 Malhotra & Goyal (Hindi & English).
- 2 Shripal saklecha.- अप्रत्क्ष कर
- 3 Commercial Tax Act. (C.G.)
- 4 Central Excise Act.
- 5 Sales Tax Act.



PAPER – III  
MANAGEMENT ACCOUNTING

(Paper Code-1155)

M.M. 75

OBJECTIVE

This course provides the students an understanding of the application of accounting techniques for management.

COURSE INPUTS

UNIT-I Management Accounting : Meaning, nature, scope, and functions of management accounting; Role of management accounting in decision making; Management accounting vs. financial accounting; Tools and techniques of management accounting; Financial statement; Objectives and methods of financial statements analysis; Ratio analysis; Classification of ratios - Profitability ratios, turnover ratios, liquidity ratios, turnover ratios; Advantages of ratio analysis; Limitations of accounting ratios.

UNIT-II Funds Flow Statement as per Indian Accounting Standard 3, cash flow statement.

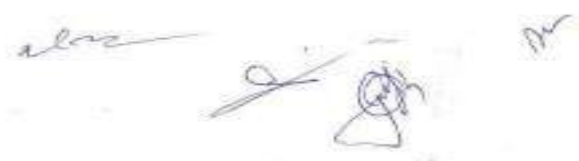
UNIT-III Absorption and Marginal Costing: Marginal and differential costing as a tool for decision making - make or buy; Change of product mix; Pricing, Break-even analysis; Exploring new markets; Shutdown decisions.

UNIT-IV Budgeting for profit Planning and control : Meaning of budget and budgetary control; Objectives; Merits and limitations; Types of budgets; Fixed and flexible budgeting; Control ratios; Zero base budgeting; Responsibility accounting; Performance budgeting.

UNIT-V Standard Costing and Variance Analysis: Meaning of standard cost and standard costing; Advantages and application; Variance analysis - material; Labour and overhead (Two-way analysis); Variances.

Suggested Reading:

1. Arora M.N.: Cost Accounting - Principles and Practice, Vikas, New Delhi.
2. Jain S.P. & Narang K.L.: Cost Accounting; Kalyani, New Delhi.
3. Anthony, Rogert & Reece, at al: Principles of Management Accounting; Richard Irwin Inc.
4. Horngren, Charles, Foster and Datar et al: Cost Accounting - A Managerial Emphasis; Prentice Hall, New Delhi.
5. Khan M.Y. and Jain P.K.: Management Accounting; Tata McGraw Hill, New Delhi.
6. Kaplan R.S. and Atkonson A.A.: Advanced Management Accounting; Printice Hall India, New Delhi.
7. J.K. Agrawal & R.K. Agrawal: Jaipur (English & Hindi).
8. Dr. M.R. Agrawal: Minakshi Prakashan Meruth.
9. Dr. S.P. Gupta - Agra (Hindi & English)



PAPER - IV  
AUDITING  
(Paper Code-1156)

OBJECTIVE

M.M. 75

This course aims at imparting knowledge about the principles and methods of auditing and their applications.

COURSE INPUTS

UNIT-I Introduction: Meaning and objectives of auditing; Types of audit; Internal audit.

Audit Process: Audit programme; Audit note books; Working papers and evidences.

UNIT-II Internal Check System: Internal control.

Audit Procedure: Vouching: Verification of assets and liabilities.

UNIT-III Audit of Limited Companies:

- a Company auditor - Appointment, powers, duties, and liabilities.
- b Divisible profits and dividend.
- c Auditor's report - standard report and qualified report.
- d Special audit of banking companies.
- e Audit of educational institutions.
- f Audit of Insurance companies.

UNIT-IV Investigation: Investigation; Audit of nonprofit companies,

- a Where fraud is suspected, and
- b When a running a business is proposed.
- c Verifications & Valuation of assets.

UNIT-V Recent Trends in Auditing: Nature and significance of cost audit; Tax audit; Management audit. Company auditing - Qualification, Appointment, Resignation and liabilities.

Suggested Reading:

1. Gupta KaPal: Contemporary Auditing: Tata Mcgraw Hill, New Delhi.
2. Tandon B.N.: Principles of Auditing: S. Chand & Co., New Delhi.
3. Pagare Dinkar: Principles and Practice of Auditing: Sultan Chand, New Delhi.
4. Sharma T.R.: Auditing Principles and Problems, Sahitya Bhawan, Agra.
5. Shukla S.M.: Auditing - Shahitya Bhavan, Agra, (Hindi)
6. Batliboy: Auditing

OPTIONAL GROUP     A  
Combination - I (Finance Area) **PAPER - I**  
**FINANCIAL MANAGEMENT**  
(Paper Code-1157)

M.M. 75

**OBJECTIVE**

The objective of this course is to help students understand the conceptual framework of financial management.

**COURSE INPUTS**

**UNIT-I** Financial Management: Financial goals; Profit vs wealth maximization; Financial functions- investment, financing, and dividend decisions; Financial planning.

**UNIT-II** Capital Budgeting : Nature of investment decisions, Investment evaluation criteria, payback period, accounting rate of return, net present value, internal rate of return profitability index; NPV and IRR comparison.

**UNIT-III** Cost of Capital: Significance of cost of capital; Calculating cost of debt; Preference shares, equity capital, and retained earnings; Combined (weighted) cost of capital.

Operating and financial Leverage: Their measure; Effects on profit, analyzing alternate financial plans, combined financial and operating leverage.

**UNIT-IV** Capital Structure: Theories and determinates.

Dividend Policies: Issues in dividend policies; Walter's model; Gordon's model; M.M. Hypothesis, forms of dividends and stability in dividends, determinates.

**UNIT-V** Management of Working Capital : Nature of working capital, significance of working capital, operating cycle and factors determining of working capital requirements, Management of working capital - cash, receivables, and inventories.

**Suggested Reading:**

1. Van Home J.C.: Financial Management and Policy; Prentice Hall of India, New Delhi.
2. Khan M.Y. and Jain P.K.: Financial Management, Text and Problems; Tata McGraw Hill, New Delhi.
3. Prasanna Chandra L Financial Management Theory and practice; Tata McGraw Hill, New Delhi.
4. Pandey I.M.: Financial Management Vikas Publishing Hous, New Delhi.
5. Brigham E.F. Gapenski L.C., and Ehrhardt M.C.: Financial Management - Theory and Practice; Harcourt College Publishers, Singapore.
6. Bhalla V.K. : Modern Working Capital Management, Anmol Pub. Delhi.
7. वित्तीय प्रबंध : एस. सी. जैन
8. वित्तीय प्रबंध : अग्रवाल एवं अग्रवाल. रमेश बुक डिपो, जयपुर
9. वित्तीय प्रबंध : एस. डी. सी. शर्मा, मेरठ



OPTIONAL GROUP A  
(Finance Area) PAPER - II  
FINANCIAL MARKET OPERATIONS  
(Paper Code-1158)

M.M. 75

**OBJECTIVE**

This course is at acquainting the students with the working of financial markets in India.

**COURSE INPUTS**

UNIT-I Money Market : Indian money market's composition and structure; (a) Acceptance houses, (b) Discount houses and (c) Call money market; Recent trends in Indian money market.

UNIT-II Capital Market : Security market - (a) New issue market, (b) Secondary market; Functions and role of stock exchange; listing procedure and legal requirements; Public issue - pricing and marketing; Stock exchanges - National Stock Exchange and over the counter exchanges.

UNIT-III Securities contract and Regulations Act: Main provisions.

Investors Protection : Grievances concerning stock exchange dealings and their removal; Grievance cells in stock exchanges; SEBI; Company Law Board; Press; Remedy through courts.

UNIT-IV Functionaries on Stock Exchanges: Brokers, sub brokers, market makers, jobbers, portfolio consultants, institutional investors, and NRIs.

UNIT-V Financial Services: Merchant banking - Functions and roles; SEBI guide-lines; Credit rating - concept, functions, and types.

**Suggested Reading:**

1. Chandler M.V. and Goldfield S.M.: Economics of money and Banking, Harper and Row, New Delhi.
2. Gupta Suraj B. Monetary Economics; s. chand and Co. New Delhi.
3. Gupta Suraj B. Monetary Planning in India; Oxford, Delhi.
4. Bhole L.M.: Financial Markets and Institutions: Tata McGraw Hill, New Delhi.
5. Hooda R.P.: Indian Securities Market - Investors view point; Excel Books, New Delhi.
6. R.B.I.: Functions and Working.
7. R.B.I.: Report in Currency and Finance.
8. R.B.I.: Report of the Committee to Review the working of the Monetary system : Chakravarty committee.
9. R.B.I.: Report of the Committee on the Financial System, Narsimham Committee.
10. वित्ती बाजारों की कार्यप्रणाली – साहित्य भवन पब्लिकेशन, आगरा

OPTIONA GROUP B  
(Marketing Area)  
PAPER - I  
PRINCIPLES OF MARKETING  
(Paper Code-1159)

M.M. 75

**OBJECTIVE**

The Objective of this course is to help students to understand the concept of marketing and its applications.

**COURSE CONTENTS**

UNIT-I Introduction: Nature and scope of marketing; Importance of marketing as a business function, and in the economy; Marketing concepts - traditional and modern; Selling vs. marketing; Marketing mix; Marketing environment.

UNIT-II Consumer Behavior and Market Segmentation: Nature, scope, and significance of consumer behavior; Market segmentation - concept and importance; Bases for market segmentation.

UNIT-III Product: Concept of product, consumer, and industrial goods; Product planning and development; Packaging role and functions; Brand name and trade mark; after sales service; Product life cycle concept.

Price: Importance of price in the marketing mix; Factors affecting price of a product/ service; Discounts and rebates.

UNIT-IV Distributions Channels and Physical Distribution; Distribution channels - Concept and role; Types of distribution channels. Factors affecting choice of a distribution channel; Retailer and wholesaler; Physical distribution of goods; Transportation, Warehousing, Inventory control; Order processing.

UNIT-V Promotion: Methods of promotion; Optimum promotion mix; Advertising media - their relative merits and limitations; Characteristics of an effective advertisement; Personal selling; Selling as a career; Classification of successful sales person; Functions of salesman.

**Suggested Reading:**

- 1 Philip Kotler: Marketing Management Englewood Cliffs; Prentice Hall, N.J.
- 2 William M. Pride and O.C. Ferrell: Marketing: Houghton - Mifflin Boston.
- 3 Stanton W.J. Etzel Michael J., and Walker Bruce J. Fundamentals of Marketing; McGraw Hill, New York.
- 4 Lamb Charles W., Hair Joseph F. and McDaniel Carl: Principles of Marketing; South- Western- Publishing, Cincinnati, Ohio.
- 5 Cravens David W. Hills Gerald E., Woodruff Robert B: Marketing management : Richard D. Irwin, Homewood Illinois.
- 6 Kotler Philip and Armstrong Gary: Principles of Marketing; Prentice Hall of India, New Delhi.
- 7 Dr. R.C. Agrawal, Agra.
- 8 Dr. S.C. Saxena Agra.
- 9 Dr. S.K. Jain, Hindi Granth Academi. M.P. Hkksiky
- 0 Dr. N.C. jain

OPTIONAL GROUP - B  
(Marketing Area)  
PAPER - II  
INTERNATIONAL MARKETING  
(Paper Code-1160)

M.M. 75

**OBJECTIVE**

This course aims at acquainting student with the operations of marketing in international environment.

**COURSE CONTENTS**

UNIT-I International Marketing: Nature, definition, and scope of international marketing; Domestic marketing vs. International marketing; International environment external and internal.

UNIT-II Identifying and Selecting Foreign Market: Foreign market entry mode decisions.

Product Planning for international Market: Product designing; Standardization vs. adaptation; Branding and packaging; Labeling and quality issues; after sales service.

International Pricing: Factors Influencing International price; Pricing process-process and methods; International price quotation and payment terms.

UNIT-III Promotion of Product/Services Abroad: Methods of international promotion; Direct mail and sales literature; Advertising; Personal selling; Trade fairs and exhibitions.

UNIT-IV International Distribution: Distribution channels and logistics decisions; Selection and appointment of foreign sales agents.

UNIT-V Export Policy and Practices in India : Exim policy - an overview; Trends in India's foreign trade; Steps in starting an export business; Product selection; Market selection; Export pricing; Export finance; Documentation; Export procedures; Export assistance and incentives.

**Suggested Reading:**

1. Bhattacharya R.L. and Varshney B: International Marketing Management; Sultan Chand, New Delhi.
2. Bhattacharya B.: Export Marketing Strategies for Success; Global Press, New Delhi.
3. Keegan W.J.: Multinational Marketing Management; Prentice Hall, New Delhi.
4. Kriplani V.: International marketing; Prentice Hall New Delhi.
5. Taggart J.H. and Moder Mott. M.C.: The Essence of International Business; Prentice Hall New Delhi.
6. Kotler Phillip: Principles of Marketing; Prentice Hall New Delhi.
7. Fayer Weather John: International Marketing; Prentice Hall N.J.
8. Caterora P.M. and Keavenay S.M: Marketing an international Perspective; Erwin Homewood, Illinois.
9. Paliwala, Stanely J. The Essence of International marketing; Prentice Hall, New Delhi .

OPTIONAL GROUP C (Commercial Area)  
PAPER - I  
INFORMATION TECHNOLOGY AND ITS APPLICATIONS IN BUSINESS  
(Paper Code-1161)

M.M. 75

**OBJECTIVE**

The objective of the course is to familiarize the students with the innovation information technology and how it affects business. An understanding of the group rules of these technologies will enable the students to appreciate the nitty-gritty Commerce.

**COURSE INPUTS**

**UNIT-I** Information Revolution and information Technology (IT) : Deployment of Business; Basic features of IT; Impact of IT on business environment and social fabric; Invention of writing; Written books; Printing Press and movable type Gutenberg's invention; Radio; telephone, wireless and satellite communication computing and dissemination of information and knowledge and convergence technologies (Internet with Wireless- WAP).

**UNIT-II** Fundamentals of Computer: Data, information and EDP: Data, information and concept of data and information; Levels of information from data; processing; Electronic data processing; Electronic machines;

- a. Number Systems and Codes: Different number systems - binary, octal decimal, hexagonal, and their conversion codes used in computers; Bed, EBCDIC, ASCII; Gray and conversions.
- b. Computer Arithmetic and Gates: Binary arithmetic, complements, addition subtraction; Conversion from one system to another; Logic Gates, truth table and applications minimization, and K-maps.
- c. Computer Processing System: Definition of computer; Hardware/Software concepts; Generation of computers; Types of computers; Elements of computer; CPU and its functions, various computer systems.
- d. I/O devices: Basic concepts of I/O devices; various input devices Keyboard, mouse; MICR, OCR, microphones.
- e. Various output devices: VDU, printer, plotter, spooling, L.S.
- f. Storage Devices: Primary and secondary memory; Types of memory capacity and its enhancement; Memory devices and comparisons; Auxiliary storage, tapes, disks (magnetic and optical); various devices and their comparison.
- g. System Software - Role of Software, Different System Software : O.S., utilization element of O.S. - Its types and variations; DOS and windows.
- h. Computer and Networks : Need of communication; Data transmission; Baud; Bandwidth; Communication Channel; Multiplexing; Basic network concepts;
- i. O.S.I. model; Types of topologies; LAN, WAN, Client server concept .

**UNIT-III** Computer-based Business Applications -

- a. Word Processing : Meaning and role of word processing in creating of documents, editing, formatting, and printing documents, using tools such as spelling check, thesaurus, etc. in word processors (MS-Word).
- b. Electronic Spreadsheet : Structure of spreadsheet and its applications to

accounting, finance, and marketing functions of business; Creating a dynamic/ sensitive worksheet; Concept of absolute and relative cell reference; Using built-in functions; Goal seeking and solver tool; Using graphics and formatting of worksheet; Sharing data with other desktop applications; Strategies of creating error-free worksheet (MS-Excel, Lotus 123). Practical knowledge on Wings Accounting (Software).

- c. Programming under a DBMS environment : The concept of data base management system; Data field, records, and files, Sorting and indexing data; Searching records, designing queries, and reports; Linking of data files; Understanding programming environment in DBMS; Developing menu driven applications in query language (MS-Access).

#### UNIT-IV Electronic Data Interchange (EDI)

Introduction to EDI; Basics of EDI; EDI standards; Financial EDI (FEDI); FEDI for international trade transaction; Applications of EDI; Advantages of EDI; Future of EDI.

#### UNIT-V The Internet and its Basic Concepts

Internet-concept, history development in India; Technological foundation of internet; Distributed computing; Client-server computing; Internet protocol suite; Application of distributed computing; Client-server computing; Internet protocol suite in the internet environment; Domain Name System (DNS); Domain Name Service (DNS); Generic top-level domain (gTLD); Country code top-level domain (ccTLD); - India; Location of second-level domains; IP addresses; Internet protocol; Applications of Internet in business, education, governance, etc.

##### Information System Audit

Basic idea of information audit; Difference with the traditional concepts of audit; Conduct and applications of IS audit in internet environment.

#### Suggested Reading:

1. Agrawala Kamlesh N. and Agarwala Deeksha: Business on the Net - Introduction to E-commerce, Macmillan India, New Delhi.
2. Agarwala Kamlesh, N. and Agarwala Deeksha: Bulls, Bears and The mouse; and introduction to On-line Service Market Trading; Macmillan India, New Delhi.
3. Agarwala Kamlesh, N. and Agarwala Prateek Amar; WAP the Net; An Introduction on Wireless Application Protocol; Macmillan India, New Delhi.
4. Bajaj Kamlesh K. and Nag Debjani: E-Commerce; The cutting Edge of Business; Tata McGraw Hill, New Delhi.
5. Edwards, Ward and Bytheway: The Essence of Information Systems; Prentice Hall, New Delhi.
6. Garg & Srinivasan: Work Book on Systems Analysis & Design; Prentice Hall New Delhi.
7. Kanter : Managing with Information; Prentice Hall New Delhi.
8. Minoli Daniel, Minoli Emma: Web Commerce Technology Handbook; Tata McGraw Hill, New Delhi.
9. Minoli Daniel: Internet & Internet Engineering; Tata McGraw Hill, New Delhi.
10. Yeats: Systems Analysis & Design; Macmillan India, New Delhi.
11. Goyal: Management information System; Macmillan India, New Delhi.
12. Timothy J O'Leary: Microsoft Office 2000; Tata McGraw Hill, New Delhi.

OPTIONAL GROUP C  
(E-Commerce Area)  
PAPER - II  
ESSENTIAL OF E-COMMERCE  
(Paper Code-1162)

OBJECTIVE

M.M. 75

The objective of this course is to familiarize the students with the basics of e-commerce and to comprehend its potential.

COURSE INPUTS

- UNIT-I Internet and Commerce : Business operations; E-Commerce practices; Concepts b2b, b2c, b2g, g2h; Benefits of e-commerce to organization, consumers, and society; Limitation of e-commerce; Management issues relating to e-commerce. Operations of E-Commerce : Credit card transaction; Secure Hypertext Transfer Protocol (SHTTP); Electronic payment systems; Secure electronic transaction (SET); Set's encryption; Process; Cybercast; Smart cards; Indian payment models.
- UNIT-II Applications in B2C : Consumer's shopping procedure on the internet; Impact on disintermediation and re-intermediation; Global market; Strategy of traditional department stores; Products in b2c model; Success factors of e-brokers; Broker based services on-line; Online travel tourism services; Benefits and impact of e-commerce on travel industry; Real estate market; Online stock trading and its benefits; Online banking and its benefits; Online financial services and their future; Educations benefits, implementation, and impact.
- UNIT-III Applications in B2B; Applications of b2b, Key technologies for b2b; Architectural models of b2b; Characteristics of the supplier-oriented marketplace, buyer-oriented marketplace, and intermediary-oriented marketplace; Benefits of b2b on procurement re-engineering; Just in Time delivery in b2b; Internet-based EDI from traditional EDI; Integrating EC with back-end information systems; Marketing issues in b2b.
- UNIT-IV Applications in Governance : EDI in governance; E-government; E-governance applications of the internet; Concept of government to business, business to government and citizen-to-government; E-governance models; Private sector interface in e-governance.
- UNIT-V Emerging Business Models: Retail model; Media model; Advisory model, Mode-to- order manufacturing model; Do-it yourself model; Information service model; Emerging Hybrid models; Emerging models in India.

### Suggested Reading:

- 1 Agarwala Kamlesh. N. and Agarwala Deeksha: Bridge to Online Storefront; Macmillan India, New Delhi.
- 2 Agarwala Kamlesh. N. and Agarwala Deeksha: Business on the Net Introduction to the E-commerce; Macmillan India New Delhi.
- 3 Agarwala Kamlesh N. and Agarwala Deeksha : Bulls, Bears and The Mouse : An Introduction to Online Stock Market Trading; Macmillan India New Delhi.
- 4 Tiwari Dr. Murli D.: Education and E-Governance; Macmillan India, New Delhi.
- 5 Minoli Daniel, Minoli Emma: Web Commerce Technology Handbook; Tata McGraw Hill, New Delhi.
- 6 Minoli Deniel, Internet & Internet Engineering: Tata McGraw Hill, 1999.
- 7 Bhatnagar Subhash and Schwabe Robert (Eds): Information and Communication Technology in Development; Sage Publications India, New Delhi.
- 8 Amor, Daniel: E-business Reevaluation, The Living and Working in an Interconnected World; Prentice Hall, U.S.
- 9 Afuah, A., and Tuccu, C.: Internet business models and Strategies; McGraw Hill, New York.
- 10 Agarwala Kamlesh. N. Internet Banking; Macmillan India, New Delhi.



OPTIONAL GROUP D  
(Money Banking & Insurance Area)  
PAPER - I  
FUNDAMENTAL OF INSURANCE M.M. 75  
(Paper Code-1163)

OBJECTIVE

This course enables the students to know the fundamentals of insurance.

COURSE INPUTS

UNIT-I Introduction to Insurance: Purpose and need of insurance; Insurance as a social security tool; Insurance and economic development.

UNIT-II Fundamentals of Agency Law: Definition of an agent; Agents regulations; Insurance intermediaries; Agents Compensation.

UNIT-III Procedure for Becoming an Agent : Prerequisite for obtaining a license; Duration of license; Cancellation of license; Revocation or suspension/termination of agent appointment; Code of conduct; Unfair practices. Functions of the Agent: Proposal form and other forms for grant of cover; Financial and medical underwriting; Material information; Nomination and assignment; Procedure regarding settlement of policy claims.

UNIT-IV Company Profile : Organizational set-up of the company; Promotion strategy; Market share; Important activities; Structure; Product; Actuarial profession; Product pricing actuarial aspects; Distribution channels.

UNIT-V Fundamentals/Principles of Life Insurance/Marine/Fire/Medical/General Insurance; Contracts of various kinds; Insurable Interest.

Suggested Reading:

1. Mishra M.N.: Insurance Principle and Practice; S. Chand and Co., New Delhi.
2. Insurance Regulatory Development Act. 1999.
3. Life Insurance Corporation Act. 1956.
4. Gupta OS: Life Insurance; Frank brothers, New Delhi.
5. Vinayakam N., Radhaswamy and Vasudevan SV: Insurance - Principles and Practice, S. Chand and Co. New Delhi.
6. Mishra MN: Life Insurance Corporation of India, Vols I, II & III; Raj Books, Jaipur.
7. Balchand Shriwastava, Agra.
8. Dr. M.L. Singhai, Ramesh Book Depot, Jaipur.
9. बीमा के तथ्य – आर. के. विश्वाकर्ष, आगरा



OPTIONAL GROUP      D  
(Money Banking & Insurance Area)  
PAPER - II  
MONEY & BANKING SYSTEM      M.M. 75  
(Paper Code-1164)

**OBJECTIVE**

This course enables the students to know the working of the Indian Money & banking system.

UNIT-I Money: Function, Alternative Measures to money supply in India - their different components. Meaning and changing relative importance of each.

UNIT-II Indian Banking System : Structure and organization of banks; Reserve Bank of India; Apex banking Institutions; Commercial banks; Regional rural banks; Cooperative banks; Development banks.

UNIT-III Banking Regulation Act, 1947 : History; Social control; Banking Regulation Act as applicable to banking companies and public sector banks; Banking Regulation Act as applicable to Cooperative banks.

UNIT-IV Regional Rural and Cooperative Banks in India: Functions; Role of regional rural and cooperative banks in rural India; Progress and performance.

UNIT-V Reserve Bank of India: Objectives; Organization; Functions and Working; Monetary policy; Credit control measures and their effectiveness. State Bank of India, Project History, Objectives, Functions & Organization working & progress.

**Suggested Reading:**

- 1 Basu A.K: Fundamentals of Banking-Theory and Practice; A Mukherjee and Co., Calcutta.
- 2 Sayers R.S.: Modern Banking: Oxford University Press.
- 3 Panandikar S.G. And Mithani D.M.: Banking in India; orient Longman.
- 4 Reserve Bank of India: Functions and Working.
- 5 Dekock: Central Banking; Crosby lockwood Staples, London.
- 6 Tannan M.L.: Banking - Law and Practice in India: India Law House, New Delhi.
- 7 Knubchandani B.S: Practice and Law of Banking; Macmillan, New Delhi .
- 8 Shekhar and Shekhar: Banking Theory and Practice; Vikas Publishing House, New Delhi.
- 9 Harishchandra Sharma.
- 10 M.L. Singhai.

## COMPUTER APPLICATION

### MARKS DISTRIBUTION

Theory Paper

Paper – I Total Marks - 50

Paper – II Total Marks - 50

Every unit of Theory Paper will consist of 10 Marks.

Practical  
paper

Total Marks - 50

Practical Marks Distribution:

Viva - 10

Internal - 15

Practical - 25

Practical Test will consist of 3 Hrs.

Total Marks - 150

PAPER - I  
PROGRAMMING IN VISUAL BASIC  
(Paper Code-1165)

UNIT-I Introduction to Visual Basic, Programs, Variables

Editions of Visual Basic, Event Driven Programming, Terminology, Working environment, project and executable files, Understanding modules, Using the code editor window, Other code navigation features, Code documentation and formatting, environment options, code formatting option automatic code completion features. Introduction to objects, Controlling objects, Properties, methods and events, working with forms, interacting with the user: Msg Box function, Input Box function, Code statements, Managing forms, Creating a program in Visual Basic, Printing, Overview of variables, User-defined data types, constants working with procedures, Working with dates and times, Using the Format Function, Manipulating text strings.

UNIT-II Controlling Program Execution, Working with Control

Comparison and logical operators, If...Then statements, Select Case Statements looping structures, Using Do...Loop structures, For...Next statement, Exiting a loop. Types of controls, Overview of standard controls, Combo Box and List Box, Option Button and Frame controls Menu, Status bars, Toolbars, Advanced standard controls, ActiveX controls, Insert table objects, Arrays, Dynamic Arrays.

UNIT-III Procedure, Function Error Trapping & Debugging

Procedure, Function, call by value, call by reference, Type definition, with object, Validation, Overview of run-time errors, error handling process, The Err object, Errors and calling chain, Errors in an error-handling routine, Inline error handling, Error handling styles, General error-trapping options Type of errors, Break mode Debug toolbar, Watch window, Immediate window, Local window, Tracing Program flow with the Call Stack.

UNIT-IV Sequential and Random Files:

Saving data to file, basic filling, data analysis and file, the extended text editor, File organization Random access file, The design and coding, File Dialog Box, Picture Box, Image box, Dialog Box, using clipboard, Copy, Cut, Paste of Text & Picture in Clipboard, Use of Grid Control Multiple document interface, Single document interface.

UNIT-V Data Access Using the ADO Data Control & Report Generation Overview of ActiveX data Objects, Visual Basic data access features, Relational database concepts Using the ADO Data control to access data, Overview of DAO, RDO, Data Control, structured query language (SQL), Manipulating data Using Data Form Wizard. Overview of Report, Data Report, Add groups, Data Environment, Connection to database Introduction to Crystal Report Generator.

BOOK REFERENCE:

- 1 Visual Basic Programming - Reeta Sahu, B.P.B. Publication.
- 2 Mastering in Visual Basic - By BPB Publications.
- 3 Visual Basic Programming - Mark Brit.

PAPER – II  
SYSTEM ANALYSIS, DESIGN & MIS  
(Paper Code-1166)

UNIT-I Introduction

Systems Concepts and the information systems environment: Definition of system, Characteristics of system, elements of system, types of system, the system Development life cycle: consideration of candidates system. The Role of system Analyst: Introduction, the multiphase role of the analyst, the analyst / user interface, the place of the analyst in the MIS Organization.

UNIT-II System Analysis, Tools of Structured Analysis, Feasibility Study-

System Planning and initial investigation: Basis for planning in systems analysis, initial investigation, fact finding, fact analysis, determination of feasibility. Information Gathering: Kind of information, Information gathering tools. Structured Analysis, Flow chart, DFD, Data Dictionary, Decision Tree, Structured English, Decision Table. System Performance, Feasibility Study. Data Analysis.

UNIT-III System Design & System Implementation -

The process of Design Methodologies. Input Design, Output Design, Form Design, File Structure, File organization, data base design, System Testing, the test plan, quality assurance, and data processing auditor. Conversion, Post implementation review, Software Maintenance.

#### UNIT-IV Introduction to MIS & Other Subsystem-

Evolution of MIS, Need of MIS, Definition & Benefits of MIS, Characteristic, Role component of Information system, data base as a future of MIS, Decision making, logic of Management Information system. Structure of MIS.

#### UNIT-V Information System Concept -

Difference between Transaction Processing. System (TPS) and Management Information System, How MIS works, MIS and Information Resource Management, Quality information Building Blocks for the information system, information system concept, Other system characteristic (Open & Closed System), difference between MIS & Strategic System, Adaptive system, Business function information system.

#### BOOK REFERENCE:

1. System Analysis and Design - Elias M. Awad.
2. System Analysis and Design - Alan Dennis & Barbara Haley Wixom.
3. Management Information systems - C.S.V. Murthy, Himalaya Publication House.

### **PAPER - III PRACTICAL EXERCISES BASED ON PAPER I & II**

Practical's to be done -

1. At least 20 practical - exercises covering the contents of paper - I (e.g. Designing calculator, sorting of elements, Generating Fibonacci series)
2. Design the Project on one of the following - Application Software / Website Design/ Accounting software / Inventory control System / System Software & other (e.g. Library Management System, Medical management, Stock Management, Hotel Management, Website for your institute / Website of any Organization)
3. The Project Report cover the following topic - Objective, Hardware & Software Requirements, Analysis, Design, Coding, input forms, testing, Reports, Future enhance- ment of s/w.
4. Practical exam is based on the Project Demonstration & report.

# दुर्ग विश्वविद्यालय, दुर्ग (छ.ग.)



पाठ्यक्रम

परीक्षा – 2017–18

बी.एससी. भाग—1  
**B.Sc. Part-1**

(Approved by Board of Studies)  
Effective from July 2017

## B.Sc.Part-I

### विषय-सूची

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	प्रथम हिन्दी	
	द्वितीय –अंग्रेजी भाषा	
	Physics (भौतिक शास्त्र)	
6.	Chemistry (रासायन शास्त्र)	17
7.	Zoology (प्राणी शास्त्र)	24
8.	Botany (वनस्पति शास्त्र)	26
9.	Mathematics (गणित)	28
10.	Microbiology (सूक्ष्म जीव विज्ञान)	31
11.	Geology (भू – विज्ञान)	33
12.	Anthropology (मानव विज्ञान)	35
13.	Statistics (सांख्यिकी)	37
14.	Defense Studies (रक्षा अध्ययन)	39
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16.	Computer Science	45
17.	Electronics Equipment Maintenance	49
18.	Electronics	51
19.	Information Technologies	54
20.	Industrial Microbiology	56
21.	Bio Chemistry	58
22.	Biotechnology	61

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**REVISED ORDINANCE NO. 21**  
**BACHELOR OF SCIENCE**

1. The three year course has been broken up into three Parts. Part-I known as B.Sc. Part-I examination at the end of the first year, Part-II known as B.Sc. Part-II examination at the end of the second year and Part-III known as B.Sc. Part-III examination at the end of the third year.
2. A candidate who after passing (10+2) Higher Secondary or Intermediate examination of C.G. Board of Secondary Education Bhopal or any other Examination recognized by the University or C.G. Board of Secondary Education as equivalent thereto, has attended a regular course of study in an affiliated College or in the Teaching Department of the University for one academic year shall be eligible for appearing at the B.Sc. Part-I examination.
3. A candidate who, after passing the B.Sc.-I examination of the University or any other examination recognized by the University as equivalent thereto, has attended a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.Sc. Part-II examination.
4. A candidate who, after passing the B.Sc. Part-II examination of the University, has completed a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.Sc. Part-III examination.
5. Besides regular students, subject to their compliance with this Ordinance ex-student and non-collegiate candidates shall be permitted to offer only such subjects/papers as are taught to the regular student at any of the University Teaching Department or College.
6. Every candidate appearing in B.Sc. Part-I, Part-II and Part-III examination shall be examined in-
  - (i) Foundation Course:
  - (ii) Any one of the following combinations of three subjects:-
    1. Physics, Chemistry & Mathematics.
    2. Chemistry, Botany & Zoology.
    3. Chemistry, Physics & Geology.
    4. Chemistry, Botany & Geology.
    5. Chemistry, Zoology & Geology.
    6. Geology, Physics & Mathematics.
    7. Chemistry, Mathematics & Geology.
    8. Chemistry, Botany & Defense Studies.
    9. Chemistry, Zoology & Defense Studies
    10. Physics, Mathematics & Defense Studies.
    11. Chemistry, Geology & Defense Studies



12. Physics, Mathematics & Statistics
13. Physics, Chemistry & Statistics
14. Chemistry, Mathematics & Statistics.
15. Chemistry, Zoology & Anthropology.
16. Chemistry, Botany & Anthropology.
17. Chemistry, Geology & Anthropology.
18. Chemistry, Mathematics & Statistics.
19. Chemistry, Anthropology & Defense Studies.
20. Geology, Mathematics & Statistics.
21. Mathematics, Defense Studies & Statistics
22. Anthropology, Mathematics & Statistics
23. Chemistry, Anthropology & Applied Statistics
24. Zoology, Botany & Anthropology
25. Physics, Mathematics & Electronics.
26. Physics, Mathematics & Computer Application
27. Chemistry, Mathematics & Computer Application
28. Chemistry, Bio-Chemistry & Pharmacy
29. Chemistry, Zoology & Fisheries.
30. Chemistry, Zoology & Agriculture
31. Chemistry, Zoology & Sericulture
32. Chemistry, Botany & Environmental Biology
33. Chemistry, Botany & Microbiology
34. Chemistry, Zoology & Microbiology
35. Chemistry, Industrial Chemistry & Mathematics
36. Chemistry, Industrial Chemistry & Zoology
37. Chemistry, Biochemistry, Botany
38. Chemistry, Biochemistry, Zoology
39. Chemistry, Biochemistry, Microbiology
40. Chemistry, Biotechnology, Botany
41. Chemistry, Biotechnology, Zoology
42. Geology, Chemistry & Geography
43. Geology, Mathematics & Geography
44. Mathematics, Physics & Geography
45. Chemistry, Botany & Geography

(iii) Practical in case prescribed for core subjects.

7. Any candidate who has passed the B.Sc. examination of the University shall be allowed to present himself for examination in any of the additional subjects prescribed for the B.Sc. examination and not taken by him at the degree examination. Such candidate will have to first appear and pass the B.Sc. Part-I examination in the subjects which he proposes to offer and then the B.Sc. Part-II and Part-III examination in the same subject. Successful candidates will be given a certificate to that effect.

8. In order to pass at any part of the three year degree course examination an examinee must obtain not less than 33% of the total marks in each subject/ group of subjects. In subject/ group of subjects where both theory and practical examination are provided an examinee must pass in both theory and practical parts of the examination separately.
9. Candidate will have to pass separately at the Part-I, Part-II and Part-III examinations. No division shall be assigned on the result of the Part-I and Part-II examination. In determining the division of the final examination, total marks obtained by the examinees in their Part-I, Part-II and Part-III examination in the aggregate shall be taken in to account. Provided in case of candidate who has passed the examination through supplementary examination having failed in one subject/ group only, the total aggregate marks being carried over for determining the division shall include actual marks obtained in the subject/ group in which he appeared at the supplementary examination.
10. Successful examinee at the Part-III examination obtaining 60% or more marks shall be places in the First Division, those obtaining less than 60% but not less than 45% marks in the Second Division and other successful examinees in the Third Division.

## SCHEME OF EXAMINATION

Subject	Paper	Max. Mark	Total Marks	Min. Marks
<b>Environmental Studies</b>		<b>75</b>	<b>100</b>	<b>33</b>
<b>Field Work</b>		<b>25</b>		
<b>Foundation Course</b>				
Hindi Language	I	75	75	26
English Language	I	75	75	26
<b>नोट— प्रत्येक खंड में से 2 दो प्रश्न हल करने होंगे। सभी प्रश्नपत्र समान अंक के होंगे।</b>				
<b>Three Elective Subject:</b>				
1. Physics	I		50	
	II		50	100
	Practical			50
				17
2. Chemistry	I		33	
	II		33	100
	III		34	
	Practical			50
				17
3. Mathematics	I		50	
	II		50	150
	III		50	
4. Botany	I		50	
	II		50	100
	Practical			50
				17
5. Zoology	I		50	
	II		50	100
	Practical			50
				17
6. Geology	I		50	

		II	50	100	33
		Practical		50	17
7. Statistics	I		50		
	II		50	100	33
	Practical			50	17
8. Anthropology	I		50		
	II		50	100	33
	Practical			50	17
<hr/>					
Subject	Paper	Max. Marks	Total Marks	Min. Marks	
<hr/>					
9. Defense Studies	I	50			
	II	50	100	33	
	Practical		50	17	
10. Micro Biology	I	50			
	II	50	100	33	
	Practical		50	17	
11. Computer Science	I	50			
	II	50	100	33	
	Practical		50	17	
12. Information Technology	I	50			
	II	50	100	33	
	Practical		50	17	
13. Industrial Chemistry	I	34			
	I	33	100	33	
	II	33			
	Practical		50	17	
14. Bio Chemistry	I	50			
	II	50	100	33	
	Practical		50	17	
15. Bio Technology	I	50			
	II	50	100	33	
	Practical		50	17	
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### **USE OF CALCULATORS**

The Students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986.

1. Student will bring their own Calculators.
2. Calculators will not be provided either by the University or examination centres.
3. Calculators with, memory and following variables be permitted +, −, x, ÷, square, reciprocal, exponentials log, square root, trigonometric functions, wize, sine, cosine, tangent etc. factorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.

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Part - I  
**SYLLABUS FORENVIRONMENTAL STUDIES AND HUMAN RIGHTS**  
**(Paper code-0828)**

**MM. 75**

इन्वायरमेंटल साईंसेस के पाठ्यक्रम को स्नातक स्तर भाग—एक की कक्षाओं में विश्वविद्यालय अनुदान आयोग के निर्देशानुसार अनिवार्य रूप से शिक्षा सत्र 2003—2004 (परीक्षा 2004) से प्रभावशील किया गया है। स्वशासी महाविद्यालयों द्वारा भी अनिवार्य रूप से अंगीकृत किया जाएगा।

भाग 1, 2 एवं 3 में से किसी भी वर्ष में पर्यावरण प्रश्न—पत्र उत्तीर्ण करना अनिवार्य है। तभी उपाधि प्रदाय योग्य होगी।

पाठ्यक्रम 100 अंकों का होगा, जिसमें से 75 अंक सैद्धांतिक प्रश्नों पर होंगे एवं 25 अंक क्षेत्रीय कार्य (Field Work) पर्यावरण पर होंगे।

सैद्धांतिक प्रश्नों पर अंक — 75 (सभी प्रश्न इकाई आधार पर रहेंगे जिसमें विकल्प रहेगा)

- |                      |   |        |
|----------------------|---|--------|
| (अ) लघु प्रश्नोंत्तर | — | 25 अंक |
| (ब) निबंधात्मक       | — | 50 अंक |

Field Work- 25 अंकों का मूल्यांकन आंतरिक मूल्यांकन पद्धति से कर विश्वविद्यालय को प्रेषित किया जावेगा। अभिलेखों की प्रायोगिक उत्तर पुस्तिकाओं के समान संबंधित महाविद्यालयों द्वारा सुरक्षित रखेंगे।

उपरोक्त पाठ्यक्रम से संबंधित परीक्षा का आयोजन वार्षिक परीक्षा के साथ किया जाएगा। पर्यावरण विज्ञान विषय अनिवार्य विषय है, जिसमें अनुत्तीर्ण होने पर स्नातक स्तर भाग—एक के छात्र/छात्राओं को एक अन्य विषय के साथ पूरक की पात्रता होगी। पर्यावरण विज्ञान के सैद्धांतिक एवं फील्ड वर्क के संयुक्त रूप से 33: (तींतीस प्रतिशत) अंक उत्तीर्ण होने के लिए अनिवार्य होंगे।

स्नातक स्तर भाग—एक के समस्त नियमित/भूतपूर्व/अमहाविद्यालयीन छात्र/छात्राओं को अपना फील्ड वर्क सैद्धांतिक परीक्षा की समाप्ति के पश्चात् 10 (दस) दिनों के भीतर संबंधित महाविद्यालय/परीक्षा केन्द्र में जमा करेंगे एवं महाविद्यालय के प्राचार्य/केन्द्र अधीक्षक, परीक्षकों की नियुक्ति के लिए अधिकृत रहेंगे तथा फील्ड वर्क जमा होने के सात दिनों के भीतर प्राप्त अंक विश्वविद्यालय को भेजेंगे।

## **UNIT-I THE MULTI DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES**

### **Definition, Scope and**

### **Importance Natural Resources:**

### **Renewable and Nonrenewable Resources**

- (a) Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people and relevant forest Act.
- (b) Water resources: Use and over-utilization of surface and ground water, floods drought, conflicts over water, dams benefits and problems and relevant Act.
- (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.
- (d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.
- (e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.
- (f) Land resources: Land as a resource, land degradation, man induced landslides soil erosion and desertification.

**(12 Lecture)**

## **UNIT-II ECOSYSTEM**

### **(a) Concept, Structure and Function of and ecosystem**

- Producers, consumers and decomposers.
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids.
- Introduction, Types, Characteristics Features, Structure and Function of Forest, Grass, Desert and Aquatic Ecosystem.

### **(b) Biodiversity and its Conservation**

- Introduction - Definition: genetic, species and ecosystem diversity
- Bio-geographical classification of India.
- Value of biodiversity: Consumptive use, Productive use, social ethics, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as mega-diversity nation.

- Hot spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wild life conflict.
- Endangered and endemic species of India.
- Conservation of biodiversity: In situ and Ex-situ conservation of biodiversity.

**(12Lecture)**

### **UNIT- III**

#### **(a) Causes, effect and control measures of**

- Air water, soil, marine, noise, nuclear pollution and Human population.
- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Disaster Management: floods, earthquake, cyclone and landslides.

**(12Lecture)**

#### **(b) Environmental Management**

- From Unsustainable to sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, water shed management.
- Resettlement and rehabilitation of people, its problems and concerns.
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
- Wasteland reclamation
- Environment protection Act: Issues involved in enforcement of environmental legislation.
- Role of Information Technology in Environment and Human Health.



#### **UNIT- IV**

General background and historical perspective- Historical development and concept of Human Rights, Meaning and definition of Human Rights, Kind and Classification of Human Rights.

Protection of Human Rights under the UNO Charter, protection of Human Rights under the Universal Declaration of Human Rights, 1948.

Convention on the Elimination of all forms of Discrimination against women.

Convention on the Rights of the Child, 1989.

#### **UNIT-V**

Impact of Human Rights norms in India, Human Rights under the Constitution of India, Fundamental Rights under the Constitution of India, Directive Principles of State policy under the Constitution of India, Enforcement of Human Rights in India.

Protection of Human Rights under the Human Rights Act, 1993- National Human Rights Commission, State Human Rights Commission and Human Rights court in India.

Fundamental Duties under the Constitution of India.

## Reference/ Books Recommended

1. SK Kapoor- Human rights under International Law and Indian Law.
2. HO Agrawal- International Law and Human Rights
3. एस.के. कपूर —मानव अधिकार
4. जे.एन. पान्डेय — भारत का संविधान
5. एम.डी. चतुर्वेदी —भारत का संविधान
6. J.N.Pandey - Constitutional Law of India
7. Agarwal K.C. 2001 Environmental Biology, Nidi pub. Ltd. Bikaner
8. Bharucha Erach, the Biodiversity of India, Mapin pub. Ltd. Ahmedabad 380013, India, Email: mapin@icenet.net(R)
9. Bruinner R.C. 1989, Hazardous Waste Incineration. McGraw Hill Inc. 480p
10. Clark R.S. Marine pollution, Clanderson press Oxford (TB)
11. Cuninghame, W.P. Cooper. T.H. Gorhani, E & Hepworth. M.T, 200
12. Dr. A.K.- Environmental Chemistry. Wiley Eastern Ltd.
13. Down to Earth, Center for Science and Environment (R)
14. Gloick, H.P. 1993 Water in crisis. Pacific Institute for Studies in Development, Environment & Security. Stockholm Eng. Institute. Oxford University, Press. m473p.
15. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Mumbai (R)
16. Heywood, V.H. & Watson, T.T. 1995 Global Biodiversity Assessment, Cambridge Univ. Press 1140p
17. Jadhav H. & Bhosale, V.H. 1995 Environmental Protection and Law. Himalaya pub. House, Delhi 284p
18. McKinney M.L. & School R.M. 1996, Environmental Science systems & solutions, web enhanced edition, 639p
19. Mhadkar A.K. Matter Hazardous, Techno-Science publication (TB)
20. Miller T.G. Jr. Environment Science, Wadsworth publication co. (TB)
21. Odum E.P. 1971, Fundamentals of Ecology, W.B. Saunders Co. USA, 574p
22. Rao M.N. & Datta, A.K. 1987, Waste water treatment. Oxford & IBH pub. co. pvt. Ltd 345p
23. Sharma B.K. 2001, Environmental chemistry, Goel pub. House, Meerut
24. Survey of the Environment, The Hindu (M)
25. Townsend C. Harper J. And Michael Begon, Essentials of Ecology, Blackwell Science (TB)
26. Trivedi R.K. Handbook of Environment Laws, Rules, Guidelines, Compliances and Standards, Vol I and II, Environment Media (R)
27. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science publication (TB)
28. Wanger K.D. 1998, Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

आधार पाठ्यक्रम  
प्रश्न पत्र प्रथम  
हिन्दी भाषा  
(पेपर संख्या 0791)

पूर्णांक:75

नोट:-

01. प्रश्न पत्र 75 अंक का होगा ।
02. प्रश्न पत्र अनिवार्य होगा ।
03. इसके अंक क्षेणी निर्धारण के लिए जोड़े जावेगे ।
04. प्रत्येक इकाई के अंक समान होंगे ।

पाठ्य विषय-

- इकाई- 01. पल्लवन, पत्राचार तथा अनुवाद एवं पारिभाषिक शब्दावली ।
- इकाई -02 मुहावरे- लोकोक्तियाँ,शब्दशुद्धि वाक्य शुद्धि, शुद्धि ज्ञान - पर्यायवाची, विलोम, अनेकार्थी ,  
समश्रुत (समानोचरित) अनेक शब्दों के लिए एक शब्द ।
- इकाई -03. देवनागरी लिपि की विशेषता, देवनागरी लिपि एवं वर्तनी का मानक रूप ।
- इकाई- 04. कम्प्युटर में हिन्दी का अनुप्रयोग, हिन्दी में पदनाम ।
- इकाई- 05. हिन्दी अपठित, संक्षेपण, हिन्दी में संक्षिप्तीकरण ।

पाठ्य क्रम के लिए पुस्तकें

- |   |   |                                      |
|---|---|--------------------------------------|
| 01. भारतीयातां के स्वर साधन धनंजय वर्मा | - | म.प्र.ग्रंथ अकादमी ।                 |
| 02. नगरी लिपि और हिन्दी                 | - | अनंत चौधरी - ग्रंथ अकादमी पटना ।     |
| 03. कम्प्युटर और हिन्दी                 | - | हरिमोहन - तक्षशिला प्रकाशन, दिल्ली । |



**FOUNDATION COURSE**  
**PAPER - II**  
**ENGLISH LANGUAGE**  
**(Paper code - 0792)**

**M.M. 75**

- UNIT-1**    **Basic Language skills : Grammar and Usage.**  
Grammar and Vocabulary based on the prescribed text.  
To be assessed by objective / multiple choice tests.  
(Grammar - 20 Marks  
Vocabulary - 15 Marks)
- UNIT-2**    **Comprehension of an unseen passage.**    **05**  
This should simply not only (a) an understanding of the passage in question, but also.  
(b) a grasp of general language skills and issues with reference to words and usage within the passage and (c) the Power of short independent composition based on themes and issues raised in the passage.  
To be assessed by both objective multiple choice and short answer type tests.
- UNIT-3**    **Composition : Paragraph writing**    **10**
- UNIT-4**    **Letter writing (The formal and one Informal)**    **10**  
Two letters to be attempted of 5 marks each. One formal and one informal.
- UNIT-5**    **Texts :**    **15**  
Short prose pieces (Fiction and not fiction) short poems, the pieces should cover a range of authors, subjects and contexts. With poetry if may sometimes be advisable to include pieces from earlier periods, which are often simpler than modern examples. In all cases, the language should be accessible (with a minimum of explanation and reference to standard dictionaries) to the general body of students schooled in the medium of an Indian language.  
Students should be able to grasp the contents of each piece ; explain specific words, phrases and allusions; and comment on general points of narrative or argument. Formal Principles of Literary criticism should not be taken up at this stage.  
To be assessed by five short answers of three marks each.

**BOOKS PRESCRIBED -**

English Language and Indian Culture - Published by M.P. Hindi Grant Academy Bhopal.

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Dr. M. Chakraborty

Dr. S. Gupta

DR. MERILY ROY

## PHYSICS

### OBJECTIVES OF THE COURSE

The undergraduate training in Physics is aimed at providing the necessary inputs so as to set forth the task of bringing about new and innovative ideas/concepts so that the formulated model curricula in physics becomes in tune with the changing scenario and incorporate new and rapid advancements and multi disciplinary skills, societal relevance, global interface, self sustaining and supportive learning.

It is desired that under graduate i.e. B.Sc. level besides grasping the basic concepts of physics should in addition have broader vision. Therefore, they should be exposed to societal interface of physics and role of physics in the development of technologies.

### EXAMINATION SCHEME :

1. There shall be 2 theory papers of 3 hours duration each and one practical paper of 4 hours duration. Each paper shall carry 50 marks.
2. Numerical problems of at least 30% will compulsorily be asked in each theory paper.
3. In practical paper, each student has to perform two experiments, one from each group as listed in the list of experiments.
4. Practical examination will be of 4 hours duration-one experiment to be completed in 2 hours.

The distribution of practical marks will be as follows:

Experiment	: 15 + 15 = 30
Viva Voce	: 10
Internal assessment	: 10

5. The external examiner should ensure that at least 16 experiments are in working order at the time of examination and submit a certificate to this effect.

**PAPER - I**  
**MECHANICS, OSCILLATIONS AND PROPERTIES OF MATTER**

**(paper code - 0793)**

**UNIT-1** Laws of motion, motion in a uniform field, components of velocity and acceleration in different coordinate systems. (Cartesian, Cylindrical and Spherical) uniformly rotating frame, centripetal acceleration, Coriolis force and its applications. Motion under a central force, Kepler's laws. Gravitational law and field. Potential due to a spherical body. System of particles, center of mass, equation of motion, conservation of linear & angular momentum, conservation of energy.

**UNIT-2** Rigid body notion, rotational motion, moments of inertia and their products, principal moments & axes, Introductory idea of Euler's equations. potential well and periodic oscillations, case of harmonic small oscillations, differential equation and its solution, kinetic and potential energy, examples of simple harmonic oscillations, spring and mass system, simple and compound pendulum, torsional pendulum.

**UNIT-3** Bifilar oscillations, Helmholtz resonator, LC circuit, vibrations of a magnet, oscillations of two masses connected by a spring. Superposition of two simple harmonic motions of the same frequency, Lissajous figures, case of different frequencies. Damped harmonic oscillator, power dissipation, quality factor, examples, driven (forced) harmonic oscillator, transient and steady states, power absorption, resonance.

**Note :** (The emphasis here should be on the mechanical aspects and not on the details of the apparatus mentioned, which are indicated as applications of principles involved)

**UNIT-4** E as an accelerating field, electron gun, case of discharge tube, linear accelerator, E as deflecting field- CRO sensitivity,

Transverse B field,  $180^\circ$  deflection, mass spectrograph, curvatures of tracks for energy determination, principle of a cyclotron. Mutually perpendicular E and B fields-velocity selector, its resolution. Parallel E and B fields, positive ray parabolas, discovery of isotopes, elements of mass spectrography, principle of magnetic focusing (lens.)

**UNIT-5** Elasticity, small deformations, Hooke's law elastic constants for an isotropic solid and relations between them beams supported at both the ends, cantilever, torsion of cylinder, bending moments and shearing forces. Kinematics of moving fluids, equations of continuity. Euler's equation, Bernoulli's theorem, viscous fluids, streamline and turbulent flow. Poiseuille's law. Capillary tube flow, Reynold's number, Stokes law, surface tension and surface energy, molecular interpretation of surface tension, pressure on a curved liquids surface, wetting.



**TEXT AND REFERENCE BOOKS :**

E M purcell, Ed Berkely physics course, vol. Mechnics (Mc. Gr. Hill) R P Feynman, R B lighton and M Sands, the feynman lectures in physics, vol I (B) publications, Bombay, Delhi, Calcutta, Madras

D P Khandelwal, Oscillations and waves (Himalaya Publishing House Bombay) R. K. Ghosh, The Mathematics of waves and vibrations (Macmillan 1975) . J.C. Upadhyaya- Mechanics (Hindi and English Edition.)

D.S. Mathur- Mechanics and properties of matter.

Brij lal and subramanium- Oscillations and waves.

Resnick and Halliday- Volume I

Three handwritten signatures in blue ink, likely of the authors or reviewers, are located at the bottom of the page. The signatures are stylized and difficult to read.

**PAPER - II**  
**ELECTRICITY, MAGNETISM AND ELECTROMAGNETIC THEORY**  
**(paper code - 0794)**

**UNIT-1** Functions of two and three variables, partial derivatives, geometrical interpretation of partial derivatives of functions of two variables. Total differential of a function of two and three variables. Repeated integrals of a function of more than one variable, definition of a double and triple integral. Scalars and vectors, dot and cross products, triple vector product, gradient of a scalar field and its geometrical interpretation, divergence and curl of a vector field, line, surface and volume integrals, flux of a vector field. Gauss's divergence theorem, Green's theorem and Stokes theorem.

**UNIT-2** Columbus law in vacuum expressed in Vector forms calculations of E for simple distributions of charges at rest, dipole and quadrupole fields.

Work done on a charge in a electrostatic field expressed as a line integral, conservative nature of the electrostatic field. Electric potential  $\phi$ ,  $E = -\nabla \phi$ , torque on a dipole in a uniform electric field and its energy, flux of the electric field, Gauss's law and its application for finding E for symmetric charge distributions, Gaussian pillbox ? Fields at the surface of a conductor screening of E field by a conductor, capacitors, electrostatic field energy, force per unit area of the surface of a conductor in an electric field, conducting sphere in a uniform electric field, point charge in front of a grounded infinite conductor.

**UNIT-3** Dielectrics parallel plate capacitor with a dielectric, electric susceptibility, permittivity and dielectric constant, polarization and polarization vector, displacement vector  $D$ , molecular interpretation of Claussius- Mossotti equation.

Steady current, current density  $J$ , non-steady currents and continuity equation, Kirchhoff's law and analysis of multiloop circuits, rise and decay of current in LR and CR circuits, decay constants, transients in LCR circuits, AC circuits, complex numbers and their applications in solving AC circuit problems, complex impedance and reactance, series and parallel resonance, Q factor, power consumed by an AC circuit, power factor,.

**UNIT-4** Force on a moving charge, Lorentz force equation and definition of B, force on a straight conductor carrying current in a uniform magnetic field, torque on a current loop, magnetic dipole moment, angular momentum and gyro magnetic ratio.

$\nabla \cdot B = 0$ ,  $\nabla \times B = \mu J$ . Biot and Savart's law, Ampere's law field due to a magnetic dipole, magnetization current, magnetization vector, magnetic permeability (Linear cases), interpretation of a bar magnet as a surface distribution of sinusoidal current.





**UNIT-5** Electromagnetic induction, Faraday's law, electromotive force,  $\varepsilon = \oint \mathbf{E} \cdot d\mathbf{r}$ , integral and differential forms of Faraday's law Mutual and self inductance, Transformers, energy in a static magnetic field. Maxwell's displacement current, Maxwells' equations, electromagnetic field energy density.

The wave equation satisfied by E and B, plane electromagnetic waves in vacuum, Poyning's vector.

**TEXT AND REFERENCE BOOK :**

Berkeley Physics Course, Electricity and Magnetism, Ed. E.M. Purcell (Mc Graw - Hill) Holliday and Resnik, Physics, Vol. 2

D J Griffith, Introduction to Electrodynamics (Prentice-Hall of India) Raitz and Milford, Electricity and Magnetism (Addison-Wesley)

A S Mahajan and A Rangwala, Electricity and Magnetism (Tata Mc Graw-hill)

A M Portis, Electromagnetic fields.

Pugh & Pugh, Principles of Electricity and Magnetism (Addison-Wesley)

Panofsky and Phillips, Classical Electricity and Magnetism, (India Book House)

S Atwood, Electricity and Magnetism (Dover).

Three handwritten signatures in blue ink, likely of the authors or reviewers, are located at the bottom of the page. The signatures are stylized and difficult to read.

## **PRACTICAL**

**Minimum 16 (Eight from each group)**

### **EXPERMENTS OUT OF THE FOLLOWING OR SIMILAR EXPERIMENTS OF EQUAL STANDARD**

#### **GROUP-A**

1. Study of laws of parallel and perpendicular axes for moment of inertia.
2. Study of conservation of momentum in two dimensional oscillations.
3. Study of a compound pendulum.
4. Study of damping of a bar pendulum under various mechanics.
5. Study of oscillations under a bifilar suspension.
6. potential energy curves of a 1- Double system and oscillations in it for various amplitudes.
7. Study of oscillations of a mass under different combinations of springs.
8. Study of bending of a cantilever or a beam.
9. Study of torsion of wire (static and dynamic methods)
10. Study of flow of liquids through capillaries.
11. Determination of surface tension of a liquid by different methods.
12. Study of viscosity of a fluid by different methods.

#### **GROUP-B**

1. Characteristics of a ballistic galvanometer.
2. Setting up and using an electroscope or electrometer.
3. Use of a vibration magnetometer to study a field.
4. Study of B field due to a current.
5. Measurement of low resistance by Carey-Foster bridge or otherwise.
6. Measurement of inductance using impedance at different frequencies.
7. Study of decay of currents in LR and RC circuits.
8. Response curve for LCR circuit and resonance frequency and quality factor.
9. Sensitivity of a cathode-ray oscilloscope.
10. Characteristics of a choke.
11. Measurement of inductance.
12. Study of Lorentz force.
13. Study of discrete and continuous LC transmission lines.
14. Elementary Fortran programs, flowcharts and their interpretation.
15. To find the product of two matrices.
16. Numerical solution of equation of motion.
17. To find the roots of quadratic equation.

#### **TEXT AND REPERENCE BOOKS:**

B saraf et al Mechanical Systems (Vikas Publishing House, New Delhi)

D.P. Khandelwal, A Laboratory Manual of Physics for Undergraduate classes (Vani Publication House, New Delhi)

C G Lambe Elements of Statistics (Longmans Green and Co London New York, Toronto)

C Dixon, Numerical Analysis.

S Lipsdutz and A Poe, Schaum's Outline of theory and problems of programming with fortran (MC Graw-Hill Book Company, Singapore 1986)

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## CHEMISTRY

The new curriculam will comprise of Three papers of 33.33 and 34 marks each and practical work of 50 marks. The curriculam is to be completed in 180 working days as per the UGC norms & conforming to the directives of the Govt. of Chhattisgarh. The theory papers are of 60 hrs. each duration & the practical work of 180 hrs. duration.

### PAPER-I

#### INORGANIC CHEMISTRY

M.M. 33

(paper code - 0795)

#### UNIT-1 A. ATOMIC STRUCTURE

Idea of de-Broglie matter-waves, Heisenberg Uncertainty principle, Schrodinger wave equation, significance of , radial & angular wave functions and probability distribution curves, Atomic orbital and shapes of s, p, d orbital's, Aube and Pauli exclusion principles, Hand's Multiplicity rule, electronic configuration of the elements, effective nuclear charges.

#### B. PERIODIC PROPERITIES

Ionization energy, electron gain enthalpy and electro negativity, trend in periodic table and applications in predicting and explaining the chemical behavior.

#### UNIT-2 CHEMICAL BONDING

Covalent Bond : Valence bond theory and its limitations, directional charectaristics of covalent bond, various types of hybridization & shapes of simple inorganic molecules

and ions. Valence shell electron pair repulsion (VSEPR)<sup>2</sup> theory to  $\text{NH}_3$ ,  $\text{H}_3\text{O}^+$ ,  $\text{SF}_4$ ,  $\text{CF}_3$ ,

$\Psi$  and  $\Psi$

$\text{ICl}_2$  and  $\text{H}_2\text{O}$  . M.O. Theory, homonuclear & hetronuclear bond strength & bond energy,

percentage ionic character from dipole moment & electronegativity difference.

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### UNIT-3 CHEMICAL BONDING

Ionic Solids- Ionic structures, radius ratio & co-ordination number, limitation of radius, ratio rule, lattice defects, semiconductors, lattice energy Born-Haber cycle, Solvation energy and solubility of ionic solids, polarising power & polarisability of ions, Fajans rule, Metallic bond-free electron, Valence bond & band theories.

### UNIT-4 A. s-BLOCK ELEMENTS

Comparative study, salient features of hydrides, solvation & complexation tendencies including their function in biosystems and introduction to alkyl & aryls, Derivatives of alkali and alkaline earth metals.

#### B. CHEMISTRY OF NOBLE GASES

Chemical properties of the noble gases, chemistry of xenon, structure binding in xenon compounds.

### UNIT-5 A. p-BLOCK ELEMENTS

Halides hydrides, oxides and oxyacids of Boron, Aluminum, Nitrogen and Phosphorus, boranes, borazines, fullerenes and silicates, interhalogens and pseudohalogens.

#### B. INORGANIC CHEMICAL ANALYSIS

Chemical principles involved in the detection of acids and basic radicals including interfering radicals.

### REFERENCE BOOKS :

1. Basic Inorganic Chemistry, F.A Cotton, G. Wilkinson and P.L. Gaus, Wiley
2. Concise Inorganic Chemistry, J.D. Lee, ELBS
3. Concepts of models of Inorganic Chemistry, B. Douglas, D. Mc Daniel and J Alexander, John Wiley.
4. Inorganic Chemistry, D.E. Shriver, P.W. Atkins and C.H.L. Angford, Oxford.
5. Inorganic Chemistry, W.W. Porterfield, Addison- Wesley.
6. Inorganic Chemistry, A.G. Sharp, ELBS.
7. Inorganic Chemistry, G.L. Miessler and D.A. Tarr, Prentice Hall.
8. Advanced Inorganic Chemistry, Satya Prakash
9. Advanced Inorganic Chemistry, Agarwal & Agarwal
10. Advanced Inorganic Chemistry, Puri & Sharma, S. Naginchand
11. Inorganic Chemistry, Madan, S. Chand
12. Aadhunik Akarbnic Rasayan, R.K. Shrivastav & P.S. Jain, Goel Publication.
13. Uchchattar Akarbnic Rasayan, Satya Prakash & G.D. Tuli, Shyamal Prakashan.
14. Uchchattar Akarbnic Rasayan, Puri & Sharma
15. Akarbnic Rasayan, Bhagchandni, Sahitaya Publication.
16. Rasayan Vigyan, Bhatnagar, Arun Publication.

*Albino* 24.7.2017 *Albino* 24.7.17 *Albino* 24.7.17 *Albino* 24.7.17 *Albino* 24.7.17 *Albino*

**PAPER - II**  
**ORGANIC CHEMISTRY**  
**(paper code - 0796 )**

**M.M. 33**

**UNIT-I ELECTRONIC STRUCTURE & BONDING**

- A. Resonance, Hyper conjugation, Inductive and other field effects, Aromaticity, hydrogen bonding.

**B. MECHANISM OF ORGANIC REACTIONS**

Homolytic & heterolytic bond breaking, types of reagents-electrophiles & nucleophiles. Structure and reactivity of reaction intermediates- Carbocation, carbanions free radicals, carbenes and nitrenes.

**UNIT-2 STEREOCHEMISTRY OF ORGANIC COMPOUNDS**

- A. Optical Isomerism - enantiomers, diastereomers, threo and erythro meso compound, resolution of enantiomers, inversion, retention and racemization,

Relative and absolute configuration, Sequence rules, D and L and R & S systems of nomenclature.

- B. Geometrical isomerism - Syn and anti forms, E & Z system of nomenclature, properties of cis-trans isomers.


**UNIT-3 ALIPHATIC AND AROMATIC RING COMPOUNDS**

- A. Cycloalkanes- Nomenclature, methods of formation, chemical reactions, Baeyer's strain theory and its limitations. Ring strain in small rings (cyclopropane and cyclobutane), theory of strainless rings. The case of cyclopropane ring: banana bonds.

- B. Mono-nuclear and polynuclear aromatic ring. Structure of benzene & naphthalene.

Molecular formula and Kekule structure. Aromatic electrophilic substitution.

General pattern of the mechanism, role of  $\sigma$  and  $\pi$  complexes. Electrophilic substitution in naphthalene.

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## UNIT-4 ALKENES, DIENES AND ALKYNES

- A. Mechanism of dehydration of alcohols.
- B. Chemical reactions of alkenes- Mechanisms involved in electrophilic and free radical additions, hydroboration-oxidation, oxymercuration-reduction. epoxidation.  
Substitution at the allylic and vinylic positions of alkenes. Structure of allenes and butadiene, chemical reaction- 1,2 and 1,4 addition, Diel-Alder reaction.  
Chemical reactions of alkynes and acidity of alkynes. Electrophilic and nucleophilic addition reactions, hydroboration and oxidation with ozone and  $\text{KMnO}_4$ .

## UNIT-5 ARENES AND AROMATICITY

### A. Alkyl halides and Aryl Halides

Mechanism and stereochemistry of nucleophilic substitution reactions and alkyl halides and aryl halides with energy profile diagrams.  $\text{SN}_1$ ,  $\text{SN}_2$ ,  $\text{SN}_i$  mechanisms.

- B. Mechanisms and stereochemistry of elimination reaction and alkyl halides. Elimination Vs Substitution.

### REFERENCE BOOK :

1. Organic Chemistry, Morrison and Boyd, Prentice- Hall
2. Organic Chemistry, L.G. Wade Jr, Prentice-Hall
3. Fundamentals of Organic Chemistry, Solomons, John Wiley
4. Organic Chemistry, Vol. I, II, III, S.M. Mukherjee, S.P. Singh and R.P. Kapoor, wiley-eastern (New-Age).
5. Organic Chemistry, F.A. Carey, MC Graw Hill
6. Introduction to Organic Chemistry, Struieweisser, Heathcock and Kosover, Macmillan.
7. Organic Chemistry, P.L.Soni.
8. Organic Chemistry, Bahi & Bahl
9. Organic Chemistry, Joginder Singh.
10. Carbanic Rasayan, Bashi & Bahi
11. Carbanic Rasayan, R.N. Singh, S.M.I. Gupta, M.M. Bakodia & S.K. Wadhwa.
12. Carbanic Rasayan, Joginder Singh.
13. Carbanic Rasayan, P.L. Soni.
14. Corbanic Rasayan, Bhagchandani, Sahitya Bhawan Publication.
15. Rasayan Vigyan, Bhatnagar, Arun Prakashan.

*Handwritten signatures and dates:*  
24.7.2017, 24.7.17, 24/7/17, 24/7/17, 24.7.17, 24.7.17

**PAPER - III**  
**PHYSICAL CHEMISTRY**  
**(paper code - 0797)**

**M.M.34**

**UNIT-1 MATHEMATICAL CONCEPTS FOR CHEMIST AND COMPUTER**

- A. Logarithmic relations, curve sketching linear graphs, Properties of straight line, sloped and intercept, Differentiation of functions, Partial differentiation, Integration of some useful and relevant functions, Maxima and minima, Permutation and combination, Probability.
- B. General introduction to computers, components of computer, hardware and software, input and output devices; binary numbers, Introduction to computer languages, Programming, Operation systems.

**UNIT-2 A. MOLECULAR VELOCITIES :**

Root mean square velocity average and most probable velocities, Maxwell's law of distribution of molecular velocities of gases, (Graphical interpretation), effect of temperature on distribution of molecular velocities, collision frequency, mean free path, Joule- Thompson effect, Liquification of gases.

- B. Deviation from ideal behavior, Real gases, Vander Waal equation of state, Relationship, Vander waal constant and critical constants, Law of corresponding state.

**UNIT-3 A. LIQUID STATE**

Inter molecular forces, magnitude of intermolecular force, structure of liquids, Properties of liquids, viscosity and surface tension.

- B. Ideal and non ideal solutions, modes of representing concentration of solutions, activity and activity coefficient.

Dilute solution : Colligative Properties, Lowering of vapor pressure of solvent, Raoult's law, Osmosis, Vant Hoff Theory of dilute solutions, measurements of Osmotic pressure, relationship between lowering of vapour pressure and osmotic pressure. Elevation of boiling point, Depression in freezing point, abnormal molar masses, Degree of dissociation and association of solutes, Vant Hoff factor.

**UNIT-4 A. LIQUID CRYSTALS :**

Difference between liquid Crystal, solids and liquids, Classification, Structure of nematic and cholesteric phases, Thermography, Sealed cell, applications of liquid Crystals.

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## B. COLLOIDAL STATE :

Classification, Optical, Kinetic, and Electrical Properties of colloid, Coagulation, Hardy Schulze law, flocculation value, Protection, Gold number, Emulsion, micelle. Gel, Syneresis and thixotrophy, Application of colloid.

## C. SOLID STATE

Space lattices, unit cells, Elements of Symmetry in crystallize solids, X-rays diffraction, Mills indices, identification of unit cell by Broggs Spectrometer, Powder method, Neutron and electron diffraction (Elementry idea only)

## UNIT-5 A. CHEMICAL KINETICS

Rate of reaction, Factors influencing rate of reaction, rate constant, Order and molecularity of reactions, Zero, first and second order reaction, methods of determining order of reaction, Complex reactions : Consecutive, opposing and side reactions, Chain reactions.

Temperature dependence of raction rate, Arrhenius theory, Physical significance of Activation energy, collision theory, demerits of collision theory, non mathematical concept of transition state theory.

## B. CATALYSIS :

Homogeneous and Heterogeneous Catalysis, types of catalyst, characteristic of Catalyst, Enzyme Catalysed reactions, Micellor catalysed reactions, Industrial applications of Catalysis.

## REFERENCE BOOKS :

1. Physical chemistry, G.M. Barrow, International student edition, MC Graw Hill
2. Basic programming with application, V.K. Jain, Tata Mc Graw-Hill
3. Computers & Common sense, R. Hunt & Shelly, Prentice-Hall
4. University general chemistry, C.N.R. Rao Macmillan.
5. Physical Chemistry, R.A. Alberty, Wiley Eastern.
6. The elemetns of Physical Chemistry, P.W. Atkin, Oxford.
7. Physical Chemistry throught problems, S.K. Dogra & Dogra, wiley Eastern.
8. Physical Chemistry, B.D. Khosla
9. Physical Chemistry, Puri & Sharma
10. Bhoutic Rasayan, Puri, Sharma & Palhanian, Vishal Publishing Company.
11. Bhoutic Rasayan, P.L. Soni
12. Bhoutic Rasayan, Bahi & Tuli.  $Pb^{2+}$ ,
13. Bhoutic Rasayan, I. R. Gambin
14. Bhoutic Rasayan, Bhagchandani, Sahitya Bhawan Publication.
15. Rasayan Vigyan, Bhatnagar, Arun Prakashan.





**PAPER - IV**  
**LABORATORY COURSE**

180 Hrs.

The following experiments are to be conducted during the curriculum

**1. Inorganic Chemistry**

Semimicro Analysis - cations analysis, separation and identification of ions from

$\text{Bi}^{3+}$ ,  $\text{Cu}^{2+}$ ,  $\text{Cd}^{2+}$ ,  $\text{Sb}^{3+}$ ,  $\text{Sn}^{2+,4+}$ ,  $\text{Fe}^{3+}$ ,  $\text{Al}^{3+}$ ,  $\text{Cr}^{3+}$ ,  $\text{Ni}^{2+}$ ,  $\text{Co}^{2+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Mn}^{2+}$ ,  $\text{Ba}^{2+}$ ,  $\text{Sr}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{NH}_4^+$  and Anions  $\text{CO}_3^{2-}$ ,  $\text{SO}_3^{2-}$ ,  $\text{S}^{2-}$ ,  $\text{SO}_4^{2-}$ ,  $\text{NO}_2^-$ ,  $\text{NO}_3^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{CH}_3\text{COO}^-$ ,  $\text{C}_2\text{O}_4^{2-}$ ,  $\text{BO}_3^{3-}$ ,  $\text{F}^-$ .

**2. Organic Chemistry**

i. Calibration of Thermometer

80° – 82° (Naphthalene), 113.5° – 114° (Acetanilide), 132.5° – 133° (Urea), 100° (Distilled Water)

ii. Determination of Melting Point

80° – 82° (Naphthalene), Benzoic acid 121.5° – 122°, Urea 132.5° – 133°, Succinic acid 184.5° – 185°, Cinnamic acid 132.5° – 133°, Salicylic acid 157.5° – 158°, Acetanilide 113.5° – 114°, m- Dinitrobenzene 90°, p- Dichlorobenzene 52° Aspirin 135°.

iii. Determination of boiling points

Ethanol = 78°, Cyclohexane 81.4°, Toluene 110.6°, Benzene 80°.

iv. Mixed Melting point Determination

Urea- Cinnamic acid mixture of various compositions (1 : 4, 1 : 1, 4 : 1)

v. Distillation (Demonstration)

Simple distillation of ethanol- water mixture using water condenser.

Distillation of nitrobenzene and aniline using air condenser.

vi. Crystallization

Phthalic acid from hot water (using fluted filter paper and stemless funnel).

Acetanilide from boiling water

Naphthalene from ethanol

Benzoic acid from water.

vii. Decolorisation and crystallisation using charcoal

Decolorisation of brown sugar with animal charcoal using gravity filtration

Crystallization and decolorisation of impure naphthalene (100g of naphthalene mixed with 0.3g of congo red using 1g of decolorising carbon) from ethanol.



Viii. Sublimation

Camphor, Naphthalene, Pthalic acid and Succinic acid

ix. Qualitative Analysis

Detection of elements (N, S and halogens) and functional groups (Phenolic, Carboxylic, Carbonyl, Esters, Carbohydrates, Amines, Amides, Nitro and Anilide) in simple organic compounds.

3. Physical Chemistry

(i) Chemical Kinetics

To determine the specific rate of hydrolysis of methyl/ ethyl acetate catalysed by hydrogen ions at room temperature.

To study the effect of acid strength on the hydrolysis of an ester

To compare the strengths of HCl &  $H_2SO_4$  by studying the kinetics of hydrolysis of ethyl acetate

To study kinetically the reaction between  $H_2O_2$  & Iodide

(i) Distribution Law

To study distribution of iodide between water &  $CCl_4$

To study distribution of benzoic acid between benzene & water.

(i) Colloids

To prepare arsenious sulphide sol & compare the precipitating power of mono-, bi, & tri valent anions.

(iv) Viscosity & Surface Tension

To determine the % composition of a given mixture (Non interacting system) by viscosity method.

To determine the viscosity of amyl alcohol in water at different concentrations & calculate the excess viscosity of these solutions.

To determine the % composition of a given binary mixture by surface tension method (acetone & ethyl methyl ketone).

**BOOK :**

1. Organic qualitative analysis, revised svehla, orient longman
2. Standard methods of chemical analysis, W.W. Scott, The Technical Press
3. Experimental Organic Chemistry, Vol. I & II, P.R. Singh, D.S. Gupta & K.S. Bajpai, Tata Mc Graw Hill
4. Manual inorganic chemistry, R.K. Bansal Wiley Eastern
5. Vogel's text book of practical organic chemistry, B.S. Furnis A.J. Hannaford, V. Rogers, P.W.G. Smith & A.R. Tatchell, ELBS
6. Experiments in general chemistry, CNR Rao & U.C. Agarwal
7. Experiments in physical chemistry, R. C. Das & B. Behara Tata Mc Graw Hill
8. Advanced practical physical chemistry, J.B. Yadav, Goel publishing house

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## PRACTICAL EXAMINATION

05 Hrs.

Three experiments are to be performed

M.M. 50

1. Inorganic Mixture Analysis, four radicals two basic & two acid (insoluble, Interfering & combination of acid radicals) any one to be given. 12 Marks.
2. Detection of functional group in the given organic compound and determine its MPt/BPt. 8 Marks
- O R** Crystallization of any one compound as given in the prospectus along with the determination of mixed MPt.
- O R** Decolorisation of brown sugar along with sublimation of camphor/ Naphthlene.
3. Any one physical experiment that can be completed in two hours including calculations. 14 marks
4. Viva 10 marks
5. Sessionals 06 marks

In case of Ex-Students two marks will be added to each of the experiments.

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Abhinav  
24.7.2017

Abhishek  
24.7.17

Aditya  
24/7/17

Anurag  
24/7/17

Arpit  
24.7.17

Arjun  
24.7.17

**ZOOLOGY**  
**PAPER - I (paper code - 0813)**  
**(CELL BIOLOGY &**  
**INVERTEBRATES)**

**M.M. 50**

- UNIT-1** The Cell (Prokaryotic & Eukaryotic)  
Methods in cell biology (Microscopy light & Electron)  
Organization of cell extranuclear and nuclear (Plasma membrane, mitochondria, chromosomes, ER. Golgi bodies, Ribosomes)
- UNIT-2** Cell divisions (Mitosis & Meiosis)  
An elementary idea of cell transformation & Cancer Immunity (elementary idea)
- UNIT-3** General Characteristics & Classification of invertebrates upto orders with examples Protozoa - type study Paramecium, protozoa & disease Porifera - type study Sycon Coelenterata - type study Obelia.
- UNIT-4** Helminths - type study Fasciola  
Annelida - type study Pheretima  
Arthropoda - type study Palaemon
- UNIT-5** Mollusca - type study Asterias (starfish)  
Protochordata - type study Balanoglossus

**PAPER - II (paper code - 0814)**  
**(VERTEBRATES & EMBRYOLOGY)**

**M.M. 50**

- UNIT-1** Origin and classification of Chordates.  
Protochordata - type study Amphioxus.  
A comparative account of Petromyzon & Myxine
- UNIT-2** Fishes - Skin and scales  
Migration in fishes  
Parental care  
Amphibia - Parental care  
Neoteny  
Reptilia - Poisonous & nonpoisonous snakes, Poison apparatus, snake venom.
- UNIT-3** Aves - Flight adaptation in birds  
Discuss - Birds are glorified reptiles  
Mammals- comparative account of prototheria, metatheria & Eutheria and Affinities.
- UNIT-4** Gametogenesis, Fertilization & Parthenogenesis.  
Development of frog upto formation of three germ layers
- UNIT-5** Development of Chick upto formation of three germ layer, Extra embryonic membranes. Placenta in mammals. Embryonic induction  
organisers & differentiation

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## PARACTICAL

M.M. 50

The practical work will, in geneal be based on the syllabus prescribed in theory and the candidates will be required to show a knowledge of the following.

1. Dissection of earth worm.
2. Dissection of Cockroach, Palaemon, Pila.
3. Minor Dissection- Appendages of Prawn & hastate plate, Mouth-parts of Insects, Radula of Pila.
4. Mounting-Setae, Spermatheca, Septal Nephridia, Nerve ring & ovary of earth worm/  
Parapodia of Nereis Salivary gland of Cockroach, ctenidium of pila, Malpighian tubules.
5. Cytological preparation- Onion root-tip "Squash Preparation" for mitosis/Grasshopper testis squash for meiosis.
6. Osteology-Frog & Rabbit
7. Museum Specimen invertebrate & Vertebrate, frog embryology.
8. Slides-Chick embryology, Cytology, Mammal Histology, Bird feather & invertebrate Slides.

### Scheme of Practical Exam.

Time 3 Hrs,  
M.M. 50

1. Major Dissection	8 Marks
2. Minor Dissection	6 Marks
3. Mounting	5 Marks
4. Cytological Preparation	5 Marks
5. Spots- 8 (Slides-4, Specimens-2, & Bones-2)	16 Marks
6. Sessional	10 Marks

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28-7-17

28-7-17

Signature

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**BOTANY**  
**PAPER - I**  
**(GENERAL DIVERSITY OF MICROBES AND**  
**CRYPTOGAMS)**  
**(paper code - 0811)**

**M.M. 50**

**UNIT-1** Viruses and Bacteria: General account of viruses and mycoplasma; bacteria structure; nutrition, reproduction and economic importance; general account of cyanobacteria.

12 Hrs.

**UNIT-2** Algae: General characters, classification and economic importance; important features and life history of Chlorophyceae-Volvox, Oedogonim, Coleochaete; Xanthophyceae- Vaucheria; Phaeophyceae- Ectocarpus, Sargassum; Rhodophyceae- Polysiphonia.

12 Hrs

**UNIT-3** Fungi: General characters, classification and economic importance; important features and life history of Mastigomycotina- Pythium, Phytophthora; Zygomycotina- Mucor, Ascomycotina-Saccharomyces, Eurotium, Chaetomium, Peziza; Basidiomycotina- Puccinia, Agaricus; Deuteromycotina-Cercospora, Colletotrichum; general account of Lichens.

12 Hrs.

**UNIT-4** Bryophyta: Amphibians of plant kingdom displaying alternation of generations; structure, reproduction and classification of Hepaticopsida (e.g. Riccia Marchantia); Anthocerotopsida (e.g. Anthoceros), Bryopsida (e.g. Funaria)

12 Hrs.

**UNIT-5** Pteridophyta: The first vascular plants; important characteristics of Psilopsida, Lycopsida, Sphenopsida and Pteropsida; structure, Reproduction in Rhynia, Lycopodium Selaginella, Equisetum, Pteris and Marsilea.

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**BOTANY**  
**PAPER - II**  
**CELL BIOLOGY AND GENETICS**  
**(paper code - 0812)**

**UNIT-1** The cell envelope: Plasma membrane; bilayer lipid structure; functions; the cell wall. Ultra structure and function of nucleus: nuclear membrane; nucleolus and other organelles: Golgi bodies, ER, peroxisomes, Vacuoles.

**12 Hrs.**

**UNIT-2** Chromosome organization: Morphology; centromere and telomere; chromosome alterations; deletions, duplications, translocations, inversions; variations in chromosome number aneuploidy, polyploidy; sex chromosomes. Cell division : Mitosis; meiosis

**12 Hrs.**

**UNIT-3** DNA the genetic material: DNA structure; replication; DNA- protein interaction; the nucleosome model; genetic code; satellite and repetitive DNA. Extranuclear genome: Presence and function of mitochondrial and plastid DNA; plasmids.

**12 Hrs**

**UNIT-4** Gene expression: Structure of gene; transfer of genetic information; transcription, translation, protein synthesis; tRNA; ribosomes; regulation of gene expression in prokaryotes and eukaryotes; proteins, 1D, 2D and 3D structure.

12 Hrs

**UNIT-5** Genetic Variations: Mutations, spontaneous and induced; transposable genetic elements; DNA damage and repair: Genetic inheritance: Mendelism; laws of segregation and independent assortment: linkage analysis; allelic and non-allelic interactions.

12 Hrs

**BOTANY PRACTICAL**

**Time : 3 Hrs**

**Marks-50**

- |                                     |    |
|-------------------------------------|----|
| 1. Algae/Fungi                      | 10 |
| 2. Bryophyta/ Pteridophyta          | 10 |
| 3. Disease Symptoms/Gram's Staining | 05 |
| 4. Cytology/Genetics                | 05 |
| 5. Spots (1-5)                      | 10 |
| 6. Viva Voce                        | 05 |
| 7. Sessionals                       | 05 |

**50 marks**

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**MATHEMATICS**  
**PAPER - I**  
**ALGEBRA AND TRIGONOMETRY**  
**(paper code - 0798)**

**UNIT-1** Symmetric, Skew symmetric, Hermitian and skew hermitian, matrices.

Elementary operations on matrices, Inverse of a matrix. Linear independence of row and column matrices, Row rank, Column rank and rank of a matrix. Equivalence of column and row ranks. Eigen values, Eigen vectors and the characteristic equations of a matrix.

Cayley Hamilton theorem and its use in finding inverse of a matrix.

**UNIT-2** Application of Matrices to a system of linear (both homogeneous and nonhomogeneous) equations. Theorems consistency of a system of linear equations. Relation between the roots and coefficients of general polynomial equations in one variable. Transformation of equations. Descartes's rule of signs. Solutions of cubic equations

(Cardan's Method), Biquadratic equation.

**UNIT-3** Mappings, Equivalence relations and partitions. Congruence modulo  $n$ .

Definition of a group with examples and simple properties. Cyclic groups generators, Coset decomposition, Lagrange's theorem and its consequences. Fermat and Euler's theorems. Normal subgroups. Quotient group, Permutation groups, Even and odd permutations the alternating groups. Cayley's theorem.

**UNIT-4** Homomorphism and Isomorphism the fundamental theorems of homomorphism. Introduction, properties and examples of Rings, Subrings, Integral domain and fields Characteristic of a ring and field.

**TRIGONOMETRY :**

**UNIT-5** De Moivre's theorem and its applications. Direct and inverse Circular and Hyperbolic functions. Logarithm of a complex quantity. Expansion of Trigonometrical functions.

Gregory's series. Summation of series.





**TEXT BOOK :**

1. I.N. Herstein, Topics in Algebra Wiley Eastern Ltd., New Delhi, 1975
2. K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd. New Delhi, 2000.
3. Chandrika Prasad, Text-Book on Algebra and Theory of equations, Pothishala Private Ltd., Allahabad.
4. S.L. Loney, Plane Trigonometry Part II, Macmillan and Company, London.

**REFERENCES :**

1. I.N. Herstein, Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975.
2. K.B. Datta, Matrix and linear algebra, Prentice Hall of India Pvt. Ltd. New Delhi, 2000.
3. P.B. Bhattacharya, S.K. Jain and S.R. Nagpaul, First Course in linear Algebra, Wiley Eastern, New Delhi, 1983.
4. P.B. Bhattacharya, S.K. Jain and S.R. Nagpaul, Basic Abstract Algebra (2 edition), Cambridge University Press, Indian Edition, 1997.
5. S.K. Jain, A. Gunawardena and P.B. Bhattacharya, Basic linear Algebra with MATLAB, Key College Publishing (Springer-Verlag), 2001.
6. H.S. Hall and S.R. Knight, Higher Algebra, H.M. Publications, 1994.
7. Chandrika Prasad, Text-Book on Algebra and Theory of Equations, Pothishala Private Ltd., Allahabad.
8. S.L. Loney, Plane Trigonometry Part II, Macmillan and Company, London.
9. R.S. Verma and K.S. Shukla, Text Book on Trigonometry, Pothishala Pvt. Ltd., Allahabad.



**PAPER - II**  
**CALCULUS**  
**(paper code - 0799)**

**DIFFERENTIAL CALCULUS :**

**UNIT-1**  $\varepsilon - \delta$  definition of the limit of a function. Basic properties of limits. Continuous functions and classification of discontinuities. Differentiability. Successive differentiation. Leibniz theorem. Maclaurin and Taylor series expansions.

**UNIT-2** Asymptotes curvature. Tests for concavity and convexity. Points of inflexion. Multiple points. Tracing of curves in Cartesian and polar coordinates.

**INTEGRAL CALCULUS:**

**UNIT-3** Integration of irrational algebraic functions and transcendental functions. Reduction formulae. Definite integrals. Quadrature. Rectification. Volumes and surfaces of solids of revolution.

**ORDINARY DIFFERENTIAL EQUATIONS :**

**UNIT-4** Degree and order of a differential equation. Equations of first order and first degree. Equations in which the variables are separable. Homogeneous equations. Linear equations and equations reducible to the linear form. Exact differential equations. First order higher degree equations solvable for  $x$ ,  $y$ ,  $p$ . Clairaut's form and singular solutions. Geometrical meaning of a differential equation. Orthogonal trajectories. Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations.

**UNIT-5** Linear differential equations of second order. Transformation of the equation by changing the dependent variable/the independent variable. Method of variation of parameters. Ordinary simultaneous differential equations.

**TEXT BOOK :**

1. Gorakh Prasad, Differential Calculus, Pothishala Private Ltd. Allahabad.
2. Gorakh Prasad, Integral Calculus, Pothishala Private Ltd. Allahabad.
3. D.A. Murray Introductory Course in Differential Equations, Orient Longman (India), 1976.

**REFERENCES :**

1. Gabriel Klambauer, Mathematical Analysis, Marcel Dekker, Inc. New York, 1975.
2. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum's outline series, Schaum Publishing Co. New York.
3. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
4. P.K. Jain and S.K. Kaushik, An Introduction to Real Analysis, S. Chand & Co. New Delhi. 2000.

5. Gorakh Prasad, Differential Calculus, Pothishala private ltd. Allahabad.
6. Gorakh Prasad Integral Calculus, Pothishala Private Ltd. Allahabad.
7. D.A. Murray, Introductory Course in Differential Equations, Orient Longman (India), 1967.
8. G.F. Simmons, Differential Equations, Tata Mc Graw Hill, 1972.
9. E.A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall of India, 1961.
10. H.T.H. Piaggio, Elementary Treatise on Differential Equations and their Applications, C.B.S. Publishers & Distributors, Delhi, 1985.
11. W.E. Boyce and P.O. DiPrima, Elementary Differential Equations and Boundary Value Problems, John Wiley, 1986.
12. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley and Sons, 1999



**PAPER - III**  
**VECTOR ANALYSIS AND GEOMETRY**  
**(paper code - 0800)**

**M.M. 50**

**VECTOR ANALYSIS :**

**UNIT-1** Scalar and vector product of three vectors. Product of four vectors. Reciprocal Vectors.

Vector differentiation. Gradient, divergence and curl.

**UNIT-2** Vector integration. Theorems of Gauss, Green, Stokes and problems based on these.

**UNIT-3** General equation of second degree. Tracing of conies. System of conies. Confocal conies. Polar equation of a conic.

**UNIT-4** Plane the Straight line and the plane. Sphere cone. Cylinder.

**UNIT-5** Central Conicoids. Paraboloids. Plane sections of conicoids. Generating lines. Confocal Conicoids. Reduction of second degree equations.

**TEXT BOOKS :**

1. N. Saran and S.N. Nigam, Introduction to vector Analysis, Pothishala Pvt. Ltd. Allahabad.
2. Gorakh Prasad and H.C. Gupta, Text Book on Coordinate Geometry, Pothishala Pvt. Ltd., Allahabad.
3. R.J.T. Bill, Elementary Treatise on Coordinate Geometry of three dimensions, Machmillan India Ltd. 1994.

**REFERENCES :**

1. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Company, New York.
2. Murray R. Spiegel, Vector Analysis, Schaum Publishing Company, New York.
3. N. Saran And S.N. Nigam Introduction to Vector Analysis, Pothishala Pvt. Ltd., Allahabad.
4. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 1999.
5. Shanti Narayan, A Text Book of Vector Calculus, S. Chand & Co., New Delhi.
6. S.L. Loney, The Elements of Coordinate Geometry, Macmillan and Company, London.
7. Gorakh Prasad and H.C. Gupta, Text Book on Coordinate Geometry, Pothishala Pvt. Ltd., Allahabad.
8. R.J.T. Bill, Elementary Treatise on Coordinate Geometry of three Dimensions, Macmillan India Ltd., 1994.
9. P.K. Jain and Khalil Ahmad, A Text Book of Analytical Geometry of two Dimensions, Wley Eastern Ltd., 1994.
10. P.K. Jain and Khalil Ahmad, A Text Book of Analytical Geometry of three Dimensions, Wiley Eastern ltd., 1999.
11. N. Saran and R.S. Gupta, Analytical Geometry of three Dimensions, Pothishala Pvt. Ltd. Allahabad.

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**MICROBIOLOGY**  
**PAPER - I** **M.M. 50**  
**GENERAL MICROBIOLOGY**  
**(paper code - 0819)**

**UNIT-1** Unity of microbial world, scope of microbiology, Microbiology and human health, beneficial and harmful microbes. development of microbiology (contributions and pioneers)

**UNIT-2** Diversity of microbial world: principle of classification, classification of viruses, Bacteria (including Cyanobacteria) Algae and Fungi ( including yeast) and protozoa.

**UNIT-3** Methods of studying microorganism: Origin of microbes, microscopy, pure culture techniques, Sterilization, Aseptic techniques, isolation of pure culture, conditions and media for growth of microorganisms in the laboratory.

**UNIT-4** General organization of microbes; Structural functional organization and economic importance of algae (*Nostoc*, *anabaena*, *Ocellularia*), fungi (*Rhizopus*, *Penicillium*, *Aspergillus*), yeast and lichens.

**UNIT-5** Structure, Functional organization and economic importance of bacteria (Gram +ve and Gram -ve), viruses (Plant and Animal) and protozoa (Ciliates, Flagellates and Sporozoans).

**TEXT BOOKS :**

1. General Microbiology by Brock.
2. Microbiology by Black.
3. General Microbiology by Pelzar et al.
4. Introduction on Microbial Techniques by Gunasekaran.

  
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**PAPER - II**  
**BIOCHEMISTRY AND IMMUNOLOGY**  
**(paper code - 0820)**

**M.M. 50**

**UNIT-1** Structure and properties of mono and disaccharides, amino acids and peptides, bases; purines and pyrimidines, sugars; ribose, deoxyribose and nucleoside and nucleotide; general account of lipids.

**UNIT-2** concept of macromolecules; Structural and functional organization of polysaccharides (starch, glycogen, cellulose, mucopolysaccharides), proteins and nucleic acids (DNA, RNA).

**UNIT-3** Enzymes; historical account, classification, Co-enzymes and their role. Enzyme action, Enzyme kinetic.  $K_m$ ,  $V_m$  and Enzyme inhibition. Allosteric enzyme and isoenzyme. Extracellular enzymes and their role.

**UNIT-4** Metabolism; General concept of metabolisms (anabolism, catabolism and amphibolism). Glycolysis TCA Cycle and HMP Shunt. Anaerobic catabolisms of glucose; alpha, beta and gamma oxidation of fatty acids.

**UNIT-5** Concept of immunity, Innate and acquired immunity. Brief account of cells and organs of immune system. Antigen and Antigenicity. Antibody structure and function. Antigen-Antibody reaction.

**Text Books :**

1. General Biochemistry by A.C. Deb.
2. Biochemistry by Lehninger (Kalyani publication)
3. Biochemistry by U. Satyanarayan.
4. General Immunology by Fatima.
5. Microbiology by Anantanarayan and Panikar.
6. Immunology by C.V. Rao.

**PRACTICAL**

**M.M. 50**

Preparation of solid/liquid culture media

Sterilization techniques

Isolation of single colonies on solid media.

Enumeration of Bacterial numbers by serial dilution and plating.

Simple and differential staining.

Measurement of microorganism (micrometry) and camera lucida drawing of isolated organism.

Determination of antibiotic resistances / sensitivity of bacteria.

General and specific qualitative test for carbohydrates

General and specific qualitative test for amino acids



General and specific qualitative test for lipids Estimation of protein  
 Estimation of blood glucose  
 Assay of the activity of amylases Assay of the  
 activity of Phosphatase  
 Identification and Enumeration of White Blood Cells  
 Defferential leukocyte count  
 Structure and histology of lymphoid organs  
 Antigen- anitbody reaction  
 Agglutination reaction

### Scheme of Practical Examination

**Time - 4 hours**

**M.M. 50**

1.	Exercise on Microbiological methods	10
2.	Exercise on Biochemical tests	10
3.	Exercise on Immunological techniques	05
4.	Spotting (1-5)	10
5.	Viva-Voce	05
6.	Sessional	10
	<b>Total</b>	<b>50</b>

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**GEOLOGY**  
**PAPER - I**  
**INTRODUCTION TO GEOLOGY**  
**(paper code - 0801)**

**M.M. 50**

- UNIT-1**
1. Geology and its perspectives. Earth in the solar system: origin, size, shape, mass, and density.
  2. Internal structure of earth, Chemical composition of crust, mantle and core.
  3. Formation of atmosphere, hydrosphere and biosphere.
  4. Age of the earth. Radio activity, Production of magnetic field.
  5. Origin of solar system and universe with Indian perspective.
- UNIT-2**
1. Elementary ideas of continental drift and Plate Tectonics.
  2. Origin of oceans, continents and mountains.
  3. Earthquake and earthquake belts, measure of earthquake. Volcanoes - types and distribution.
  4. Rock-weathering. Erosion and transportation by rivers.
  5. Erosion & transportation by winds & glaciers.
- UNIT-3**
1. Wave erosion and beach processes.
  2. Bedding identification and data measurement Effects of topography on outcrop.
  3. Unconformity, Onlap, offlap outlier, inlier.
  4. Forms of igneous rocks.
  5. Simple deformational structures; folds, Faults and joints.
- UNIT-4**
1. Elementary idea about crystal structure, edges, solid angles, zone.
  2. Crystallographic axes and axial angles. Axial parameters and indices.
  3. Crystal symmetry and Plane - Axis & Centre of symmetry.
  4. Classification of crystal : Symmetry elements of normal class of cubic, tetragonal and hexagonal system.
  5. Symmetry elements of normal class of Orthorhombic, Monoclinic and Triclinic systems.
- UNIT-5**
1. Definition and classification of minerals Physical properties of minerals.
  2. Optical properties of minerals : Twinkling, Refractive index, birefringence, pleochroism, interference colours.
  3. Physical & optical properties of Quartz and Feldspar family.
  4. Physical & optical properties of Pyroxene & Amphibole family.
  5. Physical & optical properties of Mica & Garnet.



**PAPER - II**  
**INTRODUCTION TO GEOLOGY**  
**(paper code - 0802)**

**M.M. 50**

- UNIT-1** 1. Magma: definition, composition and origin.  
2. Bowen's reaction series. Magmatic differentiation and assimilation.  
3. Texture structure and classification of igneous rocks.  
4. Definition and agents of metamorphism. Texture, structure and classification of metamorphic rocks.  
5. Metamorphic facies, facies series and isogrades. Relationship between metamorphism and deformation.
- UNIT-2** 1. Origin, transportation and deposition of sediments. Consolidation and diagenesis.  
2. Sedimentary fabric and texture Classification of sedimentary rocks- Terrigenous and chemical sedimentary rocks.  
3. Definition & Scope of paleobiology, processes of fossilization, preservation potential of organisms.  
4. Elementary idea of origin of life, evolution of fossil record.  
5. Classification of organisms.
- UNIT-3** 1. Morphology, environmental factors & geological distribution of Mollusca.  
2. Morphology, environmental factors and geological distribution of Brachiopoda  
3. Morphology, environmental factors and geological distribution of echinodermata, and Arthropoda.  
4. Gondwana Plant fossils & their significance.  
5. Morphology of corals
- UNIT-4** 1. Principles of stratigraphy. Geological time scale.  
2. Lithostratigraphic, Chronostratigraphic and biostratigraphic units. Stratigraphic correlation.  
3. Physical and structural subdivisions of Indian subcontinent and their Characteristics.  
4. Classification & distribution of Dharwar.  
5. Classification & distribution of Aravallis, saugar. Group and Cuddapah.
- UNIT-5** 1. Brief account of geology and distribution of Vindhyan and Chhattisgarh.  
2. Classification and geographic distribution of Gondwana in India.  
3. Geology and age of Deccan traps. Inter-trappians & Infra trappean beds.  
4. Classification & distribution of Siwalik.  
5. Evolution of Himalayas.

**PRACTICAL  
LABORATORY WORK :**

**M.M. 50**

**M.M. 40**

1. Study and drawing of block diagrams of important geomorphological models. Reading topographical maps and interpretation of landforms and drainage from topographical maps. - 5 Marks
2. Exercises on structural geology problems: completion of outcrops, Drawing and interpretation of cross-sections through elementary representative geological structures. -6 Marks
3. Study of elements of symmetry of at least one representative crystal of normal classes of each crystal system. Study of physical properties of important minerals in hand specimens.- 7 Marks
4. Study of optical characters of important rock forming minerals using polarizing microscope. – 4 Marks
5. Study of morphological characters of phyla included in theory syllabus - 5 Marks
6. Preparation and study of stratigraphic maps - 3 Marks
7. Sessional - 5 Marks
8. Viva-Voce - 5 Marks

**GEOLOGICAL FIELD WORK :**

**M.M. 10**

- Students will be required to carry out field work for 7 days in a suitable geological area to study the following aspects and submit a report there on.
1. Use of clinometer/ brunton in determination of attitude of planar and linear structures.
  2. Study of mode of occurrence of rocks and minerals in the field.

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**ANTHROPOLOGY**  
**PAPER - I**  
**FOUNDATION OF ANTHROPOLOGY**  
**(paper code - 0815)**

**M.M. 50**

**UNIT-1** Meaning and scope of Anthropology, history of Anthropology, Branches of Anthropology.

- (a) Sociocultural Anthropology;
- (b) Physical-Biological Anthropology;
- (c) Archaeological Anthropology;
- (d) Linguistic Anthropology.

**UNIT-2** Relationship with other disciplines: Life sciences, Earth sciences, Medical Sciences, Social Sciences, Humanities, Environment Sciences.

**UNIT-3** Foundation in Biological Anthropology.


- (a) Human Evolution
- (b) Human Variation
- (c) Human Genetics
- (d) Human Growth and Development.

**UNIT-4** Fundamentals in Social-Cultural Anthropology.

- (a) Culture, Society, Community, Group, Institution
- (b) Human Institution : Family, Marriage, Kinship Religion.
- (c) Development and change.
- (d) Research Methods : Tools and Techniques.

**UNIT-5** Fundamentals in Archaeological Anthropology.

- (a) Tool typology & Technology.
- (b) Cultural revolution: Broad outlines of cultures.
- (c) Chronology.

  
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**PAPER - II**  
**INTRODUCTION TO PHYSICAL ANTHROPOLOGY M.M. 50**  
**(paper code - 0816)**

**UNIT-1** Meaning & scope & History of Physical Anthropology & its applied aspects.

Theories of organic evolution, synthetic theory of evolution Lamarism & Darwinism.

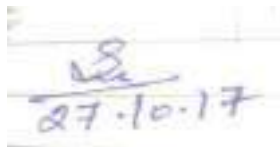
**UNIT-2** Position of Man in animal kingdom : comparative anatomy of Man and Apes.

**UNIT-3** Fossil evidence of human evolution, origin of tool making and their evolution. Ramapithecus, Australopithecus, Pithecanthropus, Sinanthropus, Neanderthal, Cro-Magnon, Grimaldi, Neanderthal, Neanderthal.

**UNIT-4** Concept of race, Genetic basis of Race, UNESCO Statement on Race-Ethnic Group population, Racial classification of human Populations.

**UNIT-5** Human Genetics, Mendelian principles, Genetic markers, DNA.

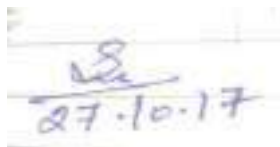
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**PAPER - III**  
**ANTHROPOLOGY PRACTICAL      M.M. 50**

- I. Identification of bones of Human Skeleton Sketching and labeling of various norms of skull Overview of Pectoral & Pelvic girdles & Femur & Human bone.
- II. Craniometry :
- (i) Maximum Cranial length
  - (i) Maximum Cranial breadth
  - (i) Minimum frontal Breadth
  - . (iv) Bizygomatic Breadth
  - (v) Nasal Height
  - (vi) Nasal Breadth
  - (vii) Basion-Bregmatic Height
  - (viii) Bimaxillary Breadth
  - (ix) Biometrical Breadth
  - (x) Length of occipital foramen.
- III. Solliatometry : Osteometry Femur
- (1) Maximum length

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**STATISTICS**  
**PAPER - I**  
**PROBABILITY THEORY (paper code - 0803)**

Important concepts in probability: definition of Probability- classical and relative frequency approach to probability, Richard Von Mises, Cramer and Kolmogorov's approaches to probability, merits and demerits of these approaches any general ideas to be given.

Random Experiment: Trial, sample point and sample space, definition of an event, operation of events, mutually exclusive and exhaustive events. Discrete sample space, properties of probability based on axiomatic approach, conditional probability, independence of events, Bayes' theorem and its applications.

Random Variables: Definition of discrete random variables, probability mass function, idea of continuous random variable, probability density function, illustrations of random variables and its properties, expectation of a random variable and its properties -moments, measures of location, dispersion skewness and kurtosis- probability generating function (if it exists), their properties and uses.

Standard univariate discrete distributions and their properties: Discrete Uniform, Binomial, Poisson, Hypergeometric, and Negative Binomial distributions.

Continuous univariate distributions- uniform, normal, Cauchy, Laplace, Exponential, Chi-Square, Gamma and Beta distributions. Bivariate normal distribution (including marginal and conditional distributions).

Chebyshev's inequality and applications, statements and applications of weak law of large numbers and central limit theorems.

**REFERENCES :**

Bhat B.R., Srivenkatramana T and Rao Madhava K.S. (1997): Statistics: A Beachner's Text, Vol. II new Age International (P) Ltd.

Edward P.J. Ford J.S. and Lin (1974): Probability for statistical decision-Making, Prentice Hall.

Goon A.M. Gupta M.K., Das Gupta.B. (1999): Fundamentals of statistics, Vol World Press Calcutta.

Mood A.M. Grabill F.A. and Boes D.C. (1974): Introduction to the theory of statistics, McGraw Hill.

**ADDITIONAL REFERENCES :**

Cooke, Cramer and Clarke ( ): Basic Statistical computing, Chapman and Hall.

Devid S. (1996): Elementary Probability, Oxford Press.

Hoel P.G. (1971): Introduction to Mathematical Statistics, Asia Publishing

House Meyer P.L. (1970): Introductory Probability and Statistical applications. Addison Wesley

**PAPER - II**  
**DESCRIPTIVE STATISTICS (paper code - 0804)**

Type of Data: Concepts of a statistical population and sample from a population; qualitative and quantitative data; nominal and ordinal data; cross sectional and time series data; discrete and continuous data; frequency and non-frequency data. Different type of scales-nominal, ordinal, ratio and interval.

Collection and security of data: Primary data- designing a questionnaire and a schedule; checking their consistency. Secondary data-its major sources including some government publications. Complete enumeration, controlled experiments, observational studies and sample survey. Scrutiny of data for internal consistency and detection of errors of recording. ideas of cross-validation.

Presentation of Data: Construction of tables with one or more factors of classification. Diagrammatic and graphical representation of grouped data. Frequency distributions, cumulative frequency distributions and their graphical representation, histogram, frequency polygon and ogives. Stem and leaf chart Box plot.

Analysis of Quantitative Data: Univariate data-Concepts of central tendency or location, dispersion and relative dispersion, skewness and kurtosis, and there, measures including those based on quintiles and moments. Sheppard's corrections for moments for grouped data (without derivation).

Bivariate Data: Scatter diagram. Product moment correlation coefficient and its properties. Coefficient of determination. Correlation ratio. Concepts of error in regression. Principle of least squares. Fitting of linear regression and related results. Fitting of curves reducible to polynomials by transformation. Rank correlation-Spearman's and Kendall's measures.

Multivariable data: Multiple regression, multiple correlation and partial correlation in three variables. Their measures and related results.

Analysis of Categorical Data: Consistency of categories data. Independence and association of attributes, Various measures of association for two way and three way classified data Odds ratio.

**REFERENCES :**

- Bhat B.R. Srivenkairamana T and Rao Madhava K.S. (1996): Statistics: A Beginner's Text,  
Vol. I, New Age International (P) Ltd.  
Croxon F.E. Covden D.J. and kelin S (1973): Applied General Statistics,  
Prentice Hall of India.  
Goon A.M. Gupta M.K., Das Gupta. B. (1991): Fundamentals of Statistics, Vol. I, World Press, Calcutta.

### **ADDITIONAL REFERENCES :**

- Anderson T.W. and Sclove S.L (19718) An Introduction to the Statistical Analysis of. Houghton Mifflin\Co.
- Cooke, Cramer and Clarke () : Basic Statistical Computing, Chapman and Hall.
- Mood A.M, Graybill F.A. and Boes D.C. (1974): Introduction to the Theory of Sttistics, Mc Graw Hill.
- Snedecor G.W. and Cochian, W.G. (1976): Statistical Mehtods. Iowa State University Press.
- Spiegel, M.R. (1967): Theory & Problems of Statistics, Schaum's Publishing Series.

### **PAPER - II PRACTICAL**

- 1 . Presentation of data by Frequency tables, diagrams and graphs.
2. Calculation of Measures of central tendecy, dispersion, skewness and Kurtosis:
3. Product Moment Correlation and Correlation ratio.
4. Fitting of Curves by the least square method.
5. Regression cf two variables.
6. Spearman's Rank correlation and Kendall's tau.
7. lvmultiple regression of three variables.
8. Multiple correlation and Partial correlation.
9. Evaluation of Probabilites using Addition and Multiplication theorems, conditional probabilities, and Baye's theorems.
10. Exercises on mathematical expectations and finding measures of central tendecy dispersion, skewness and Kurtosis of univariate probability distributions.
11. Fitting of standard univariate and continuous distributions.

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**DEFENCE - STUDIES**  
**PAPER - I**  
**INDIAN MILITARY HISTORY M.M. 50**  
**(paper code - 0817)**

**AIM :** The main idea behind this paper is to give a conceptual background about the events and factors which influenced course of history and helped in developing the art of war in India.

**Note :** Questions will be set from each unit, There will be only internal choice.

**UNIT-1** 1. The definition and scope of Defence Studies and its relationship with other subjects.

2. Art of war of Epic and Puranic period.
3. Comparative study of Indo-Greek art of war with special reference to the Battle of Hydaspes 326 B.C.
4. Mauryan Military system and art of war.

**UNIT-2** 1. Kautilya's Philosophy of war.

2. Gupta's military system and art of war.
3. Military system of Harshavardhan.
4. Decline of Chariots and Importance of Elephant and Cavalry.

**UNIT-3** 1. Mughal military system.

2. Rajput and Turk pattern of warfare with special reference to Battle of Somnath and Battle of Tarain up to 12th century A.D.
3. Causes of the fall of Rajput Military system.
4. Army organization during Sultanate period.
5. Battle of Panipat 1526 A.D. and Battle of Haldighati 1576 A.D.

**UNIT-4** 1. Maratha Military system.

2. Warfare of Shivaji.
3. Battle of Assaye 1803 A.D.
4. Sikh Military system.
5. Battle of Sobraon 1846 A.D.

**UNIT-5** 1. 1857 Liberation Movement.

2. Reorganizations of Indian Army under the Crown.
3. Nationalization of Indian Army after independence.
4. Military reforms of Lord Kitchener's.

**READING LIST :**

- |                                       |   |               |
|---------------------------------------|---|---------------|
| 1. Military System of Ancient India   | : | B.K. Majumdar |
| 2. Generalship of Alexander the Great | : | J.F.C. Fuller |
| 3. Kautilya Arthashastra              | : | K.P. Kanbale  |
| 4. Military history of India          | : | J.N. Sarkar   |

**PAPER - II**  
**DEFENCE MECHANISM OF THE MODERN STATE**  
**(paper code - 0818)**

**AIM :** To enable students to appreciate the importance of higher political direction in the formulation of national defence policy and roles as political and military leadership in furthering national security.

**Note :** Question will be from each unit, there will be only internal choice.

**UNIT-1** 1. Evolution of National defence policy.

2. Inter dependence of Foreign, Defence and Economics policies.
3. Higher defence organization of U.S.A., U.K. and RUSSIA.
4. Higher defence organization of CHINA, PAKISTAN and NATO.

**UNIT-2** 1. Higher defence organization in India.

2. Powers of President and relation to Armed forces.
3. Parliament and the Armed forces.
4. Defence (Political affair) committee of the cabinet. Its composition, methods of working during war and peace.
5. National Defence Council and its Valiant.

**UNIT-3** 1. Organization of Ministry of Defence.

2. Organization of Army head quarter.
3. Organization of Naval head quarter.
4. Orgatiization of Air head quarter.

**UNIT-4** 1. Organization and role of Para-militaty forces - B.S.F., I.T.B.P., C.I.S.F. etc.

2. Organization and role of Intelligence Agencies - RAW, CBI, CID., IB etc.
3. Military Intelligence.
4. Role of N.C.C. in preparing youth for Defence services.

**UNIT-5** 1. Organization of Civil - defence.

2. Importance and role of civil defence during war and peace.
3. Air-Raid signal and precaution before and after bombardment.
3. Role of Indian armed forces in war and peace.

**READING LIST :**

1. Indian Army, A Sketch of its History & : E.H.E. Choen  
Organisation :
2. Defence Organization in India : Venkateshwarm

## **PRACTICAL**

**M.M. : 50**

There shall be practical examination of 3 hours duration and carrying 50 marks. The distribution of marks shall be as follows -

- |                                   |             |
|-----------------------------------|-------------|
| 1. Exercises based on Map reading | : 20 Marks  |
| 2. Exercises based on models      | : 10 Marks  |
| 3. Sessional Work and Record      | : 10 Marks  |
| 4. Viva-Voce                      | : 10 Marks, |

## **PART - A**

### **ELEMENTARY MAP READING**

1. Maps- Definition, types, Marginal Information.
2. Conventional signs - Military and Geographical.
3. Direction and cardinal points.
4. Types of North, Angle of Convergence.
5. Study of Liquid compass, its parts, various tactical uses and preparation of Night navigation chart.
6. service Protractor and its uses.
7. To find North by Compass, Watch, Sun, Stars etc.
8. Bearing and interconversion of bearing.
9. Setting of Map.
10. Grid System.

## **PART - B**

### **RECOGNITION & ELEMENTARY STUDY OF FOLLOWING MODELS**

1. equivalent Rank and Badges of Indian Army, Navy and Air Force.
2. Famous Armoured vehicles used in war.
3. Weapons used in Infantry.
4. Various Ships of Indian Navy.
5. Famous Air-Crafts Used by Air-Force.

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## INDUSTRIAL CHEMISTRY

### PAPER - I

#### INDUSTRIAL ASPECTS, OF ORGANIC & INORGANIC CHEMISTRY

(paper code - 0821)

**UNIT-1** 1.1 Nomenclature Generic names, Trade names.

1.2 Raw Materials for Organic compounds :-

Petroleum, natural gas, Fractionation of Crude oil.

**UNIT-2** 2.1. Petroleum :- Cracking, reforming Hydroforming isomerisation.

2.2. Coal :- Types, Structure, Properties, distillation of coal, chemicals derived there from.

**UNIT-3** 3.1. Renewable natural resources :- Cellulose, starch, properties, modification, important industrial chemicals derived from them, Alcohol and alcohol based chemicals, Oxalic acid, Furfural.

3.2. Basic metallurgical operations :- Pulverisation, calcination, Roasting, refining.

**UNIT-4** 4.1 Physico chemical principles of extraction of :- Iron, Copper, Lead, Silver, Sodium, Aluminium, Magnesium, Zinc, Chromium.

**UNIT-5** Inorganic materials of Industrial Importance :- Their availability, forms, structure and modification. Alumina, Silica, Silicates, Clays, Mica, Carbon, Zeolites.

#### BOOKS :

1. Coal Conversion, E.J. Hoggman, The Engeron Co., Lavamie Wyoming, U.S.A.
2. Introduction of Petroleum Chemicals, H. Steiner, Pergamon Press.
3. From Agrocabon to Petrochemicals, L.F. Hatch & S. Matarm, Gulf Publishing Co., Houston.
4. Cellulose : Its Chemistry & Technology, Hall A.G.
5. Methods in Carbohydrate Chemistry, Vol. 3 - Cellulose, Whistler, R.L.
6. Chemistry of Cellulose, Heuser, E.
7. Chemistry & Industry of Starch, Kerr, R.W.
8. Modified Starches : Properties & Uses, Wurzburg, O.B.
9. Principles of Extractive Metallurgy, Herbashi, Vol. I & II.
10. Theory of Metallurgical Processes, Volsky, A. & Sergievskaya, F.
11. Text book of Metallurgy, Bailey, A.R.
12. Clays, H. Reis, John Wileys & Sons.
13. Unit Processes of Extractive Metallurgy, Peeble, Elsevier Publication.
14. Industrial Chemistry, Reigel, Reinhold Publication.

  
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**PAPER - II**  
**INDUSTRIAL ASPECTS OF PHYSICAL CHEMISTRY**  
**MATERIAL AND ENERGY BALANCE**  
**(paper code - 0822)**

**UNIT-1** Surface. chemistry and Interfacial Phenomena Adsorption Isotherm, Sols, Gels, Emulsions, Micoemulsions, micelles, Aerosols, Effect of surfactants, Hydrotropes.

**UNIT-2** Calalysts :- Introduction, Types, Homog-eneous and Heterogeneous, Basic Principles, Mechanisms factors affecting the performance, Introduction to phase transfer catalysis

**UNIT-3** 3.1. Enzyme catalysed reactions - Rate model, Industrially important reactions.

3.2. Material Balance without chemical Reactions:- flow diagram formaterial balance, simple material with or without recycle or by-pass for chemical engineering opera-tions such as distillation, crystallisation, evaporation, extraction, etc.

**UNIT-4** 4.1. Dimensions and Units :- Basic. chemical calculations -Atomic weight, molecular, weight, equivalent weight, mole composition of (i) liquid mixt'ure & (ii) gaseous mixture.

4.2. Material balance involving chemical reaction :- concept of limiting reactant, con-version, yield liquid phase reaction, gas phase reactions with/without recycle or by-pass.

**UNIT-5** Energy Balance :- Heat capacity of p-ure gases and gaseous mixtures at constant pres sures. Sensible heat changes. in liquids, Enthalpy changes.

**BOOKS :**

1. Aersol, Science & Technology, Shephered, H.R.
2. Catalysisir :Heterogeneous & Homogeneous, Delmon, Elbevier Scienu Publication.
3. Catalysisir, Science & Technology, Anderson, J.
4. Catalysisir in Micelller & Macromolecular systems, Fendler & Fendler.
5. Phase Transfer Catalysis, Principle & Techniques, Strles, C.
6. Surgace Chemistry, J.J. Bikermann, Academic Press.
7. Physical Chemistry of Surfaces by A.W. Admson.
8. Storchimetry, B.I. Bhalt & S.M. Vora.
9. Chamilal Process Principle - Part I, B.A. Hougen, K.M. Watson & R.A. Ragats, Asia Publi-cation.

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**PAPER - III**  
**UNIT OPERATIONS IN CHEMICAL INDUSTRY AND UTILITIES,**  
**FLUID FLOW AND HEAT TRANSPORT IN INDUSTRY**  
**(paper code - 0823)**

**UNIT-1** 1.1. Distillation - Introduction; Batch and continuous distillation, separation of azeo-tropes, plate columns & packed columns.

1.2. Absorption - Introduction, Equipments- Packed columns, spray columns, bubble columns, packed bubble columns, mechanically, agitated contractors.

**UNIT-2** 2.1 Evaporation - Introduction, Equipments - short tube (standard) evaporator, forced circulation evaporators, falling film evaporators, climbing film (Upward flow) evaporations, wiped (agitated) film evaporator.

2.2 Filtration - Introduction, filter media and filter aids, Equipments- Plate and frame, filter press, nutch filter, rotatory drum filter, sparkler filter, candle filter, bag filter, cen-trifuge.

2.3 Drying - Introduction, free moisture, bound. moisture, drying curve, Equipments tray dryer, rotatory dryer, flash drater, fluid bed dryer, drum dryer, spray dryer.

**UNIT-3** 3.1 Utilities in chemical Industry

Fuel - Types of fuels -advantages and disadvantages, combustion of fuels, calorific value. specification for fuel oil.

Boilers - Types of.-boilers and their functioning.

Water - Specifications for industrial use, various water treatments.

Steam - Generation and use.

Air - Specifications for Industrial use processing of air.

**UNIT-4** Fluid Flow : Fans, blowers, compressors, vacuum pumps, ejector. Pumps :-

Reciprocating pumps,, Gear pumps,, centrifugal pumps.

**UNIT-5** Heat Exchangers -: Shell and Tube type; finned tube heat exchangers, plate heat ex-changers, refrigeration cycles.

**BOOKS :**

1. Introduction Chemical Engineering, W.L. Badger, J.J. Banchero, McGraw Hill.
2. Unit Operations in Chemical Engineering, W.L. McCabe & J.C. Smith, McGraw Hill.
3. Chemical Engineer's Hand Book, J.H. Perry, McGraw Hill.
4. Unit Operations - I & II, D.D. Kale, Pune Vidyarthi Griha Prakashan, Pune.
5. Unit Operations of Chemical Engineering, Vol. I, P. Chattopadhyay, Khanna Publishers, Delhi.

  
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## PRACTICAL

### Duration of Examination :

**04 Hrs.**

Discription of marks	Experiment	:	30 marks
	Viva	:	05 marks
	Sessional	:	05 marks
	Project	:	40 marks
	<b>Total</b>	:	<b>80 marks</b>

### EXPERIMENTS TO BE PERFORMED :

1. Simple laboratory techniques crystallisation, Fraction Crystallisation, Distillation, Fractional distillation Boiling Point.Diagram.
2. Extraction Processes- Phase diagram, partition<sub>HSO<sub>4</sub>O</sub>-efficient.
3. Preparation of standard solutions- Primary<sup>2</sup> and<sup>4</sup>secondary standards, Determination of- and H<sub>3</sub>PO<sub>4</sub> in a mixture.
4. Calibration of Thermometres.
5. Acquaintance with safety measures in a laboratory Hazards of Chemicals.
6. Depression and elevation in.b.p./m.p. of solids and liquids.
7. Chromatography-column, Paper, Thin layer.
8. Ore analysis dolomite, limestone, -calcite, Analysis of alloys such as cupro-nickel.
9. Determination of Physical Constants  
Refractive -index, surface tension, Effect of surfactants, on surface tension, viscosity- Fluids, Polymer solutions effect of additives on viscosity, optical rotation.
10. Study, experimenfs/demonstration experiments.

**Note :** Any two experiments have to be carried out by the students in the Examination. A Mini mum of 60% of the'experiments have to be conducted by the students.

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**COMPUTER SCIENCE**  
**PAPER - 1**  
**COMPUTER HARDWARE**  
**(paper code - 0805)**

**AIM :** 'Introduction to computer hardware organization-& computer digital electronics:

**Note :** Question paper should be prepared, having unit-wise questions with internal choice.

**OBJECTIVE OF COURSE :**

1. To introduce, the computer PC's and clones to the students.
2. To introduce and explain terms, various parts of computer, which will be helpful in understanding of computer hardware & use of computer.
3. To introduce an idea of digital electronics and digital circuits for building up the computer.

**UNIT-1 GENERAL OVERVIEW OF COMPUTER HARDWARE :**

**(A) Introduction to computer :** Computer Vs-Calculator & typewriter ; Parts of a computer ; The system unit/inside the system unit, CPU; RAM-KeyBoard Storage Media Floppy disc & hard disc; Monitor, Mouse; Printer; Types of Computer, Evolution of personal computer from PC-XT, PC-AT (286) to Pentium PC. Hardware & Software Types of Software System Software, Application Software, introduction to Programming Languages, Procedural Oriented Language, Structured Programming, Object Oriented Programming, Languages [Ex. BASIC, COBOL, PASCAL, C, C++, Visual Basic, JAVA & C#]. Types of operating System" introduction to DOS, UNIX, Windows, Simple DOS Commands and Features of UNIX & Working of Windows.

**(B) Computer System Operation** Number system: Unary system, Decimal system, Binary system conversions, addition, subtraction by 9's and 10's complements and by 1's and 2's complements. Binary multiplication & division : Octal number system & hexadecimal number system and use.

**UNIT-2 COMPUTER DIGITAL ELECTRONICS - PART A :**

**(A) Computer Communication Code -** Binary code, 8421 code; Excess 3 code; parity code-, Grey code ASCII & EBCDIC codes.

**(B) Computer Logic System** Logic Gates, Diode and BJT logic, Basic AND, OR, NOT operator./ gate, Positive and Negative logic, NOR & NAND gates, Boolean, equations by logic symbol

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### UNIT-3 COMPUTER DIGITAL ELECTRONIC - PART B :

- (A) **Integrated Circuits for Computer Logic Family** : Electrical characteristics, Propagation delay Noise immunity, Types of load RTL,DITL,TTL & COMO Bipolar & MOS integration circuits, TTL circuits.
- (B) **Basic bone of Digital Circuitary, Boolean Algebra** : Laws of boolean Algebra, Demorgans theorem, Dual nature of Boolean Laws, Boolean expression And logic diagram. The Karnaugh map, Truth table to' K-map, Simplification of K-map.
- (C) **Computer Logic Circuits,;** Ex-OR, Ex,-NOR circuldary, Half andfull adder, Half and full subtractor, Subtraction by.1's & 2's compliments.

### UNIT-4 COMPUTER DIGITAL ELECTRONICS - PART C :

- (A) **More computer Logic carcuit cemobinational logic circuits** : Encode & Decoder, Four bit binary, decoder,BCD to 7 segmert, decoderer encoder, Multiplexers & demultiplexers, Date transmission, Logic function generator.
- (B) **Multivibrator Circuits:** Monostable, Astable & Bistable circuits, Smitt Trigr, RS flip-flop, RS flip-flop using. NOR gate and NAND gate,'clocked-RS flip-flop, D f flip-flop or latch, Edge triggered flip-flop, Preset and clear, propogaiton delay-Set-up time, Hold time Master-Slave flip-flop.

### UNIT-5 COMPUTER DIGITAL ELECTRONICS - PART D :

- (A) **Computer counters-and shift registers:** Binary counter, Down counter, Paralle or Synchronous counter, eountel with feedback, code-7 precision time interval, Moni-tor horizontal to Vertical generator, shift reqisters in brief, application of shift regis-ters.
- (B) **Computer Memories** Types of, memory, RAM, ROM., PROM, EPROM, DRAM, SRAM.

### TEXT BOOK :

- 1. Riapidex computer course - (Pustak Mahal) by vikas Gupta.
- 2. Digital'&Analogue Techniquesjz, - (Kitab Mahal) by Navneet, Gokhale & Kale

### REFERENCE BOOKS :

- 1. Computer To-day - By Donald H. Sanders
- 2. IBM PC & Clones, - By B. Govindarajalu
- 3. Fundamental of Digital Computers - By Thomas Bharti
- 4. Introduction to Digital Electronics - By Moninander singh
- 5. Fundamantal of Computer - By V. Rajaraman.



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**PAPER - II**  
**COMPUTER, SOFTWARE PART - A**  
**(paper code - 0806)**

**AIM :** Introduction to computer software organization & use for solving any problem by Com-puter.

**NOTE :** Question paper should be prepared-having unit-wise question with internal choice.

**OBJECTIVE OF COURSE :**

1. To introduce the basic knowledge of software require for running the computer.
2. To introduce the basic knowledge of programming in HLL, BASIC for solving-the problem.
3. To introduce the WORLD PRO CESSOR package for document processing and mail merge.

**UNIT-1 Fundamentals for using the Computer:**

**(A) Driving the Computer**

- (1) Computer Operating System & other Software :
  - (i) Windows & UNIX system Software & their versions.
  - (i) HLL Sottware : BASI C, COBOL,PASCAL,C, C++, Visual Basic, JAVA & C#.
  - (i) Package Softwares - MS- Office & Foxpro.
- (2) Introduction to DOS Ver 6.22 &-Windows-95, Windows-98 & Windows-2000.
- (3) Windows concept, various features &advantages, Windows structure, Desktop, Taskbar, Start Menu, My Computer, Recycle bin.
- (4) Accessories: Calculator, Notepad, Paint, WordPad, Character Map, Explorer : Creating Folders and other Explorer Facilities.
- (5) Object Linking & embedding. Communication - Dialup Networking, Phone dialer.

**(B) General idea of Problem Solving with Computers**

Problem Analysis & Solving Scheme,,Computational procedure, program outline, algorithm, pseudocodes, flow chart, testing of flow chart, branching and looping, writing, executing & testing the program with examples.

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### (C) Programming Constants, and Variables

Character set, constants (numeric string), variables (numeric & String), rules for arithmetic expression and hierarchy of operations, relational expressions, logical expressions and operator, library, functions.

### UNIT-2 (A) Working with MS-Office

**Introduction to word:** Basics of WordProcessing; Features, & Advantages of Word Processing; Creating, editing, formatting & previewing documents; Advanced features; Using Thesaurus, Mail merge, Table & Charts, Implementing OLE concept.

**Introduction to Excel:** Worksheet Basics, Creating, Opening, & Moving in Worksheet, Working with Formula & Cell referencing, Absolute & Relative addressing, Working with Ranges, Formatting of worksheet, Graphs & charts, Database, Function, and Macros.

**Introduction to Power Point:** Creating a presentation, Modifying Visual Elements, Adding objects, Applying Transitions, animations and linking, Preparing, handouts. presenting a slide show.

### (B) 'Working on Internet

**Introduction to Internet;** Concept of Internet, Application of Internet, Services on Internet, World WideWeb (WWW) & Web Browsers,, working with Internet Explorer.

Introduction to Internet search Engines, Yahoo, Alta Vista, Google etc. Surfing the Internet, Chatting on. Internet Electronic Mail (E-Mail), working with Outlook Express;

Overview of telnet & FTP (File transfer Protocol) Services. Internet Security, Web security firewalls, Type of firewalls,

### UNIT-3 PROGRAMMING WITH C : PART - A

Introduction Characterset, Identifiers and Keywords, Variables, Displaying variables, Reading Variables, Character and Character,String, Qualifiers, Type define Statements, Value initialized Variables, Constants, Constant Qualifier, Operators and Expressions, Operator Precedence- and Associativity, Basic input output : Single Character I/O General Outputs, Types of Characters in format string, Scanf with Specifier, Searchset Arrangements and Suppression Character, Format Specifier for scanf.

Control Structure: If-statement, If else statement, Multiway decision, Compound



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**Statement, Loops :** For- loop, While-loop, Do-while loop, Break statement, Switch statement, Continue statement, Goto statement. Functions Function main, Function accepting more than one parameter, User defined and library function, Concept associativity with functions, function parameter, Return value, recursion comparisons, of Iteration and recursion variable length argument list.

#### **UNIT-4 PROGRAMMING WITH C : PART - B**

Scope and Extent, Arrays, Strings, Multidimensional Arrays, Strings, Array of Strings, I Function in String, Pointers: Definition, and Use of Pointer, address operator, pointer variable, referencing pointer, void pointers, pointer arithmetic, pointer to pointer, pointer and arrays, -passing arrays to functions, pointer and functions, accessing array inside functions, pointers and two dimensional arrays, array of pointers, pointer constants, pointer and functions, accessing array inside functions, pointers and two dimensional arrays, array of pointers, pointer constants, pointer and strings.

#### **UNIT-5 PROGRAMMING WITH C : PART - C**

Structure and Union, Declaring and using Structure, Structure initialization, Structure within Structure, Operations of Structures, Array of Structure, Array within Structure, Creating user defined data type, pointer to Structure and function. Union, difference between Union and Structure, Operations on Union, Scope of Union.

Dynamic memory allocation. Library function for Dynamic memory allocation, Dynamic Multi-Dimensional arrays, Self-referential structure. File:- Introduction, Structure, Filehandling, Functions file types, Unbuffered and buffered file Error handling. Low level five Input-Output.

#### **TEXT BOOKS:**

- |                            |   |
|----------------------------|---|
| 1. PC Software made Simple | - R.K. Taxali                                     |
| 2. - Let us C              | - Yashwant Kanitkar                               |
| 3. Microsoft Office        | - Ginni Courter, Annotte Marquis, BPB Publication |

#### **REFERENCE:**

- |                             |                                      |
|-----------------------------|--------------------------------------|
| 1. Programming with C       | - SchAum's Series (Tata Mcgraw Hill) |
| 2. Programming with C       | - K.R. VENIUGOPAL, SUDDEP PRASAD     |
| 3. Computer Today           | - Donald H. Sanders                  |
| 4. Fundamentals of Computer | - V. Rajafaman                       |



**PRACTICALWORK:**

1. The practical exercises should be done to understand the working of DOS, WINDOWS & also to see the various features of existing versions of Windows OS, (eg. Windows 95, Windows 98, Windows 2000).
2. The sufficient practical work should be done for understanding the topics of Unit-II.
3. At, least Five programs on each unit from Unit III to Unit V be prepared.
4. All practical work should be prepared in form of printouts,& be evaluated, while practical examination.

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## **ELECTRONICS EQUIPMENT MAINTENANCE**

### **PAPER - I**

### **PRINCIPLES OF ELECTRONICS**

**(paper code - 0809)**

**UNIT-1** General information : Symbol, colour code, types (Such as carbon, metal film, thin-film thick-film, wire-wound), Variable resistors potentiometers (logarithmic linear multi-turn wire wound rheostat).

Physical properties : Temperature dependence (Thermistor), Light Dependence (LDR),

Voltage Dependence (VDR). technical specification wattage and working voltages. Methods of measurement of resistance: very low to very high values.

**INDUCTORS** : General Information: symbol, Types such as air core, iron core, ferrite core, choking inductors (Coil), frequency response of an inductor.

Method of measurement of inductances: using universal bridges design and fabrication rules.

**CAPACITORS** : General information : symbol, colour code, types of capacitors such as

Air, paper, Electrolytic, Mica, Tantalum Polystyrene, fixed and variable capacitors. Measurement of Capacitance: universal bridge. application areas.

**BATTERIES** : Dry Cells, Lead-Acid Accumulators, Nickel Cadmium cells, standard cells, principles, Specifications.

**FUSES** : Fast and Slow Fuses, Pilot Lamps.

**PCB** : Types of PCB, layout techniques, cables and connectors for PCB

**UNIT-2 TRANSFORMERS**: General information- principle, types of transformer such as single phase, auto mains and isolation transformers. Frequency dependence of transformer theory. (Audio, IF and RF), Design of mains transformers and CVT.

**RELAYS** : General information: symbol, types of relays, such as reed electromagnet. Specifications, rating, application areas.

**MICROPHONES AND LOUDSPEAKERS** : General information: frequency response, input and output Impedance, power rating, directionality (omni and uni-directional). Application areas.

**TRANSDUCERS** : Commonly used transducers, LDR., thermistors thermocouples, photodiodes, photo transistors, IR detectors LDR.

**UNIT-3 SWITCHES, CABLE AND CONNECTORS :** Spdl, dpdl, band switches, touch switches, thumpwheel switches, rmicro switches, specifications, application areas.

**NETWORK THEOREMS :** Kirchoffs current and voltage law, -maximurr. power transfer,

**THEOREMT :** bevenins theorem, norton's theorem, super position theorem.

**LCR AND WAVESHAPING CIRCLITS :** Serial and parallal response, idea of black Nix., qwivalent circuits. Idea of two terminal and two part network, eqi&alent cirowits. Integra-tion, differer lation using R.C. circuits, *chpping clampaig*.

**UNIT-4 NUMBER SYSTEMS :** Introduction to decimal bmiazy, octal floca decial, number system interconversions of decimals binary and BCD number. Binary arithmetic and Boolean algebr& Boolean axiom, D Morgan's theorms-statement vanfication and applications.

**LOGIC GATES :** Posifive and Negative logic, different logic gate, such as AND, OR NOT, NAI, NOF, EXOR, symbol and truth tables. Inverting a non-inverting suffers.

**LOGIC.FAMILIES :** TTL, ECL & CMOS parameters like power dissipation, speed, sup-ply requirements, logic level, fan in, fan out noise half addar, full addar, half subtulor.

**UNIT-5 COMBINATIONAL CIRCUITS :** Encioder-decoder sequenfiat circuits, flip flops (As,K,,D,I,N,S) -shift, registers, counte% Semiconductors memory.

**PAPER - II**  
**ELECTRONIC DEVICES, COMPONENTS & ASSEMBLIES**  
**(paper code - 0810)**

**UNIT-1 INTRODUCTION- TO SEMI CONDUCTORS**

**ENERGY BAND DIAGRAM:** conductors, semiconductor, insulation, intrinsic and extrinsic semiconductors (P.N. type), diffused junctions, depletion layer, barrier potential.

**JUNCTION DIODES :** Rectifying diode, forward and reverse bias characteristics, switching diode, varactor diode, photo diode. light emitting diode, IR sources and detector optical isolators, Zener diode, Tunnel diode, tunnel diode.

**BIPOLAR JUNCTION TRANSISTORS :** Basic working principle (qualitative), characteristics, Basic configurations and biasing. Operating point, load line, biasing for stabilization of operating point.

**UNIT-2 JFET & MOSFET:** Basic working principle (qualitative), characteristics  
Pinch-off voltage,

**UNI JUNCTION TRANSISTORS :** Basic working principle (qualitative), characteristics applications, as a switch.

**POWER CONTROL DEVICES :** Four layer diode (PNPN), Silicon controlled rectifier (SCR) triac, diac, principle & characteristics.

**AMPLIFIERS :** Different terms used in amplifiers, such as signal source, input output, voltage and current gain power gain, - decibel, input and output impedance.

Classification according to the frequency response, RC coupled, class A common emitter Amplifier, Introduction to the class & operation

**FEED BACK IN AMPLIFIER :** Effect of negative feedback on amplifier performance.

**UNIT-3 POWER AMPLIFIER :** Transformer coupled equivalent circuit only in brief, class A, class B. class AB and class C the constant power hyperbola, the AC load line input and output considerations, determination of Non-linear distortion.

**PUSH-PULL AMPLIFIERS :** Phase splitter circuits, complementary push-pull, thermal runaway, Heat sinks.

Class B and C resonant load amplifiers, graphical class C analysis, **resonant** load requirements.



**OPERATIONAL AMPLIFIER :**

Basic, idea of an OPAMP with black box concept inverting and noninverting inputs, virtual ground

Parameters such as input impedance, output impedance, open loop gain, measurements of parameters.

Qualitative description of OPAMP as inverting and non inverting amplifier, summing and difference amplifier, comparator and linear integrators, instrumentation amplifier.

**UNIT-4 OSCILLATORS :** Positive feedback, Barkhausen criteria, phase shift oscillators, Wein bridge oscillators Tuned oscillators, Hartley, Colpitts oscillators, crystal oscillator.

**POWER SUPPLIES :** Regulated power supply, Zener regulated power supply series and shunt regulated power supply, block diagram of IC 723, regulated supply of IC 723.

Three terminal ICs power supply. Study of power supply. w.r. to variation of load and input voltage.

**SWITCHED MODE POWER SUPPLY :** Design principle, and application. **IC 555 :** Operations and applications.

**UNIT-5 MODULATION :** AM and FM : Principles, modulation, index, modulation, bandwidth, balanced modulator,

**DEMODULATION :** Am and Fm detectors diode detectors, ratio detector, balanced de-modulator'.

Introduction to communication systems, basic principles and operation of communication system.

**ELECTRONICS**  
**PAPER - I**  
**ELECTRON DEVICES & PASSIVE CIRCUITS**  
**(paper code - 0807)**

**M.M. 50**

**UNIT-1** Physic of semiconductors : Basic idea of crystal structure and energy bands, simple idea of effective mass, carrier concentration at normal equilibrium in an intrinsic semi-conductor, Fermi level for intrinsic semiconductor. Donors and acceptors, Physical picture of electronic and holes as majority carriers, dependence of Fermi level on donor and acceptor concentration, Law of mass action ( $n_p \cdot p_p = N_i^2$ ).

**UNIT-2** Basic derivation of the relationship between carrier concentration mobility and electron charge from Ohm's Law, idea of drift and diffusion, simple idea of Hall effect.

PN junction, Barrier formation, current components in equilibrium under open circuit, derivation of barrier potential and current voltage characteristics, the resistance of p-n junction diode and its variation with biasing, definition of transition capacitance, capacitance voltage relationship for an abrupt p.n. junction diode.

Basic idea and working of a varactor diode, Solar, cell, LED, Schottky diode, tunnel diode, Zener diode and qualitative mechanism of breakdown.

**UNIT-3** PNP and NPN transistors (Eber-Moll Model), definition of alpha and beta and derivation of relationship between them, basic idea of junction capacitance.

The construction and working of JEET, the idea of channel width, field dependent mobility showing current dependence of voltage, Physical explanation of different regions of I-V curves, various parameters of JEET.

**UNIT-4** MOS Devices, Basic structure and energy level diagram, definition of work function, electron affinity, surface potential and difference between intrinsic Fermi level and Fermi level of doped semiconductor, Physical explanation of the formation of accumulation, depletion and inversion regions under an external bias, the idea of band bending (assume that  $E_f$  remains fixed).

Basic construction of MOSFET and its working Physical explanation of the characteristics curve enhancement and depletion modes, MOSFET Parameters.

**UNIT-5** Basic idea of the impedance of L, C and R, representation of L and C in presence of loss (non ideal). Transformer and its equivalent circuit, mutual inductance, qualitative idea of magnetic core, Qualitative idea of Steady State and transient response. Network analysis (resistive and reactive), Network definition, loop and nodal analysis, principle of duality, reduction of complicated network, T and Pi form, conversion between T and Pi sections, superposition theorems, Norton's theorem, maximum power transfer theorem, Definition of Z, Y, H, G, Transmission (A, B, C,D parameters) for two port networks, inter-relationship of these parameters.

**PAPER - II**  
**LINEAR ACTIVE CIRCUITS**  
**(paper code - 0808)**

**M.M. 50**

**UNIT-1** P-N Junction diode characteristic curves, static and dynamic resistance of a diode, idea of positive, negative biased resistance of a diode, idea of positive, negative biased and combination clipping circuits, Avalanche breakdown and Zener effect, half wave and full wave rectifiers and bridge rectifiers, ripple factor and power conversion efficiency for the half wave and full wave rectifiers, use of Zener diode in power supplies, voltage regulation, filter (series inductor, shunt capacitor, L-C and Pi section filters).

**UNIT-2** Characteristic curves of bipolar transistors, determination of load line (static), active, Cut off and saturation regions, dynamic load lines.

Biasing (fixed and self) of a transistor circuit, thermal instability of bias, transfer curves showing dependence of  $I_E$  on  $V_{BE}$ ,  $I_{C O}$  and  $\beta$ ,  $I_{C O}$  and  $V_{BE}$ , derivation of stability factor  $S$ ,  $S'$  and  $S''$ .

**UNIT-3** The black box idea of CE, CB and CC transistor circuit as a two port network, small signal active circuit, hybrid model of a CE transistor circuit and its  $g_m$  equivalent, similarity in the small signal amplifiers using JEET and BJT, derivation of voltage and current gains, input impedance and output impedance RC coupled amplifier and derivation of half power points for its frequency response, idea of bandwidth.

**UNIT-4** Parallel resonant circuit, its quality factor and frequency response, basic circuits for tuned amplifiers, equivalent circuit of a single tuned transistor amplifier and determination of its gain and bandwidth (for CE case), idea of cascading of tuned amplifiers, Class A, Class B and Class C amplifiers, Power amplifiers, analysis and design considerations of push pull amplifiers.

**UNIT-5** Feedback in amplifiers, advantage of negative feedback in amplifiers, voltage and current feedback transistor amplifiers, positive feedback, Barkhausen criterion for self-sustained oscillations, Analysis of LC and Phase shift oscillators, Working of Hartley, Colpitt and Weinbridge Oscillators.

Operational amplifiers : requirements of an ideal Op-Amp, Op-Amp basic idea of common mode gain, difference gain, common mode rejection ratio, application of Op-Amp as inverting and non inverting amplifier, adder, subtractor, integrator and differentiator.

## **PRACTICALS**

**M.M. 50**

A student is required to do at least 15 experiments in an academic year. The scheme of Practical Examination will be as follows :-

(i) One Experiment	3 Hours
(i) Marks	
Experiment	30
Viva-Voce	10
Sessional	10
	50

### **LIST OF PRACTICALS :**

Familiarisation with electronic components :-

I. Passive Circuit elements.

II. Active circuit elements including IC.

Familiarisation with basic electronic instruments, Power supply, signal generator, LCR bridge, CRO, frequency meter, multimeters, VTVM, EVM.

- 1) Determination of energy band-gap of a diode.
- 2) Verification of Norton's Theorem and Superposition Theorem.
- 3) Measurement of capacitance and resistance combinations using LCR bridge.
- 4) Frequency and phase measurement with CRO.
- 5) Verification of network theorems (Thevenin's and Max. power transfer theorem).
- 6) Study of simple RC network.
- 7) Study of series and parallel resonance circuits.
- 8) Study of diode, (including Zener diode) characteristics.
- 9) Study of Transistor characteristics.
- 10) Study of simple power supply.
- 11) Study of RC coupled amplifier.
- 12) Study of transistor bias stability.
- 13) Study of LC oscillator.
- 14) Study of emitter follower (Measurement of input, output impedance and gain).
- 15) Study of transistor phase shift Oscillator.
- 16) Study of FET characteristics.
- 17) Study of the clamping and clipping circuits.
- 18) Study of IC Op-AMP applications, viz. Integrator, Differentiator, Adder, Subtractor.

- 19) Study of biasing of a BJT-Designing of potential divider arrangement for given point condition. Measure the dc voltage at different points.
- 20) Study of frequency response of a single CE amplifier (Make your own circuit).

**Note :** 1. Out of above mentioned twenty experiments at least fifteen experiments should be done, use of bread board and use of soldering is expected for at least four experiments.

2. Other experiments of equal standard may also be set.

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## INFORMATION TECHNOLOGY

Elective/Core Subject Information Technology

Eligibility for B.Sc. I, II & III subjects

First Year

Theory

Paper-I Fundamental of I.T. and PC software : 50 Marks (I+II=100)

Paper-II Programming concept using C Language : 50 Marks (I+II+II=150)

Practical : 50 Marks

### PAPER - I

#### FUNDAMENTAL OF I.T. COMPUTERS & PC SOFTWARE

(paper code - 0824)

**UNIT-1** Introduction to computer Von-Neumann model general architecture of computer input and output devices. Application of computers.

**UNIT-2** Fundamental of DOS version of DOS booting process internal and external commands creating and executing batch files, files and directories creating text files.

**UNIT-3** Introduction to windows features of windows hardware requirement for running various versions of windows. New installation and upgradation. Origin of windows, part of windows screen, types and anatomy of windows, using program manager, creating and using groups, using file manager Accessories.

**UNIT-4** Introduction word processing (MS-WORD) advantage of word processing introduction and installation. Editing a file Using paragraph styles. Newspaper style columns using macros, Advanced word processing, Headers and footers, Finding text setting up printer. Mailmerge and other application Mathematical calculator. Table handling.

**UNIT-5** Introduction to spreadsheet (MS-EXCEL) Definition and advantage of electronic worksheet, working on spread sheets, Range and related operations Setting saving and retrieving worksheets, inserting deleting coping and moving of data cells inserting and deleting rows and column protecting cells printing a worksheet erasing a worksheet in Graphs creation types of graphs creating a chart sheet 3D. Columns charts moving and changing the size of chart printing the chart.

#### BOOK RECOMMENDED :

1. PC Software by Ravi Taxali
2. Computer Fundamental by P. K. Sinha
3. Computer Fundamental by Nagpal.



**PAPER - II**  
**PROGRAMMING CONCEPT USING C LANGUAGE**  
**(paper code - 0825)**

**UNIT-1** History of programming Language Low Level Middle Level and High Level Languages. Programming Development Techniques using flow charts algorithms Compiler and Interpreters.

**UNIT-2** Introduction to C Programming Structure and C Compiler.

Data representation : simple data types like real integer character etc.

Program, Statements and Header files Simple Input Output Statements in C Running simple C Programs.

Primitive data types in C++ char integer Float Double Long Double Void etc.

**UNIT-3** Operator and expression Arithmetic Operators Assignments operator increment and decrement operator relational and boolean operators Mixing of different data types and operators for forming expressions.

Control Structures using if, if else, Nested If else Switch statement Using of loops : For loop situations, while loop situation Nested loops.

**UNIT-4** User defined functions (Simple Call by value and recursion)

The array data types 1 dimensional and multi dimensional the array of character constructing strings and string manipulation, data structures, Nested structures and union.

**UNIT-5** Introduction to pointers, Use of pointer in function (call by reference).

Pointer in Array, Structures Pointers and file handlings.

**BOOK RECOMMENDED :**

1. Let us C- y. Kanetkar
2. Ansi C- Balaguruswami
3. Programming in C- Gotrfeld (Schaum Series)

**PRACTICAL**

**M.M. : 50**





## INDUSTRIAL MICROBIOLOGY

Paper	Title	Time	Marks
First	General Microbiology, Tools and Techniques	3 hrs.	50
Second	Molecular Biology, Biochemistry and Microbial Genetics	3 hrs.	50
	PRACTICAL (including sessionals)	4 hrs.	50 (40+10)

### PAPER -

#### GENERAL MICROBIOLOGY, TOOLS AND TECHNIQUES

M.M.50

#### I (paper code - 0826)

- UNIT-1** History and development of Industrial Microbiology. Contributions of Antony van Leeuwenhoek, Louis Pasteur, Robert Koch, Edward Jenner, Waksman, Alexander Fleming.
- UNIT-2** General characteristics and structure of Bacteria, Cyanobacteria, Fungi, Actinomycetes, Mycoplasmas, Viruses.
- UNIT-3** Microscopy - Invention of Microscope, Compound microscope, Dark field, Fluorescent, Phase contrast and Electron microscope.
- UNIT-4** Method of sterilization, culture media and isolation techniques. Methods of preservation of microbial cultures.
- UNIT-5** Basic principles and usage - pH meter, Densitometer, Colorimeter, Spectrophotometry, Fluorimetry, Centrifugation - Principles and applications. Usage of Fermentation.

### PRACTICALS

The Practical works will, in general be based on the prescribed syllabus in theory and the candidates will be required to show the knowledge of the following :

1. Preparation of media, autoclaving and sterilization of glassware.
2. Isolation of Phytopathogens.
3. Isolation of Microorganisms from soil and water : Bacteria, Fungi, and Algae.
4. Purification of microbial cultures.
5. Camera Lucida Drawing.
6. Standard Plate count.
7. Hemacytometer.
8. Chromatographic techniques : Separation of amino acids by paper and thin layer chromatography.
9. Measurement of pH of fruit juice.
10. Estimation of carbohydrate by colorimeter.

#### BOOK RECOMMENDED :

1. General Microbiology, Vol. II by Power and Daganawala.
2. Microbiology by Pelczar, Reid and Chan.
3. General Microbiology by Davis and Harper.
4. A Treatise on Media and Methods Used in Bacteriological Techniques by V. Iswaran.
5. Introductory Mycology by C.J. Alexopoulos & Mims.
6. Microbiology by P.D. Sharma.

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DAG 22/12/12

**PAPER - II**  
**MOLECULAR BIOLOGY, BIOCHEMISTRY AND MICROBIAL GENETICS**  
**(paper code - 0827)**

**M.M. 50**

- UNIT-1** Nucleic Acids - Structure of DNA and RNA(s), Replication of DNA, Synthesis of RNAs and their types, Genetic code, Concept of genes.
- UNIT-2** Molecular Biology - Translation and Protein Synthesis, Operon Concept, CAMP CAP (Catabolic activator protein), Gene expression in Prokaryotes, Lac-Operon. Gene regulation in Eukaryotes (Britton-Davison Model of Gene Expression).
- UNIT-3** Genetic recombination in Bacteria - Transformation, Transduction and conjugation, Genetic Mapping, Extrachromosomal genetic material, Plasmids, Cosmids, Transposons, Overlapping genes, Silent genes and their evolutionary significance. Mutation -Molecular mechanism of mutation, Chemical and Physical Mutagens, Repair of Mutation Damage.
- UNIT-4** Biochemistry - Classification of carbohydrates, Chemical structure and property of starch, Cellulose, Glycogen, Synthesis of Purines & Pyrimidine. Lipids - Saturated and unsaturated fatty acids, Biosynthesis of fatty acids, Distribution and functions of lipids in microorganisms, Degradation of lipids by  $\alpha$ -oxidation and  $\omega$ -oxidation, Lipid peroxidation.
- UNIT-5** Enzymes - Classification. Co-enzymes, Cofactors, Mechanism of enzyme action, Competitive and non-competitive inhibition. Allosteric regulations of enzymes, isoenzymes, factors contributing to catalytic efficiency of enzymes.

Amino acids - Classification of essential amino acids based on polarity. Acid-base properties and solubilities. Amino acid sequencing of proteins; Primary, Secondary and Tertiary structure.

**PRACTICAL**

The Practical work will, in general, be based on the syllabus prescribed in theory and the candidates will be required to show the knowledge of the following -

1. Isolation of antibiotic resistant bacteria.
2. Estimation of alkaline phosphatase activity.
3. Measurement of  $\alpha$ -amylase activity in extra-cellular fraction of microbial cultures.
4. Estimation of glycogen in bacterial cells.
5. Measurement of cellulase activity by Viscometric technique.
6. Determination of cellulase and amylase activity by reducing sugar assay test.
7. Isolation of DNA.



**BOOK RECOMMENDED :**

1. General Microbiology, Vol. 1 by Power & Dagainawala.
2. Bicrobial Biochemistry by Moat.
3. Principles of Biochemistry by Lehninger.
4. Outline of Biochemistry by Cohn and Stumph.
5. Biochemistry by Harper.
6. Text book of Biochemistry by Rama Rao.
7. Text book of Biochemistry by O.P. Agrawal.

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04.9  
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**BIO CHEMISTRY**  
**PAPER-I**  
**BIOMOLECULES**  
**(paper code - 0832)**

**M.M. 50**

**UNIT-I**

Introduction to Biochemistry, water as a biological solvent, weak acids and bases, pH, buffers, Henderson-Hasselbalch equation, physiological buffers, fitness of the aqueous environment for living organisms.

**CARBOHYDRATES**

Structure of monosaccharides. Stereoisomerism and optical isomerism of sugars.

Reactions of aldehyde and ketone groups. Ring structure and anomeric forms, mutarotation. Reactions of sugar due to hydroxyl groups. Important derivatives of monosaccharides, disaccharides and trisaccharides (structure, occurrence and functions of important ones). Structure occurrence and biological importance of monosaccharides, oligosaccharides and polysaccharides e.g. Cellulose, Chitin, agar, algenic acids, pectins, proteoglycans, sialic acids, blood group polysaccharides, glycogen and starch. Bacterial cell wall polysaccharides etc. Glycoproteins.

**UNIT-II Lipids**

Definition and classification. Fatty acids : introduction, classification, nomenclature, structure and properties of saturated and unsaturated fatty acids. Essential fatty acids, prostaglandins. Triacylglycerols: nomenclature, physical properties. chemical properties and characterization of fats - hydrolysis, saponification value, rancidity of fats,

Reichert-Meissel number and reaction of glycerol. Biological significance of fats. Glycerophospholipids (lecithins, lysolecithins, cephalins, phosphatidyl serine, phos-phatidyl inositol, plasmalogens), sphingomyelins, glycolipids - cerebroside, ganglio-side. Properties and functions of phospholipids, isoprenoids and sterols.

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### UNIT-III Proteins

Introduction, classification based on solubility, shape, composition and functions.

Amino acids: common structural features, stereo-isomerism and RS system of designating optical isomers, classification and chemical properties, titration of amino acids, separation of amino acids. Essential amino acids.

Peptides: structure of peptide bond, chemical synthesis of polypeptides - protection and deprotection of N-terminal, and C-terminal ends and functional groups in the side-chains, formation of peptide bonds, condensing agents, strategy of chemical synthesis, Merrifield solid-phase peptides synthesis. Determination of the amino acid sequence of a polypeptide chain, specific chemical and enzymatic cleavage of a polypeptide chains and separation of peptides. Protein structure: levels of structure in protein architecture, primary structure of proteins, secondary structure of proteins helix and pleated sheets, tertiary structure of proteins, forces stabilizing the tertiary structure and quaternary structure of proteins. Denaturation and renaturation of proteins. Behaviour of proteins in solutions, salting in and salting out of proteins.

Structure and biological functions of fibrous proteins (keratins, collagen and elastin), globular proteins (hemoglobin, myoglobin), lipoproteins, metalloproteins, glycoproteins and nucleoproteins.

**UNIT-IV** Nature of genetic material: evidence that DNA is the genetic material, Composition of RNA and DNA, generalized structural plan of nucleic acids, nomenclature used in writing structure of nucleic acids, features of DNA double helix. Denaturation and annealing of DNA, structure and roles of different types of RNA Size of DNA in procaryotic and eucaryotic cells, central dogma of molecular biology, Gene, Genome, chromosome.

### UNIT-V Porphyrins

Porphyrins: Porphyrin nucleus and classification of porphyrins. important Metalloporphyrins occurring in nature. Detection of porphyrins spectrophotometrically and by fluorescence. Bile pigments - chemical nature and their physiological significance.

Handwritten signatures and dates of six individuals, likely students or faculty, arranged horizontally. The signatures are in blue ink, and the dates are written below them. The dates are 24.7.2017, 24.7.17, 24.7.17, 24.7.17, 24.7.17, and 24.7.17.

## PAPER - II

(paper code - 0833)

### BIOPHYSICAL AND BIOCHEMICAL TECHNIQUES

M.M. 50

#### UNIT-I Concepts of Bioenergetics

Principles of thermodynamics and their applications in biochemistry - introduction, thermodynamic system, thermodynamic state functions, first and second laws of thermodynamics, concept of free energy, standard free energy, determination of  $\Delta G$  for a reaction, relation between equilibrium constant and standard free energy change, biological standard state and standard free energy change in coupled reactions.

Biological oxidation-reduction reactions - introduction, redox potentials, relation between standard reduction potentials and free energy change (derivations and numericals included).

High-energy phosphate compounds - introduction, phosphate  $^{32}\text{P}$ ,  $^{35}\text{S}$ ,  $^{14}\text{C}$  and  $^3\text{H}$  group transfers-free energy of hydrolysis of ATP and sugar phosphates along with reasons for high  $\Delta G$ .

#### UNIT-II Hydrodynamic Methods

Sedimentation - sedimentation velocity, preparative and analytical ultracentrifugation techniques. determination of molecular weight by hydrodynamic methods (derivations excluded and numericals included).

##### Measurement of pH

Principles of glass and reference electrodes, types of electrodes, complications of pH measurement (dependence of pH on ionic strength, electrode contamination and sodium error) and use of pH paper.

#### UNIT-III Radioisotopic Techniques

Types of radioisotopes used in Biochemistry, units of radioactivity measurements, techniques used to measure radioactivity (gas ionization and liquid scintillation counting), nuclear emulsions used in biological studies (pre-mounted, liquid and stripping), isotopes commonly used in biochemical studies-Autoradiography. Biological hazards of radiation and safety measures in handling radioisotopes. Biological application.

#### UNIT-IV Chromatography

General principles and applications of :

1. Adsorption chromatography
2. Ion-exchange chromatography
3. Thin-layer chromatography
4. Molecular-sieve chromatography
5. Hydrophobic chromatography
6. Gas-liquid chromatography
7. HPLC
8. Affinity chromatography
9. Paper chromatography

  
The bottom of the page contains five handwritten signatures and dates, likely from examiners. The dates are 24.7.2017, 24.7.17, 24/7/17, 24/7/17, and 24.7.17.

### **Electrophoresis**

Basic principles of agarose electrophoresis, PAGE and SDS-PAGE, Two-dimensional electrophoresis, its importance. Isoelectrofocussing.

### **UNIT-V Spectroscopic Techniques**

Beer-Lambert law, light absorption and its transmittance, determination and application of extinction coefficient, application of visible and UV spectroscopic techniques (structure elucidation and numericals excluded).  
Principle and application of NMR, ESR, Mass spectroscopy. Fluorescent and emission spectroscopy.

### **Immunological Techniques**

Immunodiffusion, immunoelectrophoresis, radioimmunoassay, ELISA, immunofluorescence.

### **PRACTICAL**

**M.M. 50**

1. Preparation of standard buffers and determination of pH of a solution.
2. Qualitative tests for :
  - a. Carbohydrates
  - b. Proteins and amino acids
  - c. Lipids
3. Determination of saponification value and iodine number of fats.
4. Estimation of ascorbic acid.
5. Titration curve for amino acids and determination of pK value;
6. Verification of Beer-Lambert's law.
7. Estimation of
  - i) Carbohydrate by anthrone method.
  - ii) Blood glucose by the methods (a) Folin-Wu, (b) Nelson-Somogyi
8. Estimation of amino acids by ninhydrin method.
9. Isolation and assay of glycogen from rat liver.
10.
  - i) Extraction of total lipids by Folch method
  - ii) Estimations of food adulterant.
11. Estimation of DNA and RNA.
12. Separation of sugars using paper chromatography.

  
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**BIOTECHNOLOGY**  
**PAPER – I**  
**BIOCHEMISTRY, MATHS & COMPUTERS**

- UNIT-1** 1. Biochemistry : Introduction scope Development, Definition, aims and nature.
2. Carbohydrates : Structure, Classification and function of mono, Oligo & polysaccharides .
  3. Proteins - Introduction, structure, classification, physical & chemical properties.
  4. Amino acids : Classification, Essential & non-essential, General properties.
- UNIT-2** 1. Lipids : Structure, Classification, chemical properties.
2. Enzymes : Introduction, Definition co-enzymes & Cofactors, Nomenclature. Classification, mechanism of enzyme action factors affecting the enzymes action.
  3. Hormones : Introduction, Definition, Structure, Classification, Function and application of plant hormone-Auxin and Gibberellins, Animal hormone-Pancreas and Thyroid.
- UNIT-3** 1. Biological Oxidation : Oxidation & Reduction constituents of electron transport chain, mechanism of oxidation in electron transport chain.
2. Carbohydrate metabolism - glycogenesis glyconeogenesis, glycogenolysis Glycolysis, Krebs cycle.
  3. Fat metabolism - Introduction, metabolism of glycerol fatty acid oxidation, conversion of fats into carbohydrates.
  4. Protein metabolism - Introduction, conversion of amino acids, decarboxylation. Deamination of amino acids formation of Urea.
  5. Enzyme technology - Introduction, Comparison between enzyme and catalysis production of enzyme, chemical energetics, enzyme kinetics, enzyme Immobilization use of enzyme solution, Application of Immobilized enzyme, Enzyme reactor, biosensors enzyme engineering.
- UNIT-4** 1. Set theory and its properties linear equation.
2. The binomial theorem, Logarithm.
  3. Simple Differentiation and Integration
  4. Probability Calculation, Methods of Sampling.
  5. Measurements of central tendencies and deviations.
- UNIT-5** 1. Computers - General introduction, Organization of computer, digital and analogue computers, computer algorithm.
2. Computer in on line monitoring and automation.
  3. Application of computer in co-ordination of solute concentration, pH and temperature etc. of a fermenter in operation.

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**List of Books :**

1. Nelson and Cox-Principles of Biochemistry, Fourth Edition (2005)
2. Albert L. Lehninger - Biochemistry, Second Edition (2005)
3. Todd and Howards Mason - Text book of Biochemistry, Fourth Edition (2004)
4. Lubert Stryer and Berg - Biochemistry, Fifth Edition (2004)
5. E. Balaguruswamy - Programming in BASIC
6. Diana Rain, Marni Ayers Barby - (2006) Textbook on Q level Programming. 4th Edition.
7. Karl Schwartz : (2006) Guide of Micro Soft. Marina Raod, 4th Edition.

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Sampath 28.7.12  
Ravi 28.7.12  
Ravi 28.7.12  
Ravi 28.7.12

**PAPER-II**  
**CELL BIOLOGY, GENETICS AND MICROBIOLOGY**

- UNIT-1**
1. Cell theory and the cell : Idea of cell theory, shape and size.
  2. Cell wall and plasma membrane.
  3. The nucleus – significance structure nucleolus  
Chromosomes – Morphology, chemical composition, Ultra structure & special types of chromosomes.
  4. Mitochondria – Morphology, ultra structure, chemical composition origin & functions.
  5. Plastids – Chloroplasts, ultra structure & functions
- UNIT-2**
1. Cytoskeleton : Microtubules – Structure, chemical composition, microtubules in cilia and flagella and role in cell division, Microfilaments in muscle cells and muscle contraction and in non-muscle cell.
  2. Cytoplasm – Structure and functions of endoplasmic reticulum Ribosome's.
  3. Golgi complex, Lysosomes, Centrosome.
  4. Cell division-Amitosis, motpsos Meiosis & Comparison with Mitosis.
  5. Mendel's laws of Inheritance.
  6. Linkage and crossing over.
- UNIT-3**
1. Structural changes in chromosomes  
Deletion, Duplication, Translocation, Inversion etc.
  2. Numerical changes in chromosomes  
Aneuploidy, Euploidy (Monoploidy and polyploidy and its importance).
  3. Mutation – History, physical and chemical mutagens, Detection of mutation in Drosophila and plants.
  4. Human Genetics
  5. Structure and synthesis of Nucleic acids
- UNIT-4**
1. Microbiology - Introduction and History
  2. Bacteria - Size, Shape & Structure
  3. Classification : Bargey's manual.
  4. Microbiol Growth & nutrition.
  5. Reproduction : Conjugation, Transduction and Transformation.
  6. Genetics of Bacteria, Plasmids, transposons and retroposons.
- UNIT-5**
1. Viruses – Basic features, structure, classification, multiplication, Bacteriophages (morphology, life cycle, infection and medicinal importance)
  2. Mycoplasma – History, classification, structure reproduction & Diseases.
  3. Food and Dairy Microbiology – Food-production (Dairy, Alcoholic) Food spoilage & food preservation.
  4. Soil Microbiology – Soil & Micro – organisms, Biogeochemical cycles (Carbon nitrogen, sulphur & phosphorous Cycle).

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**List of Books :**

1. C.B. Power- Cell biology, First Edition (2005), Himalaya Publishing House.
2. Gereld Karp - Dell and molecular biology, 4th Edition (2005)
3. Lewis J. Klein Smith and Valerie M.Kish - Principles of cell and molecular biology-Third Edition (2002)
4. P.K. Gupta - Cell and molecular biology, Second Edition (2003), Restogi publications.
5. Tortora, Funke and Case - Microbiology, An introduction, sixth Edition (1995), Benjamin/ Cummings Publishing Company.
6. Prescott, Harley and Klein - Microbiology, Third Edition, Wm. C. Brown Publishers (1996).
7. P. Chakraoborthy - Textbook of microbiology, Second Edition (2007).
8. C.B., Oowar - Cell biology, Third Edition (2005) Himalaya Publishing Hosue.
9. S.S. Purohit - Microbiology : Fundamentals and Applications, 6th Edition (2004)
10. R.C. Dubey and D.K. Maheshwari : Practical Microbiology. S.Chand Publication.
11. R.C. Dubey and D.K. Maheshwari Microbiology.
12. B.R. Vashishita, A.K. Sinha and V.P. Singh Botany for Degree students. Part I. S.chand Co. Ltd. New Delhi.
13. B.R. Vashishita, A.K. Sinha and V.P. Singh Botany for Degree students. part II. S.Chand Co. Ltd. New Delhi.
14. C.J. Alexopoulos : Introductry Mycology. Wiley Eastern Limited.
15. M.S. Ghemawat, J.N. Kapoor, H.S. Narayana : A Textbook of Algae, Ramesh Book Depot, Jaipur.
16. Bendr4e and Kumar : A textbook of Practical Botany - I. Rastogi Publications.
17. Prescott, Harley and Klein - Microbiology. Third Edition. Wm. C. Brown.

**PRACTICALS****MICROBIOLOGY AND BIOCHEMICAL TECHNIQUES**

- (1) Laboratory rules, Tools, Equipment and Other requirements in Microbiological laboratory.
- (2) Micrometry – Use of ocular & stage micrometrer
- (3) Counting of bacteria by counting chamber, by plate count.
- (4) Microscopic examination of living micro organisms
  - (a) Temporary wet mount
  - (b) Hanging drop technique
- (5) Smears and staining methods
  - (a) Preparation of bacterial smear
  - (b) Simple staining of bacteria
  - (c) Acid fast staining
  - (d) Negative & Positive gram staining

*[Handwritten signatures and dates at the bottom of the page]*

- (6) Preparation of media and cultivation techniques
  - (a) Basic liquid media (broth)
  - (b) Basic Solid media, (agar slants and deep tubes)
  - (c) Demonstration of selective and differential media
  - (d) Isolation and enumeration of micro organisms
  - (e) Isolation from air.
  - (f) Isolation from Soil.
- (7) Methods of obtaining pure cultures
  - (a) Streak plate method
  - (b) Pure plate method
  - (c) Spread plate method
  - (d) Broth cultures
- (8) Growth & Biochemical techniques
  - (a) Determination of bacterial growth
  - (b) Amylase production test
  - (c) Cellulose production test
  - (d) Estimation of Sugar in given solution
  - (e) Extraction and separation of lipids
  - (f) Estimation of proteins
  - (g) Isolation and purification of protein.
  - (h) Kinetic studies on enzymes.
  - (i) Mitosis and Meiosis
  - (j) Biostatistics : By Manual and by computer.
    - 1. Problems on chi-square test
    - 2. Problems on mean, mode and median.

### SCHEME OF PRACTICAL EXAMINATION

**Time – 4 hrs.**

**M. M. : 50**

Instrument based Experiment (Two) 5x2	:	10 Marks
Experiment based on Culture of Micro-organisms	:	10 Marks
Bacterial Growth	:	07 Marks
Biochemical techniques	:	08 Marks
Bio statistics	:	05 Marks
Viva – Voce	:	05 Marks
Record/Sessional	:	05 Marks





# दुर्ग विश्वविद्यालय, दुर्ग (छ.ग.)



पाठ्यक्रम

परीक्षा – 2017–18

बी.एससी. भाग-2  
**B.Sc. Part-2**

(Approved by Board of Studies)  
Effective from July 2017

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**REVISED ORDINANCE NO. 21**  
**BACHELOR OF SCIENCE**

1. The three year course has been broken up into three Parts. Part-I known as B.Sc. Part-I examination at the end of the first year, Part-II known as B.Sc. Part-II examination at the end of the second year and Part-III known as B.Sc. Part-III examination at the end of the third year.
2. A candidate who after passing (10+2) Higher Secondary or Intermediate examination of C.G. Board of Secondary Education Bhopal or any other Examination recognised by the University or C.G. Board of Secondary Education as equivalent thereto, has attended a regular course of study in an affiliated College or in the Teaching Department of the University for one academic year shall be eligible for appearing at the B.Sc. Part-I examination.
3. A candidate who, after passing the B.Sc.-I examination of the University or any other examination recognised by the University as equivalent thereto, has attended a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.Sc. Part-II examination.
4. A candidate who, after passing the B.Sc. Part-II examination of the University, has completed a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.Sc. Part-III examination.
5. Besides regular students, subject to their compliance with this Ordinance ex-student and non-collegiate candidates shall be permitted to offer only such subjects/papers as are taught to the regular student at any of the University Teaching Department or College.
6. Every candidate appearing in B.Sc. Part-I, Part-II and Part-III examination shall be examined in-
  - (i) Foundation Course:
  - (ii) Any one of the following combinations of three subjects:-
    1. Physics, Chemistry & Mathematics.
    2. Chemistry, Botany & Zoology.
    3. Chemistry, Physics & Geology.
    4. Chemistry, Botany & Geology.
    5. Chemistry, Zoology & Geology.
    6. Geology, Physics & Mathematics.
    7. Chemistry, Mathematics & Geology.
    8. Chemistry, Botany & Defence Studies.
    9. Chemistry, Zoology & Defence Studies.
    10. Physics, Mathematics & Defence Studies.
    11. Chemistry, Geology & Defence Studies.



12. Physics, Mathematics & Statistics
  13. Physics, Chemistry & Statistics
  14. Chemistry, Mathematics & Statistics.
  15. Chemistry, Zoology & Anthropology.
  16. Chemistry, Botany & Anthropology.
  17. Chemistry, Geology & Anthropology.
  18. Chemistry, Mathematics & Statistics.
  19. Chemistry, Anthropology & Defence Studies.
  20. Geology, Mathematics & Statistics.
  21. Mathematics, Defence Studies & Statistics
  22. Anthropology, Mathematics & Statistics
  23. Chemistry, Anthropology & Applied Statistics
  24. Zoology, Botany & Anthropology
  25. Physics, Mathematics & Electronics.
  26. Physics, Mathematics & Computer Application
  27. Chemistry, Mathematics & Computer Application
  28. Chemistry, Bio-Chemistry & Pharmacy
  29. Chemistry, Zoology & Fisheries.
  30. Chemistry, Zoology & Agriculture
  31. Chemistry, Zoology & Sericulture
  32. Chemistry, Botany & Environmental Biology
  33. Chemistry, Botany & Microbiology
  34. Chemistry, Zoology & Microbiology
  35. Chemistry, Industrial Chemistry & Mathematics
  36. Chemistry, Industrial Chemistry & Zoology
  37. Chemistry, Biochemistry, Botany
  38. Chemistry, Biochemistry, Zoology
  39. Chemistry, Biochemistry, Microbiology
  40. Chemistry, Biotechnology, Botany
  41. Chemistry, Biotechnology, Zoology
  42. Geology, Chemistry & Geography
  43. Geology, Mathematics & Geography
  44. Mathematics, Physics & Geography
  45. Chemistry, Botany & Geography
- (iii) Practical in case prescribed for core subjects.

7. Any candidate who has passed the B.Sc. examination of the University shall be allowed to present himself for examination in any of the additional subjects prescribed for the B.Sc. examination and not taken by him at the degree examination. Such candidate will have to first appear and pass the B.Sc. Part-I examination in the subjects which he proposes to offer and then the B.Sc. Part-II and Part-III examination in the same subject. Successful candidates will be given a certificate to that effect.

8. In order to pass at any part of the three year degree course examination an examinee must obtain not less than 33% of the total marks in each subject/ group of subjects. In subject/ group of subjects where both theory and practical examination are provided an examinee must pass in both theory and practical parts of the examination separately.
9. Candidate will have to pass separately at the Part-I, Part-II and Part-III examinations. No division shall be assigned on the result of the Part-I and Part-II examination. In determining the division of the final examination, total marks obtained by the examinees in their Part-I, Part-II and Part-III examination in the aggregate shall be taken in to account. Provided in case of candidate who has passed the examination through supplementary examination having failed in one subject/ group only, the total aggregate marks being carried over for determining the division shall include actual marks obtained in the subject/ group in which he appeared at the supplementary examination.
10. Successful examinee at the Part-III examination obtaining 60% or more marks shall be placed in the First Division, those obtaining less than 60% but not less than 45% marks in the Second Division and other successful examinees in the Third Division.

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## SCHEME OF EXAMINATION

Subject	Paper	Max. Marks	Total Marks	Min. Marks
C Environmental Studies		75	100	33
Fild Work		25		
<b>Foundation Course</b>				
Hindi Language		75	75	26
English Language		75	75	26

**नोट:-** प्रत्येक में से 02 (दो) प्रश्न करने होंगे । सभी प्रश्न समान अंक के होंगे ।

Three Elective Subject :

1.	Physics	I	50	100	33
		II	50		
2.	Chemistry	Practical		50	17
		I	33		
		II	33	100	33
		III	34		
3.	Mathematics	Practical		50	17
		I	50		
		II	50	150	50
		III	50		
4.	Botany	I	50	100	33
		II	50		
5.	Zoology	Practical		50	17
		I	50	100	33
		II	50		
6.	Geology	Practical		50	17
		I	50	100	33
		II	50		
7.	Statistics	Practical	50		17
		I	50	100	33
		II	50		
8.	Anthropology	Practical		50	17
		I	50	100	50
		II	50		
		Practical		50	17

Subject	Paper	Max. Marks	Total Marks	Min. Marks
Compulsory Subject–Foundation Course:				
9. Defense Studies	I	50	100	33
	II	50		
	Practical		50	17
10. MicroBiology	I	50	100	33
	II	50		
	Practical		50	17
11. Computer Sciences	I	50	100	33
	II	50		
	Practical		50	17
12. Information Technology	I	50	100	33
	II	50		
	Practical		50	17
13. Industrial Chemistry	I	34		
	II	33	100	33
	III	33		
	Practical		50	17
14. BioChemistry	I	50		
	II	50	100	33
15. BioTechnology	Practical	50	50	17
	I			
	II	50	100	33
	Practical		50	17

### USE OF CALCULATORS

The Students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986.

1. Student will bring their own Calculators.
2. Calculators will not be provided either by the University or examination centres.
3. Calculators with, memory and following variables be permitted +, -, x,  $\div$ , square, reciprocal, exponential, log, square root, trigonometric functions, sine, cosine, tangent etc. factorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.

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**आधार पाठ्यक्रम (पेपर कोड 0841)**  
**प्रश्न पत्र – प्रथम**  
**हिन्दी भाषा**

**खण्ड—क** निम्नलिखित 5 लेखकों के एक –एक निबंध पाठ्यक्रम में सम्मिलित होंगे—

- |                         |   |                          |
|-------------------------|---|--------------------------|
| 01. महात्मा गांधी       | — | सत्य और अहिंसा           |
| 02. विनोबा भावे         | — | ग्राम सेवा               |
| 03. आचार्य नरेन्द्र देव | — | युवकों का समाज में स्थान |
| 04. वासुदेव शरण अग्रवाल | — | मातृ— भूमि               |
| 05. भगवतशरण उपाध्याय    | — | हिमालय की व्युत्पत्ति    |
| 06. हरि ठाकुर           | — | डॉ. खूबचंद बघेल          |

**खण्ड—ख** हिन्दी भाषा और उसके विविध रूप

- कार्यालीन भाषा
- मीडिया की भाषा
- वित्त एवं वाणिज्य की भाषा
- मशीनी भाषा

**खण्ड—ग** अनुवाद व्यवहार : अंग्रेजी से हिन्दी में अनुवाद

हिन्दी की व्यवहारिक कोटियाँ —

रचानागत प्रयोगगत उदाहरण, संज्ञा ,सर्वनाम ,विशेषण, समास, संधि एवं संक्षिप्तियाँ, रचना एवं प्रयोगगत विवेचन।



## ENGLISH LANGUAGE

(Paper Code - 0842)

M.M. 75

The question paper for B.A./B.Sc./B.Com./B.H.Sc., English Language and cultural values shall comprise the following units :

- |  |             |
|--|-------------|
| <b>UNIT-I</b> Short answer questions to be passed by (Five short answer questions of three marks each) | 15 Marks    |
| <b>UNIT-II</b> (a) Reading comprehension of an unseen passage<br>(b) Vocabulary                        | 05 Marks    |
| <b>UNIT-III</b> Report-Writing   | 10 Marks    |
| <b>UNIT-IV</b> Expansion of an idea  | 10 Marks    |
| <b>UNIT-V</b> Grammar and Vocabulary based on the prescribed text book.                                | 20+15 Marks |

**Note :** Question on all the units shall asked from the prescribed text which will comprise specimens of popular creative/writing and the following it any

- (a) Matter & technology
  - (i) State of matter and its structure Technology (Electronics Communication, Space Science)
- (b) Our Scientists & Institutions
  - (i) Life & work of our eminent scientist Arya Bhatt. Kaard Charak Shusruta, Nagarjuna, J.C. Bose and C.V. Raman, S. Rmanujam, Homi J. Babha Birbal Sahani.
- (i) Indian Scientific Institutions (Ancient & Modern)

### Books Prescribed :

Foundation English for U.G. Second Year - Published by M.P. Hindi Granth Academy, Bhopal.

Dr. M. C. Chakraborty

Dr. S. G. Ghosh

DR. MERILY ROY

## NEW CURRICULUM OF B.SC. PART II

### CHEMISTRY

The new curriculum will comprise of three papers of 33, 33 & 34 marks each and practical work of 50 marks. The curriculum is to be completed in 180 working days as per the UGC norms & conforming to the directives of the Govt. of Chhattisgarh. The Theory papers are of 60 hrs. each duration & the practical work of 180 hrs. duration.

### PAPER - I

#### INORGANIC CHEMISTRY

(Paper Code - 0845)

M.M. 33

#### UNIT-I CHEMISTRY OF ELEMENTS OF FIRST TRANSITION SERIES

Characteristic properties of d-block elements. Properties of the elements of the first transition series, their binary compounds and complexes illustrating relative stability of their oxidation states, coordination number and geometry.

#### UNIT-II CHEMISTRY OF ELEMENTS OF SECOND & THIRD TRANSITION SERIES

General characteristics, comparative treatment with their 3d-analogues in respect of ionic radii, oxidation states, magnetic behaviour, spectral properties and stereochemistry.

#### UNIT-III A. OXIDATION AND REDUCTION

Use of redox potential data analysis of redox cycle, redox stability in water-Frost, Latimer & Pourbaix diagrams. Principles involved in the extraction of the elements.

#### B. COORDINATION COMPOUNDS

Werner's coordination theory and its experimental verification, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory of transition metal complexes.

#### UNIT-IV A. CHEMISTRY OF LANTHANIDE ELEMENTS

Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds.

#### B. CHEMISTRY OF ACTINIDES

General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from uranium, similarities between the later actinides and the later lanthanides.

*Abhinav* 24.7.2017 *Abhishek* 24.7.17 *Abhishek* 24.7.17 *Abhishek* 24.7.17 *Abhishek* 24.7.17 *Abhishek* 24.7.17

## UNIT-V A. ACID AND BASES

Arrhenius, Bronsted-Lowry, the Lux-flood, solvent system and Lewis concepts

of acids and bases.

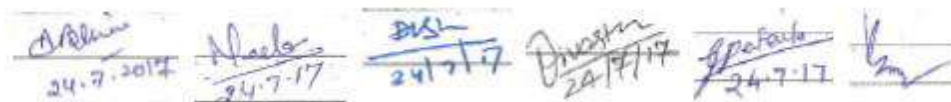
## N. NON-AQUEOUS SOLVENTS

**06 HRS.**

Physical properties of a solvent, types of solvents and their general characteristics, reaction in non-aqueous solvents with reference to liquid ammonia and liquid sulphur dioxide.

## REFERENCE BOOKS :

1. Basic Inorganic Chemistry, F.A. Cotton, G. Wilkinson and P.L. Gaus, Wiley
2. Concise Inorganic Chemistry, J.D. Lee, ELBS.
3. Concepts of models of Inorganic Chemistry, B. Douglas, D. Mc Daniel and J. Alexander, John Wiley.
4. Inorganic Chemistry, D.E. Shriver, P.W. Atkins and C.H. Langford, Oxford.
5. Inorganic Chemistry, W.W. Porterfield. Addison - Wesley.
6. Inorganic Chemistry. A.G. Sharp, ELBS.
7. Inorganic Chemistry, G.L. Miessler and D.A. Tarr, Prentice Hall.
8. Advanced Inorganic Chemistry, Stayas Prakash.
9. Advanced Inorganic Chemistry, Agarwal & Agarwal.
10. Advanced Inorganic Chemistry, Puri & Sharma, S. Naginchand
11. Inorganic Chemistry, Madan, S, Chand
12. Advanced Inorganic Chemistry, A.K. Shrivastav & P.C. Jain, Goel Pub.
13. Advanced Inorganic Chemistry, Satya Prakash & G.D. Tuli, Shyam Lal Prakashan
14. Advanced Inorganic Chemistry, Puri & Sharma.
15. Selected topics in Inorganic Chemistry by Madan Malik, & Tuli, S. Chand.





**PAPER - II**  
**ORGANIC CHEMISTRY**  
**(Paper Code - 0846)**

**60 Hrs. MM. 33**

**UNIT-I ALCOHOLS**

- A. Dihydric alcohols - nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [ $\text{Pb}(\text{OAc})_4$  and  $\text{HIO}_4$ ] and pinacol - pinacolone rearrangement.
- B. Trihydric alcohols - nomenclature and methods of formation, chemical reactions of glycerol.

**PHENOLS**

- A. Structure and bonding, in phenols, physical properties and acidic character. Comparative acidic strength of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols, acylation and carboxylation.
- B. Mechanisms of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Hauben - Hoesch reaction, Lederer - Manasse reaction and Reimer-Tiemann reaction.

**EPOXIDES**

Synthesis of epoxides. Catalysed ring opening of epoxides, orientation of epoxide ring opening, reactions of Grignard and organolithium reagents with epoxides. Anti 1,2 dihydroxylation of alkenes via epoxides. Crown ethers.

**UNIT-II ALDEHYDES AND KETONES**

- A. Nomenclature and Structure of the carbonyls group. Synthesis of aldehydes and ketones using 1,3 - dithianes, synthesis of ketones from nitriles.

Mechanism of nucleophilic additions to carbonyls group Benzoin, Aldol, Perkin and Knoevenagel condensations. Condensations with ammonia and its derivatives, Wittig reaction, Mannich reaction.

- B. Use of acetate as protecting group, Oxidation of aldehydes, Baeyer - Villiger oxidation of ketones, Cannizzaro reaction, MPV, Clemmensen Condensation, Wolff-Kishner reaction,  $\text{LiAlH}_4$  and  $\text{NaBH}_4$  reduction. Halogenation of enolizable ketones.

An introduction to  $\alpha$ ,  $\beta$  unsaturated aldehydes and ketones.

**UNIT-III A. CARBOXYLIC ACIDS**

**05 HRS.**

Structure and bonding, Physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Hell-Volhard Zeilinsky reaction.

Reduction of carboxylic acids. Mechanism of Decarboxylation.

Methods of formation and chemical reactions of unsaturated mono carboxylic acids. Di carboxylic acids : methods of formation and effect of heat and dehydrating agents.



## B. SUBSTITUTED CARBOXYLIC ACIDS

Hydroxy and Halo-substituted Acids.

## C. CARBOXYLIC ACID DERIVATIVES

Structure of acid chlorides, esters, amides and acid anhydrides. Relative stability of acyl derivatives. Physical properties, interconversion of acid derivatives by nucleophilic acyl substitution.

Mechanisms of acid and base catalyzed esterification and hydrolysis.

## UNIT-IV ORGANIC COMPOUNDS OF NITROGEN

- A. Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanisms of nucleophilic substitution in nitroarenes and their reduction in acidic, neutral and alkaline medium.
- B. Reactivity, Structure and nomenclature of amines, physical properties. Stereochemistry of amines. Separation of mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles), reductive amination of aldehydic and ketonic compounds. Gabriel - phthalimide reaction, Hofmann bromamide reaction, Reactions of amines, electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid. Synthetic transformations of aryl diazonium salts, azo coupling.

## UNIT-V HETEROCYCLIC COMPOUNDS

### A. Introduction

Molecular orbital picture and aromatic character of pyrrole, furan, thiophene and pyridine, methods of synthesis and chemical reactions with emphasis on the mechanism of electrophilic substitution. Mechanism and nucleophilic substitution reaction in pyridine derivatives. Comparison of basicity of pyridine. Piperidine and pyrrole.

- B. Preparation and reaction of Indole, quinoline and isoquinoline and with special reference to Fisher Indole synthesis and Skraup synthesis and Bischer-Napieralski synthesis, Mechanism of electrophilic substitution reactions of indole, quinoline and isoquinoline.

### Amino acids and Peptides :

- A. Classification, Structure and stereochemistry of amino acids. Acid-base behaviour, isoelectric point and electrophoresis. Preparation and reaction of  $\alpha$ -amino acids.
- B. Structure and nomenclature of peptides. Peptide synthesis, solid - phase peptide synthesis.

*Albino* 24.7.2017 *Albino* 24.7.17 *Albino* 24.7.17 *Albino* 24.7.17 *Albino* 24.7.17 *Albino*

**REFERENCE BOOKS :**

1. Organic Chemistry, Morrison and Boyd, Prentice-Hall.
2. Organic Chemistry, L.G. Wade Jr. Prentice-Hall.
3. Fundamentals of Organic Chemistry, Solomons, John Wiley
4. Organic Chemistry, Vol. I, II, III, S.M. Mukherjee, S.P. Singh and R.P. Kapoor, Wiley-Eastern (New-Age)
5. Organic Chemistry, F.A. Carey, McGraw Hill
6. Introduction to Organic Chemistry, Struikweisser, Heathcock and Kosover, Macmillan.
7. Organic Chemistry, P.L. Soni
8. Organic Chemistry, Bahi & Bahl
9. Organic Chemistry, Joginder Singh
10. Carbanic Rasayan, Bahi & Bahi
11. Carbanic Rasayan, R.N. Singh, S.M.I. Gupta, M.M. Bakodia & S.K. Wadhwa
12. Carbanic Rasayan, Joginder Singh

Alkhani  
24.7.2017

Alakh  
24.7.17

DSL  
24/7/17

Dinesh  
24/7/17

gpatel  
24.7.17

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**PAPER - III**  
**PHYSICAL CHEMISTRY**  
(Paper Code - 0847)

**60 Hrs. M.M. 34**

**UNIT-I**

**12 Hrs.**

**A. Thermodynamics - I**

Fundamental of thermodynamics system, surroundings etc. Types of systems, intensive and extensive properties, state and path functions thermodynamic operations Internal energy, enthalpy, Heat capacity of gases at constant volume and at constant pressure and their relationship.

First Law of Thermodynamics limitation of first law. Joule-Thompson expansion, inversion temperature of gases. Calculation of  $w, q, dU$  &  $dH$  for the liquification expansion of ideal gases under isothermal and adiabatic conditions.

**B. Thermo chemistry**

Standard state,- Hess's law of heat summation. Enthalpy of reaction at constant pressure and constant volume. Enthalpy of neutralizations. Enthalpy of combustion, Enthalpy of formation, Calculation of Bond enthalpy. Elirchhoff's equation.

**Unit - II**

**A Thermodynamics-II**

Second Law of Thermodynamics : Spontaseous process need of second law, statements of Carnot cycle and efficiency of heat engine, Carnot theorem. Thermodynamic state of temperature.

Concept of entropy : entropy change in a reversible and irreversible process, Entropy change in insothermal reversible expansion of an ideal gas, Entropy change in isothermal mixing of ideal gases, physical signification of entropy.


**B. Gibbs and Helmholtz free energy variation of G and A with pressure, volume temperature, Gibbs Helmholtz equation.**

**UNIT-III**

**PHASE EQUILIBRIUM**

**A. Gibbs Phase rule, Phase components and degree of freedom, Limitation of phase rule.**

Applications of phase rule to one component system - water system, suplhur system.



Three component systems : solid solution liquid pairs.

Liquid liquid mixture : (Partially miscible liquids) : phenol-water, trimethylamine-water nicotine systems, constant temperature, azeotropes.

B. Nerst distribution law, Henry's law, application, solvent extraction.

#### **UNIT-IV ELECTROCHEMISTRY-I**

**10 HRS.**

- A. Electrolytic Conductance : Specific and equivalent conductance, measurement of equivalent conductance, effect of dilution on conductance, Kohlrausch's law; application of Kohlrausch's law in determination of dissociation constant of weak electrolyte, solubility of sparingly soluble electrolyte, absolute velocity of ions, ionic product of water, conductometric titration.
- B. Theories of strong electrolytes : limitations of Ostwald dilution law, weak and strong electrolyte, Debye-Huckel-Onsager (DHO) equation for strong electrolyte, relaxation and electrophoretic effect.
- C. Migration of ions : Transport number, definition and determination by Hittorf method and moving boundary method.

#### **UNIT-V ELECTROCHEMISTRY-II**

**10 HRS.**

- A. Electrochemical cell or Galvanic cell : reversible and irreversible cells conventional representation of electrochemical cells, EMF of the cell, effect of temperature on EMF of the cell, Nernst equation, calculation of  $G$ ,  $H$  and  $S$  for cell reaction.
- B. Single electrode potential : standard hydrogen electrode, calomel electrode quinhydrone electrode, redox electrodes, electrochemical series.
- C. Concentration cells with & without transport, liquid junction potential, application of concentration cell in determining valency of ions, solubility product, activity coefficient.
- D. Determination of pH and pKa using hydrogen and quinhydrone electrode potentiometric titrations, buffer solutions; Henderson-Hasselbalch Equation, Hydrolysis of salts, Corrosion : type theories and prevention.



### REFERENCE BOOKS :

1. Physical Chemistry, G.M. Barrow, International student edition-McGraw Hill
2. University general chemistry, C.N.R. Rao, Macmillan.
3. Physical Chemistry, R.A. Alberty, Wiley Eastern.
4. The elements of Physical Chemistry, Eastern.
5. Physical Chemistry through problems, S.K. Dogra & S. Dogra, Wiley Eastern.
6. Physical Chemistry, B.D. Khosla.
7. Physical Chemistry, Puri & Sharma
8. Bhoutic Rasayan, Puri, Sharma & Pathania, Vishal Publishing Company.
9. Bhoutic Rasayan, P.L. Soni
10. Bhoutic Rasayan, Bahl & Tuli
11. Physical Chemistry, R.L. Kapoor, Vol. I-IV

  
The image shows six handwritten signatures and dates, likely representing approvals or verifications. From left to right: 1. Signature 'A. Bhatia' with date '24.7.2017'. 2. Signature 'A. Bhatia' with date '24.7.17'. 3. Signature 'B. S. L.' with date '24/7/17'. 4. Signature 'D. Dogra' with date '24/7/17'. 5. Signature 'S. P. Pathania' with date '24.7.17'. 6. A signature that appears to be 'V. Soni' with a date that is partially obscured but likely '24.7.17'.

**PAPER - IV**  
**LABORATORY COURSE**

**180 Hrs.**

**Inorganic Chemistry**

Calibration of fractional weights, pipettes and burettes. Preparation of standard solutions, Dilution-0.1 M to 0.01 M. solutions.

**Quantitative Analysis**

Volumetric Analysis

- (a) Determination of acetic acid in commercial vinegar using NaOH.
- (b) Determination of alkali content-antacid tablet using HCl.
- (c) Estimation of calcium content in chalk as calcium oxalate by permanganometry.
- (d) Estimation of hardness of water by EDTA.
- (e) Estimation of ferrous & ferric by dichromate method.
- (f) Estimation of copper using thiosulphate.

**Instrumentation**

Colorimetry

- (a) Job's method
- (b) Mole-ratio method  
Adulteration-Food Stuffs.  
Effluent analysis, water analysis

**Solvent Extraction**

Separation and estimation of Mg (H) and Fe (H).

**Ion Exchange Method**

Separation and estimation of Mg (H) and Zn (H).

**Organic Chemistry**

Laboratory Techniques

**A. Thin layer Chromatography**

Determination of  $R_f$  values and identification of organic compounds.

- (a) Separation of green leaf pigments (spinach leave may be used)
- (b) Preparation and separation of 2, 4-dinitrophenyl hydrazones of acetone, 2-butanone, hexan-2 and 3-one using toluene and light petroleum (40:60)
- (c) Separation of a mixture of dyes using cyclohexane and ethyl acetate (8.5:1.5).



## **B Paper Chromatography : Ascending & Circular.**

Determination of  $R_f$  values and identification of organic compounds.

- (a) Separation of mixture of phenylalanine and glycine. Alanine and aspartic acid, Leucine and glutamic acid, Spray reagent-ninhydrin.
- (b) Separation of mixture of D, L-alanine, glycine, and L-Leucine using n-butanol : acetic acid : water (4:1:5), Spray reagent-ninhydrin.
- (c) Separation of monosaccharides- a mixture of D-galactose and d-fructose using n-butanol : acetone : water (4:5:1), Spray reagent-aniline hydrogen phthalate.

## **Qualitative Analysis**

Identification of an organic compound through the functional group analysis, determination of M.Pt. and preparation of derivatives. (Aliphatic and Aromatic)

## **Physical Chemistry**

### **Transition Temperature**

Determination of the transition temperature of the given substance by thermometric/ dilatometric method (e.g.  $\text{MnCl}_2 \cdot 4\text{H}_2\text{O}/\text{SrBr}_2 \cdot 2\text{H}_2\text{O}$ ).

### **PHASE EQUILIBRIUM**

1. To study the effect of asolute (e.g. NaCl, Succinic acid) on the critical solution temperature of two partially miscible liquids (e.g. Phenol-water system and to determine the concentration of that solute in the given phenol-water system.
2. To construct the phase diagram of two component system (e.g. diphenylamine-benzophenone) by cooling curve method.

### **THERMO CHEMISTRY**

1. To determine the solubility of benzoic acid at different temperatures and to determine  $H$  of the dissolution process.
2. To determine the enthalpy of neutralisation of a weak acid / weak base versus strong base / strong acid and determine the enthalpy of ionisation of the weak acid weak base.
3. To determine the enthalpy of solution of solid calcium chloride and calculate the lattice energy of calcium hydroxide from its enthalpy data using Born Haber cycle.

*Alkhan* 24.7.2017 *Alkhan* 24.7.17 *Bash* 24/7/17 *Divyanshu* 24/7/17 *Pratibha* 24.7.17 *km*



### Regerence Book -

1. Vogel's qualitative Analysis, revised Svehla, Orient Longman.
2. Standered method of chemical analysis, W.W.Scott, the Technical press.
3. Experimental Organic Chemistry, Vol. I & II, P.R.Singh, D.S. Gupta and K.S.Bajpai, Tata McGraw Hill.
4. Laboratory Manual in Organic Chemistry, R.K. Bansal, Wiley Eastern.
5. Vogel's Text Book of Practical Organic Chemistry, B.S. Furnis, A.J. Hannaford, V.Rogers, P.W.G. S----ith and A.R. Tatchel, ELBS.
6. Experiments in General Chemistry C.N.R.Rao & U.C. Agrawal.
7. Experiments in Phyeical Chemistry R.C. Das & B.Behra, Tata McGraw Hill.
8. Advanced Practical Phvsical Chemistry, J.B. Yadav, Goel Publishing House.

**5 Hrs.**

### **PRACTICAL EXAMINATION**

**M.M. 50**

Three Experiments are to be Performed.

1. Inorganic - One experiment from synthesis and analysis by preparing the standard solution  
be given. 12 marks
  - O R** One Experiment from instrumentation either by colorimetry / solvent extraction/ion exchange method.
  2. (a) Identification of the given organic compound & determine its M.Pt./B.Pt. 6 marks  
(b) Determination of  $R_f$  value and identification of organic compounds by paper chromatography. 6 marks
  3. Any one physical experiment that can be completed in two hours inciuding calculations. 12 marks
  4. Viva 10 marks
  5. Sessional 04 marks
- In case of Ex-Students one marks will be added to each of the experimets.

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## PHYSICS

### Objectives :

Present course is aimed to provide ample knowledge of basics of physics which are relevant to the understanding of modern trends in higher physics.

The first paper is aimed at preparing the background of thermodynamics and statistical physics essential for any advanced study of physics of condensed matter and radiations.

The second paper is mainly concerned with a course on geometrical and Physical optics and the laser Physics. It deals with important phenomenon like inter-ference, diffraction and polarisation with stress on the basic nature of light. It also introduces the basics of laser physics with some of its important applications.

The experiments are based mostly on the contents of the theory papers so as to provide comprehensive insight of the subject.

### Scheme of Examination :

1. There shall be two theory papers of 3 hours duration each and one practical paper of 4 hours duration. Each paper shall carry 50 marks.
2. Each theory paper will comprise of 5 units. Two questions will be set from each unit and the student will have the choice to answer one out of two.
3. Numerical problems of about 30 percent will compulsorily be asked in each theory paper.
4. In practical paper each students has to perform experiments during examination.
5. Practical examination will be of 4 hours duration. The distribution of practical marks will be as follows :

Experiments	:	15 + 15 = 30
Viva-Voce	:	10
Internal Assessment	:	10

**PAPER - I**  
**THERMODYNAMICS, KINETIC THEORY AND STATISTICAL PHYSICS**  
**(Paper Code - 0843)**

- UNIT-I** The laws of thermodynamics : The Zeroth law, concept of path function and point function, various indicator diagrams, work done by and on the system, first law of thermodynamics, internal energy as a state function, reversible and irreversible change, carnot theorem and the second law of thermodynamics. Different versions of the second law. Clausius theorem inequality. Entropy, Change of entropy in simple cases (i) Isothermal expansion of an ideal gas (ii) Reversible isochoric process (iii) Free adiabatic expansion of an ideal gas. Entropy of the universe. Principle of increase of entropy. The thermodynamic scale of temperature, its identity with the perfect gas scale. Impossibility of attaining the absolute zero, third law of thermodynamics.
- UNIT-II** Thermodynamic relationships : Thermodynamic variables, extensive and intensive, Maxwell's general relationships, application to Joule-Thomson cooling and adiabatic cooling in a general system, Van der Waals gas, Clausius-Clapeyron heat equation. Thermodynamic potentials and equilibrium of thermodynamical systems, relation with thermodynamical variables. Cooling due to adiabatic demagnetization, production and measurement of very low temperatures. Blackbody radiation : Pure temperature dependence, Stefan-Boltzmann law, pressure of radiation, Special distribution of BB radiation, Wien's displacement law, Rayleigh-Jean's law, the ultraviolet catastrophe, Planck's quantum postulates, Planck's law, complete fit with experiment.
- UNIT-III** Maxwellian distribution of speeds in an ideal gas : Distribution of speeds and of velocities, experimental verification, distinction between mean, rms and most probable speed values. Doppler broadening of spectral lines.  
Transport phenomena in gases : Molecular collisions, mean free path and collision cross sections. Estimates of molecular diameter and mean free path. Transport of mass, momentum and energy and interrelationship, dependence on temperature and pressure.  
Liquifaction of gases : Boyle temperature and inversion temperature. Principle of regenerative cooling and of cascade cooling, liquifaction of hydrogen and helium. Refrigeration cycles, meaning of efficiency.
- UNIT-IV** The statistical basis of thermodynamics : Probability and thermodynamic probability, principle of equal a priori probabilities, statistical postulates. Concept of Gibb's ensemble, accessible and inaccessible states. Concept of phase space, canonical phase space, Gamma phase space and mu phase space. Equilibrium before two systems in thermal contact, probability and entropy, Boltzmann entropy relation. Boltzmann canonical distribution law and its applications, law of equipartition of energy. Transition to quantum statistics : 'h' as a natural constant and its implications, cases of particle in a one-dimensional box and one-dimensional harmonic oscillator.



**UNIT-V** Indistinguishability of particles and its consequences, Bose-Einstein & Fermi-Dirac conditions, Concept of partition function, Derivation of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics Through Canonical partition function. Limits of B.E. and F-D statistics to M-B statistics. Application of BE statistics to black body radiation, Application of F-D statistics to free electrons in a metal.

**TEXT AND REFERENCE BOOKS :**

1. B.B. Laud, "Introduction to Statistical Mechanics" (Macmillan 1981)
2. F. Reif : "Statistical Physics" (Mcgraw-Hill, 1998).
3. K, Haug : "Statatistical Physics" (Wiley Eastern, 1988).
4. Thermal and statistical Physics : R.K. Singh, Y.M. Gupta and S. Sivraman
5. Physics (Part-2) : Editor, Prof : B.P. Chandra, M.P. Hindi Granth Academy.



**PAPER - II**  
**WAVES, ACOUSTICS AND OPTICS**  
**(Paper Code - 0844)**

**UNIT-I** Waves in media : Speed of transverse waves on a uniform string, speed of longitudinal waves in a fluid, energy density and energy transmission in waves, typical measurements. Waves over liquid surface : gravity waves and ripples. Group velocity and phase velocity, their measurements.

Harmonics and the quality of sound ; examples. Production and detection of ultrasonic and infrasonic waves and applications.

Reflection, refraction and diffraction of sound : Acoustic impedance of a medium, percentage reflection & refraction at a boundary, impedance matching for transducers, diffraction of sound, principle of a sonar system, sound ranging.

**UNIT-II** Fermat's Principle of extremum path, the aplanatic points of a sphere and other applications.

Cardinal points of an optical system, thick lens and lens combinations.

Lagrange equation of magnification, telescopic combinations, telephoto lenses.

Monochromatic aberrations and their reductions ; aspherical mirrors and schmidt corrector plates, aplanatic points, oil immersion objectives, meniscus lens.

Optical instruments : Entrance and exit pupils, need for a multiple lens eyepiece, common types of eyepieces. (Ramsdon and Hygen's eyepieces)

**UNIT-III** Interference of light : The principle of superpositions, two slit interference, coherence requirement for the sources, optical path retardations, lateral shift of fringes, Rayleigh refractometer Localised fringes ; thin films. Haldinger fringes : fringes of equal inclination. Michelson interferometer, its application for precision determination of wavelength, wavelength difference and the width of spectral lines, Twyman. Green interferometer and its uses, intensify distribution in multiple beam interference. Tolansky fringes, Fabry-Perot interferometer and etalon.



**UNIT-IV** Fresnel half-period zones, plates, straight edge, rectilinear propagation, Fraunhofer diffraction : Diffraction at a slit, half-period zones, phasor diagram and integral calculus methods, the intensity distribution, diffraction at a circular aperture and a circular disc, resolution of images, Rayleigh criterion, resolving power of telescope and microscopic systems.

Diffraction gratings : Diffraction at N parallel slits, intensity distribution, plane diffraction grating, reflection grating and blazed gratings, Concave grating and different mountings, resolving power of a grating and comparison with resolving powers of prism and of a Fabry-Perot etalon.

Double refraction and optical rotation : Refraction in uniaxial crystals, Phase retardation plates, double image prism. Rotation of plane of polarisation, origin of optical rotation in liquids and in crystals.

**UNIT-V** Laser system : Purity of a spectral line, coherence length and coherence time, spatial coherence of a source, Einstein's A and B coefficients, Spontaneous and induced emissions, conditions for laser action, population inversion, Types of Laser : Ruby and, He-Ne and Semiconductor lasers.

Application of lasers : Application in communication, Holography and non linear optics. (Polarization P including higher order terms in E and generation of harmonics).

**TEXT AND REFERENCE BOOKS :**

1. A.K. Ghatak, 'Physical Optics'
2. D.P. Khandelwal, 'Optical and Atomic Physics' (Himalaya Publishing House, Bombay, 1988)
3. K.D. Moltev ; 'Optics' (Oxford University Press)
4. Sears : 'Optics'
5. Jenkins and White : 'Fundamental of Optics' (McGraw-Hill)
6. B.B. Laud : Lasers and Non-linear Optics (Wiley Eastern 1985)
7. Smith and Thomson : 'Optics' (John Wiley and Sons)
8. Berkely Physics Courses : Vol.-III, 'Waves and Oscilations'
9. I.G. Main, 'Vibratiens and Waves' (Cambridge University Press)
10. H.J. Pain : 'The Physics of Vibrations and Waves' (MacMillan 1975)
11. Text Book of Optics : B.K. Mathur
12. B.Sc. (Part III) Physics : Editor : B.P. Chandra, M.P. Hindi Granth Academy.
13. F. Smith and J.H. Thomson, Manchester Physics series : optics (English language book soeity and Jehu wiley, 1577)
14. Bern and Woif : 'Opties'.

## PRACTICALS

Minimum 16 (Sixteen) out of the following or similar experiments of equal standard.

1. Study of Brownian motion
2. Study of adiabatic expansion of a gas.
3. Study of conversion of mechanical energy into heat.
4. Heating efficiency of electrical kettle with varying voltages.
5. Study of temperature dependence of total radiation.
6. Study of temperature dependence of spectral density of radiation.
7. Resistance thermometry.
8. Thermoemf thermometry.
9. Conduction of heat through poor conductors of different geometries.
10. Experimental study of probability distribution for a two-option system using a coloured dice.
11. Study of statistical distributions on nuclear disintegration data (GM Counter used as a black box)
12. Speed of waves on a stretched string.
13. Studies on torsional waves in a lumped system.
14. Study of interference with two coherent sources of sound.
15. Chladni's figures with varying excitation and loading points.
16. Measurement of sound intensities with different situation.
17. Characteristics of a microphone-loudspeaker system.
18. Designing an optical viewing system.
19. Study of monochromatic defects of images.
20. Determining the principal points of a combination of lenses.
21. Study of interference of light (biprism or wedge film)
22. Study of diffraction at a straight edge or a single slit.
23. Study of F-P etalon fringes.
24. Use of Diffraction grating and its resolving limit.
25. Resolving limit of a telescope system.
26. Polarization of light by reflection ; also cos-squared law.
27. Study of Optical rotation for any systems.
28. Study of laser as a monochromatic coherent source.
29. Study of a divergence of a Laser beam.
30. Calculation of days between two dates of a year.
31. To check if triangle exists and the type of the triangle.
32. To find the sum of the sine and cosine series and print out the curve.

33. To solve simultaneous equations by elimination method.
34. To prepare a mark-list of polynomials.
35. Fitting a straight line or a simple curve to a given data.
36. Convert a given integer into binary and octal systems and vice-versa.
37. Inverse of a matrix.
38. Spiral array.

**TEXT AND REFERENCE BOOKS :**

- |                        |   |   |
|------------------------|---|---|
| D.P. Khandelwal        | : | "Optics and Atomic Physics" (Himalaya Publishing House, Bombay 1988)                                  |
| D.P. Khandelwal        | : | "A Laboratory Manual for Undergraduate Classes" (Vani Publishing House, New Delhi)                    |
| S. Lipschutz and A Poe | : | "Schaum's Outline of Theory and Problems of Programming with Fortran" (McGraw-Hill Book Company 1986) |
| C. Dixon               | : | "Numerical Analysis".   |

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## MATHEMATICS

There shall be three compulsory papers. Each paper of 50 marks is divided into five units and each unit carry equal marks.

### PAPER - I ADVANCED CALCULUS (Paper Code - 0848)

**UNIT-I** Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion. Series of non-negative terms. Comparison tests, Cauchy's integral test, Ratio tests, Raabe's, logarithmic, De Morgan and Bertrand's tests. Alternating series, Leibnitz's theorem. Absolute and conditional convergence.

**UNIT-II** Continuity, Sequential continuity, Properties of continuous functions, Uniform continuity, Chain rule of differentiability, Mean value theorems and their geometrical interpretations. Darboux's intermediate value theorem for derivatives Taylor's theorem with various forms of remainders.

**UNIT-III** Limit and continuity of functions of two variables, Partial differentiation Change of variables, Euler's theorem on homogeneous functions, Taylor's theorem for functions of two variables, Jacobians.

**UNIT-IV** Envelopes, Evolutes, Maxima, minima and saddle points of functions, two variables, Lagrange's multiplier method.

**UNIT-V** Beta and Gamma functions, Double and triple integrals, Dirichet's integrals, Change of order of intergration in double integrals.

#### REFERENCES :

1. Gabriel Klaumber, Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975.
2. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
3. R.R. Goldberg, Real Analysis, Oxford & I.B.H. Publishing Co., New Delhi, 1970.
4. D. Soma Sundaram and B. Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997.
5. P.K. Jain and S.K. Kaushik, An introduction to Real Analysis, S. Chand & Co., New Delhi, 2000.
6. Gorakh Prasad, Differential Calculus, Pothishala Pvt. Ltd., Allahabad.
7. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Co., New York.
8. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd., Allahabad.



9. S.C. Malik, Mathematical Analysis, Wiley Eastern Ltd., New Delhi.
10. O.E. Stanaitis, An Introduction to Sequences, Series and Improper Integrals, Holden-Dey, Inc., San Francisco, California.
11. Earl D. Rainville, Infinite Series, The Macmillan Company, New York.
12. Chandrika Prasad, Text Book on Algebra and Theory of Equations, Pothishala Pvt. Ltd., Allahabad.
13. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
14. Shanti Narayan, A Course of Mathematical Analysis, S.Chand and Company, New Delhi.



**PAPER - II**  
**DIFFERENTIAL EQUATIONS**  
**(Paper Code - 0849)**

**UNIT-I.** Series solutions of differential equations- Power series method, Bessel and Legendre, Functions and their properties-convergence, recurrence and generating relations, Orthogonality of functions, Sturm-Liouville problem, Orthogonality of eigen-functions, Reality of eigen values, Orthogonality of Bessel functions and Legendre polynomials.

**UNIT-II** Laplace Transformation - Linearity of the Laplace transformation, Existence theorem for Laplace transforms, Laplace transforms of derivatives and integrals, Shifting theorems, Differentiation and integration of transforms, Convolution theorem, Solution of integral equations and systems of differential equations using the Laplace transformation.

**UNIT-III** Partial differential equations of the first order, Lagrange's solution, Some special types of equations which can be solved easily by methods other than the general method, Charpit's general method of solution.

**UNIT-IV** Partial differential equations of second and higher orders, Classification of linear partial differential equations of second order, Homogeneous and non-homogeneous equations with constant coefficients, Partial differential equations reducible to equations with constant coefficients, Monge's methods.

**UNIT-V** Calculus of Variations - Variational problems with fixed boundaries- Euler's equation for functionals containing first order derivative and one independent variable, Externals, Functionals dependent on higher order derivatives, Functionals dependent on more than one independent variable, Variational problems in parametric form, invariance of Euler's equation undercoordinates transformation.

Variational Problems with Moving Boundaries - Functionals dependent on one and two functions, One sided variations.

Sufficient conditions for an Extremum - Jacobi and Legendre conditions, Second Variation, Variational principle of least action.



## REFERENCES :

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, Inc., New York, 1999.
2. D.A. Murray, Introductory Course on Differential Equations, Orient Longman, (India), 1967.
3. A.R. Forsyth, A Treatise on Differential Equations, Macmillan and Co. Ltd., London.
4. Lan N. Sneddon, Elements of Partial Differential Equations, McGraw-Hill Book Company, 1988.
5. Francis B. Hilderbrand, Advanced Calculus for Applications, Prentice Hall of India Pvt. Ltd., New Delhi, 1977.
6. Jane Cronin, Differential equations, Marcel Dekkar, 1994.
7. Frank Ayres, Theory and Problems of Differential Equations, McGraw-Hill Book Company, 1972.
8. Richard Bronson, Theory and Problems of Differential Equations, McGraw-Hill, Inc., 1973.
9. A.S. Gupta, Calculus of variations with-Applications, Prentice-Hall of India, 1997.
10. R. Courant and D. Hilbert, Methods of Mathematical Physics, Vols. I & II, Wiley-Interscience, 1953.
11. I.M. Gelfand and S.V. Fomin, Calculus of Variations, Prentice-Hill, Englewood Cliffs (New Jersey), 1963.
12. A.M. Arthurs, Complementary Variational Principles, Clarendon Press, Oxford, 1970.
13. V. Kornkov, Variational Principles of Continuum Mechanics with Engineering Applications, Vol. I, Reidel Publ. : Dordrecht, Holland, 1985.
14. T. Oden and J.N. Reddy, Variational Methods in Theoretical Mechanics, Springer-Verlag, 1976.



**PAPER - III**  
**MECHANICS**  
**(Paper Code - 0850)**

**STATICS**

**UNIT-I** Analytical conditions of Equilibrium, Stable and unstable equilibrium, virtual work, Catenary.

**UNIT-II** Forces in three dimensions, Poinso't's central axis, Null lines and planes, Dynamics.

**UNIT-III** Simple harmonic motion, Elastic strings, velocities and accelerations along radial and transverse directions, Projectile, Central orbits.

**UNIT-IV** Kepler's laws of motion, velocities and acceleration in tangential and normal directions, motion on smooth and rough plane curves.

**UNIT-V** Motion in a resisting medium, motion of particles of varying mass, motion of a particle in three dimensions, acceleration in terms of different co-ordinate systems.

**REFERENCES :**

1. S.L. Loney, Statics, Macmillan and Company, London.
2. R.S. Verma, A Text Book on Statics, Pothishala Pvt. Ltd., Allahabad.
3. S.L. Loney, An Elementary Treatise on the Dynamics of a particle and of rigid bodies, Cambridge University Press, 1956.

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**B O T A N Y**  
**PAPER - I**  
**DIVERSITY OF SEED PLANTS AND THEIR SYSTEMATICS**  
**(Paper Code - 0861)**

**M.M. : 50**

- UNIT-I.** 1. Characteristics of seed plants ; evolution of the seed habit ; seed plants with (angiosperms) and without (gymnosperms) fruits ; fossil and living seed plants.
2. General features of gymnosperms and their classification ; evolution and diversity of gymnosperms ; geological time scale, fossilization and fossil gymnosperms.
- UNIT-II** 3. Morphology of vegetative and reproductive parts ; anatomy of roots, stem and leaf, reproduction and life cycle of Pinus, Cycas and Ephedra.
- UNIT-III** 4. Angiosperms : origin and evolution, some examples of primitive angiosperms.
5. Angiosperms taxonomy : brief history, aims and fundamental components; identification, keys taxonomic literature.
6. Botanical nomenclature : Principles and rules; taxonomic ranks; type concept; principle of priority.
- UNIT-IV** 7. Classification of angiosperms ; salient features of the systems proposed by Bentham and Hooker and Engler and Prantl.
8. Major contributions of cytology, phytochemistry and taximetrics to taxonomy.
- UNIT-V** 9. Diversity of flowering plants : General account of the families Ranunculaceae, Brassicaceae, Malvaceae, Rutaceae, Fabaceae, Apiaceae, Acanthaceae, Apocynaceae, Asclepiadaceae, Solanaceae, Lamiaceae, Chenopodiaceae, Euphorbiaceae, Liliaceae and Poaceae.



**PAPER - II**  
**STRUCTURE DEVELOPMENT AND REPRODUCTION**  
**INFLOWERING PLANTS**  
**(Paper Code - 0862)**

**M.M. 50**

- UNIT-I.** 1. The basic body plan of a flowering plant : modular type of growth.  
2. Diversity in plant form in annuals, biennials and perennials ; convergence of evolution of tree habit in gymnosperms, monocotyledons and dicotyledons ; trees-largest and longest-lived organisms.
- UNIT-II** 3. The shoot system : the shoot apical meristem and its histological organization ; vascularization of primary shoot in monocotyledons and dicotyledons ; formation of internodes, branching pattern ; monopodial and sympodial growth canopy architecture ; cambium and its functions ; formation of secondary xylem, a general account of wood structure in relation to conduction of water and minerals ; characteristics of growth rings, sapwood and heart wood ; role of woody skeleton ; secondary phloem - structure-function relationships, periderm.
- UNIT-III** 4. Leaf : origin, development, arrangement and diversity in size and shape ; internal structure in relation to photosynthesis and water loss ; adaptations to water stress ; senescence and abscission.  
5. The root system : the root apical meristem ; differentiation of primary and secondary tissues and their roles ; structural modification for storage, respiration, reproduction and for interaction with microbes.
- UNIT-IV** 6. Flower : a modified shoot ; structure, development and varieties of flower, functions, structure of anther and pistil, the male and female gametophytes ; types of pollination ; attractions and rewards for pollinators ; pollen-pistil interaction, self incompatibility, double fertilization, formation of seed-endosperm and embryo ; fruit development and maturation.
- UNIT-V** 7. Significance of seed : suspended animation ; ecological adaptation ; unit of genetic recombination and replenishment, dispersal strategies.  
8. Vegetative reproduction : vegetative propagation, grafting, economic aspects.

**PRACTICAL SCHEME**

**Time : 4 Hrs.**

**M.M. : 50**

- |   |    |
|---|----|
| 1. Plant Description  | 08 |
| 2. Gymnosperm   | 07 |
| 3. Anatomy  | 07 |
| 4. Embryology   | 04 |
| 5. Spotting (1-5 Spots)                                       | 10 |
| 6. Field Report<br>(Local Flora : Rainy/Winter/Summer Season) | 04 |
| 7. Viva-Voce  | 05 |
| 8. Sessional  | 05 |

**Total Marks : 50**

**BOTANY (PRACTICAL)**  
**SUGGESTED LABORATORY EXERCISES**

**ANGIOSPERMS**

The following species are suitable for study. This list is only indicative. Teachers may select plants available in their locality.

1. Ranunculaceae : Ranunculus, Delphinium
2. Brassicaceae : Brassica, Alyssum, Iberis, Coronopus
3. Malvaceae : Hibiscus, Abutilon
4. Rutaceae : Murraya, Citrus
5. Fabaceae : Faboideae : Lathyrus, Cajanus, Melilotus, Trigonella, Caesalpinioideae ; Cassia, Caesalpinia ; Mimosoideae ; Prosopis, Mimosa, Acacia.
6. Apiaceae : Coriandrum, Foeniculum, Anethum
7. Acanthaceae : Adhatoda, Peristrophe
8. Apocynaceae : Vinca, Thevetia, Nerium
9. Asclepiadaceae : Calotropis
10. Solanaceae : Solanum, Withania, Datura
11. Euphorbiaceae : Euphorbia, Phyllanthus
12. Lamiaceae : Ocimum, Salvia
13. Chenopodiaceae : Chenopodium, Beta
14. Liliaceae : Asphodelus, Asparagus
15. Poaceae : Avena, Triticum, Hordeum, Poa, Sorghum

**GYMNOSPERMS**

**CYCAS**

- i Habit, armour of leaf bases on the stem (if specimen is not available show photograph), very young leaf (circinate vernation) and old foliage leaves, scale leaf, bulbils, male cone (specimen), microsporophyll, megasporophyll, mature seed.
- ii. Study through permanent slides - normal root (T.S.), stem (T.S.) (if sections are not available show photographs), ovule (L.S.).
- iii. Study through hand sections or dissections - coralloid root (T.S.), rachis (T.S.), leaflet (V.S.), microsporophyll (V.S.), pollen grains (W.M.).

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## **PINUS**

- i. Habit, long and dwarf shoot showing cataphylls and scale leaves, T.S. wood showing growth rings, male cone, 1<sup>st</sup> year, 2<sup>nd</sup> year female cones, winged seed.
- ii. Study through permanent slides - root (T.S.), female cone (L.S.), ovule (L.S.), embryo (W.M.) showing polycotyledonous condition.  
Study through hand sections or dissections - young stem (T.S.), old stem (wood) (T.L.S. and R.L.S.), needle (T.S.), male cone (L.S.), male cone (T.S.), pollen grains (W.M.).

## **EPHEDRA**

- i. Habit and structure of whole male and female cones.
- ii. Permanent slides - female cone (L.S.)
- iii. Hand sections/dissections-node (L.S.), internode (T.S.), macerated stem to see vessel structure, epidermal peel mount of vegetative parts to study stomata, male cone (T.S. and L.S.), pollen grains.

## **SUGGESTED LABORATORY EXERCISES :**

Embryology, Anatomy and Vegetative Propagation etc.

1. Study of commonly occurring dicotyledonous plant (for example *Solanum nigrum* or *Kalanchoe*) to understand the body plan and modular type of growth.
2. Life forms exhibited by flowering plants (by a visit to a forest or a garden), study of tree like habit in cycads, bamboos, banana, traveller's tree (*Ravenala madagasariensis*) or yucca and comparison with ture trees as exemplified by conifers and dicotyledons.
3. L.S. shoot tip to study the cytohistological zonation and origin of leaf primordia.
4. Monopodial and Sympodial types of branching in stems (especially rhizomes).
5. Anatomy of primary and secondary growth in monocots and dicots using hand sections (or prepared slides), structure of secondary phloem and xylem, Growth rings in wood, Microscopic study of wood in T.S., T.L.S. and R.L.S.
6. Field study of diversity in leaf shape, size, thickness, surface properties, internal structure of leaf, structure and development of stomata (using epidermal peels of leaf).
7. Anatomy of the root, Primary and secondary structure.
8. Examination of a wide range of flowers available in the locality and methods of their pollination.
9. Structure of anther, microsporogenesis (using slides) and pollen grains (using whole mounts), pollen viability using in vitro pollen germination.
10. Structure of ovule and embryo sac development (using serial sections)
11. Test of self-incompatibility (using *Petunia axillaris*, *Brassica campestris*, *B. olderacea* or suitable available material) using field pollinations.
12. Nuclear and cellular endosperm, embryo development in monocots and dicots (using slides/dissections).
13. Simple experiments to show vegetative propagation (leaf cuttings in *Bryophyllum*, *Sansevieria*, *Begonia*, stem cuttings in rose, salix, money plant, sugarcane and *Bougainvillea*).
14. Germination of non-dormant and dormant seeds.

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**ZOOLOGY**  
**PAPER - I**  
**ANATOMY & PHYSIOLOGY**  
**(Paper Code - 0863)**

**M.M. : 50**

**UNIT-I** Comparative Anatomy of various organ systems of vertebrates.

1. Integument and its derivatives : structure of scales, hair and feathers.
2. Alimentary canal and digestive glands in vertebrates.
3. Respiratory Organs

Gills and lung, Air-Sac in birds

**UNIT-II** 1. Endoskeleton-Limbs, girdles and vertebrae.

2. Circulatory System - Evolution of heart and aortic arches.
3. Urinogenital System - Kidney and excretory ducts.

**UNIT-III** 1. Nervous System - General plan of brain and spinal cord.

2. Endocrine glands - classification and histology.
3. Gonads and genital ducts.

**UNIT-IV** 1. Digestion and absorption of dietary components.

2. Physiology of heart, Cardiac cycle and ECG.
3. Blood Coagulation.
4. Respiration-Mechanism and control of breathing.

**UNIT-V** 1. Excretion-Physiology of excretion, Osmoregulation.

2. Physiology of Muscle contraction.
3. Physiology of nerve impulse, Synaptic transmission.
4. Ear and Eye - structure and function.

**LIST OF RECOMMENDED BOOKS :**

1. Conn, Stumpy RK, Bruening and D.C. : Outlines of Biochemistry.
2. Gaviong : Review of Medical Physiology.
3. Eckest, R. : Animal Physiology (W.H. Freeman)
4. Hildbrand : Analysis of Vertebrate structure
5. Kingsley : Outlines of Comparative Anatomy (Central Book Depot)
6. Rouer & Parsons : The Vertebrate Body, (Saunders)
7. Walta & Gyles : Biology of the Vertebrates (Macmillan)

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**PAPER - II**  
**VERTEBRATE ENDOCRINOLOGY, REPRODUCTIVE BIOLOGY**  
**BEHAVIOUR, EVOLUTION AND APPLIED ZOOLOGY**  
**(Paper Code - 0864)**

- UNIT-I**
1. General Characters of Hormones.
  2. Hormone Receptor
  3. Biosynthesis and secretion of thyroid, Adrenal ; Ovarian and testicular hormones.
  4. Endocrine disorder due to hormones and other gland.
- UNIT-II**
1. Reproductive cycle in vertebrate.
  2. Menstruation, Lactation and pregnancy.
  3. Mechanism of parturition.
  4. Hormonal regulation of gametogenesis.
  5. Extra embryonic membrane.
- UNIT-III**
1. Evidences of organic evolution.
  2. Theories of organic evolution.
  3. Variation, Mutation, Isolation and Natural selection.
  4. Evolution of Horse.
- UNIT-IV**
1. Introduction to Ethology.
  2. Patterns of Behaviour Taxes, Reflexes, Drives and Stereotyped Behaviour.
  3. Reproductive Behavioural Patterns.
  4. Hormones, Drugs and Behaviour.
- UNIT-V**
1. Aquaculture
  2. Sericultural
  3. Apiculture
  4. Pisciculture
  5. Poultry keeping
  6. Elements of Pest Control -
    1. Chemical control
    2. Biological Control

**PRACTICAL WORK**

The practical work in general shall be based on the syllabus prescribed in theory. The students will be required to show the knowledge of the following.

1. Study of the representative examples of the different chordates (Classification and character)
2. Dissection of various systems of scoliodon-Afferent and Efferent branchial vessels, cranial nerves, internal ear.
3. Simple microscopic technique through unstained or stained permanent mounts.
4. Study of prepared slides histological, as per theory papers.
5. Study of limb girdles and vertebrae of frog, varanus, fowl and Rabbit.
6. Identification of species and individuals of honey bee.
7. Life cycle of honey bee and silkworm.



### PRACTICAL WORK - DISTRIBUTION OF MARKS

1. Major dissection	12
(Cranial nerves/Efferent branchial vessel)	
2. Minor dissection (Afferent branchial/Internal ear)	08
3. Permanent mount	09
4. Spotting-8 (Slides-4, bones-2, specimens-2)	16
5. Viva	05
6. Sessional marks	<b>Total : 50</b>

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**MICROBIOLOGY**  
**B.SC. PART II**  
**SCHEME OF EXAMINATION**

Paper	-	Title	
First	-	Microbial Physiology and Genetics	50
Second	-	Principles of Bioinstrumentation and Techniques	50
Practical	-		50

**Total : 150**

**PAPER - I**  
**MICROBIAL PHYSIOLOGY AND GENETICS**  
**(Paper Code - 0869)**

**M.M. : 50**

**UNIT-I** Plasma membrane and transport across membrane, Energy transformation, Physiology of bacterial growth, phases of growth, growth conditions, differentiation in bacterial cells-sporulation, germination; bacterial cell division replication of chromosome, partition of chromosome into daughter cell.

**UNIT-II** Primary and Secondary metabolism.

**UNIT-III** Bacterial plasmids; structure and properties, replication, incompatibility, plasmid amplification.

Bacteriophages; lytic development cycle - T4; lytic and lysogenic development of phage, single stranded DNA phage.

Transposition; Structure of bacterial transposons, types of bacterial transposons.

Mechanism of antibiotic resistance and spread of antibiotic resistance.

**UNIT-IV** Genetic recombination; requirements, molecular basis, genetic analysis of recombination in bacteria.

**UNIT-V** DNA Repair and restriction; Types of repair systems, restriction endonuclease, various types of restriction enzymes, dam and dcm methylases.

**Text Book :**

1. Gene Cloning by T.A. Brown.
2. General Microbiology by Power and Daganiwala.
3. Zinssers Microbiology by KJ Wolfgang, McGraw- Hill Company.
4. Microbial Genetics by RM Stanley, F David and EC John.
5. Bacteriological Techniques by FJ Baker.



**PAPER II**  
**PRINCIPLES OF INSTRUMENTATION AND TECHNIQUES**  
**(Paper Code - 0870) M.M. : 50**

**UNIT-I** Colorimetry and spectrophotometry.

Spectrofluorimetry, turbidometry, nephelometry, luminometry.  
pH meter.

**UNIT-II** Chromatography; adsorption partition, column, gas, ion-exchange, gel filtration, and affinity, Chromatography, HPLC, FPLC.

**UNIT-III** Centrifugation and ultracentrifugation.

Microscopy- light, phase-contrast, fluorescence, dark field, electron microscopy. Laser, confocal, microscopy and digital image analysis.

**UNIT-IV** Tissue culture techniques; Principal and requirements of animal tissue culture, Decontamination, sterilization and disinfection.

**UNIT-V** Electrophoresis techniques- types and their application; Electrophoresis of proteins and nucleic acids. Immunoelectrophoresis

Sequencing of proteins and nucleic acids.

Radioisotope techniques; nature of radioactivity, detection measurement, counter, safety aspects.

Enzyme purification and assay techniques.

**Text Books :**

1. Introduction to Instrumental analysis by Robert Braun.
2. Instrumental Techniques by Upadhyay and Upadhyay.
3. Instrumental Methods of Chemical Analysis by BK Sharma.

  
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## PRACTICAL

M.M. - 50

Determination of growth phase of *E.coli* by measurement of OD and colony forming units.

Relationship between OD and Cfu measurements.

Measurement of growth by dry weight and wet weight - *Penicillium* spp.

Determination of antibiotic resistance by plating method.

Assaying of microbial enzymes; Catalase, Proteases, Peroxidases, Cellulase, Cellobioases, Amylase, Diastase.

Exercise on colourimeter/spectrophotometer/pH meter.

Exercise on paper, thin layer, column chromatography.

Exercise on paper and gel electrophoresis.

Exercise on tissue culture techniques.

Absorbance curve for dyes.

Testing of Beer's law

## SCHEME OF PRACTICAL

Time - 4 hours

M.M.: 50

1. Exercise on spectrophotometry / colorimetry / pH meter	08
2. Exercise on Chromatography / Electrophoresis	07
3. Measurement of microbial growth / microbial Enzymes / antibiotic sensitivity test	10
4. Spotting (1-5)	10
3. Viva-Voce	05
4. Sessional	10
Total 50	

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**विषय —भू —विज्ञान**  
**सैद्धांतिक प्रश्न पत्र — 1**  
**भू —गतिकी एवं संरचनात्मक भू —विज्ञान**  
**(पेपर कोड — 0851)**

- इकाई—1** 01. पृथ्वी की भू- भौतिकी स्थिति: गुरुत्व, चुम्बकीयता तथा पुराचुम्बकीयता ।  
02. समस्थिति की अवधारणायें एवं सिद्धांत ।  
03. पर्वतीय एवं महादेशभवनी गतियां । वैश्विक पर्वतनिर्माणकारी गतिविधियां ।  
04. पर्वतनिर्माणकारी, कायान्तरण, चुम्बकत्व एवं धातुनिर्मितीकालों में अन्तर्सम्बन्ध ।  
05. महाद्वीपीयविस्थापन एवं समुद्रतलविस्तारण के साक्ष्य एवं सहत्व ।

**इकाई—2**

01. मध्य समुद्री पर्वत, खाइयों द्वीपीयचापों की उत्पत्ति, वितरण एवं महत्व ।  
02. प्लेट — विवर्तनिकी के सिद्धांत । प्लेट सीमाओं की प्रकृति एवं प्रकार ।  
03. स्मुद्रों तथा महाद्वीपों का उद्विकास ।  
04. महाद्वीपीय सीमाओं की विवर्तनिकी : महाद्वीपीय शैल्य, उपसरिततट, सक्रियतट एवं सीमांतीय द्रोणियाँ ।  
05. नवविवर्तनिकी: सक्रियभ्रंश, भू- आकृतिक संसूचक, अपवाहपरिवर्तन, पुनर्धारा भूकम्पीयता ।

**इकाई—3**

01. विषमविन्यासों का अभिनिर्धारण एवं भू- वैज्ञानिक महत्व ।  
02. वलन आकारिकी एवं ज्यामितिक वर्गीकरण ।  
03. वलन का जननिक वर्गीकरण ।  
04. वलन का यांत्रिकी एवं कारण ।  
05. मानचित्र एवं स्थल में वलयों का अभिनिर्धारण । वलन का हश्यांश पर प्रभाव ।

**इकाई—4**

01. भ्रंश का ज्यामितिक एवं जननीय वर्गीकरण ।  
02. भ्रंश का हश्यांशों पर प्रभाव ।  
03. संधियां : ज्यामितिक एवं जननीय वर्गीकरण लवण — गुम्बद ।  
04. पत्रण : वर्णनात्मक शब्दविज्ञान, उत्पत्ति एवं दीर्घ संरचनाओं से संबंध ।  
05. रेखण : वर्णनात्मक शब्दविज्ञान, प्रकार एवं उत्पत्ति तथा दीर्घ संरचनाओं से संबंध ।

**इकाई—5**

01. प्राथमिक आग्नेय एवं अवसादी संरचनाओं के आधार पर अधे एवं शीर्ष की अभिनिर्धारण  
02. शैल विरूपण की प्रारम्भिक जानकारीयें । प्रतिबल एवं विकृति की अवधारणाएं ।  
प्रतिबल एवं विकृति दीर्घवृत्तज ।  
03. भ्रंशयांत्रिकी की मूलभूत जानकारीयें ।  
04. स्ट्रियोग्राफिक प्रक्षेपण एवं संरचनात्मक भू-विज्ञान में अनुप्रयोग ।  
05. भारत की विवर्तनिकी संरचना ।



## REFERENCE :

1. Keary F. & Vine, F.J. 1990 : Geophysics, Blackwell.
2. Storeyed, K.N. 1997 : Our Evolving planet : Earth's History in New perspective.
3. Summesfield, M.A. 2000 : Geomorphology and Global Tectonics, Spines-verlag.
4. Stanislave, M. 1984 : Introduction to applied Geophysics, Reidel publ.
5. Vogalsan. D. 1995 : Environmental Geophysics - A Practical Guide, Spines Verlag.
6. Bryant, E. 1985 : Natural hazards, Cambridge, University press.
7. Patwardhan, A.. 1999 : The Dynamic Earth system - Practice Hall
8. Bell, F.G. 1999 : Geological Hazards. Routledge, London.
9. Smith, K. 1992 : Environmental Hazards : Routledge, London
10. वल्लिया, ख, सिंह 1997 : सामान्य भू-विज्ञान, छि ज्वलंत समस्यायें, उ.प्र. हि.ग्रंथ अकादमी, लखनऊ ।
10. Mch, P & Duff, D, 1994 : Holm's Principles of physical Geology 1st ed. ELES. U.K.

## BOOKS RECOMMENDED :

1. Hobbs, B.E. Means, M.D. & Williams 1976 : Structural Geology.
2. Davis, G.R. 1984 : Structural Geology of Rocks & Region - John Wiley.
3. Ramsay, J.G. and Hober, M.I. 1987 : Modern Structural Geology Vol. I-II,
4. Price, N.J. and Cosgrove, I.W. 1990 : Analysis of Geological structure, Cambridge Uni. Press.
5. Ghosh, S.K. 1995 : Structural Geology fundamentals of modern Developments
6. संरचनात्मक भू-विज्ञान : एस.डी.के. श्रीवास्तव, म.प्र. हि.ग्रंथ अकादमी, भोपाल ।
7. भारत सिंह राठौर -भू-विज्ञान : म.प्र. हि.ग्रंथ अकादमी, भोपाल ।

**सैद्धांतिक प्रश्न पत्र – 2**  
**शैलीकी एवं भू-इतिहास**  
**(पेपर कोड –0852)**

**पूर्णांक – 50**

**इकाई- 1**

1. दिक्काल में शैल-संग्रहता । शैल ग्रंथों की आवधराणा, तंत्र-प्रावस्था एवं घटक ।
2. साम्यावस्था – उष्मागतिकी के मूल सिद्धांत । द्वि एवं त्रिघटकीय सिलिकेट तंत्र में प्रावसी साम्य (एल्बाइट – एनार्थइट), (डायोप्साइट – एडार्थइट) (डायोप्साइट – एल्बाइट-एनार्थइट)
3. अम्लीय आग्नेय शैलों का शिलाविवरणात्मक अध्ययन ।
4. शारीय एवं अल्पसिलिक आग्नेय शैलों का शिलाविवरणात्मक अध्ययन ।
5. अल्पसिलिक आग्नेय शैलों का शिलाविवरणात्मक अध्ययन ।

**इकाई-2**

1. कायात्तरण प्रक्रियाओं की साम्स एवं असाम्य अभिक्रियाएं ।
2. पेराजिनेटिक आरेख : प्रक्षेपीय विश्लेषण, ए.सी.एफ. एवं ए.के.एफ आरेख ।
3. ताप-दाब-संगठन के संदर्भ में मृणमय शैलों का उद्विकास ।
4. ताप-दाब-संगठन के संदर्भ में अल्पसिलिक तथा चूनामय शैलों का उद्विकास ।
5. अपक्षय प्रक्रियाओं की रासयनिकी : स्थलजात एवं रासयपिक अवसातों का प्रसंगनन ।

**इकाई-3**

1. वायूढ़, जलोढ़, तटीय एवं गंभीर समुद्री विक्षेपणीय वातावरण की गतिकी ।
2. अवसादी एवं स्तरविज्ञानी संलक्षणाओं की अवधारणायें ।
3. पुरापर्यावरण एवं पुराजलवायु विश्लेषण के मूलभूत सिद्धांत ।
4. संस्तरविज्ञानी वर्गीकरण एवं सहसंबंधन ।
5. स्तरविज्ञानी आंकड़े एकत्रीकरण की विधियां : स्तरविज्ञानी संस्पश । एवं विषय विन्यासों का अभिनिर्धारण ।

**इकाई- 4 वर्गीकरण, भौगोलिक वितरण, शैलीकीय लक्षण, संचित जीवाशन तथा आर्थिक महत्त्व निम्न स्तर विज्ञानी समुद्रों का –**

1. धावार, सिंहभूम, बस्तर, अरावली के महासंघ के पूर्व केम्बिलियन शैल ।
2. ससर, कड़प्पा, विन्ध्य, छत्तीसगढ़ महासंघ के पूर्व केम्बिलियन शैल ।
3. साल्ट रेंज के पुराजीवी शैल एवं गोंडवाना महासंघ ।
4. स्पिटी, कच्छ, विपनापल्ली कहाकल्पीय शैल, डेक्कन ट्रेप्स और अन्तरट्रेप्सीय संस्तर ।
5. आसान के तृतीयक शैल एवं शिवालिक संघ । हिम. नदीय युग, हिम नदीय युगों के कारण, व हिम-नदी स्थिति ।

**इकाई- 5**

1. व्यतिव एवं जीवाश्म समूहन में विभिन्नता, चित्रण, वर्गीकरण एवं क्रमबद्ध नामकरण ।
2. स्तरविज्ञान, पुरापास्थितिकी एवं पुरा-भूगोल के अध्ययन में जीवाश्मविज्ञान का महत्व ।
3. मोलस्का एवं ब्रेक्रियोपोडा जीवाश्मों की आकारिकी, पर्यावरण । तथा भू-वैज्ञानिक वितरण ।
4. इकाइनोडरमेटा, आर्थोपाडा एवं एन्थोजोआ वर्ग के जीवाश्मों की आकारिकी, पर्यावरण तथा भू-वैज्ञानिक वितरण ।
5. सूक्ष्मजीवाश्म विज्ञान एवं सूक्ष्मजीवाश्मों के अध्ययन की मूलभूत जानकारीयां । पृष्ठरज्जुकधारी एवं पादप जीवाश्मों के संक्षिप्त अध्ययन ।

### प्रायोगिक

1. प्राकृतिक स्थूलदर्शी नमूनों एवं कृत्रिम संरचनात्मक प्रादशों में संरचनाओं का सचित्र वर्णन ।
2. भू-वैज्ञानिक नक्शों में परिच्छेदिका, भू-वैज्ञानिक काट की रचना एवं विवेचना ।
3. संरचनात्मक आंकड़ों के लिये स्टिरियोग्राफिक प्रक्षेपण की निर्मिती ।
4. स्थलाकृतिक पाठ्यक्रम में शामिल जीवाश्म संघों के प्रमुख जीवाश्मों की आकारिकी का अध्ययन ।
5. भारत के मानचित्र पर मुख्य स्तर वैज्ञानिक एवं शैलविवर्तन इकाई का वितरण दर्शाना ।
6. मुख्य आग्नेय, अवसादी एवं कायान्तरित शैलों के स्थूलदर्शी नमूनों का अध्ययन ।
7. मुख्य आग्नेय, अवसादी एवं कायान्तरित शैलों के काटों का सूक्ष्मदर्शी अध्ययन ।

#### भू-वैज्ञानिक क्षेत्रीय अध्ययन:

- 10 दिवसीय भू-वैज्ञानिक मानचित्रण कार्य एवं आर्थिक खनिज निक्षेपों का अध्ययन ।  
न्मूना संग्रहण (अयस्क, शैल, जावाश्मों के रूप में) एवं उनका विशेष अध्ययन ।

#### BOOKS RECOMMENDED: FOR PAPER II

- |                                       |   |
|---------------------------------------|---|
| 1. Jurner, F.J. 1980                  | - Metamorphic Petrology, Megraw Hill, New York                    |
| 2. Best, M.G. 1986                    | - Igneous Petrology - CBS Publication                             |
| 3. Bose, M.K. 1997                    | - Igneous Petrology - World Press                                 |
| 4. Sengupta, S. 1997                  | - Introduction to sedimentology - Oxford-IBH                      |
| 5. Readings, H.G. 1996                | - Sedimentary Environments, Blackwell                             |
| 6. Bhattacharya, A. and C. 2000       | - Analysis sedimentary successions, Oxford Chakraborti,           |
| 7. Ravindra Kumar                     | - Stratigraphy of India   |
| 8. S. Anantharaman                    | - Palaeontology   |
| 9. Clackson, E.N.K. 1998              | - Investitrate palaeontology and evolution-IV edi., Blackwell     |
| 10. Boggs, Sam Jr. 1995               | - Principles of sedimentology and stratigraphy, practising shall. |
| 11. Naqvi S.M. and Roger, J.J.W. 1987 | - Pre. Geology of India, Oxford-university Press.                 |
| 12. Nordstorn, D.K. and J.L. 1986     | - Geochemical, Thermodynamics, Blackwell Manoj,                   |

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**ANTHROPOLOGY**  
**PAPER - I**  
**ARCHAEOLOGICAL ANTHROPOLOGY**  
**(Paper Code - 0865)**

**AIM :** The main aim of this course is to introduce the students about the basic elements of Prehistoric Archaeology.

**UNIT-I** Meaning and scope of the different kinds of Archaeology : Classical Archaeology, Historical Archaeology, Prehistoric Archaeology and Protohistoric Archaeology as Anthropology, Differences between the Old world and New world Dating, Archaeology Traditions. Absolute Dating Relation Dating..

**UNIT-II** Geological time scale. The Great Ice Age. Stratigraphy and other evidences of Ice Age : River terraces, Moraines etc. Alpine and Himalayan glaciations. Pluvials and interpluvials, Stone Age tools : Types and Technology.

**UNIT-III** Age of palaeolithic savagery : European lower, palaeolithic period : Stone tools and culture, Indian lower Palaeolithic period : Sohan Culture, Madrasian Culture. European Middle Palaeolithic Period : Tools & culture. Flake tool complex in India. European Upper Palaeolithic period ; Tools and Culture. Main characteristics of the European Palaeolithic Home and Cave art and its significance.

**UNIT-IV** Mesolithic complex in North Europe. Mesolithic complex in Western Europe. Mesolithic Culture in India. Chief feature of Neolithic revolution. Neolithic complex in India.

**UNIT-V** Metal Age : Copper, Bronze and Iron age : General feature of Urban revolution. The Chief characteristics and the decay of Indus valley civilization. Megalithic culture in India.

**RECOMMENDED READINGS:**

- |    |                                  |   |   |
|----|----------------------------------|---|---|
| 1  | Auchin, B. and Allchire R.(1968) | : | The birth of Indian Civilization                      |
| 2  | Rorder, F.(1970)                 | : | The Old Stone Age                                     |
| 3  | Burkitt, M.                      | : | The Stone Age   |
| 4  | Burkitt, M.                      | : | Our Early Ancestors                                   |
| 5  | Childe, V.G.(1970)               | : | Man Makes Himself                                     |
| 6  | Oakley, K.P.(1972)               | : | Man the Toolmaker                                     |
| 7  | Shaprio, H.L.(Editor)            | : | Man Culture and Society                               |
| 8  | Bhattacharya, D.K.               | : | Prehistoric Archaeology                               |
| 9  | Misra, V.N. & M.S. Mate (eds)    | : | Indian Prehistory : 1964                              |
| 10 | Sankalia, H.D.                   | : | Prehistory and Protohistory of Indian & Pakistan      |
| 11 | Wheeler, R.E.M.(1968)            | : | The Indus Civilization                                |
| 12 | Sankalia, H.D.(1964)             | : | Stone Age Tools : Their Techniques Names & Functions. |
| 13 | मजूमदार डी.एन. तथा शरणजी         | : | प्रागैतिहासिक   |
| 14 | चौबे रमेश                        | : | पुरातात्विक मानविज्ञान                                |

27-10-17

**PAPER - II**  
**TRIBAL CULTURE OF INDIA**  
**(Paper Code - 0866)**

**AIM :** The main aim of this course is to introduce the students about the basic-cultural life of Indian tribes.

**UNIT-I** Define tribe and scheduled tribe, Geographical distribution of Indian tribes and their social and linguistic classification. Anthropological contribution in the study of Indian tribes. Sacred complex, Universalisation and parochialisation, Sanskritisation and westernisation dominant caste. Tribe & caste difference between S.C. and S.T. characteristic features. Primitive tribes of Chhattisgarh (Kamar, Birhor, Hill Korwa, Abujmarh, Baisa)

**UNIT-II** Tribal economy : Hunting, food gathering, fishing, shifting and settled agriculture of property and ownership in tribal societies, problems of tribal people : land alienation, bonded labour, indebtedness, shifting, cultivation, irrigation, forest and tribals, unemployment, agricultural labour, the inter relationship of tribals with agricultural merchants, money lenders, excise officers and forest contractors, stage of tribal economy.

**UNIT-III** The problems of culture contact : problems due to urbanisation and industrialisation, regionalism economic and psychological folk traditions, tribal religion : origin & function, animistic, totemistic, concept and practices : Magic and witchcraft, shamanism, head hunting.

**UNIT-IV** Political and social organisation of Indian tribes : Political organisation of Indian tribes, Distinction between state and stateless society, law in primitive society, matriarchal and patriarchal family, lineage and clan. Ways of acquiring mates in tribal societies. Youth dormitories : Type, organisation and functions.

**UNIT-V** Tribal development : History of tribal development, the constitutional safeguards for the scheduled tribes, tribal problem : isolation, migration, acculturation, detribalizations, policies, plans and programmes of tribal development and their implements, tribal revolts in India, Response of the tribal people to the Governmental measures meant for them, the role of anthropology in tribal development.

18  
27-10-17

### PAPER - III

#### PRACTICAL OBJECTIVES

The objective of this practical course is to introduce the students with the primitive material culture and technology used by primitive man and the students will be introduced with various techniques commonly used by social anthropology.

#### **MATERIAL CULTURE :**

**PART-I** Identification and technological descriptions of the following.

1. Implements for food gathering, hunting, fishing and agriculture.
2. Fire making implements.
3. Types of habitations
4. Land and water transport

**PART-II** Sketching, identification and the description of palaeolithic, mesolithic and neolithic tools.

(It is essential that students should draw at least five tools of each age)

#### **RESEARCH TOOLS :**

Construction of schedules, Genealogy and Questionnaire :

Each student should collect information through above tools from 05 Repodents. The student will be required to maintain practical records of all work done in the practical class.

#### **RECOMMENDED BOOKS:**

- |   |                          |   |   |
|---|--------------------------|---|---|
| 1 | Beals, R. and Hoiyar, N. | : | Introduction to Anthropology            |
| 2 | Leakey, L.S.B.           | : | Adam's Ancestors                        |
| 3 | Sankalia, H.L.           | : | Prehistoric tools and their techniques  |
| 4 | Murdock, G.P.            | : | Outlines of cultural material           |
| 5 | Shapiro, H.L. (Editor)   | : | Man, culture and society (Eng. & Hindi) |
| 6 | चौबे, रमेश               | : | पुरातात्विक मानव विज्ञान                |
| 7 | विद्यार्थी व सिंग        | : | भौतिक-संस्कृति के आदित्य चरण।           |

#### **RECOMMENDED READINGS:**

- |    |                      |   |                                    |
|----|----------------------|---|------------------------------------|
| 1  | Bose, N.K.           | : | Tribal India: National integration |
| 2  | Bose, N.K.           | : | Tribal life of India               |
| 3  | Elwin, V.            | : | A new deal of Tribal India         |
| 4  | Fuchs, S.            | : | The Aboriginal Tribes of India     |
| 5  | Government of India  | : | Adivasi                            |
| 6  | Ghurye, G.S.         | : | The scheduled tribes               |
| 7  | Mamvria              | : | Tribal demography                  |
| 8  | Vidyarthi, L.P.      | : | The tribal culture of India        |
| 9  | नदीम हसनैन           | : | जनजातीय भारत                       |
| 10 | Verma, R.C.          | : | Indian tribes through ages         |
| 11 | उपाध्याय तथा शर्मा   | : | भारत की जनजाति संस्कृति            |
| 12 | तिवारी शिवकुमार      | : | मध्य प्रदेश की जनजातियां           |
| 13 | श्रीवास्तव, ए.आर.एन. | : | जनजाति विकास के चार दशक।           |

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27-10-17

**STATISTICS**  
**PAPER - I (Paper Code - 0853)**  
**STATISTICAL METHODS**

- UNIT-I** Sampling from a distribution : Definition of a random sample, simulating random sample from standard distributions, concept of a derived distributions of a function of random variables. Concept of a statistic and its sampling distribution, Point estimate of a parameter, Concept of bias and standard error of an estimate. Standard errors of sample mean, sample proportion. Sampling distribution of sum of binomial, Poisson and mean of normal distributions. Independence of sample mean and variance in random sampling from a normal distribution (without derivation).
- UNIT-II** Statistical Tests and Interval Estimation : Null and alternative hypotheses, Types of errors, p-values, Statement of chi-square, t, and F statistics. Testing for the mean and variance of univariate normal distribution, testing of equality of two means and testing of equality of two variances of two univariate normal distributions. Related confidence intervals. Testing for the significance of sample correlation coefficient in sampling from bivariate normal distribution and for the equality of means and equality of variances in sampling from bivariate normal distributions.
- UNIT-III** Large Sample Tests : Use of central limit theorem for testing and interval estimation of a single mean and a single proportion and difference of two means and two proportions, Fisher's Z transformation and its uses. Pearson's chi-square test for goodness of fit and for homogeneity for standard distributions. Contingency table and test of independence in a contingency table.
- UNIT-IV** Nonparametric tests : Definition of order statistics and their distributions, Non-parametric tests, Sign test for univariate and bivariate distributions, Wilcoxon-Mann-Whitney test, Run test, Median test and Spearman's rank correlation test.
- UNIT-V** Four short notes, one from each unit will be asked. Students have to answer any two.

**REFERENCES -**

- Freund, J.E. (2001) : Mathematical Statistics, Prentice Hall of India.
- Goon A.M., Gupta M.K., Das Gupta B. (1991) : Fundamentals of Statistics, Vol. I, World Press, Calcutta.
- Hodges J.L. and Lehman E.L. (1964) : Basic Concepts of Probability and Statistics, Holden Day.
- Mood A.M., Graybill F.A. and Boes D.C. (1974) : Introduction to the Theory of Statistics, McGraw Hill.

**ADDITIONAL REFERENCES -**

- Bhat B.R. Srivenkatramana T and Rao Madhava K.S. (1997) : Statistics : A Beginner's Text, Vol. II, New Age International (P) Ltd.
- Rohatgi V.K. (1967) : An Introduction to Probability Theory and Mathematical Statistics, John Wiley & Sons.
- Snedecor G.W. and Cochran W.G. (1967) : Statistical Methods. Iowa State University Press.



## **PAPER - II (Paper Code - 0854)**

### **A - SAMPLE SURVEYS**

**UNIT-I** Sample Surveys, Concepts of population and sample, need for sampling, Census

and sample survey, basic concepts in sampling, organizational aspects of survey sampling, sample selection and sample size.

Some basic sampling methods - simple random sampling (SRS) with and without replacement.

**UNIT-II** Stratified random sampling, Systematic sampling, ratio and regression methods of estimation under SRS.

Non sampling errors, acquaintance with the working (questionnaires, sampling design, methods followed in field investigation, principal findings etc.) of NSSO, and other agencies undertaking sample surveys.

### **B- ANALYSIS AND DESIGN OF EXPERIMENTS**

**UNIT-III** Analysis of variance for one way and two-way classifications.

Need for design of experiments, fundamental principles of design, basic designs-CRD, RBD, LSD and their analysis.

**UNIT-IV** Factorial designs -  $2^n$  designs, illustrations, main effects and interaction effects and confounding in  $2^3$  design.

**UNIT-V** Four short notes, one from each unit will be asked. Students have to answer any two.

### **REFERENCES -**

- Cochran W.G. and Cox G.M. (1957) : Experimental Designs, John Wiley and Sons.
- Das M.N. and Giri (1986) : Design and Analysis of Experiments, Springer Verlag.
- Murthy M.N. (1967) : Sampling Theory and Methods, Statistical Publishing Society, Calcutta.
- Sampath S. (2000) : Sampling Theory and Methods, Narosa Publishing House.
- Sukhatme B.V. (1984) : Sample Survey Method and its Applications, Indian Society of Agricultural Statistics.

### **ADDITIONAL REFERENCES-**

- Des Raj (2000) : Sample Survey Theory, Narosa Publishing House.
- Goon A.M., Gupta M.K., Das Gupta B. (1986) : Fundamentals of Statistics, Vol.II, World Press, Calcutta.
- Kempthorne O. (1965) : The Design and Analysis of Experiments, Wiley Eastern.

-

### **PRACTICAL**

1. Drawing random samples from standard univariate discrete and continuous distributions such as binomial, Poisson, Normal, Cauchy and Exponential.
2. Tests of significance based on t, chi-square, F. Testing of significance of sample correlation coefficient, Use of Z transformation. Testing of equality of means and equality of variances in sampling from bivariate normal.
3. Large sample tests for means and proportions, tests of goodness of fit and independence of attributes in contingency tables.
4. Nonparametric Tests : Sign, Run, Median and Wilcoxon-Mann-Whitney tests, Selection of sample and determination of sample size, Simple random sampling, Stratified SRS, and systematic sampling, Allocation problems in stratified SRS, Ratio and Regression methods of estimation in SRS.
5. Analysis of variance for one-way and two-way classifications, Analysis of CRD, RBD, and LSD, Analysis of  $2^2$  and  $2^3$  factorial designs.

- - - - -

**DEFENCE - STUDIES**  
**PAPER - I**  
**WESTERN MILITARY HISTORY**

**(Paper Code - 0867)**

**Note :** The aim of this paper is to give a historical, political & social back ground of the state engaged in the conflicts under study and the factors influencing the development of different forms of warfare and weapons system.

**Note :** Question will be set from each unit there will be only Internal choice.

- UNIT-I**
1. Sun Tzu - Founder of Military Theory and philosophy.
  2. Clausewitz - War and its relationship with politics.
  3. Machiavelli - Renaissance of Art of war.
  4. Jomini - Concept of mass armies.
- UNIT-II**
1. Churchill.
  2. Mahatma Gandhi.
  3. Kautilya.
  4. A. Hitler.
- UNIT-III**
1. Mao Tse Tung.
  2. Che Guevara.
  3. Economic and Psychological war.
  4. Collective Security.
- UNIT-IV**
1. Indo-China War -1962 Causes of war, political & military lesson.
  2. Indo - Pak War -1965 Causes of war, political & military lesson.
  3. Indo - Pak War - 1971 Causes of war, political & military lesson.
  4. Kargil Conflict 1999.
- UNIT-V**
1. Internal & External threats of National Security.
  2. Insurgency and Counter-Insurgency.
  3. Terrorism-Problem and Solution.
  4. Naxalism - Problem and solution.

**REFERENCE BOOKS:**

1. Howard M. : Theory and Practice of war
2. ---, --- : Clausewitz
3. Mao Tse Tung : Guerilla warfare
4. Palit, D.k. : The lightning War Tadi Yudh
5. Mankekar : War of 1971
6. आर.सी. जोहरी : पाश्चात्य सैन्य विचारक
7. शर्मा च निगम : सैन्य विचारक ।

## **PRACTICAL**

There shall be a practical examination of 3.5 hours duration carrying 50 Marks. The division of marks shall be as follow:

- |                                    |            |
|------------------------------------|------------|
| (a) Exercise based on Map-reading: | 15marks    |
| (b) T.W.E.S.T.                     | : 15marks  |
| (c) Sessional work                 | : 10marks  |
| (d) Viva-Voce                      | : 10markss |

### **PART - A**

Map-reading:

1. Scales - Definition, method of expressing, construction of simple, time, diagonal and comparative.
2. Relief and its representation.
3. Slopes and Gradient.
4. Visibility and inter-visibility by Gradient, proportionate and section method.
5. Re-section and inter-section.
6. Grid system-Map reference, Index to map. Four figure and Six figure.

### **PART - B**

7. Organization and equipment of infantry Platoon and Section.
8. Section Formation.
9. Indication of Target by various methods.
10. Fire control order.
11. Patrols.
12. Battle Procedures (ROFT).
13. Verbal Order.
14. Message-Writing.

### **BOOKS RECOMMENDED:**

1. Manual of Map Reading: Landon Her
2. युद्ध स्थल कला : चौ. नरेन्द्र सिंह
3. एन.सी.सी. परिचय : विष्णु कांत शर्मा ।

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## INDUSTRIAL CHEMISTRY

### PAPER – I

(Paper Code - 0871)

M.M. 34

**UNIT-I** Material Science : Mechanical Properties of materials and change with respect to temperature. **02L**

**Material of constructions used in Industry :**

**Metals and Alloys :** Important metals & alloys; iron, copper, aluminium lead, nikel, titanium and their alloys- Mechanical and chemical properties and their applications. **06L**

**Cement :** Types of cement, composition, manufacturing process, setting of cement. **04L**

**Ceramics :** Introduction, Types, Manufacturing process, Applications. Refractories. **04L**

**UNIT-II** Polymeric Mateials : Industrial polymer and comoposite materials- Their constitution, Chemical and physical properties, Industrial applications. **06L**

**UNIT-III Glass :** Types, composition, manufacture, physical and chemical properties, Applications. **04L**

**Corrosion :** Various types of corrosion relevant to chemical Industry-Machanism, Preventive methods. **04L**

**UNIT-IV** Pollution : Air, Oxygen, nitrogen cycle, water, Biosphere, flora and fauna, Energy, soil. **05L**

Pollutants and their statutory limits, pollution evaluation methods. **04L**

**UNIT-V** Air pollution-various pollutants. water pollution-organic/inorganic pollutants, Noise pollution, sewage analysis, pesticide pollution, Radiation pollution, green house effect, future. **10L**

**Books Recommended :**

1. Pollution control in chemical & Allied Industries, S.P. Mahajan.
2. Poolution Control in Industries, A Sories of Books by Jones, H.P.
3. Air Pollution - Vol.1 to 4, Editor, STERN, A.C.; Academic Press.
4. Environmental Engineering, G.N. Pandey, Tata McGraw Hill.
5. Homd Book of Air Pollution, A. Parker, Tata McGraw Hill.
6. Science of Ceromic chemical Processing, Hench, L.L.
7. Science of Ceramics, Stewarts, G.H.
8. Chemistry of Cement.
9. Properties of Glass, Morcy, G.W.
10. Chemistry of Glasses, Paul, A.
11. Corrosion, causes & Prevention, Spellur, F.N.



**PAPER - II**  
**(Paper Code - 0872)**

**M.M. 33**

**UNIT-I** Unit processes in organic chemicals manufacture -

**Nitration** : Introduction - Nitrating agents, Kinetics and mechanism of nitration processes such as nitration of :

- i Paraffinic hydrocarbons
- ii. Benzene to nitrobenzene and m-dinitrobenzene
- iii. Chlorobenzene to o and p nitrochloro benzenes.
- iv. Acetanilide to p-nitroacetanilide
- v. Toluene

Continuous vs batch nitration.

**12L**

**UNIT-II Helogenation:** Introduction-Kinetics of helogenation reactions reagents for elogenation, Helogenation of aromatics-side chain and nuclear helogenations, commercial manufacture of chlorobenzenes, chloral, monochloroacetic acid and chloromethanes, dichloro fluormethane.

**09L**

**UNIT-III Sulphonation** : Introduction-sulphonating agents, chemical and physical factors in sulphonation, Kinetics and mechanism of sulphonation reaction, commercial sulfonation of benzene, naphthalene, alkyl benzene, Batch vs continuous sultphonation.

**09L**

**UNIT-IV Effluent Treatment and waste Management** : Principles and equipments for aerobic, anaerobic treatment, adsorption, filtration, sedimentation. **09L**

**UNIT-V** Bag fillters, electrostatic precipitator, mist eliminators, wet scrubbers, absorbers, solid waste management, industrial safety. **09L**

**Books Recommended :**

1. Unit process in Organic synthesis P.M. Groggins, McGraw Hill.
2. Effluent Treatment in process Industries - Inst. of Cham. Engg.
3. Effluent Treatment and waste Disposal - Inst. of Chem. Engg.
4. Effluent Treatment and Disposal - Inst. of Chem. Engg.

The image shows five handwritten signatures and dates, likely from examiners. From left to right: 1. Signature 'A. B. Srinivas' with date '24.7.2017'. 2. Signature 'A. Srinivas' with date '24.7.17'. 3. Signature 'A. Srinivas' with date '24.7.17'. 4. Signature 'D. Srinivas' with date '24/7/17'. 5. Signature 'A. Srinivas' with date '24.7.17' and a checkmark.

**PAPER - III**  
**(Paper Code - 0873)**

**M.M. 33**

**UNIT-I Oxidation :** Introduction-Types of oxidation reactions, oxidizing agents, kinetics and mechanism of oxidation of organic compounds liquid phase oxidation, vapor phase oxidation, commercial manufacture of benzoic acid, maleic anhydride, phthalic anhydride, acrolein, acetaldehyde, acetic acid. **07L**

**UNIT-II Hydrogenation :** Introduction-Kinetics and thermo-dynamics of hydrogenation reactions, catalysts for hydrogenation reactions, hydrogenation of vegetable oil. manufacture of methanol from carbon monoxide and hydrogen, hydrogenation of acids and esters to alcohols, catalytic reforming. **07L**  
Alkylation: Introduction; Types of alkylation, Alkylating agents, Thermodynamics and mechanism of alkylation reactions, manufacture of - alkyl benzenes (for detergent manufacture), ethyl benzene, phenyl ethyl alcohol, N-alkyl anilines (mono and di- methyl anilines) **03L**

**UNIT-III Esterification :** Introduction; Hydrodynamics and kinetics of esterification reactions, Esterification by organic acids, by addition of unsaturated compounds, esterification of carboxy acid derivatives, commercial manufacture of ethyl acetate, dioctyl phthalate, vinyl acetate, cellulose acetate. **04L**

**Amination : (A) By reduction :** Introduction, Methods of reduction-metal and acid, catalytic, sulfide, electrolytic, metal and alkali sulfites, metal hydrides, sodium metal, concentrated caustic oxidation, reduction, commercial manufacture of aniline, m-nitroaniline, p-amino phenol.

**(B) By aminolysis :** Introduction, aminating agents, factors affecting. **09L**

**Hydrolysis :** Introduction; hydrolysing agents, kinetics, thermodynamics and mechanism of hydrolysis. **02L**

**UNIT-IV Process Instrumentation :** concept of measurement and accuracy Principle, construction and working of following measuring instruments.

Temperature : Glass thermometers, bimetallic thermometer pressure spring thermometer, vapour filled thermometers resistance thermometers. radiation pyrometers.

Pressure : Manometers, barometers, bourdon pressure gauge ; bellow type, diaphragm type pressure gauges, macleod gauges, pirani gauges, etc. **12L**

**UNIT-V Liquid level :** Direct-indirect liquid level measurement, Float type liquid level gauge, ultrasonic level gauges; bubbler system, density measurement, viscosity measurement. **07L**

  
The block contains six handwritten signatures, each followed by the date '24.7.17'. The signatures are written in blue ink on a white background.

**Books Recommended :**

1. Unit process in organic synthesis, P.M. Groggins, McGraw Hill.
2. Industrial Instrumentation, Bekmen, D.P., John wrleys.
3. Applied Instrumentation in process Industries, Vol. I, II & III, Andrews, W.G., Gulf Publication.
4. Instrumentation and Control for the process Industries, Borer, S. Elsevier Applied Science Publishers.
5. Chemical Enggineer's Hand book, Perry, J.H. and Green, D. McGraw Hill.

**Time : 4 Hours****PRACTICALS****M.M. 50**

**Unit Process :** One to two examples of each of the following unit processes.

Nitration, sulphonation, friedel-crafts reaction, esterification, hydrolysis, oxidation, Halogenation, chloro-sulphonation, reduction, polymerization, reactions of diazonium salts. **Instrumental methods of analysis :** Use of colourimeter pH meter, potentiometer, conductometer, refractometer, polarimeter

**Materialtesting:** Testing of alloys identification of plastics/rubber estimation of yield point, young's modulus, flaredness; Optical, thermal mechanical and electrical properties. **Process Instrumentation :** Transducers of different types. use of Tranducer for measuring flow control. Determinatiaon of flash point and ignition points of liquids.

**Water analysis :** Solid contents, Hardness, COD and other tests as per industrial specifications.

**Flow measuring devices :** Floats Monographs of representative raw materials such as sulphuric acid, toluene, sodium, carbonate, sodium hyroxide, carbon tetrachloride benzoic acid (5-6 compounds). Limit tests for heavy metals Pb, AS, Hg, Fe and ash content.

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**VOCATIONAL COURSE IN ELECTRONIC  
EQUIPMENT MAINTENANCE  
SCHEME OF EXAMINATION**

		<b>Max. Marks</b>	<b>Min. Pass Marks</b>
Paper - I	Operational Principles of Audio	50	17
Paper - II	Microprocessor Based Instrumentation and Control	50	17
	Practicals	50	17

**1. SUBJECT OBJECTIVE :**

The objective of this syllabus is to familiarize students with the fundamentals of electronics and prepares him/her to keep in track with fast change in this field so that he/she is prepared to takenup advance studies or go for self employment. It is proposed to give the students an idea of basics of all the developments in the field of electronics. Efforts are directed to impart some knowledge of computer hardware and software too, which fall in the realu of electronics so that the students become aware of fast changing scene of information superhigh wey also.

**2. JOB POTENTIALS :**

The students in (by) taking up this course may find adequta job- opportunities in industries or manufacturing firms. They may opt for setting up their own small scale industries of electronics, thus enhancing self employment.

3. **Contents :** As per attached syallbus.

4. Subject scheme.
5. On the job training will be imparted in Summer days.
6. As detailed out in the prospectus.
7. As per the draft given in the syllabus.
8. Permissible combination of subject Physics, Mathemetics & Electonic equipment mathematics.

## **PAPER - I**

**(Paper Code - 0859)**

### **OPERATIONAL PRINCIPLES OF AUDIO AND VIDEO EQUIPMENTS**

**M.M. 50**

**UNIT-I** Revision of All and FH, communication bands, signal sources, Basic Principles of propagation of e.m. wave through atmosphere and ionosphere; ground waves, sky waves, space waves, dead zones etc.

**RECEIVING ANTENNAE:** Antenna Parameters like gain, radiation pattern, effective aperture. Ferrite AE. Type of antennae like wire, loop, dish, Yagi, telescopic, their construction and operating principles.

**SUPERHETERODYNE RECEIVERS:** Principles, advantages, block diagram, RF input and AE coupling arrangements, RF amplifiers, mixer, local oscillator, IF amp. Detector, audio amplifier, loud speaker, power requirements, tuning/aligning of receivers, waveforms and voltages at different check points. Circuit reading of various radio sets, repair and trouble shooting, automobile radios.

**UNIT-II ELEMENTS OF A TELEVISION SYSTEM :** Picture transmission, sound transmission, picture reception, sound reception, synchronisation.

**TYPE VIDEO SIGNAL :** Scanning sequence details, sync details of the 625 line system, channel bandwidth, vestigial sideband transmission, reception of vestigial sideband signals, frequency modulation, FH channel bandwidth, channel bandwidth for colour transmission, allocation of frequency bands for television bandwidth for colour transmission, allocation of frequency bands for television signal transmission, television standards.

Picture tubes- monochrome and colour : Beam deflection, face plate, picture tube characteristics, picture tube circuit controls.

**UNIT-III TELEVISION RECEIVERS :** Types of television receivers, receiver sections, video detector, video section fundamentals, video amplifiers-design principles, video amplifier circuits, automatic gain control and noise cancelling circuits, sync separation circuits, sync-processing and AFC circuits, deflection circuits, sound system, RF tuner, video IF amplifiers, receiver power supplies, television receiver antennae, colour television antennae.

**TELEVISION APPLICATIONS :** Television broadcasting, cable television, closed circuit television, theatre television, picture phone and facsimile, video tape recording (VTr, television via satellite, TV games, HDTV, flatpanel TV teleconferencing.

**UNIT-IV TAPE RECORDERS :** Principles of magnetic recording, characteristics of magnetism, the hysteresis loop, recording head, recorded wave-length, response of head during reply, the effect of gap length, low frequency loss, other losses, equalization, the effect of non-linear characteristic of magnification recording bias, A.C. bias, erasing the tape, block diagram of audio tape recorder.

Oscillator, preamplifier, dolby, amplifier, record (play back) head, erase head, tapes (metal polymer), mechanical transport system, stereo recording, double deck, single deck, microphones (RF, Cable), noise, maintenance of mechanical parts, head cleaners, head alignment, graphic equalisers.

**UNIT-V TELEPHONES :** Modulation, demodulation, modem, subscriber frequency allotment, channel organisation, signalling, switching, manual exchanges, STD, ISD, EFABX, Intercom-system on equipment and EPABX, Value added services like FAX E mail.

**MEASURING INSTRUMENTS :** Multimeters analog/digital, oscilloscopes, signal generators, noise and sound level meters, frequency counters, error sources and precautions during measurement.

**GENERAL NOTE :** Familiarisation with catalogues, standard specification, knowledge about companies referring to service manual.

**PAPER - II**  
**MICROPROCESSOR BASED INSTRUMENTATION AND CONTROL**  
**(Paper Code - 0860)**

**M.M. 50**

**UNIT-I MICROCOMPUTER FUNDAMENTALS :** Introduction, simplified microcomputer architecture, simplified memory organization, instruction set, simplified CPU organisation, microcomputer operation, Personal computer organization and Word Processor. Data sheet descriptions, pin diagram and function, microprocessor architecture, using the data/address register, using the stack pointer.

**UNIT-II THE INTEL 8080/8085 MICROPROCESSOR :** Introduction, the 8085 pin diagram and functions, the 8085 architecture, addressing modes, the 8080/8085 instructions set, the 8080/8085 data transfer instructions, the 8080/8085 arithmetic instructions, the 8080/8085 logical instructions, the 8080/8085 stack, I/O, and machine control instructions.

**UNIT-III PROGRAMMING THE MICROPROCESSOR :** Machine and assembly languages, simplified instruction set, instruction set, arithmetic operations, instruction set-logical operations, instruction set-data transfer operations, instruction set branch operations, instruction set-subroutine call and return operations, instruction set-miscellaneous operations, writing a program, addressing modes, program branching, program looping using subroutines.

Programming the 8080/8085 microprocessor : Introduction, straight-line programs, looping programs, mathematical programs.

**UNIT-IV INTERFACING THE MICROPROCESSOR :** Introduction, interfacing with ROM, interfacing with RAM, input/output interfacing basics, interfacing with practical I/O ports, synchronizing I/O data transfers using interrupts. address decoding.

**UNIT-V Application to illustrate the use of microprocessor in :**

- (i) Traffic control
- (i) Temperature control
- (i) Digital clock
- (iv) Stepper motor control
- (v) Washing machine control

## PRACTICALS

A student is required to do atleast 12 experiments in an academic year, and one month Summer Training. The scheme of practical examination will be as follows :

(i) One experiment of 3 hours duration and one Month Summer Training.

(i) Marks

Experiment : 25 Marks

Sessional : 10 Marks

One Month Summer Training : 15 Marks

**Total 50 Marks**

\* The marks for summer training will be awarded by the teachers teaching the students on the basis of the certificate issued by the external supervisor of the summer training.

## LIST OF PRACTICALS

1. Development of soldering skill by constructing a few circuits and testing.
2. PCB making.
3. Study of modulator.
4. Study of oscillator.
5. Tape recorder-testing, assembly and dis-assembly.
6. Radio receiver-testing.
7. Study of PA system and i.s. testing.
8. Study of EPABK, wiring and connectivity with telephone instruments.
9. Familiarisation with 8085 Based microprocessor trainer kit. Location of 8085, 8279, 8253 keyboard, display fields, EPROM Programmer, expansion slot, TTY and serial lines.
10. Entering and executing an assembly language program, codes for insertion, deletion, memory move, block fill, setting and examining registers and memory, single step execution of a program.
11. Writing of a program to add, subtract and multiply two numbers stored in memory (nnnn & nnnn \* 1) and place the result in the subsequent memory, (nnn \* 2).
12. Writing of a program to test R.H. for errors by writing 0's & 1's in alternate location and reading it for checking.
13. Making of a board with a 3 LED's and four switches to connect to the 8085 kit on the expansion slot (8279).
14. Making of a board with a 8 LED's and four switches to connect to the 8-85 kit on the expansion slot (8255).
  - (a) Program the 8255 to glow/switch of LED's.
  - (b) Program the 8255 to switch on and OFF the LED's every few second according to a given pattern (Hint : The pattern can be 01010101 and 10101010 or 001001100, or any other).

**Reference Books:**

- |                                     |   |   |
|-------------------------------------|---|---|
| 1. Fundamentals of acoustics        | : | Kinsler & Frey                                |
| 2. System trouble shooting Handbook | : | Lucas K, Faulken Berry<br>(John Wiley & Sons) |
| 3. Monochrome & Colour Television   | : | P.R. Gulati                                   |
| 4. Television Engineering           | : | Dhake   |
| 5. Microprocessor                   | : | Gaonkar                                       |
| 6. Microprocessor                   | : | B. Ram  |
| 7. Microprocessor                   | : | Sham Saries                                   |

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**COMPUTER SCIENCE**  
**PAPER - I**  
**COMPUTER HARDWARE**  
**(Paper Code - 0855)**

**Duration 3 hours**

**Max.Marks 50**

**AIM -** The emphasis is on the design concepts & organisational details of the common PC, leaving the complicated electronics of the system of the computer Engineers.

**OBJECT OF THE COURSE -**

1. To introduce the overall organisation of the microcomputers.
2. To introduce the common peripheral devices used in computers.
3. To introduce the hardware components, use of micro processor and function of various chips used in microcomputer.

**N.B. :** Since the computer organisation study is very vast & complicated, so the study is restricted to only the description and understanding part, hence the paper setter is requested to keep this important factor in mind.

**UNIT-I CLASSIFICATION AND ORGANIZATION OF COMPUTERS**

Digital and analog computers and its evolution. Major components of digital computers; Memory addressing capability of CPU; word length and processing speed of computers. Microprocessors single chip microcomputers; large and small computers. Users interface Hardware software and firmware. multi programming multi user system. Dumb smart and intelligent terminals computer network and multi processing, LAN parallel processing. Flinn's classification of computers. Computer flow and data flow computers.

**UNIT-II CENTRAL PROCESSING UNIT.**

CPU organization, ALU control unit registers. Instructions for INTEL 8085, Instruction word size, Various addressing mode interrupts and exceptions, some special Control signals and I/O devices. Instruction cycle fetch and execute operation, time Diagram, data flow.

**UNIT-III MEMORY OF COMPUTERS.**

Main memory secondary memory, backup memory, cache memory; real and virtual Memory Semiconductor memory. Memory controller and magnetic memory; RAM; disks, optical disks Magnetic bubble memory; DASD, destructive and non destructive. readout. Program of data Memory and MMU.



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#### **UNIT-IV I/O DEVICES.**

I/O devices of micro controller; processors. I/O devices, printer, plotter, other output devices, I/O port serial data transfer scheme, Micro controller, signal processor, I/O processor I/O processor arithmetic processor.

#### **UNIT-V SYSTEM SOFTWARE AND PROGRAMMING TECHNIQUE.**

ML, AL, HLL, stack subroutine debugging of programs macro, micro programming, Program Design, software development, flow & chart multi programming, multiuser, multi tasking Protection, operating system and utility program, application package.

#### **RECOMMENDED BOOKS :**

1. Computer Fundamentals : Architecture and Organization - By B.Ram  
(Wilwy East-ern Ltd.)
2. Computers Today - By Donal H. Sanders
3. Computers Fundamental - By Rajaraman.
4. IBM PC - XT Clones - By Govinda Rajalu

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**PAPER - II**  
**SOFTWARE**  
**(Paper Code - 0856)**

**AIM** - Introduction to the web-language-HTML & problem solving through the concept of object oriented programming.

**OBJECT OF THE COURSE -**

1. To introduce the internet & web related technology & learn the intricacies of web-page designing using HTML.
2. To introduce the object oriented programming concept using C++ language.
3. To introduce the problem solving methodology using the C++ programming features.

Examiners are requested to prepare unit-wise Questions papers.

**UNIT- I      HTML BASICS & WEB SITE DESIGN PRINCIPLES**

Concept of a Web Site, Web Standards, What is HTML? HTML Versions, Naming Scheme for HTML Documents , HTML document/file, HTML Editor , Explanation of the Structure of the homepage , Elements in HTML Documents ,HTML Tags, Basic HTML Tags, Comment tag in HTML, Viewing the Source of a web page, How to download the web page source? XHTML, CSS, Extensible Markup Language (XML), Extensible Style sheet language (XSL), Some tips for designing web pages, HTML Document Structure. HTML Document Structure-Head Section, Illustration of Document Structure,<BASE> Element,<ISINDEX> Element,<LINK> Element ,META, <TITLE> Element,<SCRIPT> Element ,Practical Applications, HTML Document Structure-Body Section:-Body elements and its attributes: Background; Background Color; Text; Link; Active Link (ALINK); Visited Link (VLINK); Left margin; Top margin, Organization of Elements in the BODY of the document: Text Block Elements; Text Emphasis Elements; Special Elements — Hypertext Anchors; Character-Level Elements; Character References ,Text Block Elements: HR (Horizontal Line); Hn (Headings) ; P (Paragraph); Lists; ADDRESS ; BLOCKQUOTE; TABLE; DIV (HTML 3.2 and up) ; PRE (Preformatted); FORM ,Text Emphasis Elements, Special Elements — Hypertext Anchors ,Character-Level Elements: line breaks (BR) and Images (IMG), Lists , ADDRESS Element, BLOCKQUOTE Element, TABLE Element, COMMENTS in HTML ,CHARACTER Emphasis Modes, Logical & Physical Styles, Netscape, Microsoft and Advanced Standard Elements List, FONT, BASEFONT and CENTER.

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## **UNIT- II IMAGE, INTERNAL AND EXTERNAL LINKING BETWEEN WEBPAGES**

Netscape, Microsoft and Advanced Standard Elements List, FONT, BASEFONT and CENTER Insertion of images using the element IMG (Attributes: SRC (Source), WIDTH, HEIGHT, ALT (Alternative), ALIGN),IMG (In-line Images) Element and Attributes; Illustrations of IMG Alignment, Image as Hypertext Anchor, Internal and External Linking between Web Pages Hypertext Anchors ,HREF in Anchors ,Links to a Particular Place in a Document ,NAME attribute in an Anchor ,Targeting NAME Anchors ,TITLE attribute, Practical IT Application Designing web pages links with each other, Designing Frames in HTML. Practical examples.

## **UNIT-III INTRODUCTION TO OOP**

Advantages of OOP, The Object Oriented Approach, Characteristics of object oriented languages- Object, Classes, Inheritance, Reusability, Polymorphism and C++.

Function: Function Declaration, Calling Function, Function Defines, Passing Argument to function, Passing Constant, Passing Value, Reference Argument, returning by reference, Inline Function, Function Overloading, Default Arguments in function.

## **UNIT-IV OBJECT CLASSES AND INHERITANCE**

Object and Class, Using the class, class constructor, class destructors, object as function argument ,copy constructor ,struct and classes , array as class member, Static Class Data, Static Member Functions, , Friend function, Friend class, operator overloading. Type of inheritance, Base class, Derive class. Access Specifier: protected. Function Overriding, member function, String, Template Function.

## **UNIT-V POINTERS AND VIRTUAL FUNCTION**

pointers: & and \* operator pointer variables, .pointer to pointer, void pointer,pointer and array, pointer and function, pointer and string, memory management, new and delete, pointer to object, this pointer Virtual Function: Virtual Function, Virtual member function, accesses with pointer,pure virtual function File and Stream: C++ streams, C++ Manipulators, Stream class, string I/O, char I/O, Object I/O, I/O with multiple object, Disk I/O,



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### RECOMMENDED BOOKS :

- |                                       |   |   |
|---------------------------------------|---|---|
| 1. Introduction to HTML               | : | Kamlesh Agarwala, O.P.Vyas, Prateek A. Agrawala (Kitab Mahal Publication) |
| 2. Let us C++                         | : | Y. Kanetkar B.P.B Publication   |
| 3. Programming in C++                 | : | E. Balaguruswami  |
| 4. Mastering in C++                   | : | Venu Gopal  |
| 5. Object Oriented Programming in C++ | : | Lafore R, Galgotia Publications.  |

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**ELECTRONICS**  
**PAPER - I (Paper Code - 0857)**  
**DIGITAL ELECTRONICS**

**M.M. 50**

- UNIT-I** Number Systems : Binary numbers, binary to decimal conversion, decimal to binary conversion, Binary additions, binary subtraction, L'S Complements, 2S Comple-ments, binary multiplication and division, Octal and Hexadecimal numbers, BCD code and gray cone. Logic Gates : OR, AND, NOT NAND, NOR, X OR X-NOR gates, positive and negative logic, universal building blocks.
- UNIT-II** Boolean Algebra : De Morgan's theorem, Laws and theorems of Boolean algebra, sum of product and product of sums simplification, equivalence between AND, OR AND NAND-NAND and equivalence between OR-AND, AND NOR-NOR networks. Karnaugh map simplification.  
Arithmetic circuits : Half and full adders, half and full subtractors, binary adders, 8421 adders, 2's complement adder Subtractor.
- UNIT-III** Logic families : Various logic families RTL, DTL, TTL, ECL, MOS, I<sup>2</sup>L, (MOS) and their characteristics, basic gates used in these families. Flip flop, D flip flop, JK flip flops, positive and negative edge triggered flip flops, JK master slave flip flop, idea of astable and monostable multivibrators.
- UNIT-IV** Registers and counters : Data register, shift registers, synchronous counter, ripple counter, up-down counter, ring counter, decade counter. A/D and D/A converters : basic D/A converters, Ladder method, counter methods of A/D converter.
- UNIT-V** Memory : Volatile and Non-Volatile memories, ROM, PROM, EPROM, RAM, dynamic and static RAMS floppy disc. Microprocessor : Introduction to a microprocessor, and popular digital IC's of 8085 family. INTEL 8085-A-Architecture and pin out diagrams, The programme, CPU, Processing of instruction inside a CPU, Timing in CPU, CPU used in a system, Instruction set for 8085 Microprocessor.

**PAPER - II (Paper Code - 0858)**  
**ELECTRONIC INSTRUMENTS**

**M.M. 50**

<b>UNIT-I</b>	<b>Regulated Power Supplies :</b> Power supply characteristics, Zener regulator, series
<b>UNIT-II</b>	voltage regulator, series regulator with pass transistor to large load currents, Shunt regulator, idea of Darlington pair, Regulator with Op-amp, inverting, non-inverting, Amplifiers, Zener reference, IC regulated circuits (IC 78XX series). Regulator features : Current limiting, short circuit shut down, fold back, precision regulator.
<b>UNIT-III</b>	CRO : Block diagram, basic operation, electro-static focussing, electrostatic deflection, screens for CRT, CRT circuits, Horizontal deflection system, Sweep generator, Synchronizing the wave, vertical deflection system, vertical amp., Lissajous figures, frequency and phase measurement, Introduction to storage CRO, dual trace dual beam, samp CRO. Signal Generators : Sweep frequency Generator, pulse and square wave generator, pulse characteristics and terminology, astable multivibrator, block diagram of pulse generation function, 555 timer for frequency generation, Blocking Oscillator wave generator, Introduction to IC 8038 as complete function generator.
<b>UNIT-IV</b>	O Meter : Basic circuit; Measuring methods, direct series and parallel connections, sources of errors, Electronic Voltmeter, D.C. Voltmeter direct coupled amp. And Chopper type D.C. amp., A.C. Voltmeter, true RMS responding Voltmeter, multirange voltmeter sensitivity. Power meter : Single phase, double phase and three phase Watt-meter Watt hour meter. Digital Voltmeter: LED's digital display seven segment display, integrating DVM, Ramp DVM, Stair case Ramp, Successive approximation DVM, Sample and hold circuits.
<b>UNIT-V</b>	Analog/Digital Multimeter : Analog multimeter, AC and DC measurement, conversion of analog output to digital form (A/D), Dual ramp A/D converter, digital measuring system, multimeter block diagram, voltage, current and resistance measurements. Frequency counter : Elements of electronic counter, decade counting assembly temperature compensated crystal oscillator, universal counter, measurement modes; frequency measurement, period measurement, time interval measurement, measurement errors : gating errors, time base error, trigger level error.

## **ELECTRONICS PRACTICAL**

**M.M. 50**

Antudent is required to do ntleast 14 experiments in an academic year.  
of Practical examination will be as follows :

(i) One Experiment in 3 hours.

(i) Marks : Experiment	-	30
Viva-Voce	-	10
Sessional	-	10
<b>Total</b>	<b>-</b>	<b>50</b>

1. Sqare Wave response of amplifer.
2. Verification of :
  - (i) Truth tables of basic logic gates. (ii) De Morgens theorem.
3. Study of half adders and full adders using IC's.
4. Study of RS flip flops.
5. Study of JK Master slave flip flop.
6. Study of the decade counter and divided by N. circuits.
7. Study of D/A Converter.
8. Study of A/D Converter.
9. Study of OP Amp : inverting and non invertind amplifiers of different gains.
10. Study of OP-Amp adder, subtractor, integrator and differentiator.
11. Study of IC regulated power supply.
12. Study of astable and distable multivibrator using 555 timer.
13. Study of 8083 based function generator.
14. Addition of two binary number with microprocessor (8035).
15. Data transfer from memory to register and vice versa using 8085 microprocessor.
16. Study of frequency by Wien's bridge.

**Note :** Other experiments of equal standard may also be set.

### **REFERENCES :**

1. Microprocessor by Gaonkar
2. Electronic & Electrical Instruments by Sawhoe
3. Fundamental of Microprocessors by B. Ram
4. Digital Electronics by R.P. Jain
5. Digital Electronics by Flloyd

**INFORMATION TECHNOLOGY**  
**PAPER - I**  
**DIGITAL CIRCUITS & COMPUTER H/W**  
**(Paper Code - 0874)**

**UNIT-I (A) Number Systems :**

Octal and hexadecimal number, decimal rep., complements, addition, subtraction, multiplication, division, fixed point rep, floating point rep., other binary code-gray code, excess 3 gray, excess-3, 2421, etc. error detection code.

**(B) Boolean Algebra :**

Laws, demorgan's theorem, Simplification boolean expression & logic diagram, positive & negative logic, K-map and simplification of K-map.

**UNIT-II Combinational circuits :**

Half adder, full adder, flip-flop : SR, JK, D,T, sequential circuits : encoder, decoder, multiplexer, shift register, binary counters, BCD adder.

**UNIT-III Multivibrator circuits :**

Monostable, astable, bistable, schmitt trigger, clocked RS, master-slave flip-flop, edge triggered flip-flop, latch.

Integrated circuits :

RTL, DTL, TTL, CMOS, MOS.

**UNIT-IV (A) Central Processing Unit :**

Introduction, register organisation, stack organisation, Instruction formats, Addressing modes.

**(B) I/O organisation :**

I/O interfaces, Data transfer, types and modes, interrupts, DMA, IOP.

**UNIT-V Memory organisation :**

Memory hierarchy, main memory, Auxiliary memory, Associative memory, cache memory, virtual memory, memory management techniques.

**REFERENCE TEXT BOOK :**

- |  |                     |
|--|---------------------|
| 1. Integrated Electronics                  | - Millman & Halkias |
| 2. Principle of Electronics                | - V.K. Mehta        |
| 3. Digital Electronics                     | - R.P. Jain         |
| 4. Computer System Architecture            | - Morris Mano       |
| 5. Digital Electronics & Computer Hardware | - Morris Mano       |

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**PAPER - II**  
**(Paper Code - 0875)**

**UNIT-I** Ingroduction to OPP : Advantages of OPP, the Object oriented approach, characteristics of object oriented languages : object, classes, inheritance, reusability, polymorphism and C++.

**UNIT-II** Function : function declaration, calling function, function definition, passing arguments to function, passing constant, passing value, fegerence argument, returning by reference, inline function, function overloading, default arguments in function.

**UNIT-III** Object and olasses, using the olasses, olass oonstruotor, class destructor, object as function argument, copy constructor, struct and classes, array as class member, static class data, static member funotions, friend funotion, friend class, operator overloading, type of inheritance, bass class derive class, access percifier, protectedc, member function.

**UNIT-IV** Pointers : & and \* operator pointer variables, pointer to pointer, void pointer, pointer and array, pointer and functions, pointer and string, memory management, new and delete, pointer to object, this pointer, virtual function : virtual function, virtual member function, accesses with pointer, pure virtual function.

**UNIT-V** File and stream : C++ steams, C++ manipulators, Stream class, string I/O, char I/O; object I/O, I/O with multiple objects, disk I/O.

**REFERENCE TEXT BOOKS :**

- |                                       |                    |
|---------------------------------------|--------------------|
| 1. Programming in C++                 | - E. Balaguruswami |
| 2. Mastering in C++                   | - Venu Gopal       |
| 3. Object Oriented Programming in C++ | - Robert Lafore    |
| 4. Let us C++                         | - Y. Kanetkar      |

**PRACTICAL WORK**

1. The sufficient Practical work should be done for understanding the paper 2.
2. At least five programs on each unit from unit 2 to unit 5 be prepared.
3. All practical works should be prepared in form of print outs and be evaluated while practical examination.

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## INDUSTRIAL MICROBIOLOGY

Paper	Title	Time	Marks
First	Environmental Microbiology and Biostatistics	3 hrs.	50
Second	Microbial Physiology and Immunobiotechnology	3 hrs.	50
	PRACTICAL Examination (including sessionals)	4 hrs.	50 (40+10)

**Note :** During Two months Summer Vacation, students will visit some Industries. He/She will submit "Summer Job-Training Report" in B.Sc. IIRD Year Viva Voce Exam.

### PAPER - I ENVIRONMENTAL MICROBIOLOGY AND BIOSTATISTICS (Paper Code - 0876)

**M.M.50**

**UNIT-1** Our environment : Soil, water and air. Concept of environment in relation to microbes. Environment included physiological adaptations in microorganisms. Nature of microbial population in soil, water and air. Biogeochemical cycling - Carbon, Nitrogen, Sulphur and Phosphorus.

**UNIT-2** Population interactions : Neutralism, Commensalism, Synergism, Mutualism, Antagonistic relationships. Mycorrhizal associations. VAM and its importance.

**UNIT-3** Nitrogen fixation by symbiotic and non-symbiotic microorganisms. Use of microorganisms as biofertilizers. Mass cultivation of Rhizobium and Azotobacter. Use of blue-green algae as biofertilizers.

**UNIT-4** Liquid waste disposal. Nature of domestic and municipal waste and sewage. Sewage treatment. Solid waste disposal. Methods of disposal of Agricultural waste.

**UNIT-5** Basic idea of probability, normal, binomial and poisson distribution. Mean, Mode and Median. Chi-Square test. Exponential and Logarithmic Functions.

### PRACTICALS

1. Isolation of Microorganisms from Air.
2. Isolation of Microorganisms from Water.
3. Isolation of Microorganisms from soil.
4. Determination of MPN of faecal contaminants in water.
5. Measurement & confirmation of E. coli in water sample.
6. Biochemical tests for identification of enteric bacteria.
7. Study of Rhizobium from root nodules.
8. Study of symbiotic and non-symbiotic blue-green algae.
9. Problems based on the determination of Mean, Median and Mode.
10. Problems on Chi-Square Test.
11. Experiments to demonstrate Symbiotic, Antagonistic activities and relations amongst microbes and their interactions with plants.



**RECOMMENDED BOOKS :**

1. Introduction to Soil Microbiology by Martin Alexander.
2. General Microbiology by Pelczar, Reid & Chan.
3. Biofertilizers in Agriculture by N.S. Subba Rao.
4. Statistics by Mishra & Mishra.
5. General Microbiology, Vol. II, by Power & Dagainawala.

**PAPER - II****MICROBIAL PHYSIOLOGY AND IMMUNABIOTECHNOLOGY**  
**(Paper Code - 0877)****M.M. 50**

**UNIT-1** Diffusion, gaseous exchange, Osmosis, Plasmolysis, Biochemical properties of membranes, Passive and Active transport mechanism. Role of ionophores, group translocation across the membranes.

**UNIT-2** Photosynthetic microbes, Oxygenic and non-oxygenic reaction centre. Electron transport, Photophosphorylation, Calvin Cycle. Photorespiration and its significance. Effect of various factors on rate of photosynthesis.

**UNIT-3** Respiration mechanisms - Breakdown of carbohydrates through glycolysis, Krebs's cycle. Fermentation. Pentose Phosphate Pathway. Fermentation of alcohol, Citric acid and acetic acid.

**UNIT-4** Methanogens and Methylobacteria. Sulphur utilizing bacteria. Sulphate reduction pathway. Economic importance of Methylobacteria and sulphur utilizing bacteria.

**UNIT-5** History and Scope of immunology, Types of immunity. Antigen-Antibody reactions. Immunoglobulins - Structure and functions. Production of Vaccines and Monoclonal antibodies.

**PRACTICAL**

1. Isolation of photosynthetic bacteria and cyanobacteria from soil.
2. Isolation and characterisation of Methanogens.
3. Study of Hydrogen-production by bacteria.
4. Measurement of nitrate uptake by microorganisms.
5. Study of nitrate and nitrite reduction by microorganisms.
6. Demonstration of evolution during photosynthesis.
7. Demonstration of plasmolysis, osmosis, active and passive transport mechanism.
8. Testing of Blood Groups.
9. Titration of Antigen and Antibody.
10. Precipitation reaction of antigens and antibodies.

**BOOK RECOMMENDED :**

1. Cell Biology by Pawar.
2. General Microbiology, Vol. II, by Power and Dagainawala.
3. Immunology by Davis.
4. Immunology by G.P. T

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D.S.G. 23/12/12

**BIOCHEMISTRY**  
**PAPER - I**  
**ENZYMOLOGY**

**M.M. 50**

**UNIT-I INTRODUCTION**

History, general characteristics, nomenclature, IUB enzyme classification (rationale, over view and specific examples), significance of numbering system. Definitions with examples of holoenzyme, apoenzyme, coenzymes. cofactors, activators, inhibitors, active site (identification of groups excluded), metallo-enzymes, units of enzyme activity, specific enzymes, Isoenzymes, monomeric enzymes, oligomeric enzymes and multienzyme complexes. Enzyme specificity. Historical perspective, nature of non-enzymatic and enzymatic catalysis. Measurement and expression of enzyme activity-enzyme assays. Definition of IU, Katal, enzyme turn over number and specific activity. Role of non-protein organic molecules and inorganic ions coenzyme, prosthetic groups. Role of vitamins as coenzymes precursors (general treatment).

**UNIT-I ENZYME CATALYSIS**

Role of cofactors in enzyme catalysis : NAD/NADP<sup>+</sup>, FMN/FAD, coenzyme A, biocytin, cobamide, lipoamide, TPP, pyridoxal phosphate, tetrahydrofolate and metal ions with special emphasis on coenzyme functions. Acid-base catalysis, covalent, proximity and orientation effects, strain and distortion theory. Mechanism of action of chymotrypsin, carboxypeptidase, ribonuclease and lysozyme.

**UNIT- I ENZYME PURIFICATION**

Methods for isolation, purification and characterization of enzymes.

**UNIT-IV ENZYME KINETICS**

Factors affecting enzyme activity : enzyme concentration, substrate concentration, pH and temperature. Derivation of Michaelis-Menten equation for uni-substrate reactions.  $K_m$  and its significance. Line weaver-Burk plot and its limitations. Importance of  $K_m$ . Bi-substrate reactions-brief introduction to sequential and ping-pong mechanism with examples.

Kinetics of zero and first order reactions. Significance and evaluation of energy of activation and free energy.

Reversible and irreversible inhibition, competitive, non-competitive and uncompetitive inhibitions. determination of  $K_m$  &  $V_{max}$  in presence and absence of inhibitor. Allosteric enzymes.

**UNIT-V INDUSTRIAL AND CLINICAL APPLICATION OF ENZYME.**

Immobilization of enzyme and their industrial applications. Production of glucose from starch, cellulose and dextran; use of lactase in dairy industry; production of glucose-fructose syrup from sucrose; use proteases in food, detergent and leather industry; medical application of enzymes. use of glucose oxidase in enzyme electrodes.

  
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## PAPER - II

### INTERMEDIARY METABOLISM

M.M. 50

#### UNIT-I INTRODUCTION TO METABOLISM

General features of metabolism, experimental approaches to study metabolism; use of intact organism, bacterial mutants, tissue slices, stable and radioactive isotopes.

#### CARBOHYDRATE METABOLISM

Reactions and energetics of glycolysis. Alcoholic and lactic acid fermentations. Entry of fructose, galactose, mannose etc. Reactions and energetics of TCA cycle. Gluconeogenesis, glycogenesis and glycogenolysis, Reactions and physiological significance of pentose phosphate pathway. Regulation of glycolysis and TCA cycle. Photosynthesis, a brief review.

#### UNIT-II ELECTRON TRANSPORT CHAIN AND OXIDATIVE PHOSPHORYLATION

Structure of mitochondria, sequence of electron carriers, sites of ATP production, inhibitors of electron transport chain. Hypothesis of mitochondrial oxidative phosphorylation (basic concepts). Inhibitors and uncouplers of oxidative phosphorylation. Transport of reducing potentials into mitochondria.

#### UNIT-III LIPID METABOLISM

Introduction, hydrolysis of triacylglycerols, transport of fatty acids into mitochondria.

$\beta$ -oxidation of saturated fatty acids, ATP yield from fatty acid oxidation. Biosynthesis of saturated and unsaturated fatty acids. Metabolism of ketone bodies, oxidation of unsaturated and odd chain fatty acids. Biosynthesis of triglycerides and important phospholipids, glycolipids, sphingolipids and cholesterol. Regulation of cholesterol metabolism.

#### UNIT-IV AMINO ACID METABOLISM

General reactions of amino acid metabolism : transamination, oxidative deamination and decarboxylation. Urea cycle. Degradation and biosynthesis of amino acids. Glycogenic and ketogenic amino acids.

#### UNIT-V NUCLEOTIDE METABOLISM

Sources of the atoms in the purine and pyrimidine molecules. Biosynthesis and degradation of purines and pyrimidines. Regulation of purine and pyrimidine biosynthesis.

#### PORPHYRIN METABOLISM

Biosynthesis and degradation of porphyrins. Production of bile pigments.

  
The bottom of the page contains six handwritten signatures, each followed by the date 24.7.17. The signatures are written in blue ink and are somewhat stylized.

## PRACTICAL

1. Separation of Blood Plasm and Serum
  - a. Estimation of proteins from serum by biuret and lowry methods.
  - b. Determination of albumin and A/G ratio in serum.
2. Estimation of bilirubin (conjugated and unconjugated) in serum.
3.
  - i. Estimation of total lipids in serum by vanillin method.
  - ii. Estimation of cholesterol in serum.
4. Estimation of lipoproteins in plasma.
5. Estimation of lactic acid in blood before and after exercise.
6. Estimation of blood urea nitrogen from plasma.
7. Separation and identification of amino acids by (a) paper chromatography and (b) thin-layer chromatography.
8. Separation of polar and non-polar lipids by thin-layer chromatography.
9. Estimation of SGPT and SGOT in serum.
10.
  - a. Assay of serum alkaline phosphatase activity.
  - b. Inhibition of alkaline phosphatase activity by EDTA.
  - c. Effect of substrate concentration on alkaline phosphatase activity and determination of its  $K_m$  value.
11.
  - a. Effect of temperature on enzyme activity and determination of activation energy.
  - b. Effect of pH on enzyme activity and determination of optimum pH.
  - c. Effect of enzyme concentration on enzyme activity.
12.
  - a. Preparation of starch from potato and its hydrolysis by salivary amylase.
  - b. Determination of achromatic point in salivary amylase.
  - c. Effect of sodium chloride on amylases.

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Arshad  
24.7.2017

Arshad  
24.7.17

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24.7.17

## BIOTECHNOLOGY

### PAPER - I

#### MOLECULAR BIOLOGY & BIOPHYSICS M.M. 50

**UNIT-II1.** DNA : Structure, types and replication

2. RNA : Structure, and type and Function
3. Structure of gene, old and new concept.

**UNIT-II** 1. Genetic code : Properties, codon assignment, Secondary genetic code,

2. Protein synthesis.
3. Mitochondrial genome.
4. Chloroplast genome

**UNIT-III** 1. Gene Therapy

2. Transposable elements.
3. DNA damage and repair
4. Tissue engineering : General Concept

**UNIT-IV** 1. Law of Thermodynamics.

2. Beer lambert's law
3. Radioisotopes techniques.
4. Autoradiography

**UNIT-V** 1. Biophysics Introduction, scope and application

2. Principle, structure, functions of the following
  - a. Spectroscopy
  - b. Electrophoresis
  - c. Centrifugation
  - d. Colorimeter
  - e. Chromatography
  - f. ELISA

#### List of Books :

1. C.B. Power-Cell Biology, First Edition (2005), Himalaya Publishing House.
2. Gerald Karp - Cell and Molecular biology, 4th Edition (2005).
3. Lewis J.Klein Smith and Valerie M.Kish-Principles of cell and molecular biology- Third Edition (2002)
4. P.K. Gupta- Cell and molecular biology, Second Edition (2003), Rastogi publications.
5. Tortora, Funke and Case-Microbiology : An introduction 6th Edition (1998), Benjamin/ Cummings Publishing Co.
6. Richard M-Twyaman-Advanced Molecular Biology, First South Asian Edition (1998), Viva Books Pvt. Ltd.
7. K. Wilson and J.Walker :Principle and Techniques of Biotechnology and Molecular Biotechnology.
8. Upadhyaya and Upadhyaya : Biophysical Chemistry.
9. David, I. Nelson and Michael M.Cox : Lehniger : Principal of Biochemistry 4th Edition. W.H. Freeman and Company, New York.

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**PAPER - II**  
**RECOMBINANT DNA TECHNOLOGY**

**M.M.**  
**50**

**UNIT-I1.** Scope and aim of the Biotechnology.

2. Recombinant DNA Technology : General concept and Application. Strategies of recombinant DNA technology in Prokaryotes.
3. Restriction Enzymes : End O nublease (type, Nomenclature, Restriction, Sequence, and Cleavage Pattern).
  - a. Modification of cut ends.
  - b. Steps in gene cloning
  - d. Isolation of the desired gene.
4. DNA Library, Genomic Library.

**UNIT-II** 1. Vectors (Animal and Plant vectors)

2. Bacteriophage Vectors
3. Introduction of vectors into aproprate host.

**UNIT-III** 1. PCR:- Procedure (denaturation, Annealing, extension)

2. Types of PCR
3. Applications Advantages and Limitation of PCR.

**UNIT-IV** 1. Monoclonal Antibodies : Structure, Production, Application.

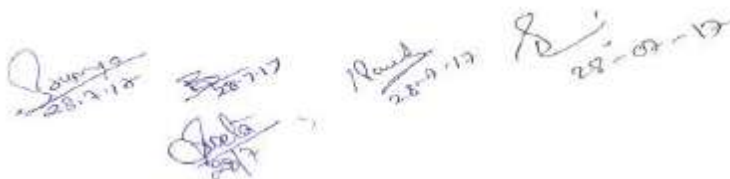
2. In vitro fertilization and embryo transfer.
3. Genome map and Genome Project.
5. Apoptosis.

**UNIT-V** 1. Stem cell technology

2. Targeted Gene Transfer
3. DNA fingerprinting
4. Transgenic animals and Plants.

**List or Books :**

1. B.D. Singh (2004) Biotechynology, Expanding Horizons. First Edition. Kalyani Publishers, Ludhiana.
2. P.K. Gupta (2005) Biotechnology and Genomics, Rastogi Publication, Meerut.
3. Stan bury and Whittaker - Principles of Sterilization techniques, First Indian reprint Edition (1997). Aditya Book (P) Ltd. New Delhi.

  
The bottom of the page contains several handwritten signatures and dates in blue ink. From left to right, there are four distinct signatures, each followed by a date. The dates appear to be 28-7-12, 28-7-12, 28-7-12, and 28-02-12.



4. L.E. Casida- Industrial Microbiology Edition (1994).
5. A.H. Patel - Industrial Microbiology 4th Edition (2003)
6. K.S. Bilgrami and A.K. Pandey - Introduction to Biotechnology Edition 2nd (1998)
7. U Satyanarayan Biotechnology, First Edition (2005) Books and Allied (P) Ltd. Kolkata.
8. Atul kumar and Vandana A.Kumar (2004) Plant Biotechnology and tissue culture, Principle and Perspectives, International Books Distributing Co. Luchnow.

### PRACTICAL LIST :

1. Isolation of DNA.
2. Isolation RNA.
3. Estimation of DNA from Plant Cells.
4. Laminar Flow, Autoclave, Oven Incubator water bath Quebec colony counter, Centrifuge, Spectrophotometer, Electrophoresis, Camera Lucida.
5. Experiments (at least - two) on the basis of electrophoresis.

### SCHEME FOR PRACTICAL EXAMINATION

**Time : 4 hrs.**

**M.M. : 50**

1. DNA Isolation	10 marks
2. RNA Isolation	10 marks
3. Practical based on Biophysics	10 marks
4. Spotting based on paper I and II (5 spots) at least two from each paper	10 marks
5. Viva - Voce	05 marks
6. Record / Sessional	05 marks

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# दुर्ग विश्वविद्यालय, दुर्ग (छ.ग.)



पाठ्यक्रम

परीक्षा – 2017–18

बी.एससी. भाग-3  
**B.Sc. Part-3**

**(Approved by Board of Studies)**  
**Effective from July 2017**

## **REVISED ORDINANCE NO. 21**

### **BACHELOR OF SCIENCE**

1. The three year course has been broken up into three Parts. Part-I known as B.Sc. Part-I examination at the end of the first year, Part-II known as B.Sc. Part-II examination at the end of the second year and Part-III known as B.Sc. Part-III examination at the end of the third year.
2. A candidate who after passing (10+2) Higher Secondary or Intermediate examination of C.G. Board of Secondary Education Bhopal or any other Examination recognised by the University or C.G. Board of Secondary Education as equivalent thereto, has attended a regular course of study in an affiliated College or in the Teaching Department of the University for one academic year shall be eligible for appearing at the B.Sc. Part-I examination.
3. A candidate who, after passing the B.Sc.-I examination of the University or any other examination recognised by the University as equivalent thereto, has attended a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.Sc. Part-II examination.
4. A candidate who, after passing the B.Sc. Part-I examination of the University, has completed a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.Sc. Part-III examination.
5. Besides regular students, subject to their compliance with this Ordinance ex-student and non-collegiate candidates shall be permitted to offer only such subjects/papers as are taught to the regular student at any of the University Teaching Department or College.
6. Every candidate appearing in B.Sc. Part-I, Part-II and Part-III examination shall be examined in-
  - (i) Foundation Course:
  - (ii) Any one of the following combinations of three subjects:-
    1. Physics, Chemistry & Mathematics.
    2. Chemistry, Botany & Zoology.
    3. Chemistry, Physics & Geology.
    4. Chemistry, Botany & Geology.
    5. Chemistry, Zoology & Geology.
    6. Geology, Physics & Mathematics.
    7. Chemistry, Mathematics & Geology.
    8. Chemistry, Botany & Defence Studies.
    9. Chemistry, Zoology & Defence Studies.
    10. Physics, Mathematics & Defence Studies.
    11. Chemistry, Geology & Defence Studies.
    12. Physics, Mathematics & Statistics.
    13. Physics, Chemistry & Statistics.
    14. Chemistry, Mathematics & Statistics.
    15. Chemistry, Zoology & Anthropology.
    16. Chemistry, Botany & Anthropology.
    17. Chemistry, Geology & Anthropology.
    18. Chemistry, Mathematics & Statistics.

19. Chemistry, Anthropology & Defence Studies.
20. Geology, Mathematics & Statistics.
21. Mathematics, Defence Studies & Statistics
22. Anthropology, Mathematics & Statistics
23. Chemistry, Anthropology & Applied Statistics
24. Zoology, Botany & Anthropology
25. Physics, Mathematics & Electronics.
26. Physics, Mathematics & Computer Application
27. Chemistry, Mathematics & Computer Application
28. Chemistry, Bio-Chemistry & Pharmacy
29. Chemistry, Zoology & Fisheries.
30. Chemistry, Zoology & Agriculture
31. Chemistry, Zoology & Sericulture
32. Chemistry, Botany & Environmental Biology
33. Chemistry, Botany & Microbiology
34. Chemistry, Zoology & Microbiology
35. Chemistry, Industrial Chemistry & Mathematics
36. Chemistry, Industrial Chemistry & Zoology
37. Chemistry, Biochemistry, Botany
38. Chemistry, Biochemistry, Zoology
39. Chemistry, Biochemistry, Microbiology
40. Chemistry, Biotechnology, Botany
41. Chemistry, Biotechnology, Zoology
42. Geology, Chemistry & Geography
43. Geology, Mathematics & Geography
44. Mathematics, Physics & Geography
45. Chemistry, Botany & Geography

(iii) Practical in case prescribed for core subjects.

7. Any candidate who has passed the B.Sc. examination of the University shall be allowed to present himself for examination in any of the additional subjects prescribed for the B.Sc. examination and not taken by him at the degree examination. Such candidate will have to first appear and pass the B.Sc. Part-I examination in the subjects which he proposes to offer and then the B.Sc. Part-II and Part-III examination in the same subject. Successful candidates will be given a certificate to that effect.
8. In order to pass at any part of the three year degree course examination an examinee must obtain not less than 33% of the total marks in each subject/ group of subjects. In subject/ group of subjects where both theory and practical examination are provided an examinee must pass in both theory and practical parts of the examination separately.
9. Candidate will have to pass separately at the Part-I, Part-II and Part-III examinations. No division shall be assigned on the result of the Part-I and Part-II examination. In determining the division of the final examination, total marks obtained by the examinees in their Part-I, Part-II and Part-III examination in the aggregate shall be taken into account. Provided in case of candidate who has passed the examination through supplementary examination having failed in one subject/ group only, the total aggregate marks being carried over for determining the division shall include actual marks obtained in the subject/ group in which he appeared at the supplementary examination.
10. Successful examinee at the Part-III examination obtaining 60% or more marks shall be placed in the First Division, those obtaining less than 60% but not less than 45% marks in the Second Division and other successful examinees in the Third Division.

## B.Sc.Part-III

### विषय-सूची

1.	Revised Ordinance No. 21	3
2.	Scheme of Examination	5
3.	Foundation Course: आधार पाठ्यक्रम	7
4.	Chemistry : रसायन शास्त्र	9
5.	Physics : (भौतिक शास्त्र)	15
6.	Mathematics	19
7.	Botany (वनस्पति शास्त्र)	26
8.	Zoology (प्राणी शास्त्र)	29
9.	Microbiology (सूक्ष्म जीव विज्ञान)	32
10.	Geology (भूविज्ञान)	35
11.	Statistics (सांख्यिकी)	38
12.	Defence Studies (रक्षा अध्ययन)	41
13.	Industrial Chemistry (औद्योगिक रसायन)	44
14.	Computer Science	48
15.	Information Technology	53
16.	Industrial Microbiology	55
17.	Electronics (इलेक्ट्रॉनिक्स)	57
18.	Anthropology (मानव विज्ञान)	60
19.	Electronic Equipment maintenance	63
20.	Biotechnology	60
21.	Biochemistry	68

### SCHEME OF EXAMINATION

Subject	Paper	Max. Mark	Total Mark	Min. Mark
(A) Compulsory Subject				
1) Hindi Language	I	75	-	26
2) English Language	I	75	-	26
(B) Three Elective Subject :				
2. Chemistry	I	33		
	II	33	100	33
	III	34		
	Practical		50	17
1. Physics	I	50		
	II	50	100	33
	Practical		50	17
3. Mathematics	I	50		
	II	50	150	50
	III	50		
4. Botany	I	50		
	II	50	100	33
	Practical		50	17
5. Zoology	I	50		
	II	50	100	33
	Practical		50	17
6. Geology	I	50		
	II	50	100	33
	Practical		50	17
7. Statistics	I	50		
	II	50	100	33
	Practical		50	17
8. Anthropology	I	50		
	II	50	100	33
	Practical		50	17
9. Inde. chemistry	I	34		
	II	33	100	33
	III	33		
	Practical		50	17

<b>Subject</b>	<b>Paper</b>	<b>Max. Marks</b>		<b>Min. Marks</b>
10. Defence Studies	I	50		
	II	50	100	33
	Practical		50	17
11. Micro Biology	I	50		
	II	50	100	33
	Practical		50	17
12. Electronics	I	50		
	II	50	100	33
	Practical		50	17
13. I.T.	I	50		
	II	50	100	33
	Practical		50	17
14. Computer Science	I	50		
	II	50	100	33
	Practical		50	17
15. Biochemistry	I	50		
	II	50	100	33
	Practical	50		

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### **USE OF CALCULATORS**

The Students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986.

1. Student will bring their own Calculators.
2. Calculators will not be provided either by the University or examination centres.
3. Calculators with, memory and following variables be permitted +, -, x,  $\div$ , square, reciprocal, exponentials log, square root, trigonometric functions, sine, cosine, tangent etc. factorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.

**आधार पाठ्यक्रम  
हिन्दी भाषा  
(पेपर कोड – 0891)**

**प्रथम प्रश्न पत्र**

**पूर्णांक – 75**

(बी.ए., बी.एच.सी., बी.एच.एस-सी., बी.कॉम., तृतीय वर्ष के पुनरीक्षित एकीकृत आधार पाठ्यक्रम एवं पाठ्य सामग्री का संयोजन 2000-2001 से लागू है )

**।। सम्प्रेषण कौशल, हिन्दी भाषा और सामान्य ज्ञान ।।**

आधार पाठ्यक्रम की संरचना और अनिवार्य पाठ्य पुस्तकें—हिन्दी भाषा एवं समसामयिकी— का संयोजन इस तरह किया गया है कि सामान्य ज्ञान की विषय वस्तु — विकासशील देशों की समस्याओं के माध्यम और साथ-साथ हिन्दी भाषा का ज्ञान और उसमें सम्प्रेषण कौशल अर्जित किया जा सके । इसी प्रयोजन से व्याकरण की अन्तर्वस्तु को विविध विधाओं की संकलित रचनाओं और सामान्य ज्ञान की पाठ्य सामग्री के साथ अन्तर्गुम्फित किया गया है । अध्ययन अध्यापन के लिए परी पुस्तक की पाठ्य सामग्री है और अभ्यास के लिये विस्तृत प्रश्नावली है । यह प्रश्नपत्र भाषा का है अतः पाठ्य सामग्री का व्याख्यत्मक या आलोचनात्मक अध्ययन अनेक्षित नहीं है । पाठ्यक्रम और पाठ्य सामग्री का संयोजन निम्नलिखित पांच इकाईयों में किया जाता है । प्रत्येक इकाई को दो भागों में विभक्त किया गया है ।

**इकाई— 1**

1. भारत माता : सुमित्रानंद पंत, परशुराम की प्रतीज्ञा : रामधारी सिंह दिनकर, बहुत बड़ा सवाल : मोहन राकेश, संस्कृति और राष्ट्रीय एकीकरण : योगेश अटल ।
2. कथन की शैलियां : रचनागत उदाहरण और प्रयोग ।

**इकाई— 2**

1. विकासशील देशों की समस्याएँ, विकासात्मक पुनर्विचार, और प्रौद्योगिक एवं नगरीकरण ।
2. विभिन्न संरचनाएं ।

**इकाई— 3**

1. आधुनिक तकनीकी सभ्यता, पर्यावरण प्रदूषण तथा धारणीय विकास ।
2. कार्यालयीन पत्र और आलेख ।

**इकाई— 4**

1. जनसंख्या : भारत के संदर्भ में और गरीबी तथा बेरोजगारी ।
2. अनुवाद ।

**इकाई— 5**

1. उर्जा और शक्तिमानता का अर्थशास्त्र ।
2. घटानाओं , समारोहों आदि का प्रतिवेदन और विभिन्न प्रकार के निमंत्रण-पत्र ।

**मुल्यांकन योजना :** प्रत्येक इकाई से एक-एक प्रश्न पूछा जायेगा । प्रत्येक प्रश्न में आंतरिक विकल्प होगा। प्रत्येक प्रश्न के 15 अंक होंगे । प्रत्येक दो-दो खंड (क्रमशः 'क' और 'ख' में ) विभक्त है, इसलिए प्रत्येक प्रश्न के भी दो भाग, कौशल से संबद्ध प्रश्न के अंक 7 होंगे। इस प्रकार पूरे प्रश्न पत्र के पूर्णांक 75 होंगे ।



## PART - II

(Paper Code-0892)

ENGLISH LANGUAGE

M.M. 75

The question paper for B.A./B.Sc./B.Com./B.H.Sc. III Foundation course, English Language and General Answers shall comprise the following items :

Five question to be attempted, each carrying 3 marks.

<b>UNIT-I</b>	Essay type answer in about 200 words. 5 essay type question to be asked three to be attempted.	15
<b>UNIT-II</b>	Essay writing	10
<b>UNIT-III</b>	Precis writing	10
<b>UNIT-IV</b>	(a) Reading comprehension of an unseen passage	05
	(b) Vocabulary based on text	10
<b>UNIT-V</b>	Grammar Advanced Exercises	25

**Note :**

Question on unit I and IV (b) shall be asked from the prescribed text. Which will comprise of popular create writing and the following items. Minimum needs housing and transport Geo-economic profile of M.P. communication Educate and culture. Women and Worm in Empowerment Development, management of change, physical quality of life. War and human survival, the question of human social value survival, the question of human social value, new Economic Philosophy Recent Diberlialiation Method) Demoration docontralisation (with reference to 73, 74 constitutional Amendment.

**Books Prescribed:**

Aspects of English Language And Development - Published by M.P. Hindi Granth Academy, Bhopal.

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Dr. M. Chakraborty

Dr. S. Gupta

DR. MERILY ROY



## CHEMISTRY

The new curriculum will comprise of Three papers of 33,33, & 34 marks each and Practical work of 50 marks. The curriculum is to be completed in 180 working days as per the UGC norms & conforming to the directives of the Govt. of Chhattisgarh. The theory papers are of 60 hrs. each duration & the practical work of 180 hrs. duration.

### PAPER - I

(Paper Code-0895)

### INORGANIC CHEMISTRY

M.M. 33

#### UNIT-I METAL-LIGAND BONDING IN TRANSITION METAL COMPLEXES

Limitations of valence bond theory, an elementary idea of crystal field theory, crystal field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal field parameters.

Thermodynamic and kinetic aspects of metal complexes.

A brief outline of thermodynamic stability of metal complexes and factors affecting the stability, substitution reactions of square planar complexes.

#### UNIT-II MAGNETIC PROPERTIES OF TRANSITION METAL COMPLEXES

Types of magnetic behaviour, methods of determining magnetic susceptibility, spin only formula, L-S coupling, correlation of  $\mu_s$  and  $\mu_{eff}$  values, orbital contribution to magnetic moments, application of magnetic moment data for 3d metal complexes. Electronic spectra of Transition Metal Complexes. Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, spectro-chemical series. Orgel-energy level diagram for d1 and d2 states, discussion of the electronic spectrum of complex ion.

#### UNIT-III ORGANOMETALLIC CHEMISTRY

Definition, nomenclature and classification of organo metallic compounds. Preparation, properties, bonding and applications of alkyls and aryls of Li, Al, Hg, Sn, & Ti, A brief account of metal-ethylenic complexes and homogeneous hydrogenation, mononuclear carbonyls and nature of bonding in metal carbonyls.

#### UNIT-IV BIOINORGANIC CHEMISTRY

Essential and trace elements in biological processes, metalloporphyrins with special reference to hemoglobin and myoglobin. Biological role of alkali and alkaline earth metals with special reference to  $Ca^{2+}$ , nitrogen fixation.

#### UNIT-V HARD AND SOFT ACIDS AND BASES (HSAB)

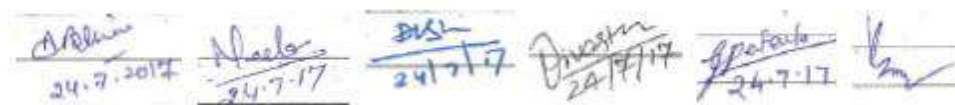
07 HRS.

Classification of acids and bases as hard and soft. Pearson's HSAB concept, acid-base strength and hardness and softness. Silanes and Silicones and Phosphazenes Silicons and phosphazenes as examples of inorganic polymers, nature of bonding in triphosphazenes.



### REFERENCE BOOKS:

1. Basic Inorganic Chemistry, F.A. Cotton, G. Wilkinson and P.L. Gaus, Wiley
2. Concise Inorganic Chemistry, J.D. Lee, ELBS.
3. Concepts of models of Inorganic Chemistry, B. Douglas, D. McDaniel and J. Alexander, John Wiley
4. Inorganic Chemistry, D.E. Shriver, P.W. Atkins and C.H. Langford, Oxford.
5. Inorganic Chemistry, W.W. Porterfield, Addison-Wesley.
6. Inorganic Chemistry, A.G. Sharp, ELBS.
7. Inorganic Chemistry, G.L. Miessler and D.A. Tarr, Prentice Hall.
8. Advanced Inorganic Chemistry, Satyas Prakash.
9. Advanced Inorganic Chemistry, Agarwal & Agarwal.
10. Advanced Inorganic Chemistry, Puri & Sharma, S. Naginchand
11. Inorganic Chemistry, Madan, S. Chand & Co.
12. Adhunik Akarbanic Rasayan, A.K. Shrivastav & P.C. Jain, Goel Pub.
13. Uchhattar Akarbanic Rasayan, Satya Prakash & G.D. Tuli, Shyamlal Prakashan
14. Uchhattar Akarbanic Rasayan, Puri & Sharma.



**PAPER - II**  
**(Paper Code-0896)**

**ORGANIC CHEMISTRY**

**M.M. 33**

**UNIT-I A. ORGANOMETALLIC COMPOUNDS**

Organomagnesium compounds : Grignard reagents-formation, structure and chemical reactions. Organozinc compounds: formation and chemical reactions.

Organolithium compounds : formation and chemical reactions.

**B. Organosulphur Compounds**

Nomenclature, structural features, methods of formation and chemical reactions of thiols, thioethers, sulphonic acids, sulphonamides and sulphaguanidine.

**Organic Synthesis via Enolates**

Active methylene group alkylation of diethylmalonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate : the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate.

**UNIT-II BIOMOLECULES**

**A. Carbohydrates :**

Configuration of monosaccharides, threo and erythro diastereomers. Formation of glycosides ethers and esters Determination of ring size of monosaccharides. Cyclic structure of D(+) glucose. Structure of ribose and deoxyribose. An introduction to disaccharides (maltose, sucrose and lactose) and polysaccharides (starch and cellulose) without involving structure determination.

**B. Proteins and Nucleic acids**

Classification and structure of protein levels of protein structure, protein Denaturation / renaturation, Constituents of amino acids Ribonucleosides and ribonucleotides, double helical structure of DNA.

**UNIT-III A. Synthetic Polymers**

Addition or chain growth polymerization. Free radical vinyl polymerization, Ziegler-Natta polymerization, Condensation or Step growth polymerization, Polyesters, polyamides, phenols- formaldehyde resins, urea- formaldehyde resins, epoxy resins and polyurethanes, natural and synthetic rubbers.

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## B. Synthetic Dyes

Colour and constitution (Electronic Concept). Classification of Dyes. Chemistry of dyes. Chemistry and synthesis of Methyl Orange, Congo Red, Malachite Green, Crystal Violet, Phenolphthalein, fluorescein, Alizarine and Indigo.

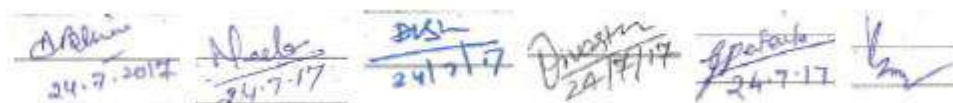
## UNIT-IV SPECTROSCOPY

- A. **Mass spectroscopy:** mass spectrum fragmentation of functional groups.
- B. **InfraRed Spectroscopy:** IR absorption Band their position and intensity, Identification of IR spectra.
- C. **UV-Visible Spectroscopy:** Beer Lambert's law, effect of Conjugation max Visible spectrum and colour.
- D. Anthocyanin as natural colouring matter (Introduction only)
- E. Application of Mass, IR, UV-Visible Spectroscopy to organic molecules.

- UNIT-V**
- A. **NMR Spectroscopy:** Introduction to NMR. Shielding and Number of signal in PMR, Chemical shift and characteristic values, splitting of Signals and Coupling constant. Application to organic molecules.
  - B.  **$^{13}\text{C}$ MR Spectroscopy:** Principal & Application.
  - C. **Magnetic Resonance Imaging (MRI)-** Introductory idea.

## REFERENCE BOOKS:

1. Organic Chemistry, Morrison and Boyd, Prentice-Hall
2. Organic Chemistry, L.G. Wade Jr., Prentice-Hall
3. Fundamentals of Organic Chemistry, Solomons, John Wiley
4. Organic Chemistry, Vol.I, II, III, S.M. Mukherjee, S.P. Singh and R.P. Kapoor, Wiley-Eastern (New-Age)
5. Organic Chemistry, F.A. Carey, McGraw Hill
6. Introduction to Organic Chemistry, Streiweisser, Heathcock and Kosover, Macmillan
7. Organic Chemistry, P.L. Soni
8. Organic Chemistry, Bahi & Bahl
9. Organic Chemistry, Joginder Singh
10. Carbanic Rasayan, Bashi & Bahi
11. Carbanic Rasayan, R.N. Singh, S.M.I. Gupta, M.M. Bakodia & S.K. Wadhwa
12. Carbanic Rasayan, Joginder Singh.
13. Carbanic Resayan, P.L., Soni.
14. Corbanic Rasayan, Bhagchandani, Sahitya Bhawan Publication.
15. Rasayan Vigyan, Bhatnagar, Arun Prakashan.



**PAPER - III**  
**(Paper Code-0897)**  
**PHYSICAL CHEMISTRY**

**M.M. 34**

**UNIT-I QUANTUM MECHANICS**

Black body radiation, Plank's radiation law, photoelectric effect, Compton effect. DeBroglie's idea of matter waves, experimental verification Heisenberg's uncertainty principle, Sinusoidal wave equation, Operators : Hamiltonian operator, angular momentum operator, laplacian operators postulate of quantum mechanics Eigen values, Eigen function. Schrodinger time independed wave equation physical Significance of and . Applications of Schrodinger wave equation: particle in one dimensional box Hydrogenation (separation into three equation's) radial wave function and angular wave function.

**UNIT-II QUANTUM MECHANICS-II**

Quantum mechanical approach of molecular orbit theory; basic idea criteria for forming M.O and A.O, LCAO approximation, formation of  $H^{2+}$  ion, calculation of energy levels from wave functions bonding and antibonding wave functions concept of and orbitals and their characteristics, Hybrid orbital :  $SP$ ,  $SP^2$ ,  $SP^3$ , Calculation of coefficients  $A_d^s$  used in these hybrid orbitals.

Introduction to valence bond model of  $H^2$ , Comparison of M.O. and V.B. model, Huckle theory, application of huckel theory to ethane propene etc.

**UNIT-III SPECTROSCOPY-I**

- A. Introduction, characterization of electromagnetic radiation, regions of the spectrum, representation of spectra width and intensity of spectral transition, rotational spectra of calculated diatomic molecules, energy level of rigid rotator, selection rule, determination of bond length qualitative description of non - rigid rotator isotopic effect.
- B. Vibrational spectra - Fundamental vibrational and their symmetry, vibrating diatomic molecules, enegy levels of simple harmonic oscillator. Selection Rule, Pure vibrational Spectrum, determination of force constant, diatomic vibrating operator. Anhormonic Oscillator.
- C. Raman Spectra : Concept of polarizability, quantum theory of Raman spectra stokes and anti stokes lines pure rotational and vibrational Raman spectra,

Application of Raman spectra stokes and anti stokes lines, pure rotational and vibrational Raman apectra, Applications of Raman spectra.

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## UNIT-IV SPECTROSCOPY-II

- A. Electronic Spectra: Electronic Spectra of diatomic molecule, Frank London principle, types of electronic transitions. Applications of electronic spectra.
- B. Photo-chemistry: Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry. Grothus-Draper law, Stark-Einstein law, Jablonski diagram depicting various process occurring in the excited state, qualitative description of fluorescence, occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield photosensitized reactions energy transfer processes (simple examples).

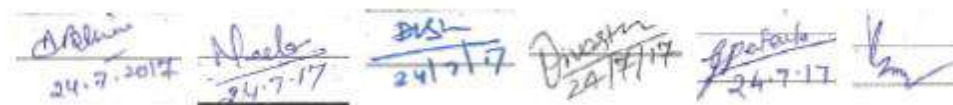
## UNIT-V A. Thermodynamics

Energy referred to absolute zero, third law of thermodynamics Test of III law of thermodynamics Nerst heat theorem application and limitation of Nerst heat theorem.

- B. Physical properties and molecular structure : polarization of molecules, {Classius-Mosotti equation. orientation of dipoles in an electric field. Dipole moment, induced dipole moment, measurement of dipole moment. Temperature methods and refractivity methods. Dipole moment and molecular structure.
- C. Magnetic Properties: Paramagnetism diamagnetism, ferromagnetism. Determination of magnetic susceptibility, elucidation of molecular structure.

## REFERENCE BOOKS:

1. Physical Chemistry, G.M. Barrow, International student edition, McGraw Hill
2. Basic programming with application, V.K. Jain, Tata McGraw-Hill
3. Computers & Common sense, R. Hunt & Shelly, Prentice-Hall
4. University general chemistry, C.N.R. Rao, Macmillan.
5. Physical Chemistry, R.A. Alberty, Wiley Eastern
6. The elements of Physical Chemistry, P.W. Atkins, Oxford
7. Physical Chemistry through problems, S.K. Dogra & S. Dogra, Wiley Eastern
8. Physical Chemistry, B.D. Khosla
9. Physical Chemistry, Puri & Sharma
10. Bhoutic Rasayan, Puri & Sharma
11. Bhoutic Rasayan, P.L. Soni
12. Bhoutic Rasayan, Bahl & Tuli



**PAPER-IV**  
**LABORATORY COURSE**

**180 Hrs.**

**Inorganic Chemistry**

**Synthesis Analysis**

- (a) Preparation of Sodium trioxalato ferrate (III),  $\text{Na}_3[\text{Fe}(\text{C}_2\text{O}_4)_3]$  and determination of its composition by permanganometry.
- (b) Preparation of Ni-DMG complex,  $[\text{Ni}(\text{DMG})_2]$
- (c) Preparation of copper tetraammine complex,  $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4$ .
- (d) Preparation of cis-and trans-bioxalato diaqua chromate (III) ion.

**Gravimetric Analysis**

Analysis of Cu as  $\text{CuSCN}$  or  $\text{CuO}$ , Ni as  $\text{Ni}(\text{DMG})_2$ , Ba as  $\text{BaSO}_4$  and Fe as  $\text{Fe}_2\text{O}_3$

**Organic Chemistry**

**Laboratory Techniques**

**A Steam Distillation**

Napthalene from its suspension in water Clove oil from cloves

Separation of ortho and para-nitrophenols.

**B Column Chromatography**

Separation of fluorescein and methylene blue Separation of

leaf pigments from spinach leaves

Resolution of racemic mixture of (+,-) mandelic acid.

**Qualitative Analysis**

Analysis of an organic mixture containing two solid components using water,  $\text{NaHCO}_3$ ,  $\text{NaOH}$  for separation and preparation of suitable derivatives.

**Synthesis of Organic Compounds**

- (a) Acetylation of salicylic acid, aniline, glucose and hydroquinone. Benzoylation of aniline and phenol.
- (b) Aliphatic electrophilic substitution- Preparation of iodoform from ethanol and acetone.
- (c) Aromatic electrophilic substitution-Nitration-  
Preparation of m-dinitrobenzene, p-nitroacetanilide  
Halogenation- Preparation of p-bromoacetanilide, 2,4,6 tribromophenol
- (d) Diazotization/Coupling- Preparation of methyl orange and methyl red
- (e) Oxidation- Preparation of benzoic acid from toluene
- (f) Reduction- Preparation of aniline from nitrobenzene, m-nitroaniline from m-dinitrobenzene.

*Alkane* 24.7.2017    *Alkane* 24.7.17    *BIS* 24.7.17    *Dinitro* 24.7.17    *p-nitro* 24.7.17    *h*



## Physical Chemistry

### Electrochemistry

- (a) To determine strength of given acid conductometrically using standard alkali solution.
- (b) To determine solubility and solubility product of a sparingly soluble electrolyte conductometrically.
- (c) To study saponification of ethyl acetate conductometrically.
- (d) Determine the ionization constant of a weak acid conductometrically.
- (e) To titrate potentiometrically the given ferrous ammonium sulphate using  $\text{KMnO}_4/\text{K}_2\text{Cr}_2\text{O}_7$  as titrant and calculate the redox potential of  $\text{Fe}^{2+}/\text{Fe}^{3+}$  system on the hydrogen scale.

### Refractometry and Polarimetry

- (a) To verify law of refraction of mixtures (e.g. of glycerol and water) using Abbe's refractometer.
- (b) To determine the specific rotation of a given optically active compound.

### Molecular Weight Determination

- (a) Determination of molecular weight of a non-volatile solute by Rast method/Beckmann freezing point method.
- (b) Determination of the apparent degree of dissociation of an electrolyte (e.g., NaCl) in aqueous solution at different concentrations by ebullioscopy.

### Colorimetry

To verify Beer-Lambert law for  $\text{KMnO}_4/\text{K}_2\text{Cr}_2\text{O}_7$  and determine the concentration of the given solution of the substance.

### REFERENCE BOOKS :

1. Vogel's qualitative Analysis, revised, Svehla, Orient Longman
2. Standard methods of chemical analysis, W.W. Scott, The Technical Press
3. Experimental Organic Chemistry, Vol. I & II, P.R. Singh, D.S. Gupta and K.S. Bajpai, tata McGraw Hill.
4. Laboratory Manual in Organic Chemistry, R.K. Bansal, Wiley Eastern
5. Vogel's Text Book of Practical Organic Chemistry, B.S. Furnis, A.J. Hannaford, V. Rogers, P.W.G. Smith and A.R. Tatchel, ELBS
6. Experiments in general chemistry, C.N.R. Rao & U.C. Agrawal
7. Experiments in Physical Chemistry, R.C. Das & Behra, Tata McGraw Hill
8. Advanced Practical Physical Chemistry, J.B. Yadav, Goel Publishing House.





**8 Hrs.**

**PRACTICAL EXAMINATION**

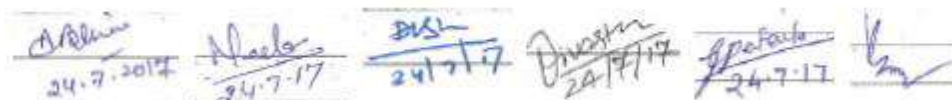
**M.M.50.**

**Five experiments are to be performed.**

1. Inorganic - Two experiments to be performed.  
Gravimetric estimation compulsory carrying 08 marks. (Manipulation 3 marks).  
Anyone experiment from synthesis and analysis carrying 04 marks.
2. Organic-Two experiments to be performed.  
Qualitative analysis of organic mixture containing two solid components.  
compulsory carrying 08 marks (03 marks for each compound and two marks for separation).  
One experiment from synthesis of organic compound (Single step) carrying 04 marks.
3. Physical-One physical experiment carrying 12 marks.
4. Sessional 04 marks.
5. Viva Voce 10 marks.

In case of Ex-Students one mark each will be added to Gravimetric analysis and Qualitative analysis of organic mixture and two marks in Physical experiment.

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## PHYSICS

### Objectives :

Present course is aimed to provide ample knowledge of basics of Physics which are relevant to the understanding of modern trends in higher physics.

The first paper is aimed at preparing the back ground of modern physics which includes the relativistic and quantum ideas mainly concerned with atomic, molecular and nuclear physics. It constitutes an essential pre-requisite for better understanding of any branch of physics.

The second paper is mainly concerned with Solid State Physics, Solid State Devices and Electronics. This course is quite important from the applicational aspects of modern electronic devices. It also forms the basis of advance electronics including communication technology to be covered at higher level.

The experiments are based mostly on the contents of the theory papers so as to provide comprehensive insight of the subject.

### Scheme of Examination :

1. There shall be two theory papers of 3 hours duration each and one practical paper of 4 hours duration. Such paper shall carry 50 marks.
2. Each theory paper will comprise of 5 units. Two questions will be in each unit and the student will have the choice to answer one out of the two.
3. Numerical problems of about 30 percent will compulsorily be asked in each theory paper.
4. In practical paper each student has to perform two experiments during examination.
5. Practical examination will be of 4 hours duration. The distribution of practical marks will be as follows.

Experiments :  $15 + 15 = 30$ , Viva-voce

:10 Internal Assessment - 10.



**PAPER - I (Paper Code-0893)**  
**RELATIVITY, QUANTUM MECHANICS, ATOMIC MOLECULAR**  
**AND NUCLEAR PHYSICS.**

- UNIT-I** Reference systems, inertial frames, Galilean invariance and conservation laws, propagation of light, Michelson-Morley experiment, search for ether. Postulates for the special theory of relativity, Lorentz transformations, length contraction, time dilation, velocity addition theorem, variation of mass with velocity, mass-energy equivalence, particle with zero rest mass, Compton effect.
- UNIT-II** Origin of the quantum theory : Failure of classical physics to explain the phenomena such as black-body spectrum, photoelectric effect. Wave-particle duality and uncertainty principle : de Broglie's hypothesis for matter waves : the concept of wave and group velocities, evidence for diffraction & interference of particles, experimental demonstration of matter waves. Davisson and Germer's experiment. Consequence of de Broglie's concepts, quantisation in hydrogen atom, energies of a particle in a box, wave packets. Consequence of the uncertainty relation : gamma ray microscope, diffraction at a slit.
- UNIT-III** Quantum Mechanics : Schrodinger's equation. Postulatory basis of quantum mechanics, operators, expectation values, transition probabilities, applications to particle in a one- and three dimensional boxes, harmonic oscillator in one dimension, reflection at a step potential, transmission across a potential barrier. Hydrogen atom : natural occurrence of  $n$ , and  $m$  quantum numbers, the related physical quantities.
- UNIT-IV** Spectra of hydrogen, deuterium and alkali atoms spectral terms, doublet fine structure, screening constants for alkali spectra for  $s, p, d$  and  $f$  states, selection rules. Discrete set of electronic energies of molecules, quantisation of vibrational and rotational energies, determination of internuclear distance, pure rotational and rotation vibration spectra. Dissociation limit for the ground and other electronic states, transition rules for pure vibration and electronic vibration spectra. Raman effect, Stokes and anti-Stokes lines, complementary character of Raman and infrared spectra, experimental arrangements for Raman spectroscopy.
- UNIT-V** Interaction of charged particles and neutrons with matter, working of nuclear detectors, G-M counter, proportional counter and scintillation counter, cloud chambers, spark chamber, emulsions. Structure of nuclei, basic properties ( $Z, A, \mu, Q$  and binding energy), deuteron binding energy,  $p-p$  and  $n-p$  scattering and general concepts of nuclear forces, Beta decay, range of alpha particle Geiger-Nuttall law. Gamow's explanation of beta decay, alpha decay and continuous and discrete spectra. Nuclear reactions, channels, compound nucleus, direct reaction (concepts). Shell model & liquid drop model, fission and fusion (concepts), energy production in stars by  $p-p$  and carbon cycles (concepts).



### TEXT AND REFERENCE BOOKS :

1. H.S. Mani and G.K. Metha : "Introduction to Modern Physics"" (Affiliated East-West Press, 1989)
2. A Beiser, "Prospective of Modern Physics"
3. H.E. White, Introduction to Atomic Physic"
4. Barrow, "Introduction to Molecular Physics!"
5. R.P. Feynman, R.B. Leighton and M Sands, "The Feynman Lectures on Physics", Vol.III (B.I. Publications, Bombay, Delhi, Calcutta, Madras).
6. T.A. Littlefield and N Thorley, "Atomic and Nuclear Physics" (Engineering Language Book Society)
7. H.A. Enge, "Introduction to Nuclear Physics", (Addision-Wesly)
8. Eisenberg and Resnik, "Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles" (John Wiley)
9. D.P. Khandelwal, "Optics and Atomic Physics", (Himalaya Publishing House, Bombay, 1988).



**PAPER-II (Paper Code-0894)**

**SOLID STATE PHYSICS, SOLID STATE DEVICES AND ELECTRONICS**

**UNIT-I** Amorphous and crystalline solids, Elements of symmetry, seven crystal system, Cubic lattices, Crystal planes, Miller indices, Laue's equation for X-ray diffraction, Bragg's Law. Bonding in solids, classification. Cohesive energy of solid.

Madelung constant, evaluation of Parameters.

Specific heat of solids, classical theory (Dulong-Petit's law). Einstein and Debye theories. Vibrational modes of one dimensional monoatomic lattice, Dispersion relation, Brillouin Zone.

**UNIT-II** Free electron model of a metal, Solution of one dimensional Schrodinger equation in a constant potential. Density of states. Fermi Energy, Energy bands in a solid (Kronig-Penny model without mathematical details). Metals, Insulator and Semiconductors. Hall effect.

Dia, Para and Ferromagnetism. Langevin's theory of dia and para-magnetism. Curie-Weiss's Law. Qualitative description of Ferromagnetism (Magnetic domains), B-H. curve and Hysteresis loss.

**UNIT-III** Intrinsic semiconductors, carrier concentration in thermal equilibrium, Fermi level, Impurity semiconductor, donor and acceptor levels, Diode equation, junctions, junction breakdown, Depletion width and junction capacitance, abrupt junction, Tunnel diode, Zener diode. Light emitting diode, solar cell, Bipolar transistors, pnp and npn transistors, characteristics of transistors, different configurations, current amplification factor, FET.

**UNIT-IV** Half and full wave rectifier, rectifier efficiency ripple factor, Bridge rectifier, Filters, Inductor filter, T and N filters, Zener diode, regulated power supply. Applications of transistors. Bipolar Transistor as amplifier.

Single stage and CE small signal amplifiers, Emitter followers, Transistor as power amplifier, Transistor as oscillator, Wein-Bridge Oscillator and Hartley oscillator.



**UNIT-V** Introduction to computer organisation, time sharing and multi programming systems, window based word processing packages, MS Word.

Introduction to C programming and application to simple problems of arranging numbers in ascending / descending orders : sorting a given data in an array, solution of simultaneous equation.

**BOOKS RECOMMENDED :**

1. Introduction to solid state physics : C.Kittel
2. Solid State Physics : A.J. Dekkar
3. Electronic Circuits : Mottershead
4. Electronic Circuits : Millman and Halkias
5. Semiconductor Devices : S.M. Sze
6. Computer fundamental : balaguara Swami

**PRACTICALS**

MINIMUM 16 (Sixteen) Out of the following or similar experiment of equal standard :

1. Determination of Planck's constant
2. Determination of  $e/m$  by using Thomson's tube
3. Determination of  $e$  by Millikan's method
4. Study of spectra of hydrogen and deuterium (Rydberg constant and ratio of masses of electron proton)
5. Absorption spectrum of iodine vapour
6. Study of alkali or alkaline earth spectra using a concave grating
7. Study of Zeeman effect for determination of Lande  $g$ -factor.
8. Analysis of a given band spectrum.
9. Study of Raman spectrum using laser as an excitation source.
10. Study of absorption of alpha and beta rays.
11. Study of statistics in radioactive measurement.
12. Colorimetric study of crystal faces.
13. Determination of dielectric constant
14. Hysteresis curve of transformer core
15. Hall-probe method for measurement of magnetic field
16. Specific resistance and energy gap of a semiconductor
17. Characteristics of transistor
18. Characteristics of a tunnel diode
19. Study of voltage regulation system
20. Study of a regulated power supply



21. Study of lissajous figures using a CRO
22. Study of VTVM
23. Study of RC and TC coupled amplifiers
24. Study of AF and RF oscillators
25. Find roots of  $f(x)=0$  by using Newton-Raphson method
26. Find roots of  $F(x)=0$  by using secant method
27. Integration by Simpson rule
28. To find the value of V at
31. String manipulations
32. Towers of Hanoi (Nonrecursive)
33. Finding first four perfect numbers
34. Quadratic interpolation using Newton's forward-difference formula of degree two.

**TEXT AND REFERENCE BOOKS :**

1. B.G. Strechman ; "Solid State Electronic Devices". II Edition (Prentice-Hall of India, New Delhi, 1986)
2. W.D. Stanley ; "Electronic Devices, Circuits and Applications" (Prentice Hall, New Jersey, USA, 1988)
3. S. Lipschutz and A Poe ; "Schaum's Outline of Theory and Problems of Programming with Fortran" (McGraw-Hill Book Co. Singapore, 1986)
4. C Dixon ; "Numerical Analysis"

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## MATHEMATIS

There shall be three theory papers. Two compulsory and one optional Each paper carrying 50 marks is divided into five units and each unit carry equal marks.

### PAPER - I (Paper Code-0898)

#### ANALYSIS

##### REAL ANALYSIS

**UNIT-I** Series of arbitrary terms. Convergence, divergence and Oscillation. Abel's and Dirichlet's test. Multiplication of series. Double series. Partial derivation and differentiability of real-valued functions of two variables. Schwarz and Young's theorem. Implicit function theorem. Fourier series. Fourier expansion of piecewise monotonic functions.

**UNIT-II** Riemann integral. Integrability of continuous and monotonic functions. The fundamental theorem of integral calculus. Mean value theorems of integral calculus.

Improper integrals and their convergence, Comparison tests. Abel's and Dirichlet's tests. Frullani's integral. Integral as a function of a parameter. Continuity, derivability and integrability of an integral of a function of a parameter.

##### COMPLEX ANALYSIS

**UNIT-III** Complex numbers as ordered pairs. Geometric representation of Complex numbers. Stereographic projection. Continuity and differentiability of Complex functions. Analytic functions. Cauchy-Riemann equations. Harmonic functions. Elementary functions. Mapping by elementary functions. Mobius transformations. Fixed points, Cross ratio. Inverse points and critical mappings. Conformal mappings.

##### METRIC SPACES

**UNIT-IV** Definition and examples of metric spaces. Neighbourhoods, Limit points, Interior points, Open and closed sets, Closure and interior. Boundary points, Sub-space of a metric space. Cauchy sequences, Completeness, Cantor's intersection theorem. Contraction principle, Construction of real numbers as the completion of the incomplete metric space of rationals. Real numbers as a complete ordered field.

**UNIT-V** Dense subsets. Baire Category theorem. Separable, second countable and first countable spaces. Continuous functions. Extension theorem. Uniform continuity, Isometry and homeomorphism. Equivalent metrics. Compactness, Sequential compactness. Totally bounded spaces. Finite intersection property. Continuous functions and compact sets, Connectedness, Components, Continuous functions and connected sets.





## REFERENCES :

1. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
2. R.R. Goldberg, Real Analysis, Oxford & IBH publishing Co., New Delhi, 1970.
3. S. Lang, Undergraduate Analysis, Springer-Verlag, New York, 1983.
4. D. Somasundaram and B. Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997.
5. Shanti Narayan, A Course of Mathematical Analysis, S. Chand & Co. New Delhi.
6. P.K. Jain and S.K. Kaushik, An introduction to Real Analysis, S. Chand & Co., New Delhi, 2000.
7. R.v. Churchill & J.W. Brown, Complex Variables and Applications, 5<sup>th</sup> Edition, McGraw-Hill, New York, 1990.
8. MarkJ. Ablowitz & A.S.Fokas, Complex Variables : Introduction and Applications, Cambridge University Press, South Asian Edition, 1998.
9. Shanti Narayan, Theory of Functions of a Complex Variable, S. Chand & Co., New Delhi.
10. E.t. Copson, Metric Spaces, Cambridge University Press, 1968.
11. P.K. Jain and K. Ahmad, Metric Spaces, Narosa Publishing House, New Delhi, 1996.
12. G.F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill, 1963.



**PART - II (Paper Code-0899)**

**ABSTRACT ALGEBRA**

**UNIT-I** Group-Automorphisms, inner automorphism. Automorphism groups and their computations, Conjugacy relation, Normaliser, Counting principle and the class equation of a finite group. Center for Group of prime-order, Abelianizing of a group and its universal property. Sylow's theorems, Sylow subgroup, Structure theorem for finite Abelian groups.

**UNIT-II** Ring theory-Ring homomorphism. Ideals and Quotient Rings. Field of Quotients of an Integral Domain, Euclidean Rings, Polynomial Rings, Polynomials over the Rational Field. The Eisenstien Criterion, Polynomial Rings over Commutative Rings, Unique factorization domain.  $R$  unique factorisation domain implies so is  $R[x_1, x_2, \dots, x_n]$  Modules, Submodules, Quotient modules, Homomorphism and Isomorphism theorems.

**UNIT-III** Definition and examples of vector spaces. Subspaces. Sum and direct sum of subspaces, Linear span. Linear dependence, independence and their basic properties.

Basis. Finite dimensional vector spaces. Existence theorem for bases. Invariance of the number of elements of a basis set. Dimension. Existence of complementary subspace of a subspace of a finite dimensional vector space. Dimension of sums of subspaces. Quotient space and its dimension.

**UNIT-IV** Linear transformations and their representation as matrices. The Algebra of linear transformations. The rank nullity theorem. Change of basis. Dual space. Bidual space and natural isomorphism. Adjoint of a linear transformation. Eigenvalues and eigenvectors of a linear transformation. Diagonalisation. Annihilator of a subspace. Bilinear, Quadratic and Hermitian forms.

**UNIT-V** Inner Product Spaces-Cauchy-Schwarz inequality. Orthogonal vectors. Orthogonal Complements. Orthonormal sets and bases. Bessel's inequality for finite dimensional spaces. Gram-Schmidt Orthogonalization process.



## REFERENCES :

1. I.N. Herstein, Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975.
2. N. Jacobson, Basic Algebra, Vols. I & II. W.H. Freeman, 1980 (also published by Hindustan Publishing Company).
3. Shanti Narayan, A Text Book of Modern Abstract Algebra, S.Chand & Co. New Delhi.
4. K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
5. P.B. Bhattacharya, S.K. Jain and S.R. Nagpal, Basic Abstract Algebra (2<sup>nd</sup> Edition) Cambridge University Press, Indian Edition, 1997.
6. K. Hoffman and R. Kunze, Linear Algebra, 2<sup>nd</sup> Edition, Prentice Hall. Englewood Cliffs, New Jersey, 1971.
7. S.K. Jain, A. Gunawardena & P.B. Bhattacharya, Basic Linear Algebra with MATLAB. Key College Publishing (Springer-Verlag) 2001.
8. S. Kumaresan, Linear Algebra, A Geometric Approach, Prentice-Hall of India, 2000.
9. Vivek Sahai and Vikas Bist, Algebra, Norosa Publishing House, 1997.
10. I.S. Luther and I.B.S. Passi, Algebra, Vol. I-Groups, Vol. II-Rings. Narosa Publishing House (Vol. I-1996, Vol. II-1999)
11. D.S. Malik, J.N. Mordeson, and M.K. Sen, Fundamentals of Abstract Algebra, McGraw-Hill International Edition, 1997.



### **PAPER - III - (OPTIONAL)**

#### **(I) PRINCIPLES OF COMPUTER SCIENCE (Paper Code-0900)**

**UNIT-I Data Storage** - Storage of bits. Main Memory. Mass Storage. Coding Information of Storage. The Binary System. Storing integers, storing fractions, communication errors. **Data Manipulation** - The Central Processing Unit. The Stored-Program Concept. Programme Execution. Other Architectures. Arithmetic/Logic Instructions. Computer-Peripheral Communication.

**UNIT-II Operating System and Networks** - The Evolution of Operating System. Operating System Architecture. Coordinating the Machine's Activities. Handling Competition Among Process. Networks. Networks Protocol.

**Software Engineering** - The Software Engineering Discipline. The Software Life Cycle. Modularity. Development Tools and Techniques. Documentation. Software Ownership and Liability.

**UNIT-III Algorithms** - The Concept of an Algorithm, Algorithm Representation. Algorithm

Discovery. Iterative Structures. Recursive Structures. Efficiency and Correctness.

(Algorithms to be implemented in C++).

**Programming Languages** - Historical Perspective. Traditional Programming Concepts, Program Units. Language Implementation. Parallel Computing. Declarative Computing.

**UNIT-IV Data Structures** - Arrays. Lists. Stacks. Queues. Trees. Customised Data Types. Object Oriented Programming.

**File Structure** - Sequential Files. Text Files. Indexed Files. Hashed Files. The Role of The Operating System.

**Database Structure** - General Issues. The Layered Approach to Database Implementation. The Relational Model. Object-Oriented Database. Maintaining Database Integrity. E-R models.

**UNIT-V Artificial Intelligence** - Some Philosophical Issues. Image Analysis. Reasoning, Control System Activities. Using Heuristics. Artificial Neural Networks. Application of Artificial Intelligence.

**Theory of Computation** - Turning Machines. Computable functions. A Non computable Function. Complexity and its Measures. Problem Classification.

#### **REFERENCES :**

1. J. Glen Brookshear, Computer Science : An Overview, Addison -Wesley.
2. Stanley B. Lippman, Josee Lojoie, C++ Primer (3rd Edition), Addison-Wesley.

### **PAPER - III - (OPTIONAL)**

#### **(II) DISCRETE MATHEMATICS (Paper Code-0901)**

**UNIT-I Sets and Propositions** - Cardinality. Mathematical Induction, Principle of Inclusion and exclusion.

Computability and Formal Languages - Ordered Sets. Languages. Phrase Structure Grammars. Types of Grammars and Languages. Permutations. Combinations and Discrete Probability.

**UNIT-II Relations and Functions** - Binary Relations, Equivalence Relations and Partitions. Partial Order Relations and Lattices. Chains and Antichains. Pigeon Hole Principle. **Graphs and Planar Graphs** - Basic Terminology. Multigraphs. Weighted Graphs. Paths and Circuits. Shortest Paths. Eulerian Paths and Circuits. Travelling Salesman Problem. Planner Graphs.

#### **TREES.**

**UNIT-III Finite State Machines** - Equivalent Machines. Finite State Machines as Language Recognizers. Analysis of Algorithms - Time Complexity. Complexity of Problems. Discrete Numeric Functions and Generating Functions.

**UNIT-IV1 Recurrence Relations and Recursive Algorithms** - Linear Recurrence Relations with Constant Coefficients. Homogeneous Solutions. Particular Solution. Total Solution. Solution by the Method of Generating Functions. Brief review of Groups and Rings.

**UNIT-V Boolean Algebras** - Lattices and Algebraic Structures. Duality, Distributive and Complemented Lattices. Boolean Lattices and Boolean Algebras. Boolean Functions and Expressions. Propositional Calculus. Design and Implementation of Digital Networks. Switching Circuits.

#### **REFERENCES :**

C.L. Liu, Elements of Discrete Mathematics, (Second Edition), McGraw Hill, International Edition, Computer Science Series, 1986.



### **PAPER - III - (OPTIONAL)**

### **(III) APPLICATION OF MATHEMATICS IN FINANCE AND INSURANCE**

**(Paper Code-0902)**

#### **Application of Mathematics in Finance :**

**UNIT-I Financial Management** - An overview. Nature and Scope of Financial Management.

Goals of Financial Management and main decisions of financial management.

Difference between risk, speculation and gambling.

Time value of Money-Interest rate and discount rate. Present value and future value discrete case as well as continuous compounding case. Annuities and its kinds.

**UNIT-II** Meaning of return. Return as Internal Rate of Return (IRR). Numerical

Methods like Newton Raphson Method to calculate IRR. Measurement of returns under uncertainty situations. Meaning of risk. Difference between risk and uncertainty. Types of risks. Measurement of risk. Calculation of security and Portfolio Risk and Return-Markowitz Model. Sharpe's Single Index Model Systematic Risk and Unsystematic Risk.

**UNIT-III** Taylor series and Bond Valuation. Calculation of Duration and Convexity of bonds. Financial Derivatives - Futures. Forward. Swaps and Options. Call and Put Option. Call and Put Parity Theorem. Pricing of contingent claims through Arbitrage and Arbitrage Theorem.

#### **Application of Mathematics in Insurance**

**UNIT-IV** Insurance Fundamentals - Insurance defined. Meaning of loss. Chances of loss, peril, hazard, and proximate cause in insurance. Costs and benefits of insurance to the society and branches of insurance-life insurance and various types of general insurance. Insurable loss exposures feature of a loss that is ideal for insurance. Life Insurance Mathematics - Construction of Mortality Tables. Computation of Premium of Life Insurance for a fixed duration and for the whole life.

**UNIT-V** Determination of claims for General Insurance - Using Poisson Distribution and Negative Binomial Distribution-the Polya Case.

Determination of the amount of Claims in General Insurance - Compound Aggregate claim model and its properties, and claims of reinsurance. Calculation of a compound claim density function. F-recursive and approximate formulae for F.

**REFERENCES :**

1. Aswath Damodaran, Corporate Finance - Theory and Practice, John Wiley & Sons Inc.
2. John C. Hull, Options, Futures, and Other Derivatives, Prentice-Hall of Indian Private Limited.
3. Sheldon M. Ross, An Introduction to Mathematical Finance, Cambridge University Press.
4. Mark S. Dorfman, Introduction to Risk Management and Insurance, Prentice Hall, Englewood Cliffs, New Jersey.
5. C.D. Daykin, T. Pentikainen and M. Pesonen, Practical Risk Theory for Actuaries, Chapman & Hall.



### **PAPER - III - (OPTIONAL)**

**Theory component will have maximum marks 30.**

**Practical component will have maximum marks 20.**

#### **(IV) PROGRAMMING IN C AND NUMERICAL ANALYSIS (Theory & Practical)**

**(Paper Code-0903)**

**UNIT-I** Programmer's model of a computer. Algorithms. Flow Charts. Data Types. Arithmetic and input/output instructions. Decisions control structures. Decision statements. Logical and Conditional operators. Loop. Case control structures. Functions. Recursions. Preprocessors. Arrays. Puppeting of strings. Structures. Pointers. File formatting.

#### **Numerical Analysis**

**UNIT-II** Solution of Equations : Bisection, Secant, Regula Falsi, Newton's Method, Roots of Polynomials : Interpolation : Lagrange and Hermite Interpolation, Divided Differences, Difference Schemes, Interpolation Formulas using Differences. Numerical Differentiation. Numerical Quadrature : Newton-Cote's Formulas. Gauss Quadrature Formulas, Chebychev's Formulas.

**UNIT-III** Linear Equations : Direct Methods for Solving. Systems of Linear Equations (Guass Elimination, LU Decomposition, Cholesky Decomposition), Iterative Methods (Jacobi, GaussSeidel, Relaxation Methods).

The Algebraic Eigenvalue problem : Jacobi's Method, Givens' Method, Householder's Method, Power Method, QR Method, Lanezos' Method.

**UNIT-IV** Ordinary Differential Equations : Euler Method, Single-step Methods, Runge-Kutta's Method, Multi-step Methods, Milne-Simpson Method, Methods Based on Numerical Integration, Methods Based on Numerical Differentiation, Boundary Value Problems, Eigenvalue Problems.

Approximation : Different Types of Approximation, Least Square Polynomial Approximation, Polynomial Approximation using Orthogonal Polynomials, Approximation with Trigonometric Functions, Exponential Functions, Chebychev Polynomials, Rational Functions.

**Unit-V** Monte Carlo Methods Random number generation, congruential generators, statistical tests of pseudo-random numbers.

Random variate generation, inverse tranform method, composition method, acceptancerejection method, generation of exponential, normal variates, binomial and Poisson variates.

Monte Carlo integration, hit or miss Monte Carlo integration, Monte Carlo integration for improper integrals, error analysis for Monte Carlo intergration.





## REFERENCES :

1. Henry Mullish & Herbert L. Cooper, Spirit of C : An Introduction to Modern Programming, Jaico Publishers, Bombay.
2. B.W. Kernighan and D.M. Ritchie. The C Programming Language 2<sup>nd</sup> Edition, (ANSI features) Prentice Hall, 1989.
3. Peter A Darnel and Philip E. Margolis, C : A Software Engineering Approach, Narosa Publishing House, 1993.
4. Robert C. Huthison and Steven B. Just, Programming using C Language, McGraw Hill, 1988.
5. Les Hancock and Morris Krieger, The C Primer, McGraw Hill, 1988.
6. V. Rajaraman, Programming in C, Prentice Hall of India, 1994.
7. Byron S. Gottfried, Theory and Problems of Programming with C, tata McGraw-Hill Publishing Co. Ltd., 1998.
8. C.E. Froberg, Introduction to Numerical Analysis, (Second Edition), Addison-Wesley, 1979.
9. James B. Scarborough, Numerical Mathematical Analysis, Oxford and IBH Publishing Co. Pvt. Ltd. 1966.
10. Melvin J. Maron, Numerical Analysis A Practical Approach, Macmillan publishing Co., Inc. New York, 1982.
11. M.K. Jain, S.R.K. Iyengar, R.K. Jain, Numerical Methods Problems and Solutions, New Age International (P) Ltd., 1996.
12. M.K. Jain, S.R.K. Iyengar, R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International (P) Ltd., 1999.
13. R.Y. Rubinstein, Simulation and the Monte Carlo Methods, John Wiley, 1981.
14. D.J. Yakowitz Computational Probability and Simulation, Addison-Wesley, 1977.



**PAPER - III - (OPTIONAL)**

**(IV) PRACTICAL**

**PROGRAMMING IN C AND NUMERICAL ANALYSIS  
LIST OF PRACTICAL TO BE CONDUCTED...**

1. Write a program in C to find out the largest number of three integer numbers.
2. Write a program in C to accept monthly salary from the user, find and display income tax with the help of following rules :

Monthly Salary	Income Tax
9000 or more	40% of monthly salary
7500 or more	30% of monthly salary
7499 or less	20% of monthly salary
3. Write a program in C that reads a year and determine whether it is a leap year or not.
4. Write a program in C to calculate and print the first n terms of fibonacci series using looping statement.
5. Write a program in C that reads in a number and single digit. It determines whether the first number contains the digit or not.
6. Write a program in C to computes the roots of a quadratic equation using case statement.
7. Write a program in C to find out the largest number of four numbers using function.
8. Write a program in C to find the sum of all the digits of a given number using recursion.
9. Write a program in C to calculate the factorial of a given number using recursion.
10. Write a program in C to calculate and print the multiplication of given 2D matrices.
11. Write a program in C to check that whether given string palindrome or not.
12. Write a C function seriesum () to calculate the sum of series  
:  $1+X+1/2! X^2+1/3! X^3+..... 1/n! X^n$
13. Write a program in C to determine the grade of all students in the class using Structure. Where structure having following members - name, age, roll, sub 1, sub2, sub3, sub4 and total.
14. Write a program in C to copy one string to another using pointers. (Without using standard library functions).
15. Write a program in C to store the data of five students permanently in a data file using file handling.



**PAPER - III - (OPTIONAL)**

**(V) MATHEMATICAL MODELLING**

**(Paper Code-0904) The Process of Applied mathematics.**

**UNIT-I** Setting up first-order differential equations - Qualitative solution sketching.  
Difference and differential equation growth models.

**UNIT-II** Single-species population models. Population growth-An age structure model. The spread of Technological innovation.

**UNIT-III** Higher-order linear models- A model for the detection of diabetes. Combat modes.

Traffic models - Car-following models. Equilibrium speed distributions.

**UNIT-IV** Nonlinear population growth models. Prey-Predator models. Epidemic growth models. Models from political science - Proportional representation-cumulative voting, comparison voting.

**UNIT-V** Applications in Ecological and Environmental subject areas- Urban waste water management planning.

**REFERENCES :**

1. Differential equation models, Eds. Martin Braun, C.S. Coleman, D.A. Drew.
  2. Political and Related Models, Steven. J. Brams, W.F. Lucas, P.D. Straffin (Eds.)
  3. Discrete and System models, W.F. Lucas, F.S. Roberts, R.M. Thrall.
  4. Life Science Models, H.M. Roberts & M. Thompson.
- All volumes published as modules in applied Mathematics, Springer-Verlag, 1982.
5. Mathematical Modelling by J.N. Kapur, New Age International, New Delhi.



**BOTANY**  
**PAPER-I (Paper Code-0915)**  
**PLANT PHYSIOLOGY, BIOCHEMISTRY AND BIOTECHNOLOGY**

**M.M. : 50**

**UNIT-I** Plant-water relations : Importance of water to plant life ; physical properties of water; diffusion and osmosis; absorption, transport of water and transpiration ; physiology of stomata.  
Mineral nutrition : Essential macro and micro-elements and their role ; mineral uptake; deficiency and toxicity symptoms.

**UNIT-II** Transport of organic substances : Mechanism of phloem transport ; source-sink relationship ; factors affecting translocation.  
Basic of enzymology : Discovery and nomenclature ; characteristics of enzymes ; concept of holoenzyme apoenzyme, coenzyme and cofactors ; regulation of enzyme activity, mechanism of action.  
Photosynthesis : Significance ; historical aspects ; photosynthetic pigments ; action spectra and enhancement effects ; concept of two photosystems; Z-scheme ; photo-phosphorylation ; Calvin cycle ; C<sub>4</sub> pathway ; CAM plants ; photorespiration.

**UNIT-III** Respiration : ATP - the biological energy currency ; aerobic and anaerobic respiration; Krebs' cycle, electron transport mechanism (chemi-osmotic theory) ; redox potential; oxidative phosphorylation ; pentose phosphate pathway.  
Nitrogen and lipid metabolism : Biology of nitrogen fixation ; importance of nitrate reductase and its regulations ; ammonium assimilation ; structure and function of lipids; fatty acid biosynthesis ; Beta-oxidation ; saturated and unsaturated fatty acids; storage and mobilization of fatty acids.

**UNIT-IV** Growth and development : Definitions ; phases of growth and development ; kinetics of growth, seed dormancy, seed germination and factors of their regulation ; plant movements ; the concept of photoperiodism ; physiology of flowering ; florigen concept; biological clocks ; physiology of senescence, fruit ripening ; plant hormones auxins, gibberellins, cytokinins, abscisic acid and ethylene, history of their discovery, biosynthesis and mechanism of action; photomorphogenesis ; phytochromes and cryptochromes, their discovery, physiological role and mechanism of action.

**UNIT-IV** Genetic engineering : Tools and techniques of recombinant DNA technology ; cloning vectors ; genomic and cDNA library ; transposable elements ; techniques of gene mapping and chromosome walking.  
Biotechnology : Functional definition ; basic aspects of plant tissue culture ; cellular totipotency, differentiation and morphogenesis ; biology of Agrobacterium ; vectors for gene delivery and marker genes ; salient achievements in crop biotechnology.



**PAPER-II**  
**(Paper Code-0916)**  
**ECOLOGY AND UTILIZATION OF PLANTS M.M. : 50**

**UNIT-I** Plants and environment : Atmosphere (gaseous composition), water (properties of water cycle), light (global radiation, photosynthetically active radiation), temperature, soil (development, soil profiles, physico-chemical properties), and biota.

Morphological, anatomical and physiological responses of plants to water (hydro-phytes and xerophytes), temperature (thermoperiodicity), light (photoperiodism, heliophytes and sciophytes) and salinity.

**UNIT-II** Community Ecology : Community characteristics, frequency, density, cover, life forms biological spectrum ; ecological succession.  
Ecosystems : Structure, abiotic and biotic components ; food chain, food web, ecological pyramids, energy flow ; biogeochemical cycles of carbon, nitrogen and phosphorus.

**UNIT-III** Population ecology : Growth curves ; ecotypes ; ecads.  
Biogeographical regions of India.  
Vegetation types of India : Forests and grasslands.

**UNIT-IV** Utilization of Plants  
Food plants : Rice, wheat, maize, potato, sugarcane.  
Fibres : Cotton and jute.  
Vegetable oils : Groundnut, mustard and coconut  
General account of sources of firewood, timber and bamboos.

**UNIT-V** Spices : General account.  
Medicinal plants : General account  
Beverages : Tea and coffee.  
Rubber.

<b>PRACTICAL SCHEME</b>	<b>M.M. 50</b>
01. Physiology	08
02. Ecology	08
03. Utilization of Plants	05
04. Biochemistry / Biotechnology	05
05. Spotting (1-5 spots)	10
06. Project work	04
07. Viva V.	05
08. Sessional	05
	<b>50</b>



### **Suggested Laboratory Exercises**

1. To study the permeability of plasma membrane using different concentrations of organic solvents.
2. To study the effect of temperature on permeability of plasma membrane.
3. To prepare the standard curve of protein and determine the protein content in unknown samples.
4. To study the enzyme activity of catalase and peroxidase as influenced by pH and temperature.
5. Comparison of the rate of respiration of various plant parts.
6. Separation of chloroplast pigment by solvents method.
7. Determining the osmotic potential of vacuolar sap by plasmolytic method.
8. Determining the water potential of any tuber.
9. Separation of amino acids in a mixture by paper chromatography and their identification by comparison with standards.
10. Bioassay of auxin, cytokinin, GA, ABA and ethylene using appropriate plant material.
11. Demonstration of the technique of micropropagation by using different explants, e.g. axillary buds, shoot meristems.
12. Demonstration of the technique of anther culture.
13. Isolation of protoplasts from different tissues using commercially available enzymes.
14. Demonstration of root and shoot formation from the apical and basal portion of stem segments in liquid medium containing different hormones.

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### **Suggested Laboratory Exercises (Ecology)**

1. To determine minimum number of quadrats required for reliable estimate of biomass in grasslands.
2. To study the frequency of herbaceous species in grassland and to compare the frequency distribution with Raunkair's Standard Frequency Diagram.
3. To estimate importance Value Index for grassland species on the basis of relative frequency, relative density and relative biomass in protected and grazed grassland.
4. To measure the vegetation cover of grassland through point frame method.
5. To measure the aboveground plant biomass in a grassland.
6. To determine Kemp's constant for dicot and monocot leaves and to estimate the leaf area index of a grassland community.
7. To determine diversity indices (richness, Simpson, Shannon-Wiener) in grazed and protected grassland.
8. To estimate bulk density and porosity of grassland and woodland soils.
9. To determine moisture content and water holding capacity of grassland and woodland soil.
10. To study the vegetation structure through profile diagram.
11. To estimate transparency, pH and temperature of different water bodies.
12. To measure dissolved oxygen content in polluted and unpolluted water samples.
13. To estimate salinity of different water samples.
14. To determine the percent leaf area injury of different leaf samples collected around polluted sites.
15. To estimate dust holding capacity of the leaves of different plant species.

### **PRACTICAL**

#### **Suggested Laboratory Exercises (for Utilization of Plants)**

1. Food Plants : Study of the morphology, structure and simple microchemical tests of the food storing tissues in rice, wheat, maize, potato and sugarcane, Microscopic examination of starch in these plants (excepting sugarcane)
2. Fibres : Study of cotton flowers, sectioning of the cotton ovules/developing seeds to trace the origin and development of cotton fibres. Microscopic study of cotton and test for cellulose, Sectioning and staining of jute stem to show the location and development of fibres. Microscopic structure. Test for lignocellulose.
3. Vegetable oils : Study of hand sections of groundnut, mustard and coconut and staining of oil droplets by Sudan III and Sudan Black.



4. Field visits : To study sources of firewood (10 plants), timber-yielding trees (10 trees) and bamboos. A list to be prepared mentioning special features.
5. Spices : Examine black pepper, cloves, cinnamon (hand sections) and opened fruits of cardamom and describe them briefly.
6. Preparation of an illustrated inventory of 10 medicinal plants used in indigenous systems of medicine or allopathy : Write their botanical and common names, parts used and disease/disorders for which they are prescribed.
7. Beverages : Cut Sections of boiled coffee beans and tea leaves to study the characteristic structural features.
8. Rubber : Collect illustrative materials of *Hevea brasiliensis* ; morphology of the plant and tapping practices, history of rubber. List the many uses of rubber.

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## **ZOOLOGY**

### **Paper-I (Paper Code-0917)**

**Ecology, Environmental-biology ; Toxicology ; Microbiology and Medical Zoology.**

**2. Attempting one question from each unit will be compulsory. 100% choice be given.**

#### **UNIT-I (ECOLOGY)**

1. Aims and scopes of Ecology.
2. Major ecosystems of the world-Brief introduction
3. Population- Characteristics and regulation of densities.
4. Communities and Ecosystems.
5. Biogeochemical cycles
6. Air and water pollution
7. Ecological succession

#### **UNIT-II (ENVIRONMENTAL BIOLOGY)**

1. Laws of limiting factors
2. Food chain in a freshwater ecosystem.
3. Energy flow in ecosystem-Trophic levels
4. Conservation of Natural resources
5. Environmental impact Assessment

#### **UNIT-III (TOXICOLOGY)**

1. Definition of Toxicity
2. Classification of toxicants
3. Principle of systematic toxicology
4. Toxic agents and their action- Metallic and inorganic agents
5. Animal poisons - Snake-venom, Scorpion and bee poisoning
6. Food poisoning

#### **UNIT-IV (MICROBIOLOGY)**

1. General and Applied microbiology.
2. Microbiology of Domestic water and sewage.
3. Microbiology of milk and milk products.
4. Industrial microbiology.

#### **UNIT-V (MEDICAL MICROBIOLOGY)**

1. Brief introduction to pathogenic micro-organisms, Rickettsia, Spirochaetes and Bacteria.
2. Brief account of life-history and pathogenicity of the following pathogens with reference to man ; Prophylaxis and treatment -
  - (a) Pathogenic Protozoans - Entamoeba, Trypanosoma, and Giardia
  - (b) Pathogenic helminths - Schistosoma
  - (c) Nematode Pathogenic parasites of man
3. Vector insects

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## PAPER-II

(Paper Code-0918)

### (GENETIC'S, CELL PHYSIOLOGY, BIOCHEMISTRY, BIOTECHNOLOGY AND BIOTECHNIQUES)

**Note :** Attempting one question from each unit will be compulsory, 100% choice be given.

#### UNIT-I (GENETIC'S)

1. Linkage and Linkage maps
2. Varieties of gene expression - Multiple alleles ; lithogenesis ; Pleiotropic genes; gene interaction ; epistasis.
3. Sexchromosome systems, and sex-linkage.
4. Mutation and chromosomal alterations ; meiotic consequences.
5. Human genetics - chromosomal and single gene disorders (somatic cell genetics)

#### UNIT-II(CELL PHYSIOLOGY)

1. General idea about pH and Buffer.
2. Transport across membrane - cell membrane; Mitochondria and Endoplasmic reticulum.
3. Active transport and its mechanism; Active transport in Mitochondria and Endoplasmic reticulum.
4. Hydrolytic enzymes - Their chemical nature, Activation and specificity.

#### UNIT-III (BIOCHEMISTRY)

1. Amino acids and Peptides - Basic structure and biological function.
2. Carbohydrate and its metabolism - Glycogenesis; Gluconeogenesis; glycolysis, Glycogenolysis; Cose-cycle.
3. Lipid metabolism - Oxidation of glycerol; oxidation of fatty acid.
4. Protein metabolism - Deamination, Transamination, Transmethylation; Biosynthesis of Protein;

#### UNIT-IV (BIOTECHNOLOGY)

1. Biotechnology - Scope and importance.
2. Recombinant DNA and Gene cloning.
3. Cloned genes and other tools of biotechnology.
4. Applications of biotechnology in (i) Pharmaceutical industry, and (ii) Food processing industry.

#### UNIT-V(BIOTECHNIQUE)

Principles and techniques about the following

1. pH meter
2. Colorimeter
3. Microscopy-Light microscopes, Phase contrast and Electron microscopes.
4. Centrifugation
5. Separation of biomolecules by chromatography, and Electrophoresis
6. Histochemical methods for determination of Protein, Lipids, and carbohydrate

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## PRACTICAL WORK

The Practical work in general shall be based on syllabus prescribed in theory.

The candidates will be required to show knowledge of the following :

1. Estimation of population density, Percentage frequency, Relative density.
2. Analysis of Producers and consumers in grassland.
3. Detection of gram-negative and gram-positive bacteria.
4. Blood group detection (A,B, AB & O).
6. R.B.C., W.B.C. count.
6. Blood coagulation time.
7. Preparation of Hematin crystals from blood of rat.
8. Observation of Drosophila, wild and mutant.
9. Chromatography-Paper or gel.
10. Colorimetric estimation of hemoglobin.
11. Mitosis in onion root tip.
12. Biochemical detection of Carbohydrate, Protein and Lipid.
13. Study of Permanent slides of Parasites, based on theory paper.
14. Working Principles of pH meter, Colorimeter, centrifuge and microscopes.

## SCHEDULE FOR PRACTICALEXAMINATION

**Duration : 4 Hrs.**

**Max Marks : 50**

1.	Haematological Experiment : (R.B.Cs./W.B.Cs. Counting/Blood group detection)	08	marks
2.	Ecological Experiment : (Estimation of Population Density/Frequency/relative Density)	06	marks
3.	Staining of Gram +ve and Gram -ve Bacteria/cytological experiment : Mitosis in onion root tip	05	marks
4.	Biochemical Experiment : (biochemical detection of carbohydrate/protein lipid)	06	marks
5.	Chromatography	05	marks
6.	Spotting : Study of permanent slides of Parasites : 3 Comments on working Principles of pH meter / Calorimeter / centrifuge and Microscope :	10	marks
7.	Viva Voce	05	marks
8.	Sessional :	05	marks

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**MICRO-BIOLOGY**  
**SCHEME OF PRACTICAL**

**Duration : 4 Hrs.**

**Max Marks : 50**

1. Characterization and Identification of micro-organism from any given source	15
2. Biochemical identification of some biodegraded organic molecules	10
3. Spots (1 to 5)	10
4. Viva voce	05
5. Sessional	10
<b>Total -</b>	<b>50</b>

**(PRACTICAL SYLLABUS)**

**MOLECULAR BIOLOGY AND GENETIC ENGINEERING**

Characterization of genetic markers of known bacterial strains.

Phage growth curve.

Isolation of DNA from bacteria.

Isolation of plasmid DNA and restriction analysis.

Simple cloning using plasmid DNA as vector and transformation of competent E. coli cells.

Electrophoretic analysis of proteins.

Isolation of Bacteria from air and soil (crop fields)

Isolation of Fungi from air and soil

Study of rhizospheric & Phyllospheric microbes of some economically important plants

Biodegradation study of some organic molecules

microbial assessment of potable water

Analysis of sewage waste

Analysis of Garbages (soild wastes)

**REFERENCE :**

Philipp Gorhardt, manual of Methods for general Bacteriology. ASM. 536pp.



**PAPER-I (Paper Code-0923)**

**MOLECULAR BIOLOGY AND GENETIC ENGINEERING M.M.50**

**UNIT-I** History of molecular biology, model systems, concepts of molecular biology, Early history of genetic engineering, genetic engineering concepts, ethical issue.

**UNIT-II** Mutation; spontaneous and induced, base pair change, frame shift, deletion, inversion, random duplication, insertion, useful phenotypes (auxotrophs, conditional lethal, resistance). Reversion vs suppression, Ames's test.

**UNIT-III** Function of macromolecules; early observation on the mechanism of heredity, DNA as genetic material; basic mechanism of replication, enzymes involved in replication, Enzymes involved in transcription translation, genetic code, regulation of gene expression-transcription, translation and control of gene expression in microbes.

**UNIT-IV** DNA repair and restriction, types of repair systems, restriction modification systems, types of restriction enzymes, properties and uses, methylation. Biology of plasmids. Bacteriophages, lytic vs lysogenic phages, single standard DNA phages, M 13, restriction modification systems, restriction enzymes.

**UNIT-V** Plasmid and phage vectors, restriction and ligation of vector and passenger DNA, transformation of host cells, selection vs. screening of recombinant colonies, analysis of recombinant clones, DNA sequencing, protein separation and identification methods.

**TEXT BOOKS :**

1. Essentials of Molecular Biology by GM Malacinski.
2. Genes IX by Benjamin Lewin
3. Molecular Biology by TA Brown.

019  
21/12/12  
22/12/12

**PAPER - II (Paper Code-0924)**  
**ENVIRONMENTAL AND MEDICAL MICROBIOLOGY**

**M.M.50**

**UNIT-I** Aerobiology; definition, droplet nuclei, aerosol assessment of air quality, some important air borne diseases caused by bacteria (Diphtheria, Pneumonia, Meningitis), virus (Influenza, Chicken pox, Measels) and fungi (mycosis); their symptoms and preventive measures.

**UNIT-II** Soil microbiology : Physical and chemical characteristics and micro flora of various soil types, rhizosphere, phyllosphere. Brief account of microbial interactions: symbiosis, mutualism, commensalism, competition, amensalism, synergism, parasitism, and predation.

Biofertilizers - biological nitrogen fixation, nitrogenase enzyme, nif genes, symbiotic nitrogen fixation, and non-symbiotic nitrogen fixation (Azotobacter, Azospirillum), VAM-ecto-endo-ectendomycorrhizae.

**UNIT-III** Aquatic microbiology; ecosystem, fresh water (ponds, lakes, stream) and marine, Water zonation : upwelling, entrophication.

Potability of water - microbial assessment of water quality.

Brief account of water borne diseases (Typhoid, Dysentery, Cholera, Hepatitis) and preventive measures.

**UNIT-IV** Food spoilage and food borne infections.

A brief mention about biodegradation, xenobiotics, bioaccumulation, biopesticides and deterioration.

General concept of industrial microbiology and their applications.

**UNIT-V** Waste Treatment : types of wastes, characterization of solid and liquid waste, waste treatment solid saccharification, gasification, composting.

Liquid waste treatment - aerobic, anaerobic primary, secondary and tertiary methods.

Useful byproducts, mushroom, fuel, fertilizer, Biodegradation of industrial waste.

**REFERENCES :**

1. Food Microbiology by WC Frazier and D Westhoff.
2. Agricultural Microbiology by Bhagyaraj and Rangaswamy.
3. Bioremediation by KH Baker and DS Herson.
4. Scott's Diagnostic Microbiology by EJ Baron.



**PRACTICAL FOR B.SC. PART III  
(MICROBIOLOGY)**

Characterization of genetic markers of known bacterial strain  
Isolation of DNA from bacteria  
Isolation of plasmid DNA  
Simple cloning using plasmid DNA as vector and transformation of competent E. coli  
Electrophoresis of protein / DNA.  
Isolation of microorganisms from air, soil and water.  
Isolation of pathogenic microorganisms.  
Study of rhizospheric and phyllospheric microbes from economically important plants.  
Biodegradation of some organic molecules.  
Microbial assessment of potable water.  
Analysis of sewage waste, solid waste (garbage).  
Isolation of aquatic fungi (zoosporic) by baiting technique.  
Isolation of keratinophilic fungi soil by baiting technique  
Demonstration of bacterial antagonism.  
Microscopic observation of root colonization by VAM fungi.

**SCHEME FOR PRACTICAL EXAMINATION**

**Time : 4 hours**

**M.M. : 50**

1. Characterization and identification of microorganism from given source/ Isolation of plasmid DNA/Genomic DNA	15
2. Biochemical identification of some biodegraded organic molecules/ Microbial assessment of potable water/BOD/COD	10
3. Spotting (1-5)	10
4. Viva-Voce	05
5. Sessional	10
<b>Total</b>	<b>150</b>



**विषय-भू-विज्ञान**  
**सैद्धांतिक प्रश्न पत्र – प्रश्न**  
**(पेपर कोड – 0905)**

पुर्णांक – 50

**इकाई-1**

1. खनिज उपलब्धता के नियामक तथ्य । वैश्विक खनिज नियम एवं संसाधन
2. दिक्काल में खनिज निक्षेपों का वितरण, पारम्परिक एवं गैर पारम्परिक ऊर्जा संसाधन ' सूर्य –आतय, जल, वायु उष्ण झरने, समुद्र तरंगे ।
3. अयस्क निर्माणकारी खनिज: धात्विक एवं अधात्विक । अयस्क निर्माण की मैग्नीय सांद्रगण विधि ।
4. उष्ण जलीय – प्रक्रियायें, स्कान ।
5. उपक्षय उत्पाद एवं अवशिष्ट निक्षेप । आक्सीकरण एवं सल्फाइड समृद्धि प्रक्रम ।

**इकाई- 2**

1. अयस्क निर्माण की अवसादी प्रक्रिया ।
2. प्रतिस्थापन एवं जीवाश्विक अवक्षेपण, कोलायडल निक्षेपण, लवणीजल का वाष्पोत्सर्जन ।
3. अयस्क निर्माण की कायान्मरणी प्रक्रिया ।
4. भू-वैज्ञानिक कालों में वैश्विक वर्तनिकी एवं धातुनिर्मिती ।
5. भू-वैज्ञानिक वितरण, खनिजकीय विशेषता तथा भारत में निम्न धातु निक्षेपों का वितरण लौह-मैग्नीज-क्रोमियम ।

**इकाई- 3**

1. भू-वैज्ञानिक वितरण, खनिजकीय विशेषता एवं भारत में निम्न धातु निक्षेपों का वितरण: ताम्र-सीसा-जस्ता ।
2. भू-वैज्ञानिक वितरण, खनिजकीय विशेषता एवं भारत में निम्न धातु निक्षेपों का वितरण: तापसह एवं उर्वरक खनिज ।
3. भू-वैज्ञानिक वितरण, खनिजकीय विशेषता एवं भारत में निम्न धातु निक्षेपों का वितरण: तापसह एवं उर्वरक खनिज ।
4. भू-वैज्ञानिक वितरण, खनिजकीय विशेषता एवं भारत में निम्न धातु निक्षेपों का वितरण: सीमेंट एवं केमिकल उद्योग में प्रयुक्त खनिज एवं वास्तुप्रास्तर ।
5. भू-वैज्ञानिक वितरण, खनिजकीय विशेषता एवं भारत में निम्न धातु निक्षेपों का वितरण: रत्न ।

**इकाई- 4**

1. धातु सांद्रण की प्रमुख विधियां : ताम्र एवं मैग्नीज ।
2. खनिज दोहन के पर्यावरणीय प्रभाव ।
3. कोयला निक्षेपों की उत्पत्ति, परिभाषा एवं संस्तर विज्ञान ।
4. कोल-शैलिकी के मूलभूत तथ्य पीठ, लिग्राइट, विटूमिनस, एंथ्रासाइट ।
5. भारतीस कोयला निक्षेप : विशेष संदर्भ में छत्तीसगढ़ ।

**इकाई- 5**

1. प्राकृतिक हाइड्रोकार्बन की उत्पत्ति, स्थानांतरण एवं स्थानबद्धता, स्रोत एवं संचयकारी ।
2. आयलट्रेप के प्रकार – संरचनात्मक, स्तरविज्ञानी एवं मिश्रित ।
3. भारत के तटीय एवं अपतटीय पेट्रोलियम निक्षेप ।
4. रेडियोधर्मी खनिज : खनिजकीय, भू-रसायन, पूर्वक्षण तकनीक ।
5. भारत वर्ष में रेडियोधर्मी खनिज का वितरण ।



**विषय—भू-विज्ञान**  
**सैद्धांतिक प्रश्न पत्र—द्वितीय**  
(पेपर कोड – 0906) पूर्णांक : 50  
(प्राकृतिक पर्यावरण, दूर संवेदन, भू-जल एवं खनिज—अन्वेषण)

**इकाई—1**

1. तिक पर्यावरण भू-विज्ञान की अवधारणायें एवं परिभाषा।
2. मुदानिर्माण – मृदा प्रकार।
3. पृथ्वी की प्राकृतिक—पारिस्थितिकी तंत्र की अवधारणायें – उनकी अंतर्क्रियाएं एवं अन्तर्म्बन्ध।
4. प्राकृतिक पर्यावरण पर मानव का पर्यावरण।
5. नदी मार्ग का अंतरण : मार्ग अंतरण का मृदा अपरदन पर प्रभाव : भूस्खलन एवं बाढ़।

**इकाई—2**

1. वृहत्त बांध, जलाशय, सुरंगें आदि के निर्माण में स्थल चयन एवं पर्यावरणीय प्रभावों का अध्ययन।
2. हवाई—छायाचित्रों एवं उपग्रह इमेजियरी का प्रारंभिक अध्ययन।
3. शहरी विकास एवं वृहद्आभियांत्रिकी संरचनाओं की आयोजना में दूर—संवेदन तकनीकों की अनुप्रयोग।
4. फोटो जियोलॉजिकल मानचित्रों का निर्माण।
5. जल चक्र।

**इकाई—3भूजलसंचयी शैल**

1. शैल एवं उनका वर्गीकरण
2. जलमृतशैलों का वर्गीकरण : डार्सि का नियम एवं उसकी उपयुक्ता।
3. भारत का भूजल—प्रदेश।
4. जलग्रहण प्रबंधन की अवधारणायें।
5. सतही एवं अधो सतही निष्कर्षण विधियां।

**इकाई—4**

1. आर्थिक खनिजों के लिये पूर्वक्षण विधियां : ड्रीलिंग, प्रतिनयन एवं आमापन।
2. खनिज पूर्वक्षण की गुरुत्वी, विद्युतीय एवं चुम्बकीय विधियां।
3. पूर्वक्षण की हवाई एवं भूकम्पीय विधियां।
4. पूर्वक्षण की भू-पादकीय विधियां।
5. पूर्वक्षण की भू-रासायनिक विधियां।

**इकाई—5**

1. बोरहोललांगिंग एवं विचलन सांख्यिकी।
2. खनिज खपत का परिवर्तनशील स्वरूप।
3. राष्ट्रीय खनिज नीति।
4. खनिज—कन्शेसन—नियम।
5. समुद्री खनिज संसाधन एवं तत्संबंधित नियम।

1. अयस्क निर्माणकारी खनिजों के भौतिक एवं प्रकाशीय गुणों का अध्ययन।
2. भारत के मानचित्र में अयस्क निक्षेप एवं आर्थिक महत्व को खनिजों का वितरण।
3. कोयला एवं उसके विभिन्न प्रकारों के नमूनों का स्थूलदर्शी अध्ययन।
4. रेडियोधर्मी खनिज एवं उसके आतिथेय शैलो का स्थूलदर्शी अध्ययन।
5. खनिज एवं संबंधित प्रयोगशाला अभ्यास कार्य, निक्षेप आंकलन, टनेज फेक्टर आंकलन, टनेज फेक्टर आंकलन, ड्रिलिंग आदि से संबंधित।
6. स्टिरियोस्कोप के द्वारा ऐरियल छाया चित्रों का अध्ससन एवं विवेचना।
7. उपग्रह इमेजियरी का अध्ययन एवं विवेचना।

**भू-वैज्ञानिक – क्षेत्रीय अध्ययन–**

15 दिवसीय भू-वैज्ञानिक क्षेत्रीय अध्ययन कार्य, जिसमें संरचनात्मक दृष्टि से जटिल क्षेत्रों में भू-वैज्ञानिक मानचित्र एवं शैल नमूनों का संग्रहण तथा प्रयोगशाला कार्य एवं रिपोर्ट का अनुलेखन।

**BOOK RECOMMENDED FOR PAPER-I**

Evans, A.M. 1993.	-	Ore Geology and Industrial Minerals
Sawkins, F.J. 1984	-	Metal Deposits in relation in plate Tecto. Springer.
Stanton, R.L. 1972	-	Ore Petrology. Mcgraw Hill
Mookherjee A. 2000	-	Ore Geniois - a helistic Approach Allied Publisher
Chandra 2000	-	Text book of coal (Indian context) Tara book Agency, Varanashi
Selley, R.C.1998	-	Elements of Petroleum Geology. Academic Press
Torling D.H. 1981	-	Economic Geology and Geofectericks Blackwell
Melustry, H.E. 1962	-	Mining Geology 2nd Ed., Asia Pub. House
Arogya Swamy, RPN 1996	-	Gourses in rining Geology IV Ed. Oxford IBH
Dahl Kamp F.J. 1993	-	Uranium Ore Deposits Springer

**BOOK RECOMMENDED FOR PAPER-II**

Valdiya K.S. 1987 Environmental Geology-Tata MacgrawHill

Keller, E.A. 1978	-	Environmental Geology-Bell & Hewell
Subramaniam V. 2001	-	Textbook in Environmental Science, Narosa International
Bell, F.G. 1999	-	Geological Hazards, Routledge, London
Drury, S.A. 1987	-	Image Interpretation in Geology
Siegal, B.S. and Gillespie A.R.1980	-	Remote Sensing in Geology, John Wiley
Pandey, S.N.	-	Principles and Application of Photology. Wiley Eastern, New Delhi
Todd. D.K. 1980	-	Groundwater Hydrology, John Wiley
Raghunath, N.M. 1982	-	Ground Water, Wiley Eastern
Karanth, K.R. 1987	-	Groundwater Assessment Development and Management, Tata Macgraw Hill
Subramaniam, V.2000	-	Water, KingstonPubl. London
Sharma P.V. 1986	-	Geophysical Methods in Geology Mcgraw Hill
Krynine, D.H. & Juddwr 1998	-	Principles of Engineering G. CBS Edition

**STATISTICS**  
**PAPER-I**  
**(Paper Code-0907)**  
**APPLIED STATISTICS**

**UNIT-I** Indian Applied Statistical System : Present official statistical system in India, Methods of collection of official statistics, their reliability and limitations, and the principal publications containing such statistics on the topics- population agriculture, industry, trade, price, labour and employment, transport and communications, banking and finance. (15L)

**UNIT-II** Demographic Methods : Sources of demographic data - census, register, adhoc survey, hospital records, demographic profiles of Indian census. Measurement of mortality and life tables- crude, death rates, infant mortality rates, death date by cause, standardized death rate, complete life table - its main features, mortality rate and probability of dying, use of survival tables. Measurement of fertility - crude birth rate, general fertility rate, total fertility rate, gross reproduction rate, net reproduction rate. (25L)

**UNIT-III** Economic Statistics : Index number - its definition, applications of index numbers. price relatives and quantity or volume relatives, link and chain relatives, problems involved in computation of index numbers, use of averages, simple aggregative and weighted average methods, Laspeyre's, Paasche's and Fisher's index numbers, time and factor reversal tests of index numbers. Consumer Price Index. (20L)

**UNIT-IV** Static laws of demand and supply, price elasticity of demand, analysis of income and allied size distribution - Pareto distribution, graphical test, fitting of Pareto's law, log normal distribution and its properties, Lorenz curve and estimation of elasticity from time series data. Gini's coefficient.

**UNIT-V** Time Series Analysis : Economic time series, its different components, Illustrations, additive and multiplicative models, determination of trend, growth curves, analysis of seasonal fluctuations construction of seasonal indices. (15L)

**REFERENCES :**

1. Croxton F.E. and Cowden D.J. (1969) : Applied General Statistics, Prentice Hall of India.
2. Goon, A.M., Gupta, M.K., Das gupta, B (1986) : Fundamentals of statistics, vol.-II, World Press, Calcutta.
3. Guide to Current Indian Official Statistics : Central Statistical Organization, Govt. of India, New Delhi.
4. Saluja M.P. ( ) Indian Official statistical Systems, Statistical Publishing Society, Calcutta.
5. Srivastava, O.S. (1983) : A textbook of Demography, Vikas Publishing.

**ADDITIONAL REFERENCES :**

1. Gupta and Mukhopadhyay P.P. ( ) Aplied Statistics, Central Book Agency.
2. Pressat R. (1978) : Statistical Demography, Methuen and Co. Ltd.

**PAPER-II**  
**(Paper Code-0908)**

**STATISTICAL QUALITY CONTROL AND COMPUTATIONAL TECHNIQUES**

**UNIT-I** Importance of statistical methods in industrial research and practice, specification of items and lot qualities corresponding to visual gauging, count and measurements, types of inspection, determination of tolerance limits. General theory of control charts, causes of variation in quality, control limits, sub-grouping, summary of out-of control criteria, charts for attributes, np chart, p-chart, c-chart, u-chart, Charts for variables- X- and R charts, design of X and R charts versus p-charts, process capability studies.

**(30L)**

**UNIT-II** Principle of acceptance sampling- problem of lot acceptance, stipulation of good and bad lots, producer's and consumers risks, single and double sampling plans, their OC functions, concepts of AQL, LTPD, AOQL, average amount of inspection and ASN function, rectifying inspection plans, Sampling inspection plans, Indian Standards Tables Part-I (including applications), IS 2500 Part I. (15L)

**UNIT-III** Computational techniques : Difference tables and methods of interpolation, Newton's and Lagrange's methods of interpolation, Divided differences, numerical differentiation and integration, Trapezoidal rule, Simpson's one-third formula, iterative solution of non-linear equations. **(15L)**

**UNIT-IV** Linear Programming : Elementary theory of convex sets, definition of general linear programming problems (LPP), formulation problems of LPP, examples of LPP, Problems occurring in various fields, graphical and Simplex method of solving an LPP, artificial variables, duality of LPP. Transportation Problem (non-degenerate and balanced cases only), Assignment Problem. (30L)

**UNIT-V** Four short notes, one from each unit. Student has to answer any two.

**REFERENCES :**

1. Brownless K.A. (1960) : Statistical theory and Methodology in Science and Engineering. John Wiley and Sons.
2. Grant E.L. (1964) : Statistical Quality Control, McGraw Hill.
3. Duncan A.J. (1974) : Quality Control and Industrial Statistics, Traporewala and Sons.
4. Gass S.I. (1975) : Linear Programming Methods and Applications, McGraw Hill.
5. Rajaraman, V. (1981) : Computer Oriented Numerical Methods, Prentice Hall.
6. Sastry S.S. (1987) : Introductory Methods of Numerical Analysis, Prentice Hall.
7. Taha H.A. (1989) : Operations Research : An Introduction, Macmillan Publishing Company.

### **ADDITIONAL REFERENCES :**

1. Bowker H.A. and Liberman G.T. (1962) : Engineering Statistics, Prentice Hall.
2. Cowden D.J. (1960) : Statistical Methods in Quality Control, Asia Publishing Society.
3. Garvin W.W. (1960) : Introduction to Linear Programming, McGraw Hill.
4. Mahajan M. (2001) : Statistical Quality Control, Dhanpat Rai & Co. (P) Ltd.
5. Rao S.S. (1984) : Optimization Theory and Applications, Wiley Eastern.
6. Krishnamurthy E.V. and Sen S.K. (1976) : Computer Based Numerical Algorithms, Affiliated East-West Press.

### **PRACTICAL**

1. Computing measures of mortality & fertility, Construction of life tables and examples involving use of life tables, Graduation of mortality rates by Gompertz curve, fitting of a logistic curve.
2. Construction of Index Numbers by Laspeyre's, Paasche's, Fisher's method.
3. Determination of trend in a time series, construction of seasonal indices.
4. Fitting of Pareto curve to income data, Lorenz curve of concentration, Estimation of price elasticity of demand from time series data.
5. Drawing of X-R, np, p and c- charts. Drawing of OC curve for single and double sampling plans for attributes, AOQ and ATI curves.
6. Construction of difference tables, use of Newton's Lagrange's methods of interpolation and divided difference formulae, numerical evaluation of integrals using Trapezoidal and Simpson's one-third formulae, solution of non-linear equation by Newton-Raphson iterative method.
7. Formulation of LPP's and their duals. Solving LPPs by graphical and simplex methods, transportation and assignment problems.

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## **DEFENCE STUDIES**

### **PAPER-I**

#### **PROBLEMS OF WAR AND PEACE (Paper Code-0921)**

**Aim :** The objective of this paper is to acquaint the students about the multidimensional problems of war and peace and humanitarian laws.

**Note :** Question will be set from each unit, there will be only internal choice.

#### **Unit-I U.N.O. AND WORLD PEACE**

1. Organs and its role.
2. Main specialized agencies of U.N.O.
3. Role of U.N.O. in world peace.
4. Peace keeping forces of the U.N.O.
5. Veto power and Security Council.

#### **Unit-II WAR AND PEACE**

1. Settlement of International Disputes.
2. Diplomatic agents and Consuls.
3. War Crimes.
4. Neutrality.
5. Intervention.

#### **Unit-III HUMANITARIAN LAW**

1. Basic concepts and development of Humanitarian law.
2. UN General Assembly declaration of human rights on Dec. 10, 1948.
3. Protection of Victims and defenceless in armed conflict, POWs, wounded and civilians in Armed Forces.
4. Central Human Right Commission : Organisation and Function.
5. State Human Right Commission : Organisation and Function.

#### **Unit-IV REFUGEE LAW**

1. Meaning, Concept and causes of Refugee.
2. Refugee and IDPs.
3. Refugee law in India.
4. Refugee Problem in South Asia.
5. Role of International Committee of Red Cross and UNO in Refugee Problems.

#### **Unit-V LAWS OF WAR**

1. Law of Land war.
2. Law of Sea war.
3. Law of Air war.
4. Space law.
5. The International Court of Justice.

#### **SELECTED READINGS :**

- |                           |   |  |
|---------------------------|---|--|
| 1. Maunce clark, J        | : | Readings in the Economics of War.              |
| 2. International Security | : | Modern political Science series.               |
| 3. Rajani Kothari         | : | Word order.                                    |
| 4. Openhem, I             | : | Use of Forces by states and International law. |

**PAPER - II**  
**MODERN WARFARE**  
**(Paper Code-922)**

**Aim :** To enable students to appreciate the impact of Political, economic and technological developments on the patterns of conflicts between nations.

**Note :** Question will be set from each unit, there will be only internal choice.

**UNIT-I** 1. Development of Nuclear weapons.

2. Effects of Nuclear Explosion.
3. Spread of Nuclear Weapons.
4. Missile and their characteristics.
5. Type of Missiles.

**UNIT-II** 1. Trends in Science and Technology and their impact on war.

2. Role of Research and Development.
3. Development of Weapons and their impact on tactics
4. Command, Control, Communication and Intelligence (C<sup>3</sup>I) in Modern Warfare.
5. Elements of National Power.

**UNIT-III** 1. Military Satellites.

2. Explosive Bombs.
3. War Gases.
4. Micro Organs : as a weapons.
5. Smart Weapons.

**UNIT-IV** 1. Rocket Technology and India.

2. Missile Technology and India.
3. Nuclear Technology and India.
4. Atomic Minerals and India.
5. Space Technology and India.

**UNIT-V** 1. New world order - Political, Social and Economical.

2. Alliance and Regional co-operation.
3. Mobilisation of resources for war.
4. War time economics.
5. New trends.

**SELECTED READINGS :**

- |                      |   |                                 |
|----------------------|---|---------------------------------|
| 1. Halailan Morton   | : | Coutemporary Military strategy  |
| 2. Brodue, Y.        | : | Strategy in the Missile Age.    |
| 3. Markabi, Y.       | : | Nuclear war and Nuclear peace   |
| 4. Osanka. F.M.      | : | Modern Guerilla warfare         |
| 5. Gerald. J.        | : | Defence Psychology              |
| 6. Know Kalus        | : | Science and Defence             |
| 7. Pandey Girishkant | : | Yudh mein vigyan aven Tachniki. |

## **PRACTICALS**

**50 marks**

There shall be practical examination of 3.5 hours duration carrying.

The division of marks shall be as follows :

(1) Plain Table Survey	: 15 Marks.
(2) Experimental Military Psychology	: 15 Marks.
(3) Group Discussion & Lectring	: 05 Marks.
(4) Viva-Voce	: 05 Marks
(5) Sessional work & Record	: 10 Marks.

### **Section - A**

Plain table Survey by inters section methods. (Atleast ten exercises in a session).

### **Section - B**

Military - Psychology Experiment :

- (1) Muller-Layer-Illusion test.
- (2) Koh's Block Design Test.
- (3) Allexander Pass Along Test.

### **Section - C**

Group Discussion and Lectures based on current topic on any international & national Problems.

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## INDUSTRIAL CHEMISTRY

### PAPER - I

(Paper Code-0925)

#### CHEMICAL PROCESS ECONOMICS

M.M. 34

- UNIT-I** 1. Factors involved in project cost estimation, methods employed for the estimation of capital investment. 06L  
2. Capital formation, elements of cost accounting. 05L
- UNIT-II** 1. Interest & investment cost, time value of money equivalence. 03L  
2. Depreciation, method of determining depreciation, taxes. 04L  
3. Some aspects of marketing, pricing policy. 04L
- UNIT-III** 1. Profitability criteria, economics of selecting alternatives. 03L  
2. Variation of costs with capacity, Break-even point, optimum batch sizes, Production, scheduling etc. 05L  
3. Sampling of Bulk materials, techniques of sampling of solids, liquids and gasses.  
4. Collection & Processing data. 02L  
5. Particle size determination. 02L  
6. Rheological properties of liquids, plastics and their analysis. 03L

#### INDUSTRIAL ORGANIZATION

- UNIT-IV** 1. Concept of scientific management in industry. 04L  
2. Functions of management, decision making, planning, organising. directing & control. 09L  
3. Location of industry. 03L
- UNIT-V** 1. Materials management. 05L  
2. Inventory control. 04L  
3. Management of human resources-selection, incentives, welfare & safety. 05L

#### BOOKS :

1. Economics of Chemical industry, Hempel, E.H.
2. Plant Design & Economics for Chemical Engineers, Peter Time Rhaus, McGraw Hill.
3. I.C.M.A. Booklets-9 & 10.
4. Industrial Organization & Management, Bethel, L.L.
5. Industrial Organization & Management, Tarachand, Vol. I & II.
6. Book on Management, O.P. Khandelwal.
7. Rheology theory & application, Vol. 5, Elrich, R.F.

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**PAPER - II**  
**(Paper Code-0926)**  
**PHARMACEUTICALS**

**M.M. 33**

- UNIT-I** 1. Historical Background & development of pharmaceutical industry in India in brief. 02L
2. Pharmacopoeias - Development of Indian pharmacopoeia & introduction of B.P., U.S.P., E.P., N.F. & other Important Pharmacopoeias. 02L
3. Introduction to various types of formulations & routes of administration. 02L
4. Aseptic conditions, need for sterilisation, various methods of sterilisation. 02L
- UNIT-II** 1. Various types of pharmaceutical excipients their chemistry, process of manufacture & quality, specifications Glidants, lubricants, diluents, preservatives, antioxidants, emulsifying agents, coating agents, binders, coloring agents, flavouring agents gelatin & other additives, sorbitol, mannitol, viscosity builders etc. 12L
2. Surgical dressing, sutures, ligatures with respect to the process, equipments used for manufacture, method of sterilization and quality control. 05L
- UNIT-III** 1. Pharmaceutical packaging introduction, package selection, packaging materials, ancillary materials, packaging machinery, quality control of packaging materials. 05L
2. F.D.A., Important schedules & some legal aspects of drugs. 03L
3. Pharmaceutical quality control (other than the analytical methods covered under core-subject) - sterility testing, pyrogenic testing, glass testing, bulk density of powders, etc. 06L
- UNIT-IV** 1. Evaluation of crude drugs-Moisture content, extractive value, volatile oil content, foreign organic matter, quantitative microscopic exercises, including starch, leaf content, (palisade ratio, stomatal number & index vein, islet number & vein termination number), crude fiber content, introduction to chromatographic method of identification of crude drugs. 06L
2. Chromatography, Paper chromatography, TLC, HPLC, GLC. 04L
3. Ion chromatography. 01L
- INSTRUMENTATION**
- UNIT-V** 1. UV-Visible spectroscopy. 03L
2. IR-Spectroscopy non-dispersive IR. 03L
3. NMR Spectroscopy. 03L
4. Atomic Absorption & Flame photometry. 03L
5. Neutron diffraction. 01L
6. X-Ray Fluorescence. 01L
7. Ion Selective Electrodes. 01L



## BOOKS :

1. Instrumental methods of analysis, Willard, Merit, Dean.
2. Introduction to instrumental methods of analysis, Braun, R.D., McGraw Hill.
3. Analytical chemistry, J.B. Dick, McGraw Hill.
4. Quantitative Inorganic analysis, A. Vogel.
5. Instrumental methods of Analysis, Skoog & West.
6. Instrumental Methods of Analysis, B.K. Sharma.

## PAPER -III

(Paper Code-0927)

## DRUGS

M.M. 33

- UNIT-I**
1. Phyto-chemicals-Introduction to plant classification & crude drugs, cultivation, collection, preparations for the market & storage of medicinal plants.
  2. Classification of various types of drugs with examples.
  3. Raw materials, process of manufacture, effluent handling, etc. of the following bulk drugs :-  
(i) Sulpha drugs-sulphaguandine, sulphamethoxazole.
- UNIT-II**
1. Chemical constitution of plants including carbohydrates, amino acids, proteins, fats, waxes, volatile oils, terpenoids, steroids, saponins flavonoids, tanins, glycosides, alkaloids.
  2. Various isolation procedures for active ingredients with examples for alkaloids, reserpine one for steroids sapogenin, diosgenin, diogron.
- UNIT-III**
1. Antimicrobial :- Chloramphenicol, Furazolidne, Mercurochrome, Isoniazid, Na-PAS.
  2. Analgesic-AntiInflammatory :- Salicylic acid and its derivatives, Ibuprofen, Mefenamic acid.
  3. Steroidal Harmones :- Progesterone, Testosterone, Methyl testosterne.
- UNIT-IV**
1. Vitamins :- Vit.-A, Vit.-B6, Vit.-C.
  2. Barbiturates :- Pentobarbital.
  3. Blockers :- Propranolol, Atenolol.
  4. Cardiovascular Agent :- Methyl dopa.
  5. Antihistamins :- Chloropheneramine Maleate.
- UNIT-V**
1. Products based of fermentation processes :- Brief idea of micro-organisma, their structure, growth & usefulness. Enzyme systems useful for transformation, microbial products.
  2. General principles of fermentation processes & product processing.
  3. Manufacture of antibiotics - Pencillin-G & semi synthetic pencillines, Rifamycin, Vitamin-B12.
  4. Bio-transformation process for prednisolone, 11-hydroxylation in steroids.
  5. Enzyme catalysed transformation, manufacture of ephidrine.

  
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## BOOKS :-

1. Practical Pharmacognosy, T.B. Willis.
2. Practical Pharmacognosy, T.N. Vasudevan.
3. Modern Pharmacognosy, Remstad, McGraw Hill.
4. Indian Pharmacopoea, 1985.
5. British Pharmacopoea, 1990.
6. Hand Book of Drugs & Cosmetic Act, Mehrotra.
7. Pharmaceutical excipients.
8. Pharmaceutical Dosage forms.
9. Principles of Medicinal Chemistry, W.O. Foye, Lea & Febigen, Publication Philadelphia.
10. Text Book of Organic Medicinal & Pharmaceutical Chemistry, Willson, Gisvold, Derge; Lippinett-Toppan.
11. Essentials of Medicinal Chemistry, Korolkovas & Burkhatler, Wiley Interscience.

## PRACTICAL

**Marks : 50**

The Practical examination will be of 08 Hrs. Duration spread over two days carrying 50 Marks.

Two experiments have to be performed.

1. Synthesis of common industrial compounds involving two step reactions. 4-Bromoaniline, 3-Nitroaniline, Sulphanilamide, 4-Aminobenzoic acid, 4-Nitrobenzoic acid, dihalobenzenes, Nitrohalobenzenes.
2. Industrial analysis of common raw materials as per industrial specification :- Phenol, Aniline, Formaldehyde, Hydrogen peroxide, Acetone, Epoxide, Olefins, Oils etc.
3. Demonstration of various pharmaceutical packaging materials, quality control tests of some materials, -Al Strips, Cartons, Glass bottles.
4. Limit tests for chlorine, heavy metals, arsenic, etc. of two representative bulk drugs.
5. Demonstration of various pharmaceutical products.
6. Active ingredient analysis of few types of formulations representing different methods of analysis-acidimetry, alkalimetry, non-aqueous.
7. Determination of sulphate ash, loss on drying & other tests of bulk drugs, complete I.P. monograph of three drugs representing variety of testing methods.
8. Evaluation of crude drugs-macroscopic examination-determination & identification of starch granules, calcium oxalate.
9. Palisade ratio, stomatal index-determination & Identification of few drugs. TLC method for identification.
10. Microbiological testing-determination of MIC of some antibacterial drugs by zone/cup plate method.

## DISTRIBUTION OF MARKS :

1. Experiment No. 1.	20
2. Experiment No. 2.	10
3. Viva	05
4. Sessional	05
5. Project Work	10
<b>Total</b>	<b>50</b>

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**COMPUTER SCIENCE**  
**PAPER - I**  
**(Paper Code-0909)**  
**COMPUTER HARDWARE PART-C**

**AIM :** The emphasis is on the design concepts & organisational details of the common PC, leaving the complicated Electronics of the system to the computer engineers.

**Objective of the Course :**

1. To introduce the overall organisation of the microcomputers and operating systems.
2. To introduce the interaction of common devices used with computers with operating softwares, excluding the Assembly languages, with special reference to DOS/WINDOWS.
3. To introduce the working of hardware components, Micro-Processor and various chips used in micro-computers by operating system, without the use of electronic circuitry.
4. To introduce the use of operating systems architecture with IBM-PC & clones, excluding Assembly language, with forms an important part of hardwares.

**N.B. :** Since the computer organisation study is very vast & complicated, so the study is restricted only to the description and understanding part, hence the paper-setter is requested to keep this important factor in mind.

**UNIT-1 : ORGANISATION OF Micro-Processor & MICRO-COMPUTER :-**

**1. Introduction & organisation of Micro-Computer :**

- (a) Basic Components of Micro-computer : Basic Block; Prom ram memory; Data memory; I/O Ports; Clock generator; Integration of functional blocks.
- (b) Interconnecting Components in a Micro-computer : Necessary functional block; Bussed architecture for microcomputer; memory addressing; Addressing I/O ports; comparison of I/O mapped and memory mapped I/O.
- (c) Input Output Techniques : Non-CPU devices, Program & interrupt controlled I/O; Hardware controlled I/O or DMA.



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## **2. An Introduction to the various as :**

- (a) General understanding of different  $\mu$  P or CPU :  
Intel 8088, 286, 386, 486, 586 Pentium, P54C, MMX P55C;  
Motorola 6800 & 88100 series; CYRIX & AMD CPUs.
- (b) The Registers of CPU : (Give Example of P-8088) Register organisation of 8088, Scratch pad segment, pointer, Index and Flag, Registers.
- (c) Memory addressing modes of P-8088 : Segment offset; Data addressing modes; Addressing for branch instructions.
- (d) I/O Addressing with P-8088 : Memory mapped I/O & I/O mapped I/O.

## **UNIT-2 : SYSTEM HARDWARE ORGANISATION OF COMPUTERS :**

### **1. Hardware Organisation of the Personal Computer :**

- (a) Block diagram with various parts of PC.
- (b) The Mother Board of General P.C. : 8088 CPU; ROM & RAM; Keyboard & its interface; System timer/counters; Hardware interrupt vectoring; DMA controller & channels; Interfacing to audio speaker; Bus slots & feature cards.
- (c) The Serial I/O ports, COM-1 & COM-2.
- (d) The parallel Port for Printer.
- (e) Expansion Slots for RAM.
- (f) Disk Controllers : For floppy, Hard disk, CD-ROM & Cassetts drives.

### **2. The Video Display of PCs :**

- (a) Video Monitors; Monochrome and colour.
- (b) Video Display Adapters & Their Video Modes; Monochrome & colour graphics adapters.
- (c) Video Control Through ANSI-SYS.
- (d) Video Control Through ROM-BOIS : INT 10H.
- (e) Direct Video Control; Monochrome & colour graphics adapters.
- (f) Installing Customized Character Sets.



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### **UNIT-3 : ORGANISATION OF OPERATING SYSTEM WITH SYSTEM HARDWARE :**

#### **1. The ROM-BIOS Services :**

- (a) Introduction to UNIX, ENIX, SUN, solaris, DOS & MAC with special reference to DOS & Windows, its ver., as DOS becomes more popular than others in PCs.
- (b) The ROM-BIOS Diskette Services, INT 13H.
- (c) The ROM-BIOS Serial Port Services, INT 14H.
- (d) The ROM-BIOS Keyboard Services, INT 16H.
- (e) The ROM-BIOS Printer Services, INT 17H.
- (f) Miscellaneous Service Provided by the ROM-BIOS : INT 05H, INT 11H, INT 12H, INT 18H, INT 19H, INT 1AH.

#### **2. The fundamental of Operating System viz. DOS/WINDOWS :**

- (a) The loading of DOS & Its Basic Structure ; ROM bootstrap, IO.SYS, DOS.SYS & Command.COM.
- (b) The Execution of the programs under DOS ; EXEC functions, program segment prefix; Features of COM & EXE program files.
- (c) Device Handling by Dos ; FDD, HDD, CON, Keyboard, PRN, AUX, CLOCK and NUL devices; Block devices; Character devices; Driver installation sequence.
- (d) File Structures of DOS ;
- (e) The DOS Interrupts : INT 20H-2FH
- (f) The DOS functions through INT 21H; Discuss only the understanding part of various other DOS function to handle hard & softwares.
- (g) Installation of windows : Important system files in windows.

### **UNIT-4 : ORGANIZATION & HANDLING BY OPERATING SYSTEMS :**

#### **1. Disk and Files under DOS :**

- (a) Logical Structure of a Disk : Organisation of disk for use; Boot record ; FAT files; disk or root directory.
- (b) File Organisation on a DOS disk : Logical volumes ; Sub directories; Volume labels.
- (c) Manipulating Files under DOS : File attributes ; date and time, file Access; FCB functions.

#### **2. Memory Allocation, Program Loading and Execution :**

- (a) Memory Management under DOS : EXEC loader; Memory Management & its functions; Modifying a Program's memory allocation.



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(b) Loading and Executing Programs under DOS : The EXEC function ;  
Memory considerations; parameter blocks; calling & returning from  
EXEC.

(c) Loading the program overlays through EXEC.

## **UNIT-5 : ORGANISATION OF HARDWARE BY OPERATING SYSTEM :**

### **1. Interrupt Handling through DOS :**

- (a) Types of interrupts.
- (b) Interrupt Vector Table in PC.
- (c) Interrupt Service Routines.
- (d) Special Interrupts in PC : Clock Interrupt; The -C or Break Interrupt  
; DOS reserved interrupt INT 28H ; Patching memory resident  
routines.

### **2. Filters for DOS :**

- (a) Filters in operating systems.
- (b) Redirection of I/O under DOS.
- (c) The Filters Supplied with DOS.
- (d) Writing Filters to run under DOS.

### **3. Handling of Various Versions of Windows O.S. :**

- (a) Setup Installation
- (b) Trouble shooting
- (c) Networking features

### **Text Book :**

- 1. Hardware and Software of Personal Computers.  
By Sanjay K. Bose. (Wiley Eastern Ltd. New Delhi).

### **Supporting Text Books :**

- 1. Digital System from Gates to Microprocessor.  
By Sanjay K. Bose. (Wiley Eastern Ltd. New Delhi).
- 2. Computer Fundamentals : Architecture & Organisation.  
By B. Ram.. (Wiley Eastern Ltd. New Delhi).

### **Reference Books :**

- 1. IBM PC-XT and Clones : By Govinda Rajalu.
- 2. Microprocessor and interfacing : By Douglas Hall.
- 3. Insight the IBM-PC : Peter Norton.
- 4. Microprocessor System : 8086/8088 family architecture, programming &  
design : By Liu and Gibson.



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**PAPER - II**  
**(Paper Code-0910)**

**Atm :** To introduce DBMS and RDBMS using Back-end tool and Front-end tool.

**Object of the Course :**

1. To introduce Data Base Management System concepts.
2. To introduce the Relational Database Management System and Relational Database Design.
3. To introduce the RDBMS software and utility of query language.
4. To introduce basic concept of GUI Programming and database connectivity using Visual Basic.

**UNIT-1 : CONCEPT OF D.B.M.S. AND DATA MODELS**

- (a) Introduction to DBMS :- Purpose of Data base systems, views of data, Data Modeling Database Languages, Transaction management, Storage Management, Database Administrator and User, Database System Structure.
- (b) E-R Model : Basic concepts, Constraints, Keys, Mapping Constraint, E-R Diagram, Weak and Strong Entity sets, E-R Database Schema, Reduction of an E-R Schema to Table.

**UNIT-2. : RELATIONAL DATABASE MANAGEMENT SYSTEM**

- (a) Relational Model : Structure of Relational Database, Relational Algebra, Domain Relational Calculus, Extended Relational- Algebra Operation, Modification of database, Views.
- (b) Relational Database Design : Pitfalls in Relational Database Design, Decomposition Functional Dependencies, Normalization : 1NF, 2NF, BCNF, 3NF, 4NF, 5NF.

**UNIT-3 : INTRODUCTION TO RDBMS SOFTWARE - ORACLE**

- (a) Introduction : Introduction to personal and Enterprises Oracle, Data Types, Commercial Query Language, SQL, SQL\*PLUS.
- (b) DDL and DML : Creating Table, Specifying Integrity Constraint, Modifying Existing Table, Dropping Table, Inserting Deleting and Updating Rows in as Table, Where Clause, Operators, ORDER BY, GROUP Function, SQL Function, JOIN, Set Operation, SQL Sub Queries. Views : What is Views, Create, Drop and Retrieving data from views.



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- (c) Security : Management of Roles, Changing Password, Granting Roles & Privilege, with drawing privileges.
- (d) PL/SQL : Block Structure in PL/SQL, Variable and constants, Running PL/SQL in the SQL\*PLUS, Data base Access with PL/SQL, Exception Handling, Record Data type in PL/SQL, Triggers in PL/SQL.

#### **UNIT-4 : G.U.I. PROGRAMMING**

- (a) Introduction to Visual Basic : Event Driven Programming, IDE, Introduction to Object, Controlling Objects, Models and Events, Working with Forms, MDI Form Working with standard Controls.
- (b) Overview of Variables, Declaring, Scope, Arrays, User defined data types, Constants, Working with procedures : Function, Subroutine, and Property. Working with Data, Time, Format, String, and Math's Function. Controlling Program Execution: Comparison and Logical Operators, If...Then statements, Select Case Statement, Looping Structures, Exiting a loop. Error Trapping and Debugging.
- (c) File Organization : Saving data to file, Sequential and Random access file, the desing and coding.

#### **UNIT-5 : V DATA BASE PROGRAMMING IN VB**

- (a) Introduction :- Concept of DAO, RDO, ADO, input validation : field & form level validation, ADO object model : the ADO object Hierarchy, the connection object, the command object, record set object, parameter object, field object, record object, stream object, Error object, parameter object.
- (b) Using Bound control to Present ADO data : Using the ADO data control, ADO data control properties, binding simple controls : Data list, data combo, Data Grid, Data Form Wizard : single form wizard, Grid form, master/Detail form.  
  
Programming the ADO data control : Refresh method, Event, Hierarchical flex Grid control.
- (c) Data Environment & Data Report : Creating connection, Using command object in the data Environment, Data Environment option and operation, Binding Form to the data Environment, ADO Events in the Data report, Print Preview, Print, Export, Data report in code : Data reports Events, Binding data reports Directly.

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### **REFERENCE BOOKS :**

1. Data Base System Concept : By Hery F. Korth, Tata McGraw Hill
2. Fundamental of Data Base : Nawathe & Elmasri (Pearson educations)  
System Concept
3. Oracle Complete Reference : By Oracle Press
4. Introduction to OOPS & VB : By V.K. Jain, Vikas Publishing House
5. Database Programming VB 6 : By B.P.B. Publication

### **PRACTICALS :**

#### **1. Practicals on Oracle :**

At least 20 practicals covering the SQL, PL/SQL, Triggers, Views.

#### **2. Practicals on Visual Basic :**

At least 20 practicals on VB that covering basic and data controls components.

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## **INFORMATION TECHNOLOGIES**

### **PAPER - I**

**(Paper Code-0928)**

#### **AMPLIFIERS AND OSCILLATORS**

**UNIT-I POWER AMPLIFIER :** Classification of power amplifiers, requirement of power amplifiers, single ended class A power amplifier, and its efficiency, transformer coupled power amplifier, power dissipation curve, harmonic dissipation curve, harmonic distortion in pushpull power amplifier, power and efficiency calculation for pushpull for pushpull power amplifier, Distortion in pushpull power amplifier, Advantages of pushpull power amplifier.

**UNIT-II FEEDBACK AMPLIFIERS AND OSCILLATORS :** Feedback in amplifiers, types of feedback positive, and negative feedback. Derivation of input and output impedance in voltage and current series feedback. Advantages of negative feedback. Positive feedback. Barkhausen criteria for sustained oscillator. RF oscillators-Hartley oscillator, Colpitts oscillators (Qualitative study) relaxation oscillators, Multivibrators-Astable, Monostable.

**UNIT-III OPERATIONAL AMPLIFIER AND POWER CONTROL DEVICES :** Differential amplifier, operational amplifier, Characteristics of an ideal OPAMP, definition of input bias current input offset current, current drift, input offset, common mode rejection ratio, slew rate, universal biasing technique, Application of OP-Amp, as inverting, non-inverting amplifiers, differentiation, Integrator, voltage follower and voltage follower, Silicon controlled rectifier (SCR), Diac, Triac and UJT (Only qualitative study).

**UNIT-IV THE INTEL 8080/8085 MICROPROCESSOR :** Introduction, the 8085 pin diagram and functions, The 8085 architecture, addressing modes, the 8080/8085 instruction set, the 8080/8085 data transfer instructions, the 8080/8085 arithmetic instructions, the 8080/8085 logical instructions the 8080/8085 stack, I/O and machine controlled instructions.

**UNIT-V PROGRAMMING THE MICROPROCESSOR :** Machine and assembly languages simplified instruction set, Instruction set, arithmetic operation, Instructions set logical operations, instruction set data transfer operations, instruction set branch operations, instruction set-subroutine call and return operations, instruction set miscellaneous operations, writing a program, addressing modes, program branching, program looping using subroutines.

Programming the 8080/8085 microprocessor : Introduction straight-line programs looping programs, mathematical programs.



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**PAPER - II**  
**(Paper Code-0929)**

**FUNDAMENTAL DATA STRUCTURE**

**UNIT-I Introduction to Data Structure :** The concept of data structure, Abstract data structure, Analysis of Algorithm, The concept of list.

**Stacks and Queues :** Introduction to stack & primitive operation on stack, Stack as an abstract data type, Multiple Stack, Stacks application : infix, post fix, and Recursion, Introduction to queues, Primitive Operations on the Queues, Queue as an abstract data type, Circular Queue, Dequeue, Priority Queue.

**UNIT-II Linked List :** Introduction to the linked list of stacks, The linked list of queues, Header nodes, Doubly linked list, Circular linked list, Stacks & Queues as a Circular linked list, Application of linked list.

**UNIT-III Trees:** Basic Terminology, Binary Trees, Tree Representations as Array & Linked list, Binary tree representation, Traversal of binary trees : In order, Preorder & post order.

Application of Binary tree, Threaded binary tree, B-Tree & Height balanced tree, representation of  $B^+$  &  $B^*$  trees, Binary tree representation of trees, Counting binary trees, 2-3 Trees algorithm or manipulating 2-3 Trees.

**UNIT-IV** Searching & Sorting : Sequential Searching, Binary search, Insertion sort, Selection sort, Quick sort, Bubble sort, Heap sort, Comparison of sorting methods.

**UNIT-V** Tables & Graphs : Hash Table, Collision resolution Techniques, Introduction to graphs, Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs. Graph Traversal Depth first & Breadth first search, Spanning Trees, minimum spanning Tree, The basic, Greedy Strategy for computing Algorithm of Kruskal and prims.

**TEXT & REFERENCE BOOK :**

Fundamentals of Data structure : By S. Sawhney & Horowitz

Data Structure : By Trembley & Sorrenson.

Data Structure Using Pascal : By Tannenbaum & Alugenstein

Data Structure : By lipschuists (Schaume's Outline Series McGraw Hill Publication)

Fundamentals of Computer Algorithm : By Ellis Horowitz and Sartaj Sawhney.

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## PRACTICAL WORK

1. The sufficient practical work should be done for understanding the data structure with C++.
2. The sufficient practical work must be performed on stacks queues linked list, trees etc.
3. All practical works should prepared in form of print outs and voluated while practical examination.

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## INDUSTRIAL MICROBIOLOGY

Paper	Title	Time	Marks
First	Agriculture and Food Microbiology	3 hrs.	50
Second	Fermentation Technology & Government Regulations	3 hrs.	50
	<b>PRACTICAL</b> Examination (including sessionals)	4 hrs.	(20+5) 25
	Viva-Voce Exam. based on "Summer Job-Training Report"		25

### PAPER-I

(Paper Code-0930)

### AGRICULTURE AND FOOD MICROBIOLOGY M.M. : 50

- UNIT-I** Soil fertility and management of agricultural soils. Influence of available nitrogen on soil-fertility. Importance of crop-rotation. Soil management. Management practices : Pesticides and their impact and effect on soil fertility.
- UNIT-II** Microbial diseases of crop plants with special reference to Wheat, Rice, Maize, Groundnut, Mustard, Grapes, Potato and Papaya.
- UNIT-III** Control of plant diseases. Chemical control of plant diseases. Biological Control- its mechanism and importance. Biopesticides. Concept of integrated pest management (IPM). Bacterial insecticides.
- UNIT-IV** Food spoilage mechanism, Spoilage of stored products, fruits and vegetables. Microbial spoilage of milk and meat. Food borne diseases.
- UNIT-V** Food preservation methods - Asepsis, Pasteurisation canning, dessication, low temperature, Anaerobiosis, filtration.  
Chemical preservation of food - salt and sugar, organic acids. Use of SO<sub>2</sub>, ethylene and propylene oxides, wood smoke.

### PRACTICALS

1. Study of microbial diseases of crop plants.
2. Study of effect of fungicides and insecticides on microorganisms.
3. Study of antagonistic activities amongst microorganisms.
4. Study of fungal contaminants from stored agricultural products.
5. Study of food spoilage microorganisms from sweets and bakery products.
6. Study of effect of the preservatives on the growth of microorganisms.
7. Study of UV radiations on microorganisms.
8. Study of the effect of agrochemicals on soil inhabiting microorganisms.

### RECOMMENDED BOOKS :

1. Modern Plant Pathology by Bilgramy and Dubey.
2. Food Microbiology by Frazier.
3. Microbiology by S.S. Purohit.
4. Microbiology by P.D. Sharma.
5. Agricultural Microbiology by Rangaswami.
6. Plant Pathology by R.S. Mehrotra.

  
04/9/12      23/7/12

**PAPER-II**  
**(Paper Code-0931)**

**FERMENTATION TECHNOLOGY AND GOVERNMENT REGULATIONS**

**M.M. : 50**

**UNIT-I** Fermentation equipments and production process. Principal types of fermenters - The batch fermenters, continuous stirred tank fermenters, Tubular fermenter, The fluidised bed fermenter, Solid State fermenters. Computer control of fermentation process. Strain improvement process.

**UNIT-II** Industrial production of organic acids - Lactic and citric acid.  
Enzymes - amylase, protease and amino acids - L-lysine and glutamic acid.

**UNIT-III** Production of alcohol, wine, beer and acetic acid.  
Production of antibiotics - Penicillin and Streptomycine.  
Industrial production of vitamins - Vitamin B12 and Riboflavin.

**UNIT-IV** Importance of microorganisms in dairy industries. Production of cheese, Butter milk; and in bakery industries - leavening of bread, Indian fermented foods. Fungi and bacteria as a source of single cell proteins (SCP) and proteins.

**UNIT-V** Role of international organisation in biotechnology. Government programmes for biotechnology development. Government regulations of recombinant DNA research. Hazardous industrial wastes, Mycotoxin hazards in the production of fungal products. Regulations for disposal of biohazardous materials. Patenting of the products in Industries.

**PRACTICALS**

1. Measurement of production of citric acid by *Aspergillus niger*.
2. Measurement and production of alcohol by yeast.
3. Demonstration of Transformation of steroids.
4. Demonstration of IAA production by microbes.
5. Demonstration of enzyme production by microorganisms.  
(a) Amylase (b) Cellulase
6. Demonstration of mushroom cultivation.

**RECOMMENDED BOOKS :**

1. Industrial Microbiology by L.E. Casida.
2. Fermentation Technology by Whittakar.
3. General Microbiology, Vol. II, by Powar and Daginawala.
4. Molecular Biology and Biotechnology by H.D. Kumar.
5. Elements of Biotechnology by P.K. Gupta.

  
DAG 21/12/12      Venu 23/1/12



## **ELECTRONICS**

	<b>Max.M.</b>	<b>Min.M</b>
Paper-I Power Electronics, Microprocessors and IT Fundamental's	50	33
Paper-II Communication Systems	50	
Paper-III Practicals and Project	50	17

### **PAPER - I**

**(Paper Code-0911)**

#### **POWER ELECTRONICS, MICROPROCESSORS AND IT FUNDAMENTAL'S**

**UNIT-I** Comparative study of semiconductor power Devices : Power Diodes, Power Transistors, Unijunction Transistor, Silicon controlled Rectifier, Diac and Triac. Structural Description and working of Unijunction Transistor (UJT), Characteristic curve, Use of a UJT as a Relaxation oscillator.

Description and working of a DIAC, Characteristic curve.

Description and working of a Triac, Characteristic curve, Triac as a switch.

Silicon controlled Rectifier : Description of the structure and idea of doping profiles of different layers, Two Transistor model analysis of SCR, Voltage current Characteristics, Forward and Reverse Blocking states; Triggering mechanisms and methods of turn on, turn off mechanism.

**UNIT-II** 8085 up Instruction Sets and Programing of 8085 microprocessor : Logic 8 bit Instructions of 8085 Data Transfer (copy) Instructions, MOV, Arithmetic Instructions (ADD, ADI, SUB, SUI, INR, DCR), Logic operations : ANA,

ANI, ORA, ORI, XRA, XRI, Branch Operations : Unconditional and Conditional Jump Instruction, Rotate Operations : RLC, RAL, RRC, RAR, 16 Bit Arithmetic and Logical operations.

Use of Instruction set to make following programs.

(i) Data Block Transfer.

(i) To Arrange a Series in Assending and Decending Order.

(i) Largest Number Finding.

(iv) To Carry out simple arithmetic operations : Addition, Division Multiplication, Subtraction.

**UNIT-III** Programmable Interface Devices : Internal Architecture and pin out diagram of the 8155/8156 and 8355/8755 Multipurpose Programmable Devices, The 8279 Programable keyboard/display interface.

Interfacing Data Converters : Digital to Analog (D/A) converter, Analog to Digital (A/ D) converter.

#### **UNIT-IV Information Technology :**

Information theory - Introduction information in communication system, measurement of information, the binary digit (bit).

Data sets and their connection requirements, Modem : Classification, modes of modem operation, modem interconnection, modem data transmission speed. Internet basics : Basic information about Http, WWW, HTML, shell and TCP/IP account, Browsers - Netscape and Internet explorer, e-mail.

#### **UNIT-V Communication Technology :**

LAN, WAN and MAN, wireless network, Internetwork, network topology, OSI and TCP/ IP reference models, comparison between them and their criticism. Details about Physical layer : magnetic media, twisted pair (UTP and STP), coaxial cable, fiber-optic cable Basic idea about ISDN.

#### **REFERENCES :**

1. Power Electronics : M.H. Rashid Prentice Hall of India, New Delhi.
2. Microprocessor Architecture : R.S. Gaonkar Penram Publication, Mumbai.  
Program and Applications
3. Computer Network : A.S. Tanenbaum, Second Edition Prentice Hall of India Pvt. Ltd.
4. Introduction to Microprocessors: A.P. Godse, VTU Publishers, Pune.
5. Power Electronics : Alok Jain Penram Publishers, Mumbai.
6. Microprocessors & Interfacing : Douglas V. Hall Tata Mcgraw Hill.

**PAPER - II**  
**(Paper Code-0912)**

**COMMUNICATION SYSTEMS**

**UNIT-I** Analysis of passive filters (low pass, band pass and high pass), elementary idea of active filters-Butterworth and Cbevyshev response) Noise : Thermal noise, shot noise, Partition noise, low frequency and transit time noise, Generation and recombination noise, equivalent noise resistance, signal to noise ratio, noise factor, noise temperature.

**UNIT-II Modulation** : Principle of modulation, wave spectra and effect of filtering an complex wave : Amplitude modulation; frequency spectrum of AM, average power average voltage, modulation index for multiple sine waves, linear and square modulators, collector modulator, balance modulator, single side band (SSB) generation/method, diode detector, advantages and disadvantages of SSB over DSB AM : SSB detection, Transmitters and Receivers : Superheterodyne receiver, AM Transmitters.

**UNIT-III Angle Modulation** : Elements of frequency and phase modulation frequency spectrum of FM waves, inter system comparisions (FM and AM); Generation of FM, direct and indirect methods; Angle - Modulator circuits, varactor diode and FET modulators; Foster Seelay discriminator and ratio detector.

**UNIT-IV Pulse Modulation** : Pulse Modulation, pulse transmission, pulse amplitude modulation, time division multiplexing, pulse time modulation, pulse width and pulse position modulation, digital filtering, pulse code modulation; Block diagrams of PCM transmission and receiving circuits.

**UNIT-V Television engineering** : Scanning process, characteristics of human eye, aspect ratio, persistence of vision and flicker, resolution and video bandwidth, interlaced scanning, blanking, synchronizing and equalizing pulses, Vestigial side band signal, standard channel characterstics, TV camera tubes Image orthicon and vidicon; Block diagram of TV transmitter and receiver.

Three colour system, luminance and chrominance signal, colour TV camera, Shadow mask, Trinitron and in line colour picure tubes.

**REFERENCES :**

- |  |  |
|--|--|
| 1. Electronic Communication Systems    | : George Kennedy, Tata Mcgraw Hill.              |
| 2. Principles of Communication Systems | : Taub & Schilling TMH                           |
| 3. Communication Systmems              | : Simon Haykin, Mcgraw Hill.                     |
| 4. Monochrome & Color Television       | : R.L. Gulati, New Age International, New Delhi. |

**PAPER - III**  
**PRACTICALS AND PROJECT**

A student is required to do atleast 12 experiments and a project work in the academic year.

The scheme of practical examination will be as follows :

- (i) One experiment and Working and Demonstration of Project works - 5 :

Marks

Experiment	-	20
Viva	-	05
Project work & Viva	-	15 (10+5)
Sessional	-	10
<b>Total</b>	-	<b>50</b>

1. Study of SCR characteristics.
2. Study of Diac and Triac characteristics.
3. Study of UJT Characteristics.
4. Study of UJT as a relaxation oscillator.
5. Study of AM generation and detection.
6. Radio Receiver measurements.
7. Study of low pass, band pass and high pass filters.
8. Study of FM using voltage controlled oscillators.
9. Study of DC choppers.
10. Study of Pulse code modulation.
11. Study of electronic regulation of D.C. & A.C. Motors.
12. Any four experiments on microprocessors.

**NOTE : Other experiments of equal standard may also be set.**

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## ANTHROPOLOGY

### PAPER-I

(Paper Code-0919)

#### "FUNDAMENTALS OF HUMAN GENETICS & HUMAN GROWTH"

AIM- The aim of this paper is to introduce the students the basics of Human Genetics and Human Growth.

**UNIT-I** Human Genetics : History, aims and scope. and its application to human society Cell division : Mitosis and Meiosis. Mendelism, Chromosomes ; Normal and Abnormal chromosomes. Genes, concept of DNA & RNA. Types of Inheritance : autosomal, (Dominant and Recessive). Sex linked Inheritance.

**UNIT-II** Concept of Race. Formation of Racial groups. Criteria for racial classification. Racial elements in India. Major stocks of the world and their broad sub divisions.

**UNIT-III** Types of twins and their importance in genetic investigation. Inheritance of ABO Blood groups, P.T.C., Colour blindness and dermatoglyphics. Genetic counselling, Eugenics. Population Genetics.

**UNIT-IV** Definition and scope of Human growth. Methods of studying human growth and Development. Ageing, Nutritional requirement for normal growth. Common nutritional disorder (Protein, Fat, Carbohydrates, Mineral, Vitamin).

**UNIT-V** Ecology : definition and scope. Varieties of human ecosystems. Environmental Population. Definition, nature and scope of biological demography. Demographic Profiles : Fertility, Mortality, Morbidity.

#### RECOMMENDED READINGS :

- |    |                             |   |                                     |
|----|-----------------------------|---|-------------------------------------|
| 1  | Agrawal S.N.                | : | India Population Problems           |
| 2  | Bogue                       | : | Principles of Demography            |
| 3  | Bresler                     | : | Human Ecology                       |
| 4  | Granand Shamir              | : | Methods of Research in Human Growth |
| 5  | Hari.I.                     | : | Biochemical Genetics Man            |
| 6  | Harrison.A.E.(editor)       | : | Human Biology                       |
| 7  | Phyllis and Home,P.S.       | : | Basic nutrition in health & disease |
| 8  | Race, R.R. & Sanger R.      | : | Blood Group in Man                  |
| 9  | Stern C.                    | : | Principles of Human Genetics        |
| 10 | Tanner, J.M.                | : | Human Growth                        |
| 11 | Theodaron                   | : | Studies in Human Ecology            |
| 12 | Walson and Lowry            | : | Growth and Development of Children  |
| 13 | Winchester A.W.             | : | Principal of Genetics               |
| 14 | रधुवंशी अरुण एवं चन्द्रलेखा | : | पर्यावरण प्रदूषण ।                  |
| 15 | Sinnot, Dunn & Dozansly     | : | Principal of Grntics                |

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**PAPER-II**  
**(Paper Code-0920)**

**THEORIES IN SOCIAL CULTURAL ANTHROPOLOGY**

**AIM :** The main aim of this course is to introduce the student about the basic principles and Theories of Social cultural Anthropology to-provide preliminary understanding of various theoretical models evolved by Social and Cultural Anthropology.

**UNIT-I** The contributions made by the following Anthropologists to Social-Cultural Anthropology.

(I) E.Durkheim, (II) F. Boas, (III) R. Redcfield, (IV) A. L. Kroeber, (V) S.C. Dube, (VI) M.N. Shrinivas, (VII) L.P. Vidyarthi.

**UNIT-II** Evolution: Biological and cultural Evolutionism; classical Evolutionism; E.B. Tylor, L.H. Morgan.

Neo - Evolutionism; jLeslie white, Gordon childe.

Culture traits, Culture Complex, Culture Area, and Culture focus.

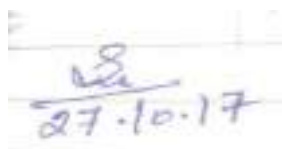
Diffusion of Culture : British diffusionist : Genrman - Austrian diffusionist ( Kuttre kriesse American diffusionist ( Culture Area).

**UNIT-III** Function and structure: Functionalism (Malinowski) and Structure Functionalism ( Redcliffe Brown ) Structuralism ( Levi Strauss).

**UNIT-IV Personality :** Basic personality and Model personality.

Culture pattern : Configurationalism ( Ruth Benedict). Anthropological study of National character.

**UNIT-V** Field work tradition in Anthropology Major tools of Research: Schedule, Questionnaire, Participant observation, interview, case study, Geneological Method. The main bases of Anthropological Methods: Historical Method, Comparative Method and Functional Method.

  
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### **PAPER-III**

### **PRACTICAL**

**Obejctive :** The main of this practical coures is to introduce the student about the tools and Method, analysis & statistical methods used in Human Biology. Laboratory Procedures in blood grouping and dermatoglyphics would give confidence in Dealing with all the applied dimensions they process.

#### **PART-I : Somatometry :**

- (a) Measurements on body :
  - (i) Height vertex, (ii) Height tragus, (iii) Suprasternale height, (iv) Biacromial Breadth, (v) Bi-illioncristal breadth, (vi) Tibial Height, (vii) Upper extremity Length, (viii) Sitting height, (ix) height dactylion, (x) Body weight.
- (b) Head and Face Measurement :
  - (i) Morphological upper facial length.
  - (i) Physiognomic upper facial length.
  - (i) Morphological facial length.
  - (iv) Bizygomatic breadth.
  - (v) Max head length
  - (vi) Max head breadth
  - (vii) Nasal length
  - (viii) Nasal breadth
- (c) Indices :
  - (i) Cephalic Index
  - (i) Nasal Index
  - (i) Facial Index

#### **PART-II Genetic Traits :**

ABO blood group ; colour blindness, PTC taste sensitivity, Dermatioglyphics, Methods of taking finger and palm prints and their analysis.

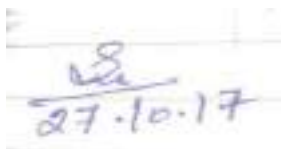
#### **PART-III Statistics**

Mean, Median, Standard deviation,  $X^2$  test.

#### **BOOKS RECOMMENDED :**

- |                              |   |  |
|------------------------------|---|--|
| 1. Basin M.K. and I.P. Singh | : | Anthropometry                            |
| 2. Cummins H. and Midlo C.   | : | An Introduction of Dermatoglyphics       |
| 3. Dunsford and Bowley       | : | Blood Group Techniques                   |
| 4. Fisher R.S.               | : | Statistical methods for Research Workers |
| 5. मित्रा, मिताश्री          | : | प्रायोगिक मानव विज्ञान भाग-02            |
| 6. Olivi                     | : | Practical Anthropology                   |

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## **ELECTRONICS EQUIPMENT MAINTENANCE**

	<b>Max. Marks</b>	<b>Min. pass Marks</b>
Paper - I Trouble shooting and maintenance of audio and video Equipments.	50	17
Practical	50	17
Project	50	17

### **PAPER-I**

**(Paper Code - 0913)**

### **TROUBLE SHOOTING AND MAINTENANCE OF AUDIO AND VIDEO EQUIPEMENTS**

#### **UNIT-I REMOTE CONTROL AND SPECIAL CIRCUITS:**

Remote control, electromechanical control system, electronic touch tuning frequency synthesiser, TV tuner, automatic fone tuning (AFT), booster emplifier, automatic brightness control, instantious circuitry, picture tube boosters.

#### **ALIGNMENT AND SERVICING EQUIPMENTS :**

Antistatics and low leakage multimeters, soldering Iron, Vacuum tube voltmeter (VT VM) Cathode Ray Oscillouscope (CRO) single Generation Video pattern Generator Coulor Ilur Generation Vector Scope, High voltage probe Cable connectors shielding and Graunding.

#### **UNIT-II TELEVISION:**

Trouble shooting procedure, troubles shooting monochrome receivers, servicing of various functional blocks, trouble, shooting colour receivers, servicing circuit modeles, saprets precautions in television servicing.

**TELEVISION CAMERA TUBES :** Basic principles and maintenance recording.

#### **UNIT-III BLOCK DIGRAM OF VCR :**

Requirement of VCR, retaining video drums, helical scan, guard band, frequency response, serva systems, tape tension regulatar, real servo, system control. Different formats, the quacruplex format, type B segmented format, type C formet, the U matic format, the 1/2" V.H.S. format, 3-Max system.

#### **UNIT-IV SINGAL PROCESSING, CHROME PROCESSING :**

Colour under technique, recovery of down converted chrome signals, luminance processing. frequency modulation, deviation and band width, autometric gain correction, limited, pre-enphasis, replay of luminance signal, Y/C delay, drop out compensator, block diagram of main requirements, zero guard band system, turners and modulators, the modulator. Servo mechanisms and system control : Recording, playback, tracking, capstan servo system control, loading and tereading and play mode, record mode, auto stops, counter, audio video muting.



## UNIT-V CARE OF MECHANICAL SYSTEM:

Cleaning of head and tape path. Lubrication, replacement of parts, replacement of audio CTC head, replacement of video drum, dihedral error, table height, tape tension. drive tongue stop brenks.

## ELECTRONIC SYSTEM ALUGNMENTS:

Instruments, fault finding the power supply, free funning speed the servo system, tracking, video system, playback section alignment, amplifier balance and gain, luminance signal adjustment, D.O.C., F.M. demodulator, limited balance, carrier leak, noise canceller, colour processing, up conversion automatic colour correction, autometric face connection recording, luminance, syntip or clamping frequency, deviation set, white clip, chrominance, summary.

## NEW TECHNOLOGIES:

Industrial aspects of consumer electronics, jigs and fixture, quality control/ management, production techniques, business cycle new technologies, compact disc, laser disc.

## PAPER - II

(Paper Code - 0914)

## PRACTICAL

A student is required to do atleast 2 experiments in an acadmic year, and one month summer Training. The scheme of practical examination will be as follows :

(1) On experiment of 3 hours duration and one month summer Training.

(2) The marks for summer training will be awarded by the teachers teaching the students on the basis of the certificate issued by the external supervisor of the summer training.

Marks

Experiment	25	Marks
Sessional	10	Marks
on month summer training	15	Marks
<b>Total</b>	<b>50</b>	<b>Marsk</b>

Orientation and connection to TV antenna. Knowledge of booster connection and replacement. Knowledge of bloon Unit - different types (for different TV sets) and replacement of ballon, Replacement of front end.

Power supply and resistance cold tests. Voltage measurement at different points.

Horizontal and vertical oscilator checking and testing using CRO.

To see and read circuit diagram and to identity (Locate) various block on p/s, H and V deflection, video amplifier, audio, section, chroma section, IF section, tuner, tube and direction yokes (connecting and

adjustment).

Audio section wave form testing step by step-sound separator, sound take off from IF section and then onwards to detector amplifier, IF alignment and loud speaker. (intercarrier sound take off).

If stage testing : IF alignment, tuner and band select.

Chroma processor : testing signals at various IC's.

Remote control studies-range, direction various, controls, IR transmitter and receiver, coding of signal.

Fault finding: cold testing and voltage testing of various parts. (Revision of parts

## BIOTECHNOLOGY

### PAPER - I

#### GENERAL BIOTECHNOLOGY

##### Plant, Environment and Industrial Biotechnology

**Time : 3 Hrs**

**MM-50**

- UNIT-I** Plant cell and tissue culture : General introduction history, scope.  
Application of tissue culture  
Concept of cellular differentiation.  
Agro bacterium. Ti and Ri plasmid.  
Bt gene. Molecular marker (RFLP, RAPD), edible vaccines.
- UNIT-II** Organogenesis, Embryogenesis. Protoplast isolation and fusion.  
Germplasm storage and Cryopreservation.  
Anther and Ovary culture.
- UNIT-III** General introduction and scope of environmental biotechnology.  
Environmental pollution and its type.  
Control of pollution through biotechnology, Wastewater treatment:- Physical, Chemical, and Biological.
- UNIT-IV** Biofertilizer, Biopesticides, IPR.  
Global environmental problem- General introduction, Ozone depletion. Acid rain.  
Green house effect.
- UNIT-V** Bioreactors and its type.  
Fermentation (Lactic acid, alcohol).  
Maintenance of Industrial microorganisms.  
Food technology- introduction, canning. packing and food preservation.

### PAPER – II

#### IMMUNOLOGY

**Time : 3 Hrs**

**MM-50**

- UNIT-I** Immunology - General Concept, history and Development.  
Immune system and immunity, Organization of Immune system.  
Antigen - Antibody and its type.
- UNIT-II** Cell involved in immune system. Type and cells. Basic structure and function.  
Cytokines.  
Cell mediated immunity Interferons. Hypersensitivity.
- UNIT-III** Antigen - antibody interaction. Principles and types.  
Immunohaematology - General concept. Blood group system. Rh factor. medical application of blood groups.
- UNIT-IV** Origin and diversity in immune system.  
Effectors mechanisms.  
Immunity of infection diseases monoclonal Antibodies.
- UNIT-V** Autoimmune diseases. Hemolytic anemia. Rheumatoid arthritis. Insulin dependent diabetes. Myasthenia gravis. Organ transplantation.  
Immunodeficient diseases. Cancers. AIDS.

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## PRACTICAL

### EXPERIMENTS

#### Plant :

1. Sterilization of plant materials.
2. Preparation of Tissue culture media.
3. Plant tissue culture by plant parts.

#### Environment :

1. Determination of total dissolved solids of water.
2. Determination of DO, BOD, COD of water.
3. MPN Test.

#### Industrial :

1. Food preservation techniques.
2. Application of biopesticides on microorganisms
3. Production of Citric acid by microorganisms.

#### Immunology :

1. Blood grouping in relation to Antigen Antibody interaction.
2. Rh factor determination.
3. Widal Test
4. VDRL Test.
5. Double diffusion experiment
6. ELISA Test

## BIOTECHNOLOGY

Time : 4 HRS

MM-50

#### Scheme

#### Marks

- |   |    |
|---|----|
| 1. Experiment based on Paper - I  |    |
| (i) Plant tissue culture  | 08 |
| (i) Environment / Industrial  | 07 |
| 2. Experiment based on Paper - II                                       | 15 |
| 3. Spots 05 (based on paper I & II, at least two spots from each paper) | 10 |
| 4. Viva-voce  | 05 |
| 5. Sessional  | 05 |

**Total**

**50**

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## BOOKS-

1. A test Book of Biotechnology : Indu Shekher Thakur - I.K. International Pvt. Ltd., New Delhi.
2. Biotechnology (Fundamentals and Applications) : S.S. Purohit - Agrobios (India), Jodhpur.
3. Fundamentals of Microbiology and Immunology : Ajit Kr. Banerjee, Nirmalya Banerjee - New central Book Agency (P) Ltd., Kolkata.
4. Plant Biotechnology : R.S. Chawla - Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
5. Plant Biotechnology : B.D. Singh - Kalyani Publication, New Delhi.
6. Biotechnology : Fundamental & Application : S.S. Purohit
7. Immunology : J. Kubey et al.
8. Immunology : Roitt et al.
9. Fundamental of Immunology : W. Paul.
10. Plant Tissue culture : Rojgov
11. Plant Tissue Culture (Practical) : H.S. Chawla.

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**BIOCHEMISTRY**  
**PAPER - I**  
**MOLECULAR BIOLOGY**

**UNIT-I-BASIC CONCEPTS OF GENETIC INFORMATION**

- a. Nucleic acids as genetic information carriers, experimental evidence e.g. bacterial genetic transformation, Hershey - Chase Experiment, TMV reconstitution experiment.
- b. Central dogma of molecular genetics - current version, reverse transcription and retroviruses.
- c. Primary structure of nucleic acids and their properties, silent features of eukaryotic, prokaryotic and viral genome; highly repetitive, moderately repetitive and unique DNA sequences.
- d. Basic concepts about the secondary structures of nucleic acids, 5' 3' direction antiparallel strands, base composition, base equivalence, base pairing and base stacking in DNA molecule. and buoyant density and there.

**UNIT-II-STRUCTURAL LEVELS OF NUCLEIC ACIDS AND SEQUENCING**

- a. Secondary and tertiary structure of DNA : Watson and Crick model, A.B. and Z types of DNA major and minor grooves, chirality of DNA, tertiary structure of DNA.
- b. Structure and properties of RNA; Classes of RNA secondary and tertiary structures.
- c. Nucleic acid hybridization : Cot value and satellite DNA.
- d. Sequencing : Restriction and modification system; sequencing of DNA and RNA.

**UNIT-III a. DNA REPLICATION**

DNA replication in prokaryotes - conservative, semi conservative and dispersive types, experimental evidence for semi conservative replication. DNA polymerases, other enzymes and protein factors involved in replication. Mechanism of replication. Inhibitors of DNA replication.

The image shows six handwritten signatures, each followed by the date '24.7.17'. The signatures are written in blue ink on a white background. The first signature is 'Arjun', the second is 'Arjun', the third is 'Arjun', the fourth is 'Arjun', the fifth is 'Arjun', and the sixth is 'Arjun'.

## **b. TRANSCRIPTION**

Transcription in prokaryotes RNA polymerase, promoters, initiation, elongation and termination of RNA synthesis, inhibitors of transcription. Reverse tran-scriptase, post transcriptional processing of RNA in eukaryotes.

## **UNIT-IV TRANSLATION AND REGULATION OF GENE EXPRESSION**

- a. Genetic code : Basic feature of genetic code, biological significance of degeneracy. Wobble hypothesis, gene within genes and overlapping genes.
- b. Mechanism of translation : Ribosome tructure, A and P sites, charged tRNA, f-mat-tRNA initiator codon, Shine Dalgarno consensus sequence (AGGA), formation of 70S initiation complex, role of EF-Tu, EF-Ts, EF G and GTP, nonsense codons and release factors RF 1 and RF 2.
- c. Regulation of gene Expression in prokaryotes : Enzyme induction and repression, operon concepts, Lac operon, Trp operon.

## **UNIT-V MUTATION AND REPAIR**

- a. Mutation: Molecular basis of mutation, types of mutation, e.g. transition, transversion frame shift, insertion, deletion, suppresser sensitive, germinal and somatic, backward and forward mutations, true reversion and suppresion, dominant and recessive mutation, spontaneous and induced mutations = Ledergerg's replica plating experiment.
- b. Mutagenecity testing : Correlation of mutagenecity and carcinogenicity : Ames testing, Random and site directed mutagenesis.
- c. DNA Rapair : UV repair system in E.Coli, Significance of thymine in DNA.

## **RECOMBINATION AND TECHNOLOGY**

Restriction endonucleases, brief discussion of steps in DNA cloning. Application of recombinant DNA technology.

### **Books:**

1. Biochemistry J David Rawn, Neil Patterson Publisher, North Carolina.
2. Molecular biology of the gene JD Watson, NH Hopkins, JW Robert, JP Stretz, AM Weiner, Freeman San Francisco.
3. Fundamental of biochemistry by D Voet and CW Pratt, John Wiley & Sons, NY.
4. Text book of biochemistry Thomas M Devin, John Weley & Sons, NY.

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**PAPER - II**  
**NUTRITIONAL, CLINICAL & ENVIRONMENTAL BIOCHEMISTRY**  
**M.M.-50**

**UNIT-I NUTRITIONAL BIOCHEMISTRY**

**Nutrition and dietary habits**

- a. Introduction and definition of foods and nutritiori. Factors determining food acceptance, physiological, energy, body building (growth and development).
- Regulation of body temperature. Physiology and nutrition of carbohydrates, fats, proteins and water. Vitamins A,D,E,K, Vit B-Complex and Vit C and minerals like Ca, Fe and Iodine and their biological functions. Basic food groups : energy giving foods, body building foods and protective foods.
- b. Composition of balanced diet, recommended dietary allowances (RDA) for average indian, locally available foods, inexpensive quality foods and food stuff's rich in mor ethan one nutrients. Balanced vegetarian diet, emphasis on nutritional adequacy.

**UNIT-II NUTRITATIVE AND CALORIFIC VALUES OF FOODS**

- a. Basic concepts of energy expenditure, units of energy, measurement of energy expenditure by direct or indirect calorimetry, calculation of non protein RQ with respect to carbohydrates and lipids. Determination of heat production of the diet. The basal metabolism and method of measuring basal metabolic rate (BMR) energy requirements during growth, pregnancy, lactation and various physiologi-cal activities. Calculation of energy expenditure of average man and women.





- b. Specific dynamic action (SDA) of foods, nutritive value of various kinds of foods generally used by Indian population. Planning of dietary regimes for infants, during pregnancy and old age. Malnutrition, its implications and relationship with dietary habits and prevention of malnutrition specially protein-calories malnutrition (Kwashiorkor and Marasmus) by improvements of diets. Human milk and its virtues, breast vs formulated milk feeding. Food preservation standards, food adulterations and precautions, government regulations on preservation and quality of food.

### UNIT-III CLINICAL BIOCHEMISTRY

#### i) Basic concepts of clinical biochemistry

- a. Definition and scope of clinical biochemistry in diagnosis, a brief review of units and abbreviation used in expression concentration and standard solutions. Quality control. Manual vs automation in clinical laboratory.
- b. Collection and preservation of biological fluids (blood, serum, plasma, urine and CSF) Chemical analysis of blood, urine and CSF. Normal values for important constituents (in SI units) in blood (plasma / serum), CSF and urine, clearance test for urea.

### UNIT-IV (i) CLINICAL ENZYMOLOGY

- a. Definition of functional and non- functional plasma enzymes. Isozymes and diagnostics Tests. Enzymes pattern in health and diseases with special mention of plasma lipase, amylase, cholinesterase, alkaline and acid phosphatase, SGOT, SGPT, LDH and CPK.
- b. Functional tests of kidney, liver and gastric fluids.
- (i) Hypo and hyper-glycemia, glycogen storage diseases, lipid mal-absorption and steatorrhea, sphingolipidosis, role of lipoproteins. Inborn errors of amino acid metabolism alkaptonuria, phenyl-ketonuria, albinism, gout and hyper-uricemia.

### UNIT-V ENVIRONMENTAL BIOCHEMISTRY

- (i) **Air pollution** : Particulate matter, compounds of carbon, sulphur, nitrogen and their interactions, methods of their estimation, their effect on atmosphere.
- (ii) **Water pollution** : Types of water bodies and their general characteristic, major pollutants in domestic, agricultural and industrial wastes, methods of their estimation, effects of pollutants on plants and animals, treatment of domestic and industrial wastes, solid-wastes and their treatment.

A. B. Srinivas 24.7.2017    A. B. Srinivas 24.7.17    A. B. Srinivas 24.7.17    A. B. Srinivas 24.7.17    A. B. Srinivas 24.7.17    A. B. Srinivas 24.7.17

**Books :**

1. Modern nutrition in health and disease by Whol and Goodhart.
2. Human nutrition and Dietetics-S. Davidson and passmore-ELBS Zurich.
3. Tietz fundamental of clinical Chemistry by Cart A Burits & ER Ashwood Saunders WB Co.
4. Leacture Notes on Clinical Biochemistry-LG Whitby, AF Smith, GJ Beckett.

**PRACTICAL FOR IIIrd YEAR****LABORATORY - III (BCH 305)**

1. Estimation of DNA by diphenylamine method.
2. Effect of temperature on the viscosity of DNA using Ostwald's Viscometer.
3. Extraction of RNA and its estimation by Orcinol method.
4. Estimation of hemoglobin by measuring total iron in blood.
5. Estimation of calcium and phosphorus in serum & urine.
6. Estimation of creatine and creatinine in urine.
7. Estimation of immunoglobulins by precipitation with saturated ammonium sulphate.
8. Denaturation of enzyme, studies on DNA.
9. a. Separation of proteins by column chromatography. b. Determination of proteins by dye binding assay.
10. Separation of proteins by SDS-polyacrylamide gel electrophoresis.

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# **DURG VISHWAVIDYALAYA, DURG (C.G.)**

Website - [www.durguniversity.ac.in](http://www.durguniversity.ac.in), Email - [durguniversity@gmail.com](mailto:durguniversity@gmail.com)



## **SCHEME OF EXAMINATION & SYLLABUS Of B.Sc. (Home Science) Part-1 Annual Exam UNDER FACULTY OF SCIENCE Session 2017-18**

**(Approved by Board of Studies)  
Effective from July 2017**

**B.SC. HOME SCIENCE**

**I<sup>ST</sup> YEAR**

**2017-2018**

*Reddy*  
22.07.17

*Don*  
22/7/17

*Devi*  
22.7.17  
*Ben*  
22/7/17

*Prith*  
22.7.17

## B.Sc. (Home Science) PART - I

### MARKING SCHEME

S.N.	Subject	M.M.	M.M.	Total	Min. Marks.	
	Group Paper	Theory	Practical		Theory	Pract.
<b>Group – I</b>						
A.	Environmental Studies	75		100	33	
	Feld Work	25				
<b>Found ation Course</b>						
C.	English Language - II	75		75	26	
<b>Group – II</b>						
A.	Fundamentals of Food & Nutrition	50	25	75	33	09
B.	Introduction to Resource					
<b>Group – III</b>						
A.	Introduction Human Development & Family Dynamics	50	25	75	33	09
B.	Introduction to Textile and Clothing	50	25	75		09
<b>Group - IV</b>						
A.	Community Development perspectives & Approaches Socio-Economic Analysis of community.	50	25	75	33	09
B.	Personal Empowerment & Computer Baric	50	25	75		09

### DISTRIGATION OF MARKSIN VARIOUS PRACTICALS

#### (ENCL OSURE -2)

S.No.	Name of the Practical	Total M.	Ses- sinal	Viva	Practical	Marks
1.	Fundamentals of food & Nutrition	25	05	05	A. Preparation & Pre- sentation) any one Recepie..... B. Taste ....	10 05
2.	Introduction to Resource Management, Eco. & Environment.	25	05	05	(On Ecology & Any Two)	8+7
3.	Introduction to Human Dev. & Family Dynamics.	25	05	-	A. Preparation of any o ne article of Baby Kit B. Preparation of Baby Toy or wearing Food or Imm. Chart.	10 10 10
4.	Introduction ot textile & Clothing	25	05	-	A. Drafting B. Stiching C. Weave	05 10 05
5.	Community Deve. Perspective & approaches Socio- Economic analysis of Community	25	10	05	Preparation of audio- visual aids	10
6.	Personal Empowerment & Computer Pasics.	25	05	05	Computer Practical	15



Part-I  
SYLLABUS FOR ENVIRONMENTAL STUDIES AND  
HUMAN RIGHTS

(Paper code -0828)

MM. 75

इन्वारमेटल साईसेस के पाठ्यक्रम को स्नातक स्तर भाग-एक की कक्षाओं में विश्वविद्यालय अनुदान आयोग के निर्देशानुसार अनिवार्य रूप से शिक्षा सत्र 2003-2004 (परीक्षा 2004) से प्रभावशील किया गया है। स्वशासी महाविद्यालयों द्वारा भी अनिवार्य रूप से अंगीकृत किया गया जाएगा।

भाग 1, 2, एवं 3 में से किसी भी वर्ष में पर्यावरण प्रश्न-पत्र उत्तीर्ण करना अनिवार्य है। तभी उपाधि प्रदान योग्य होगा।

पाठ्यक्रम 100 अंको का होगा, जिसमें से 75 अंक सैद्धांतिक प्रश्नों पर होंगे एवं 25 अंक क्षेत्रीय कार्य (Filed Work) पर्यावरण पर होंगे।

सौद्धांतिक प्रश्नों पर अंक - 75 (सभी प्रश्न इकाई आधार पर रहेंगे जिसमें विकल्प रहेगा)

(अ) लघु प्रश्नोंत्तर - 25 अंक

(ब) निबंधात्मक - 50 अंक

Filed Work- 25 अंको कर मूल्यांकन आंतरित मूल्यांकन पद्धति से कर विश्वविद्यालय को प्रेषित किया जावेगा। अभिलेखों की प्रायोगिक उत्तर पुस्तिकाओं के समान संगंधित महाविद्यालयों द्वारा सुरक्षित रखेंगे।

उपरोक्त पाठ्यक्रम में संबंधित परीक्षा के साथ किया जाएगा।

पर्यावरण विज्ञान विषय अनिवार्य विषय है, जिसमें अनुत्तीर्ण होने पर स्नातक स्तर भाग-एक के छात्र/छात्राओं को एक अन्य विषय के साथ पूरक की पात्रता होगी। पर्यावरण विज्ञान के सैद्धांतिक एवं फील्ड वर्क के संयुक्त रूप से 33% (तैंतीस प्रतिशत) अंक उत्तीर्ण होने के लिए अनिवार्य होंगे।

स्नातक स्तर भाग-एक के समस्त नियमित/भूतपूर्व/अमहाविद्यालयीन छात्र/छात्राओं को अपना फील्ड वर्क सैद्धांतिक परीक्षा की समाप्ति के पश्चात् 10 (दस) दिनों के भीतर संबंधित महाविद्यालय/परीक्षा केन्द्र में जमा करेंगे एवं प्राचार्य/केन्द्र अधिक्षक, परीक्षकों की नियुक्ति के लिए अधिकृत रहेंगे तथा फील्ड वर्क जमा होने के सात दिनों के भीतर प्राप्त अंक विश्वविद्यालय को भेजेंगे।

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## **UNIT-I THE MULTI DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES**

### **Definition, Scope and**

### **Importance Natural Resources:**

### **Renewable and Nonrenewable Resources**

- (a) Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people and relevant forest Act.
- (b) Water resources: Use and over-utilization of surface and ground water, floods drought, conflicts over water, dams benefits and problems and relevant Act.
- (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.
- (d) food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging , salinity.
- (e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.
- (f) Land resources: Land as a resource, land degradation, man induced landslides soil erosion and desertification.

**(12 Lecture)**

## **UNIT-II ECOSYSTEM**

### **(a) Concept, Structure and Function of and ecosystem**

- Producers, consumers and decomposers.
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids.
- Introduction, Types, Characteristics Features, Structure and Function of Forest, Grass, Desert and Aquatic Ecosystem.

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**(b) Biodiversity and its Conservation**

- Introduction - Definition: genetic, species and ecosystem diversity
- Bio-geographical classification of India.
- Value of biodiversity: Consumptive use, productive use, social ethics, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as mega-diversity nation.
- Hot spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wild life conflict.
- Endangered and endemic species of India.
- Conservation of biodiversity: In situ and Ex-situ conservation of biodiversity.

**(12 Lecture)**

**UNIT- III**

**(a) Causes, effect and control measures of**

- Air water, soil, marine, noise, nuclear pollution and Human population.
- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Disaster Management: floods, earthquake, cyclone and landslides.

**(12 Lecture)**

**(b) Environmental Management**

- From Unsustainable to sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people, its problems and concerns.
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
- Wasteland reclamation
- Environment protection Act: Issues involved in enforcement of environmental legislation.
- Role of Information Technology in Environment and Human Health.

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## UNIT- IV

General background and historical perspective- Historical development and concept of Human Rights, Meaning and definition of Human Rights, Kind and Classification of Human Rights. Protection of Human Rights under the UNO Charter, protection of Human Rights under the Universal Declaration of Human Rights, 1948. Convention on the Elimination of all forms of Discrimination against women. Convention on the Rights of the Child, 1989.

## UNIT- V

Impact of Human Rights norms in India, Human Rights under the Constitution of India, Fundamental Rights under the Constitution of India, Directive Principles of State policy under the Constitution of India, Enforcement of Human Rights in India. Protection of Human Rights under the Human Rights Act, 1993- National Human Rights Commission, State Human Rights Commission and Human Rights court in India. Fundamental Duties under the Constitution of India.

### Reference/ Books Recommended

1. SK Kapoor- Human rights under International Law and Indian Law.
2. HO Agrawal- International Law and Human Rights
3. एस.के.कपूर — मानव अधिकार
4. जे.एन. पान्डेय — भारत का संविधान
5. एम.डी. चतुर्वेदी — भारत का संविधान
6. J.N.Pandey - Constitutional Law of India
7. Agarwal K.C. 2001 Environmental Biology, Nidi pub. Ltd. Bikaner
8. Bharucha Erach, the Biodiversity of India, Mapin pub. Ltd. Ahmedabad 380013, India, Email: mapin@icenet.net(R)
9. Bruinner R.C. 1989, Hazardous Waste Incineration. McGraw Hill Inc.480p
10. Clark R.S. Marine pollution, Clanderson press Oxford (TB)
11. Cuningham, W.P.Cooper. T.H.Gorhani, E & Hepworth. M.T,200
12. Dr. A.K.- Environmental Chemistry. Wiley Eastern Ltd.
13. Down to Earth, Center for Science and Environment (R)
14. Gloick, H.P. 1993 Water in crisis. pacific institute for studies in Deve. Environment & Security. Stockholm Eng. Institute. Oxford University, Press. m 473p.
15. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Mumbai (R)
16. Heywood, V.H. & Watson, T.T.1995 Global Biodiversity Assessment, Cambridge Univ. Press 1140p
17. Jadhav H. & Bhosale, V.H. 1995 Environmental Protection and Law. Himalaya pub. House, Delhi 284p
18. Mckinney M.L.& School R.M.1996, environmental Science systems & solutions, web enhanced edition, 639p
19. Mhadkar A.K. Matter Hazardous, Techno-Science publication(TB)
20. Miller T.G.Jr. Environment Science, Wadsworth publication co. (TB)
21. Odum E.P.1971, Fundamentals of Ecology, W.B. Saunders Co. USA,574p

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22. Rao M.N. & Datta, A.K. 1987, Waste water treatment. Oxford & IBH pub.co.pvt. Ltd 345p
23. Sharma B.K. 2001, Environmental chemistry, Goel pub. House, Meerut
24. Survey of the Environment, The Hindu (M)
25. Townsend C. Harper J. And Michael Begon, Essentials of Ecology, Blackwell Science(TB)
26. Trivedi R.K. Handbook of Environment Laws, Rules, Guidelines, Compliances and Standards, Vol I and II, Environment Media(R)
27. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science publication (TB)
28. Wanger K.D. 1998, Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

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आधार पाठ्यक्रम

प्रश्न पत्र – प्रथम

हिन्दी भाषा

पूर्णांक – 75

(पेपर संख्या 0791)

नोट :

1. प्रश्न पत्र 75 अंक का होगा।
2. प्रश्न पत्र अनिवार्य होगा।
3. इसके अंक श्रेणी निर्धारण के लिए जोड़े जावेंगे।
4. प्रत्येक इकाई के अंक समान होंगे।

पाठ्य विषय:

- इकाई – 1 पल्लवन, पत्राचार तथा अनुवाद एवं पारिभाषिक शब्दावली।
- इकाई – 2 मुहावरे— लोकोक्तियां, शब्दाशुद्धि, वाक्य शुद्धि, शब्द ज्ञान—पर्यायवाची, विलोम, अनेकार्थी, समश्रुत (समानाचरित) अनेक शब्दों के लिये एक शब्द।
- इकाई – 3 देवनागरी लिपि की विशेषता, देवनागरी लिपि एवं वर्तनी का मापक रूप।
- इकाई – 4 कम्प्यूटर में हिन्दी का अनुप्रयोग, हिन्दी में पदनाम।
- इकाई – 5 हिन्दी अपठित, संक्षेपण, हिन्दी में संक्षिप्तीकरण।

पाठ्य क्रम के लिए पुस्तकें—

1. भारतीयता के स्वर साधन धनंजय वर्मा — म.प्र. ग्रंथ अकादमी।
2. नगरी लिपि और हिन्दी — अनंत चौधरी — ग्रंथ अकादमी पटना।
3. कम्प्यूटर और हिन्दी — हरिमोहन — तक्षशिला प्रकाशन, दिल्ली।

22/7/17

22/7/17

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22/7/17

## FOUNDATION COURSE

### PAPER - II

### ENGLISH LANGUAGE

M.M. 75

(Paper code 0792)

#### UNIT - 1 Basic Language skills: Grammar and Usage.

Grammar and Vocabulary based on the prescribed text. To be assessed by objective / multiple choice tests.

(Grammar - 20 Marks)

(Vocabulary - 15 Marks)

#### UNIT-2 Comprehension of an unseen passage.

05

This should simply not only (a) an understanding of the passage in question, but also (b) A grasp of general language skills and issues with reference to words and usage within the passage and (c) the Power of short independent composition based on themes and issues raised in the passage.

To be assessed by both objective multiple choice and short answer type tests.

#### UNIT-3 Composition: Paragraph writing

10

#### UNIT-4 Letter writing (The formal and one Informal)

10

Two letters to be attempted of 5 marks each. One formal and one informal.

#### UNIT-5 Texts:

15

Short prose pieces (Fiction and not fiction) short poems, the pieces should cover a range of authors, subjects and contexts. With poetry if may sometimes be advisable to include pieces from earlier periods, which are often simpler than modern examples. In all cases, the language should be accessible (with a minimum of explanation and reference to standard dictionaries) to the general body of students schooled in the medium of an Indian language.

Students should be able to grasp the contents of each place; explain specific words, phrases and allusions; and comment on general points of narrative or argument. Formal Principles of Literary criticism should not be taken up at this stage.

To be assessed by five short answers of three marks each.

#### BOOKS PRESCRIBED -

English Language and Indian Culture - Published by M.P. Hindi Granth Academy  
Bhopal.

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**PAPER –I**  
**FUNDAMENTALS OF FOOD AND NUTRITION (CORE) (Paper Code -0553)**

**Marks – 50**

**OBJECTIVE:**

This course will enable the student to

1. Understand the functions of food and the role of various nutrients, their requirements and the effects of deficiency and excess (in brief).
2. Learn about the structure, composition, nutritional contribution and selection of different foodstuffs,
3. Be familiar with the different methods of cooking, their advantages and disadvantages,
4. Develop an ability to improve the nutritional-quality of food.

**THEORY:**

- UNIT-I**
1. Concept of Nutrition - Food; Nutrients, Nutrition, under & over Nutrition,- Health.
  2. Functions of Food
  3. Basic Terminology used in food preparation

- UNIT-II** Nutrients: Macro nutrients
- Classification, sources, functions
- Recommended Dietary-Allowances
- Deficiency and excess (in brief)
- Water
- Carbohydrates
- Fats
- Protein
- Fiber

**UNIT-III Calcium**

- Iron
- Magnesium
- Zinc
- Fluorine
- Iodine, Selenium, Copper, Manganese
- Fat-soluble vitamins (A, D, E,K)

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Water soluble Vitamins (Thiamine, Riboflavin, Niacin)

Vitamin C, Folic (Acid)

Pyridoxine, Pantothenic acid, B12

**UNIT-IV** Food Production (in brief), Food Composition Structure

nutritional contribution and selection factors for the following

Cereals and –Millets

Pulses

Fruits

Vegetables

Milk and milk products

Nuts and oilseeds

Meat, fish and poultry

Eggs

Sugars

Tea, coffee, cocoa, chocolate and other beverages

Condiments and

spices processed

foods

**UNIT-V** **Methods of Cooking, their Advantages and Disadvantages and Effect on Nutritive Value**

Improving Nutritional Quality of

Foods Germination

Fermentation

Supplementation

Substitution

Fortification and enrichment

**REFERENCES:**

Robinson, C.H., Lawler, M.R. Chenoweth, W.L and Garwick' A.E. (1986) :

Normal and therapeutic Nutrition, 17th Ed., Macmillan Publishing Co.

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Hughes, O. Behnion, M. (1970) : Introductory Foods, 5th Edn., MacMillan

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Mosby Co.

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## PRACTICALS

### OBJECTIVES:

1. To acquire skills in food preparation techniques.
2. To use appropriate methods of cooking for preparation of specific food products.

### ANY EIGHT UNITS

- UNIT-1** Use and care of kitchen equipment.
- UNIT-II** Controlling Techniques.
- a. Weights and Measures standard and household measures for raw and Cooked food.
  - b. Cereal and flour mixtures – basic preparations (15+3)
    - i. Boild rice and rice pulao.
    - ii. Chapati, puri, paratha
    - iii. Sandwithes
    - iv. Pastas
    - v. Pancakes, biscuits, cookies, cakes
  - c. Pulses and legumes – using whole dehusked and sprouted
- UNIT-IV** **Vegetables**
- a. Simple salads
  - b. Dry vegetables
  - c. Curries
- UNIT-V** **Fruits**
- Fruit preparations using fresh and dried –stewed fruit, fruit salad.
- UNIT-VI** **Milk**
- a. Porridges
  - b. Curds, paneer and their commonly made preparation.
  - c. Milk based simple desserts and puddings – custards, kheer, ice-cream
- UNIT-VII** **Meat- cuts of meat**
- a. Meat preparations
  - b. Poultry
  - c. Fish
- UNIT-VII** Hard and soft cooked poached, scrambled, fried omelette, egg yolks
- UNIT-IX** **Soups**
- Basic, clear and cream soups
- UNIT-X** **Snacks**
- Pakorras, Cheese toast, upma, poha
- UNIT-XI** **Peanut, chikki, til laddoo**

### REFERENCES:

1. .Robinson, C.H., Lawler, M.R., Chenoweth, W.L. and Garwick A.E. (.1986) : Normal and Therapeutic 'Nutrition, 17th Ed., Macmillan Publishing Co.

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PAPER –II

**INTRODUCTION TO RESOURCE MANAGEMENT ECOLOGY AND  
ENVIRONMENT (Paper Code-0554)**

**Marks 50**

This course deals with the management of resources in-the family with particular reference to mobilizing all the resources for achieving the family goals. It also deals with the factors motivating management and management applied to specific resources. The course intends to create awareness, appreciation and understanding of environment. The major environmental issues and problems are to be critically analyzed for inculcating environmental consciousness among the learners and to help them take individual/ household/community level decision for making the physical environment conducive for family living. The course content has to be taught at an elementary level.

**OBJECTIVES:**

1. To create awareness among the students about, management in the family as well as the other systems.
2. To recognize the importance' of wise use of resources in order to achieve goals.
3. The physical environment and its components and the major.issues
4. The impact of human, activities on environment
5. The action needed for checking environmental threats

**THEORY:**

**UNIT - I Introduction to Management**

Basic concepts of Management

**Purpose of Management**

Achievement of Goals

**Obstacles to the Improvement of Management**

- a. Life style
- b. Type of family
- c. Family size, stage of family life cycle

**UNIT-II Factors Motivating Management**

- a. Goals, definition, types and utility
- b. Values - Importance, sources, of values, . classification, characteristics, changing values
- c. Standards'. - Definition, classification-quantitative, qualitative,

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conventional and non-conventional.

- d. Decision -., Role of decision making in management, resource availability

### **UNIT-III Management Process**

- a. Meaning and elements of process - planning, controlling the plan and evaluating, decision making
- b. Planning - Importance, techniques, types, of-plan
  - i. Controlling the plan in action
  - ii. Phases energizing checking
    - Factors in success of the control step
    - Suitability
    - Promptness
    - New decisions
    - Flexibility
  - iii. Supervisions of delegated plan
    - Types of supervision - direction and guidance
    - Analysis of supervision
  - iv. Evaluation - Importance, relationship to goals
    - Types-informal and formal, overall and detailed
    - Techniques, of self-evaluation
    - Evaluation of the whole process of management

### **Resources in the Family**

- a. Types of resources
- b. Factors affecting the use of resources

### **UNIT-1V Introduction**

Meaning and definition of ecology and environment, scope of the subject.

#### **Land**

as a resource, energy and mineral resources land pollution - sources, domestic waste major health hazards prevention and control.

#### **Water**

Problems and issues: Water pollution and scarcity, pollutants - health hazards and their control

Utility of forests and forest resources, deforestation and its impact, -forest conservation.

#### **Air**

Composition; air pollutants sources, their health hazards, greenhouse effect

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## **UNIT-V    Energy**

Major sources of energy - alternate energy sources and energy conservation measure.

### **Habitat and Population**

Uncontrolled population growth and its impact, control measures.

### **Environmental Education**

Meaning, need and objectives, highlights, role of government, NGOs and educational institutions, national and international agencies.

### **Environmental Protection**

Policies, programmes and legislations

## **PRACTICALS**

### **ANY EIGHT PRACTICALS**

1. Visit to Air Quality Monitoring unit of the Municipal Corporation
  2. Visit to water supply station and sewage plant to study the water supply system and the waste water and sewage disposal.
  3. Identify the Food Chain in our daily life.
  4. Study the water cycle and water distribution on earth.
  5. Study the cooling effects of evaporation.
  6. Study the uses of solar energy
- Practicals of Family resource management of B.H.Sc. Part I of Pt. R.S.S. Uni. Raipur.
7. Decision for various problems, group and individual decision.
  8. Management for a Picnic/party.
  9. Find all minimum and maximum approaches (Vertical & horizontal).
  10. Identification of own goals.
  11. Identification of own values.
  12. Identification of own standards.

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16. Sinha, Rajiv K. (1997) : Reforesting the earth : an insurance for survival. P.213-227 In Environmental crisis and humans at risk : priorities for action. Edited by Sinha, Rajiv K. Ina Shree Publ., Jaipur
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**PAPER - III**  
**INTRODUCTION TO HUMAN DEVELOPMENT & FAMILY DYNAMICS**  
**(Paper Code-0555)**

**Marks : 50**

**FOCUS:**

This is an attempt to guide undergraduate students in understanding of the field of Human Development in a basic way.

A Conscious deviation is taken from the stage-wise approach to the life span so as to make the course more meaningful and to allow for flexibility in understanding human development, as a continuous process. All topics are given a cross-cultural orientation. The major topics covered are An overview of the field; factors important for growth and development; different dimensions of development across the life-span namely, physical and motor, cognition, language, socio-emotional and personality and finally relevant issues in human development and social change.

Techers are encouraged to use the points of emphasis mentioned and culturally relevant examples to stimulate through and participatory discussion. The use of Video-films is also recommended to supplement course content and facilitate discussions. This course purports to create awareness and appreciation for the role and functions of marriage and family as basic institutions. The changing trends, the dynamics of adjustment and contemporary problems and issues are to be critically analyzed for developing better understanding of needs, adjustment areas and intervention strategies.

**OBJECTIVES:**

**The student will –**

1. Acquire knowledge and insights about the dynamics of contemporary marriage and family systems in India.
2. Become

**UNIT-I An overview of the Field of HD & Early childhood care & education.**

- i. What Human Development? Why do we need to student it ? Definition of development and human development with focus on life span nature and context of development, i.e. family and society, variations across cultures, and individual differences in human development.  
(a) Pre- School Centers (b) day caro contres ( c) hobby censer, (d) early stimulation programs, (e) ICDS anganwadis,
- ii. Family and child welfare: (a) family welfare programs, (b) child welfare programs, (c) problems of the care of oldorly, (d) organizations catering to advocacy.

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- iii. Children with special needs : (a) specialized counseling centres (as planner), (b) schools, (c) early intervention, (d) developmental testing.

### **Growth and Development**

- a. Understanding growth and development ( definitions)
- b. General principles of development.
- c. Constraints and facilitators in growth and development ( influences of heredity and environment).
  - Genetic inheritance: ( i) fertilization (ii) Number of chromosomes, (iii) the unique third pair determines sex, (iv) genotype and phenotype, ( v) sex linked genetic effects.
  - Environmental per-requisites: (i) nutrition, (ii) opportunities.
  - Interaction between environment and inheritance: (i) genes provide the predisposition, range and direction of development, (ii) environment determines the extent or limit.
- d. The beginning of a new life
  - Prenatal development and the birth process can be covered by a film Or emphasize major developments during the three stages of inter- uterine development and the stages of the birth process.
  - Prenatal influence's on the child biological risks, age of mother, physical characteristics, illness, diet and nutrition, stress and emotional strains, environmental hazards.
  - Cultural variations in child birth practices.
  - Productive thinking reasoning

## **UNIT-II What is physical and motor development?**

### **Physical Development**

- The new born physical appearance: size, weight, bodily proportions, sensory capacities i.e. hearing, vision, taste, smell,, touch, temperature and position.
- Changes in size, shape, muscles and bones, and brain as it continues through: infancy end of infancy, preschool, middle childhood, adolescent growth spurt (include primary and secondary sexual characteristics and psychological impact of adolescence), plateau in adulthood, decreasing physical abilities in old age.
- Linking physical and motor development.

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- Motor development: reflexes in infancy; major milestones through end of infancy, preschool years, middle and late childhood, adolescence; plateau in adulthood, declining co-ordination in middle adulthood and old age.
- Physical and motor development can be influenced through: (i) Maturation, (ii) nutrition, (iii) monitoring and health. Care, (iv) stimulation, (v) practice.

The Development of Language Across the Life Span .

### **UNIT-III Cognitive Development across the Life Span**

a. What is cognitive development?

- The concept of intelligence
- A brief introduction to Piaget's theory )introduce stages with our much elaboration : sensorimotor stage in infancy concrete operational stage in childhood (changes in remembering the reasoning in middle childhood, formal operations in adolescence, fluid and crystallized intelligence in adulthood, declining cognitive abilities in late adulthood and old age.) Every day cognition: perception, creativity, imagination, productive thinking reasoning.

(Note: The section on cognition is based Piagetian approach. However, it must be taught with emphasis on changing process across life span without using technical terms of the theory.)

### **The Development of Language Across the Life Span**

#### **Language as a form of communication**

- Functions of language: expressing wishes, controlling others, interacting with others, expressing individuality, exploring the world, pretending, using language to communicate/share information, understanding our society and culture, reasoning.
- Communicating before language development i.e. the stages of vocalization : undifferentiated crying, differentiated crying, babbling, Imitation of sound, patterned speech.
- Beginning to use language: one or two word utterances; early sentences; telegraphic speech; understanding metaphors, similes, irony, reflecting on superficial and deeper level meanings of sentences.
- Uses of language; conversational acts (non-verbal) conversational

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conventions, learning to listen.

- Language is refined through middle, late-childhood and puberty; language linked to academic skills, cognition and thought.
- Language development can be influenced through : (i) maturation, (ii) Stimulation
- Deviations in language development: in language development: Possible decline of language in the aged, (speech- impairment and disorders to be introduced briefly).

(Note: While teaching this topic emphasizes variations in language

Development – for example, by gender and socio-economic strate etc. Also

Introduce issues of bilingualism and multilingualism.

#### **UNIT-IV** Socio-emotional Development across the Life Span

a. Understanding social and emotional development

b. Social development :

- Introduce socialization as an important part of the process of becoming human.
- Social milestones: beginning with the emergence of the social smile; attachment, separation, anxiety, acquiring sex roles in childhood, induction into occupational roles by adulthood, social isolation and consequences in late adulthood and in the elderly.
- Patterns and role of parent-child interactions, interactions with siblings and peers; social and cultural interactions through infancy to old age.

c. Emotional development

- Emotions serve two adaptive functions: (i) motivating and (ii) communication.
- Basic emotional reactions (joy, fear, jealousy, anger, sadness, aggressions)
- Components of emotion : (i) emotions are elicited by the context, (ii) include bodily activity, (iii) emotional expressions are made through facial expressions, bodily movements, vocalization, (iv) labeling emotions. Emotions may be acquired as a result of/by the Influence of - (i) internal and

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external sources, (ii) cognition, (iii) learning and (iv) social reinforcement.

- Milestones of emotional development through infancy and childhood emotional confusions and adolescence, stability of emotions in adulthood and old age.
- Emotional problems: (i) depression, (ii) over-activity, (iii) aggression.

### **Personality Development across the Life Span**

- a. What is personality?
- b. How personality develops across the life span: temperament and sense of self in infancy and childhood, identity development in adolescence, crystallization of identity by late adolescence and early adulthood, stability versus personality change in adulthood and old age.
- c. Personality may be influenced by: (a) heredity, (b) environment (parenting styles, peer groups, social interactions, early childhood experiences, life events, support available in a community etc.)
- d. The role of social norms in personality development. Deviant personalities : (juvenile delinquency in childhood and anti-social personalities in adulthood)

## **UNIT-V**

### **Marriage**

- a. Marriage as an institution: goals, rituals, functions, changes and challenges.
- b. Mate selection: factors influencing, considerations of exogamy and endogamy, changing trends, arranged and personal choice of mates.
- c. Preparation for marriage, social emotional issues, financial concerns and exchanges, guidance and counseling.
- d. Marital adjustment, areas and factors influencing: Planned Parenthood.

### **Families with Problems**

- a. Families with marital disharmony and disruption, dimension, casual factors.
- b. Families in distress, violence and abuse, dowry victimization, violence against women.

### **Interventions for Families in Trouble**

- a. Scope, needs and assessment
- b. Counseling premarital and marital
- c. Welfare and rehabilitation policies and programmed
- d. Public awareness and education programmers

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## PRACTICALS

### Introduction to Human Development and Family Dynamics

1. Visit to a pediatric ward to observe a new born baby and a premature baby.
2. Preparing a growth average height weight chart of five (5) children from one to (1 -3) years.
3. Study of immunization schedule.
4. Survey of parents regulative awareness about weaning food, toys; clothes.
5. Preparation of baby Kit- Baby carry bag, bib, Jhabla.

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**PAPER - IV**  
**INTRODUCTION TO TEXTILES & CLOTHING**  
**(Paper Code)**

**Marks: 50**

**FOCUS:**

- A. Variety in clothing depends on variety in textiles. Though very few textiles were known to man earlier, presently, he is seeing newer textiles each one superseding the other. Their performance is also varying. IT is essential for a student to have some basic knowledge of these textiles to select the right kind of fabric for a specific end use.

Clothing is important for protection, comfort, personality and growth in relevant age groups. The course should be dealt with, keeping in view the activities of the concerned age group with consideration for safety, ease of care and comfort.

Clothing is important for protection, comfort, personality and growth in relevant age groups. The course should be dealt with, keeping in view the activities of the concerned age group with consideration for safety, ease of care and comfort.

**B. OBJECTIVES:**

1. To enable students to -
2. To acquaint with proper notion regarding choice of fabrics.
3. To develop skills in clothing construction.
4. Acquaint with the different textiles and their performances.
5. Impart knowledge on different textile finishes.

**OBJECTIVES:**

1. To acquaint with proper notion regarding choice of fabrics.
2. To develop skills in clothing construction.

**UNIT-I Classify citation of Textiles:**

- a. Introduction to and classification of textiles, Terminology in textiles
- b. History, composition, types, production, properties and uses -
- c. Cotton, Linen, Wool, Silk, Rayon, Polyamide, Polyester and Acrylic fibers.

**UNIT-II Study of Yarns:**

Methods of spinning, making of spinning, making of sewing thread, simple, novelty, metallic and texturized yarns, stretch, core spun, bi and multi component yarns - characteristics. Yarn numbering systems (Cotton count, Denier, tex-conversion from one to the other).

**UNIT-III Finishes**

- A. Physical - Singeing, napping, brushing, shearing, sizing, shrinking, tendering, calendaring's, etc.
- B. Chemical - bleaching, mercerizing, etc.
- C. Special purpose finishes - wrinkle resistant, water resistant and repellent, flame retardant, durable press, soil release and resistant, ant piling, dyeing and printing, etc.

**UNIT-IV Equipment**

Equipment and supplies used in clothing construction, their maintenance, and problems faced remedies with specific reference to sewing machine.

**Select ion of Fabrics**

Factors influencing selection of fabrics, budget, age, season, occupation, igure, fashion, occasion etc.

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## **UNIT-V Principles of Clothing Construction:**

General Principles of clothing construction. Drafting and making paper patterns. Taking body measurements for different types of garments. Preparation of fabrics for garment making. Laying out of patterns, cutting and marking.

### **PRACTICALS**

1. Identification of Textile Fibers  
Visual, Microscopic, burning and chemical
2. Identification of Yarn types
3. Identification of weaves and their variations
4. Sample collection for weaves and finishes and Identification
5. Sewing Techniques  
Sewing techniques: Basic stitches, seams and seam finishes, fullness, placket, fasteners, simple collars.
6. Garment Construction  
Drafting, cutting and stitching of simple garments, such as vest and bib.

A-

Line Dress and knickers. Sun suit/romper.

### **REFERENCES:**

1. Corbman, B.P. (1985): Textile Fibre to Fabric, McGraw Hill, New York.
2. Hollen, N. and Saddler, J. Textiles Latest Edn., Mac Millan & Co., New York.
3. Joseph, M.L. (1976): Essentials of Textiles, Holt Ripenhart of Winston, New York.
4. Joseph, M.L. (1972): Introductory Textile Science, Holt Ripenhart of Winston, New York.
5. Tortora, P.G. (1978): Understanding Textiles, New York, Mac Millan Publishing Inc.
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7. Anna Jacob (1993): Art of Sowing - UBS PD, New Delhi.
8. Bane, A. (1974): Tailoring, McGraw Hill Publication, New York.
9. Readers Digest (1982): Complete Guide to Sewing, Association Inc. New York, New Delhi.
10. Savitri Pandit (1957): Mnuual for Children's Clothing,. Orient Longman.

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## **PAPER-V**

### **COMMUNITY DEVELOPMENT PERSPECTIVE AND APPROACHES**

#### **SOCIO ECONOMIC ANALYSIS OF COMMUNITIES**

**(Paper Code-0557)**

**Marks: 50**

#### **FOCUS:**

The focus of the course is on the evaluation of approaches to community development in general and in our country in particular. The course focuses on the structure of rural and urban communities, the systems comprising of interacting structures and interlocking of these to form the existing society. It will also indicate the relationship of social change to changes in the structures and systems that exist. It is expected to help students to orient themselves to be part of the development process.

#### **OBJECTIVES: To enable students to**

1. Be aware of the approaches to development
2. Develop faith in the capacity of the people, to take responsibility for their own development.
3. Understand the existing support structures for development efforts.
4. Understand the role of non Govt. organizations in community development.
5. Understand the socio - economic structures and systems that make up the rural and urban communities.
6. Understand the meaning of social change through development plans and programs in the context of the exiting socio-economic structures and systems.
7. Recognize one's own role in the development process.

#### **UNIT-I Development:**

- a. Definitions, types - large scale and centrally planned and small scale and locally planned.
- b. Goals, the purpose of development - processes of development - the input process and social action process.

#### **Historical Perspective of Development Approaches:**

- a. The Capitalistic approach.
- b. The welfare approach
- c. The Gandhian approach
- d. The modernization approach
- e. The institutional and social justice approach

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**Critical Development Issues:**

- a. Massive poverty
- b. Food security

**Community Development in India:**

- a. Evolution of community development programme in India since Independence.

**UNIT-II Support structures and their Functions:**

- a. Central Social Welfare Board
- b. State Social Welfare Board
- c. National Level Voluntary Agencies such as CAPART, KVIC.
- d. Elected Panchayats.

**Community Development Programme Approaches:**

- a. Multi-purpose
- b. Target group
- c. Growth centered
- d. Area
- e. Minimum needs
- f. Antyodaya
- g. Integrated

**Home Science and Community Development:**

Scope of Home Science Extension for meaningful participation in community development in India

**UNIT-III Introduction to Social Structures and Systems-Framework for Analysis –**

- a. Meaning and Systems of Organization
- b. Relationship between Social Systems
- c. Types of Society - Harmonic – Disharmonic

**Analysis of Family as a Social Unit –**

Type(s), average size (Micro/Macro), marriage, distinct social roles and nature of relationships between members of the family; internal distinction in authority based on age and sex roles, gender differences with reference to activities and access to resources. Emerging patterns of familial organization influenced by broader economics and political forces - female headed households.

**Analysis of Social Relations of Groups Social Stratification -Caste System (Micro/Macro)**

Differential ranking of groups as superior and inferior caste-groups; changes that have taken place/expected; abolition of untouchability, inter-caste collaboration, fusion of sub-castes; impact of reservations; social inequalities - extent of acceptance or opposition.

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#### **UNIT-IV      Poverty Analysis (Micro/Macro)**

The number and proportion of poor (in general and with reference to gender in particular) prevalence of hunger and malnutrition, availability and accessibility to drinking water and sanitation facilities, health facilities, clothing and housing facilities, education facilities. Unemployment pattern and indebtedness; causes of poverty and inequalities; programs for poverty alleviation. Poverty line.

#### **Social Relations in Religion and Culture (Micro/Macro)**

- a. Religions represented - the role of religion in the lives of people.
- b. Popular expression of beliefs and attitudes that promote fatalism or confidence in themselves.
- c. Religious and cultural customs and organizational patterns that oppose the values of social justice, equality, liberty and solidarity.

#### **UNIT-V      Analysis of Social Relation to Environment (Micro/Macro)**

- a. Customs, mores, rules, regulations that are eco-friendly and that are not eco-friendly.
- b. Changing patterns of production and consumption-organic farming, soil and water conservation measures, recycling of wastes, use of bio-degradable articles etc., impact of these in the communities

#### **Gender Analysis –**

- a. The concept of Gender as distinct from sex.
- b. The division of labor.
- c. Access and control of resource.
- d. Changes in the means of gaining access to resources

#### **Approaches and Methods of Socio-Economic Analysis-**

- a. Rapid Rural Appraisal
- b. Participatory Rural Appraisal
- c. Surveys, case studies, observation
- d. Participant observations.

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## PRACTICALS

### Field Experience in Village(s) / Urban Slums

- a. Practical use of RRA / P RA Methods
- b. Reporting on Socio-economic analysis of the rural / urban community
- c. To select, Plan, preparation. & use of different-audio visual aids., aids,  
i.e. Chart - Educational, Tree Chart, Flow.  
Chart., Suspense Chart.-  
Posters - Cartoons Pemphlets Puppets.
- d. Conduct of survey based on Unit IV & V of Theory Papers, (any two)
- e. Organising group demonstration.

### REFERENCES:

- Desrochers, John (1977): Methods of Sociotal Analysis, Bangalore, India Contre for Social Action.
- Desrochers, John (1980): Casto in India Today, Bangalore, India, Centre for Social Actions. Desrochers, John (1984): Classes in India Today, Bangalore, India, Centre for Social Action. Dietrich, Gabriele (1978) : Culture, Religion and Development, Bangalore, India, Centre for Social Action.
- Desrochers, John (1984) : India's Search for Cevelopment and Social Justice, Analysis of Indian Society. The Development Debate, Bangalore, India, Centre for Social Action. Dhurate, Barreto (1984): India's Search for Development and Social Justice, Analysis of Indian Society. The Indian. Situation, Bangalore, India, Centre for Social Action. Chamber, Robert (1.992): Rural Appraisal, Rapid, Relaxed and Participatory, Discussion paper, 311, IDS, Sussex University, Brighton, BNI 9E, England.
- Mukherjee, Neel (1992): Villagers' Perception of Rural poverty through the Mapping methods of participatory Rural appraisal or participatory Learning Methods: PRA / PALM Series, No. 2, Service Road, Domlur Layout, Bangalore - 560071.
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- Desai, Vasant (1990) A Study of Rural Economics - Systems Approach, New Delhi,

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Mann, Peter H. (1985) : Methods of Social Investigation, Basil Blackwell. Oakley, Peter and David, Marsden (1984): Approaches to Participation in Rural Development - Published on behalf of the ACC Task Force of Rural Development, Geneva, and International Labour Office.

### **JOURNALS:**

Changing Villages, PPS Gussain for Consortium on Rural Technology, D-320 Laxmi Nagar, New Delhi -110 092.

Journal of Rural Development, The National Institute of Rural Development, Rajendranagar, Hyderabad - 500 029.

Social Welfare, Central Social Welfare Board, Samaj Kalyan. Bhavan, B-12, Tana Crescent, Institutional Area, South of IIT, New Delhi- 110 016.

KUrukshetra, Director, Publications Division, Ministry-of I & B, Government of India,

Patiala House, New Delhi - 110 001.

Yojana, Director, Publication Division, Patiala House, New Delhi - 110 001.

### **REFERENCES:**

1. Rogers, Alan (1992): Adults Learning for development, Cassette published in association with Education for Development, London.
2. Descrochers, John (1998): India's Search for Development and Social Justice: Analysis of Indian Society - 1. Development Debate, Centre for Social Action. Bangalore, India.
3. Duarata, Barreto (1984) : India's Search for Development and Social Justice L Analysis of Indian Society - 2. Indian Situation Centre for Social Action, Bangalore, India.
4. Staley John (1982) : People in Development : A Training Manual for Groups, SEARCH, Bangalore India.
5. Desai, John (1982) : Rural Development (Volumes 1-6) : Programs and Strategies, Himalaya Publishing House, Bombay.
6. Patnayak, Rama (1990) : Rural Development in India, Anmol Publications, New Delhi.
7. Reddy A. (1987) : Extension Education. Sri Lakshmi Press, Bapatla.
8. Baidyanath, Misra (1991) : Poverty, Unemployment and Rural Development, Himalaya Publishing house, Bombay.
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**PAPER - VI**  
**PERSONAL EMPOWERMENT & COMPUTER BASIC (Paper Code-0558)**

**Marks: 50**

**FOCUS:**

This course is designed to create awareness and understanding of the need for empowerment and motivating the student towards higher goals and challenges of self-improvement. The focus is on the adolescent moving towards making choices, developing competencies and skills for handling responsibilities of self-growth and interpersonal relationships in personal and professional spheres. The thrust of this course must be in the Indian context, creating pride in and respect for cultural heritage and values. The teaching approach should be truly a "facilitator"- convinced and committed to the cause of empowerment of youth.

The Purpose of inclusion of this course must be viewed as "offering opportunities, motivation, information and skills" for enhancing the total outlook (perspectives) of the young student particularly girls. Hence the thrust is on development, women and the concept of Home Science education as holistic education with interface (and integration) of professionalism and qualitative development of individuals and families. The teacher (facilitator) for this course must share such an- outlook and be oriented towards the same to be really effective. Also the typical examination oriented approach should be replaced by promoting dynamism, visionary zeal and motivational ethos in the classroom.

This course is designed to give basic inputs to students on Computers and their functioning and hands-on experience.

The awareness of the basic applications of computers as the tool for education, information and research is to be created and emphasized. The teaching learning process should include demonstrations and hands-on experience for all the students. Individuals, families and community.

  
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## OBJECTIVES:

The student will

1. become aware of the need, competencies and skills to be developed for empowerment and be motivated for self-improvement/self-enhancement.
2. become aware of the role of empowerment of women from the perspectives of personal and national development;
3. become aware of the inter disciplinarily of Home Science education and its potential for personal and professional enhancement.
4. become sensitized to some pertinent contemporary issues that affect the quality of life of individuals, families and community.
5. know the basics of computers;
6. to be able to use computers for education, information and research.

## NOTE:

Practical based and participatory teaching-learning methodology to be utilized: not conventional lectures. Dynamism on the part of the teacher is essential for successful outcome of the course.

## THEORY:

### UNIT-I **Personal Growth and Personality Development** (through exercises, role play, discussions)

- a. The challenge: understanding and managing oneself: being aware of one's strengths and weaknesses.
- b. Personality Development: Factors and influences: emotional and motivational aspects; assertion vs. aggression.
- c. Peer pressures: Issues and management; group conformity and individualism as co-existing aspects.
- d. Conflicts and stresses, simple coping strategies.
- e. Adjustment and readjustment to changing needs and conditions of contemporary society (technological changes, social changes, changes in values)

### UNIT-II **Empowerment of Women**

- a. Women and Development: The personal, familial, societal and national perspectives.
- b. Capacity building for women: Education, decision-making abilities and opportunities, awareness and information on legal and political issues.
- c. Women's organizations and collective strength: Women's action groups, women's participation in development initiatives.
- d. Study and discussion of life histories, case studies of illustrious Indian women from different walks of life (eg. Indira Gandhi, Jhansi ki Rani, Medha Patkar, Kiran Bedi, Vijayalaxmi Pandit, Sudha Chandran, Anutai Wagh, Ha Bhat, Bhanvari Devi)  
Brief sketches/ profiles of women's organization and collective and activist efforts to improve the quality of life or tackle issues of concern

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(e.g. SEWA, Women's co-operatives, WIT).

**Note:** Students must be sensitized and made aware through assignments to identify and study the contributions of women in their own regional areas as also in the context of national perspectives. Cases of individual and collective / organized women's strengths must be discussed with examples from local / regional / levels. Each student may prepare profiles of one individual and one collective group.

### **UNIT-III Home Science Education as Empowerment**

1. The inter disciplinarily of Home Science Education.
2. The role of Home Science Education for personal growth and professional development.
3. Home Science as holistic education with integration of goals for persons, enhancement and community development.

### **UNIT-IV Some Significant Contemporary Issues of Concern**

- a. Gender issues: inequities and discriminations, biases and stereotypes; myths and facts.
- b. Substance abuse: Why and how to say no.
- c. Healthy Habits: In relation to physique, to studies, to heterosexual interests.
- d. AIDS: Awareness and education.

**Note:** Teachers/facilitators must be knowledgeable and equip themselves sufficiently; orientations/training sessions for facilitator.

### **UNIT-V Computer Fundamentals:**

- a. Overview about computers
- b. Components of a computer
- c. Input/output devices
- d. Secondary storage devices
- e. Number Systems : Decimal, Binary, Octal, Hexadecimal
- f. Representation of information : BCD, EBCDIC, ASCII
- g. Representation of Data : Files, Records, Files
- h. File organization and access
- i. Security and safely of data.
- j. Introduction to Operating Systems.

### **REFERENCES:**

1. Adair, J. (1992) : The action Cenytrrod Loaders, Bombay, Jaico Publishing House.
2. Antony, M.J. (1989) : Women's Rights, New Delhi, Hind Pocket Books Pvt. Ltd.
3. Bhattacharya, R. (1987): Career Management: A NEw Challenge, Vol. I, New Delhi Enkg.
4. Chandrashekhar R. (1992) : (Ed) Women's Resource and National Development - A Perspective, New Delhi; Gaurav Publishing House.
5. Chandra A.A. Shah and U. Joshi (1989): Fundamentals of Toaching Home Science, New Delhi; Sterling Publishers Pvt Ltd.
6. Feldman, R. (1987) : Understanding Psycholoty, New York; McGraw Hill Co.

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8. Gore, M.S. : Indian Youth; Frocesres of Socialization New Delhi, Vishwa Yuvak Kendra.
9. Garmwood, C. and Poppte Stone, R. (1993): Women Management and Core, Hong Kong; The Macmillan Press Ltd.
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11. Hatcher, J.M. and Halchin, C. (1973) : The Teaching of Home Economics, Boston Houghton mifflin Co.
12. Hick, H. (1980) : Towards Better Teaching of Home Economics, New York; Macmillan Publishing Co.
13. Kakkar, S. (1997) : Identity and Adulthood, Bombay Oxford Press.
14. Khandwala, P. (1984) : Fourth Eye : Excellence through Crativity. Allahabad : A.H. Wheeler.
15. Rathur, S. and Brid, J. (1983) : Adjustment and Growth : The Challange of Life New York : C.B.S. College Publishing Co.
16. Singh H.N. (1992): Sky is the Limit: Practical Guids Lines on.Effective Career Planning, Bombay : Bombay Schandra Publications.
17. Sargent, A. (1995) : How to Motivate People ; Turning People On, Bombay : Jaico Publishing House.
18. Verma, N. (1986): Leadership Styles in Interpersonal Perspective, Delhi: B.R. publishing.

**Note : Suggested References unit-wise are as under**

For Unit – I	:	Ref. 1, 3, 6, 7, 8
For Unit-II	:	Ref. 2, 4, 9, 10, 17, 18
For Unit-III	:	Ref. 11, 12, 5
For Unit – IV	:	Ref. 1, 8, 18, Newspapers and Magazines


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**PAPER - VII**  
**PRACTICALS - COMPUTER BASICS**

1.
  - a. Introduction
  - b. Exploring the Desktop
  - c. Running multiple programmers
  - d. Accessories
  - e. Control Panel
  - f. Managing Documents and Folders
2. **MS Word**
  - a. Starting MS-WORD
  - b. Creating and Formatting a document
  - c. Changing Fonts and Point Size
  - d. Table Creation and operations
  - e. Autocorrect, Auto Text, Spell Check, Thesaurus
  - f. Word Art, inserting objects
  - g. Mail merge, letter, label, envelope
  - h. Page set-up, Page preview
  - i. Printing a document
3. **MS-Excel**
  - a. Starting Excel
  - b. Work Sheet, Cell, Inserting Data into Rows/Columns
  - c. Alignment, Text-wrapping
  - d. Sorting data, Auto sum
  - e. Use of functions, referencing formula cells in other formulae
  - f. Naming cells and ranges, Goal seek
  - g. Generating graphs
  - h. integrating Worksheet, data and charts with WORD
  - i. Creating Hyperlink to a WORD document
  - j. Page set-up, Print Preview, Printing Worksheets.
- 4 **Internet**
  - a. Genesis and use of Internet
  - b. Software and hardware requirements for Internet
  - c. Accessing the Internet, Web Page, Using a Search Engine, Accessing the Internet from MS-Office applications

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# **DURG VISHWAVIDYALAYA, DURG (C.G.)**

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## **SCHEME OF EXAMINATION & SYLLABUS Of B.Sc. (Home Science) Part-2 Annual Exam**

**UNDER  
FACULTY OF SCIENCE  
Session 2017-18**

**(Approved by Board of Studies)  
Effective from July 2017**



B.SC.HOME SCIENCE

II<sup>ND</sup> YEAR

2017-2018

*Asst. Prof.*  
22-07-17

*Don*  
22-7-17

*Devi*  
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*P. Singh*  
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## MARKING SCHEME OF B.SC (HOME SCIENCE) PART – II

Group No.	Paper No.	Subject	Theory M.Marks	Practical M.Marks	Theory M.Mark	Practical M.Mark
<b>I</b>	<b>(A)</b>	Environmental Studies	<b>75</b>			
		Field Work	<b>25</b>		<b>33</b>	
		Foundation Course				
	<b>(B)</b>	English Language	<b>75</b>		<b>26</b>	
	<b>(C)</b>	Hindi Language	<b>75</b>		<b>26</b>	
<b>II</b>	<b>(A)</b>	Nutritional Management in Health and Diseases	<b>50</b>	<b>25</b>	<b>33</b>	<b>09</b>
	<b>(B)</b>	Textile and Laundry Science	<b>50</b>	<b>25</b>		<b>09</b>
<b>III</b>	<b>(A)</b>	Community Nutrition and Applied life Sciences	<b>50</b>	<b>25</b>	<b>33</b>	<b>09</b>
	<b>(B)</b>	Communication Process	<b>50</b>	<b>25</b>		<b>09</b>
<b>IV</b>	<b>(A)</b>	Life Span Development	<b>50</b>	<b>25</b>	<b>33</b>	<b>09</b>
	<b>(B)</b>	Consumer Economics	<b>50</b>	<b>25</b>		<b>09</b>

## B.SC (HOME SCIENCE) PART - II DISTRIBUTION OF MARKS IN VARIOUS PRACTICALS

No.	Name of the Practical	Total Marks	Distribution			Marks
			Sessional	Viva	Practical	
01.	Nutritional Management Health & Diseases	<b>25</b>	<b>05</b>	<b>05</b>	Planning Cooking + Presentatio	<b>08</b> <b>07</b>
02.	Textile and Laundry Science	<b>25</b>	<b>05</b>	<b>05</b>	Stain Removal Tie & Dye Printing	<b>05</b> <b>05</b> <b>05</b>
03.	Community Nutrition and Applied life Sciences	<b>25</b>	<b>05</b>	<b>05</b>	Spotting Blood Practical'	<b>10</b> <b>05</b>
04.	Communication Process	<b>25</b>	<b>05</b>	<b>05</b>	Preparation of Audio Visual Aids - 2	<b>15</b>
05.	Life Span Development	<b>25</b>	<b>05</b>	<b>05</b>	Practical	<b>15</b>
06.	Consumer Economics	<b>25</b>	<b>05</b>	<b>05</b>	Practical.	<b>15</b>

आधार पाठ्यक्रम  
(पेपर कोड 0841)

प्रश्न पत्र – प्रथम

पूर्णांक – 75

हिन्दी भाषा

खण्ड – क निम्नलिखित 5 लेखकों के एक-एक निबंध पाठ्यक्रम में सम्मिलित होंगे— अंक – 30

1. महात्मा गांधी – सत्य और अहिंसा
2. विनोबा भावे – ग्राम सेवा
3. आचार्य नरेन्द्र देव – युवको का समाज में स्थान अंक – 20
4. भागवतशरण उपाध्याय – हिमालय की व्युत्पत्ति
5. हरि ठाकुर – डॉ. खूबचंद बघेल

खण्ड – ख हिन्दी भाषा और उसके विविध रूप अंक – 25

- कार्यालयीन भाषा
- मीडिया की भाषा
- वित्त एवं वाणिज्य की भाषा
- मशीनी भाषा

खण्ड – ग अनुवाद व्यवहार : अंग्रेजी से हिन्दी में अनुवाद

हिन्दी की व्याहारिक कोटियां—

रचनागत प्रयोगगत उदाहारण, संज्ञा, सर्वनाम, विशेषण, क्रिया विशेषण, समास, संधि एवं संक्षिप्तियां, रचना एवं प्रयोगगत विवेचन।

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ENGLISH LANGUAGE

M.M. 75

(Paper Code - 0842)

The question paper for B.A./B.Sc./B.Com./B.H.Sc., English Language and cultural values shall comprise the following units :

UNIT-I	Short answer questions to be asked by (Five short answer questions of three marks each)	15
	Marks	
UNIT-II	(a) Reading comprehension of an unseen passage (b) Vocabulary	05 Marks
UNIT-III	Report-Writing	10 Marks
UNIT-IV	Expansion of an idea	10 Marks
UNIT-V	Grammar and Vocabulary based on the prescribed text book.	20+15

Marks Note:

Question on

all the units shall be asked from the prescribed text which will comprise Specimens of popular creative/writing and the following in any

- a) Matter & technology
  - i. State of matter and its structure
  - ii. Technology (Electronics Communication, Space Science)
- b) Our Scientists & Institutions
  - i. Life & work of our eminent scientist Arya Bhatt. Kaundharak Shusruta, Nagarjuna, J.C. Bose and C.V. Raman, S. Ramanujam, Homi J. Bhabha, Birbal Sahani.
  - ii. Indian Scientific Institutions (Ancient & Modern)

**Books Prescribed:**

Foundation English for U.G. Second Year -Published by M.P. Hindi Granth Academy, Bhopal.

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**GROUP – II**  
**PAPER - A**

**M.M. 50**

**NUTRITIONAL MANAGEMENT IN HEALTH & DISEASES (Paper Code-0573)**

**Focus:** The course encompasses the various stages of the life cycle and how nutrition is critical at various stages. It briefly familiarizes students with the role of nutrition in common elements.

**Objectives:** This course will enable to students to -

1. Understand the concept of an adequate diet and the importance of meal planning.
2. Know the factors affecting the nutrient needs during the life cycle and the RDA-for various age groups.
3. Gain knowledge about dietary management in common ailments.

**THEORY**

**UNIT-I**

**Definition of Health & Nutrition**

Dimensions of Health (Physical, Psychological emotional & Spiritual)

**Energy Requirements - Factors affecting energy requirements**

BMR, Activity, age, climate, diet - induced thermogenesis (SDA physiological conditions.

**Concept of nutritionally adequate diet and meal planning**

- (a) Importance of meal planning
- (b) Factors affecting meal planning  
-Nutritional, Sociocultural, Religious, Geographic, Economic Availability of time.

**UNIT-II**

Nutrition through the life cycle –  
(At different activity and Social economic levels) requirements, nutritional problems, food selection.

- (a) Adulthood
- (b) Pregnancy
- (c) Lactation
- (d) Infancy
- (e) Pre-School
- (f) Adolescence
- (g) Old age

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### UNIT-III

Principles of diet therapy

- (A) Modification of normal diet for therapeutic purposes, full diet, soft diet, Fluid diet, Bland diet. Energy modification and Nutrition for weight management- Identifying the overweight and obese factors contributing to. Obesity Prevention & treatment, low energy diets. Under weight - aetiology and assessment, high energy diet. Diet for Febrile conditions & surgical condition. Nutritional Anemia  
Fevers – Typhoid

### UNIT-IV

Etiology, Symptoms & diet management of the following -Diarrhoea, Constipation, Peptic ulcer, Jaundice, Viral Hepatitis, Cirrhosis, Arthritides, Gout.

### UNIT-V

Diet in disease of the endocrine –

Pancreas - Diabetes mellitus - classification, symptoms, diagnosis, Dietary case & Nutritional, management of diabetes mellitus. Insulin Therapy, Oral Hypoglycemic agents, special dietetic food, sweetness & Sugar substitutes, Diabetic coma, Juvenile Diabetes.

Diseases of the cardiac vascular system –

Atherosclerosis Etiology & Risk Factors.

Hypertension - Etiology, prevalence Nutritional management & prevention.

Renal diseases - Etiology, characteristic,

Symptoms & Dietary management of Glomerulonephritis Acute & Chronic

### REFERENCES:

1. Krause, M.V. and Mohan, L.K. 1986: Food, Nutrition and Diet Therapy, Alan R. Liss, Saunders Co., London.
2. Passmore, R. And Davidson, S. 1986 : Human Nutrition and Dietetics, Livingstone Publishers.
3. Robinson, OH. Laer, M.R. Chenoweth, W.L. Ganwick, A.E. 1986: Normal and Therapeutic Nutrition, MacMillan publishing Company, New York.
4. Williams, S.R. 1989: Nutrition and Diet Therapy, 4th Ed., C.V. Mosby Co.
5. Shils, M.E. Olson, J. A. Shike, M. Eds. 1994: Modern Nutrition in Health and Disease, 8th edn., Lea and Febiger a Waverly Company.

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## PRACTICALS

Planning-S Preparation of Normal and Therapeutic diet in relation to special. Nutrient requirements (Any 15)

1. Adult
2. Pregnancy
3. Lactation
4. Constipation
5. Diarrhea
6. Obesity
7. Underweight
8. Peptic Ulcer
9. Jaundice
10. Viral Hepatitis
11. Cirrhosis
12. Acute glomeruli nephritis
13. Chronic glomeruli nephritis
14. Diabetes mellitus
  - (i) With Insulin
  - (ii) Without insulin
15. Hypertension
16. Atherosclerosis
17. Anemia

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**GROUP- II PAPER – B**  
**TEXTILE & LAUNDRY SCIENCE (Paper Code – 0574)**

M.M. 50

**UNIT-I**

Introduction,  
Classification and Introduction to Laundry process  
(i) Wet and  
(ii) Dry cleaning  
Materials and equipment in laundry  
Water- Hard & Soft water  
Temporary and permanent hardness. Problems caused by hard water. Methods of softening water.  
Soaps and Detergents - Definition, Chemical nature, manufacture, Properties and their cleaning action.  
Balance - Classification commercial Products, application of bleaches to various fibre fabrics.

**UNIT-II**

Additives used in laundry  
Optical brightness blueing agent vs. fluorescent whiteness.  
Starches, Stiffening's and Softeners  
Various types and their characteristics, method of application.  
Additional laundry Agent  
Acidic, alkaline and others.  
Principles of Laundering  
Hand washing methods, types & uses.

**UNIT-III**

Dry Cleaning  
Technology - agents – classification  
Stain Removal. Classification of stains, Principles of removal. Types of stain removals.  
Techniques of removal,  
Preservation and storage  
Apparel & household linen.  
Disinfection of cloths  
A brief study of different types of dyes and their applicability to different fibers.

**UNIT-IV**

Difference between dyeing and printing, methods of dyeing, methods of printing

**UNIT-V**

Style of dyeing - Direct, resist and discharge styles involving varying dyed effects.  
Fiber, yarn and fabric dyeing

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### **PRACTICAL'S - (ANY EIGHT)**

Printing - Block, screen, tie & die, stencil printing. -.

1. Stain Removal
2. Laundering of cotton, rayon silk wool & synthetics etc.
3. Bleaching & whitening
4. Starching
5. Care of household linen
6. Simple dyeing of different fabric.
7. Tie and Dye techniques
8. Batik
9. Finishing of fabric before dyeing & printing, Scoring, bleaching, Desizing.

### **REFERENCE:**

Course: Introduction to Fashion Illustration

1. **Tate, S.L.**, Edwards, M.S. 1987: The complete Book of Fashion Illustration, New York, Harper & Row Publications, 2nd Edn.
2. Allen, Anne & Seaman, Julian: Fashion drawing: basic principles, B.T. Batsford, London, 1993, 108p.
3. Barnes Colin: Fashion Illustration, Macdonald, 1988.
4. Chowdhry, Sonia : A Unique phenomenon : understanding the dynamics of fashion, Clothesline 11 (11) Nov. 1998 p. 75-77
5. Ewing, Elizabeth: History of twentieth century fashion, Elizabeth Ewing, London, 1974, XI, 300P.
6. Ireland John Patrick 1976: Drawing and Designing Men's Wear, London B.T. Branford Ltd.

### **UNDERGRADUATE HOME SCIENCE**

1. Ireland John Patric 1976: Drawng and designing Children's and teenage fashions, London, B.T. Bradford Ltd.
2. Ireland John Patric 1975 : Basic Fashion Design, London, B.T. Bradford Ltd.-
3. Ireland John Patreck: Encyclopaedia of Fashion details, London, B.T. Bradford Ltd.
4. Jindal, Ritu : Handbook for fashion designing : best drafting techniques. Mittal

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Publ., New Delhi, 1988, XIII 142p.

5. Krthryn Mekelively and Joininc Munstrov : Illustrating Fashion, Blockwell Science Ltd. 1997.
6. Ptrick John Ireland: Fashion Design Illustration, B.T. Batsfool, London.
7. Peacock, John : Fashion Sourcebooks : the 1970s, Themes and hudson, London, 1997, 64p.(eng)
8. Patric John Ireland: Introduction to Fashion Design, B.T. Batsfond, London-.
9. Stecker, Pamela: The Fashion design Mamillan, South Yarra, 1996, VIII 294p.

#### **UNIT-V Introduction to use of different laboratory dyeing machines**

##### **REFERENCES:**

1. Cockett, B.R. 1964: Dyeing & Printing, London, Sir Issac Pitman &. Sons Ltd.
2. Faulkher Ray & Faulkner Sarah 1975: inside Today's Home, Rinehart & Winston.
3. Gohl & Vilensky 1987: Textile/Science, Delhi BCS, Publishers & Distributors.
4. Grossicki, Watson's 1975 : Textile Designn and colour, Butterworth & Company,
5. Pandit Savitri and Patel Saroj 1970: Tie and Dye and Batik techniques for all, Baroda, Faculty of Home Science.
6. Shenai, V.A. 1973: chemitstry of Dyes and Principles of Dyeing, Ahmedabad, Textile Book Sellers & Publishers.
7. Shenai; V.A., 1977: Technology'of Dyeing, Technology of Textile Processing, Vol VI. Bombay Sevak Publication.
8. Story Joyee 1974: The Thames and Hundon, Mannuai of Textile Printing, London, Thames & Hudson Ltd.
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## GROUP –III

### PAPER –A

M.M. 50

## COMMUNITY NUTRITION & APPLIED LIFE SCIENCES (Paper Code-0575)

### UNIT-I

An Introduction of physiology & Anatomy

A. Structure & Functions of cell & Tissues

B. Cardiovascular System

- Blood and its composition & Functions
- Coagulation of blood
- Blood group
- Structure and functions of Heart, Blood vessels
- Heart rate, Cardiac output blood pressure and its regulation
- Circulation of Blood

C. Muscular skeletal System

- Types of muscles, functions
- Skeletal System, Structure and types of Bone

### UNIT-II Gastrointestinal System

- Structure and functions of various organs of the GI Tract.
- Digestion & absorption of food.

Nervous System

- Elementary Anatomy of Nervous System
- Functions of different part of the brain and Spinal cord.
- Autonomic, Sympathetic & Parasympathetic nervous system.

### UNIT-III Excretory System-

- Structure & Functions of Kidney, bladder, formation. Of urine.
- Structure & Functions of Skin.
- Regulation of temperature of the body.

Respiratory System

- Structure of lungs
- Mechanism of respiration and its regulations
- O<sub>2</sub> and CO<sub>2</sub> transport in blood.
- Vital capacity and other volumes.

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**UNIT-IV** Reproductive System

- Structure and functions of Male & Female reproductive organs
- Physiology of pregnancy, parturition, Lactation and menopause
- Special sense organs structure & Functions.

**UNIT-V** Concept and scope of community nutrition

- A. Nutritional problems of the community and implications for public health.
- Common problems in India.
  - Causes (Nutritional and non-nutritional)
  - Incidence of nutritional problems, signs and symptoms treatment
- B. Schemes and programmers to combat nutritional problems in India.
- Prophylaxis programmers.
  - Mid-day meal programmer.
  - ICDS
- C. Hazard to Community Health and Nutritional Status.
- Adulteration in food.
  - Pollution of water

**REFERENCES:**

1. Guyton, A.C. Hall, J.E. 1996, Text book of Medical Physiology, 9th Ed. Prism Books (Pvt.) Ltd., Bangalore.
2. Winwood 1988: Sear's Anatomy and Physiology for nurses, London, Edward Arnold.
3. Wilson 1988: Anatomy and Physiology in Health and Illness, Edinburgh, Churchill Livingstone.
4. Chatterjee Chandi Charan 1988: Text book of Medical physiology, London, W.B.
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8. Dhami, P.S. 1987: A text book of Zoology, S. Nagin & Company, Julundhar.
9. K.S. Gopalaswamy iyengar 1991 : Complete Gardening in India, Bangalore, Gapalaswamy Parthasarthy.
10. Kochar, S.L. 1981: Economic. Botany in tropics, Macmillan, India.
11. Hartmann, H. and Kester, D.E. 1993: Plant Propagation principles and Practice, New Delhi, Prentice Hall of India (Pvt.) Ltd.

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### **PRACTICALS (ANY SIX)**

1. Preparation of charts of different systems.  
(Part of human baby)
2. Identification of Bones.
3. Recording pulse rate.
4. Measurement of Blood Pressure.
5. Preparation of temperature chart.
6. Bleeding time.
7. Clotting time.
8. Study of Histological slides of different organs.

### **GROUP - III**

#### **PAPER - B**

#### **COMMUNICATION PROCESS IN DEVELOPMENT (CORE) (Paper Code-0576)**

**Code 21003**

**Cr: T 2 + PI Pd/Wk: 2 + 2**

**Mark: 50**

#### **Focus:**

The course focuses on the process of communication, especially in development work in rural and urban areas.

**Objectives:** To enable students to –

1. Understand the process .of communication in development work ;
2. Develop skirls in the use of methods and media ; and
3. Be sensitive to the interests and needs of the people and the power of the media and methods.in catering to these needs and interests.

#### **THEORY**

- UNIT-I** Concept of development communication (3)
- Meaning and importance of communication in development
  - The purpose of communication
  - Existing patterns of communication Factors
  - that help or hinder communication

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**UNIT-II** Communication Process (3)

- One-way and two-way or interactive communication
- Gaps in communication or distortions in transmission of message and their causes
- Importance of two way communication
- Basis for effective, interactive communication. Attitude
- of 'respect for others

**UNIT-III** Methods of communication in Development Methods to reach individuals  
Personal conference

(10)

- Interviews
- House visits
- Exhibits
- Methods to reach small groups
- Illustrated lecture
- Group discussions
- - Fish Bowl
- - Small group
- Co-operation
- Role Plays
- Demonstrations
- Workshop Camps
- Radio announcements/programs
- Newspaper stories

**UNIT-IV**

- Posters
- Videos, films
- Television programmers
- Letters, folders or pamphlets
- Public meetings
- 

**UNIT-V** Media for development communication

- Folk media Songs Stories Street-theatre
- Games Arts
- Puppet play Print Media
- Posters Pamphlets, leaflets
- Newspapers - articles, stories
- Periodicals - articles, stories, songs
- Books
- Cartoons
- Audio/Visuals, Audio-Visual Media
- Audio-tapes, radio broadcasts
- Slides, pictures, drawings, photographs etc.
- Videos, telecasts
- Films-documentary, feature
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### **PRACTICALS (ANY SIX)**

1. Organising group discussion.
2. Organising group demonstration.
3. Preparation & Presentation of Audio visual aids, i.e. Posters, Charts, Cartoons, Models Puppets.
4. Problem/need identification "of a community.
5. Planning an educational programme.
6. Evaluation of the effectiveness of methods and media.
7. Visit to Radio Station/T.V. Centre/Printing Press.
8. Preparation of Drama based on Social Development

### **GROUP IV**

#### **PAPER - A (Paper Code-0577)**

#### **LIFE SPAN DEVELOPMENT, METHODS AND MATERIAL FOR YOUNG CHILDREN**

**Code 24104 + 24105**

**Cr T5 + P2**

**Pol/Wk 5+4**

**Marks-50**

#### **Focus:**

This course covers the entire life span and traces the various developmental stages. Its encompasses in scope development in utero, infancy up to senescence identifying critical concerns in Socio-cultural perspectives.

To develop understanding of various methods and materials, which can be used-while working with children? The emphasis is on promoting creativity and use of different materials *to* allow for optimum development.

#### **Objectives:**

To become acquainted with developmental stages from birth to old age.

1. To develop awareness of important aspects of development during the whole life span.
2. To know the reqDon Welpers (1974): uirement of infants and fidders and develop skills to create play materials and designing learning experiences.
3. To understand the significance of various creative activities and teachers role in implementry them.

**Note:** For each of the following stages of development, the-influence and inter-actions of sociocultural and environmental factors needs to be discussed.

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# **LIFE SPAN DEVELOPMENT, METHODS AND MATERIALS FOR YOUNG CHILDREN**

**Code: 24104 and 24105**

## **UNIT-I**

1. Life Span development and need to study development through the life cycle. Inter-relationship between the aspects of development.
2. Prenatal Period - Review of prenatal development.
3. Infancy (0 to 2 years) and childhood period (2 to 12 years) - Definition, Characteristics and Developmental tasks. "Review (2-6 yrs. to 6-12 yrs.) of different developmental areas (Physical, motor, Social, emotional, intellectual sensory and perceptual development) cognition piaget) significance of preschool education, importance of play (for all round development) peer group and school.

## **UNIT-II**

Adolescence (13 to 18 years)

1. Definition, Developmental tasks.
2. Physical Development - Puberty, growth, spurts, Primary and Secondary sex characteristics, early and late maturing adolescents.
3. Identity - Definition, body image, positive and negative outcomes (Role confusion, ego-identity)
4. Heightened emotionality- Meaning causes, expression characteristics of emotional maturity, conflict with, authority coping up strategies.
5. Problems - Drug and alcohol abuse, psychological breakdown (Behavior) STD and AIDS, Pregnancy.

## **UNIT-III**

Adulthood (19 to 60 years) and ageing- (Early adulthood 19 to 40 years) Definition and characteristics Development tasks, significance of the period, responsibilities and adjustment - New family, parenthood, independence, financial matters.

1. Middle Adulthood (41 to 60' years), Definition, physical changes (senses, diseases-Transitition Period.
2. Menopause- Health issues.
3. Stresses in middle age, coping with stress to family.
4. Preparation for retirement.

Late Adulthood and Ageing – Definition.

1. Physiological changes and health problems.
2. Retirement-effect of retirement on self-family, society financial problems faced.
3. Recreational interest of the aged.
4. Issues- Old age homes, loneliness, living in joint family, prolonged illness. (Plan visit to old age homes)

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## UNIT-IV

### Infancy and Toddlerhood (Emotional Aspect)

1. Importance and ways of meeting child psychological needs to promote feeling of security, trust and acceptance.

Activities according to developments for various age groups

- (A) 0-6 months - Activities for stimulating and sessions motor experiences with emphasis on seen, hearing, touching, feeling sensation and movements.
- (B) 7 to 12 months - Integration of experiences involving more than one sense to deeper sensory motor experiences promotic manipulation, concept formation, communication and perceptual divtiminsyion.
- (C) 3 to 24 months - Promotion of co-ordination and control of body movements, gross and fine motor skills. Strengthening concept formation, imagination and communication through language promotion of problem solving, environment to explore and satisfy curiosity and develop confidence.
- (D) 25-36 months - Improvement in body movement and communication skills, social skills concept formation.

## UNIT-V

### Creativity

- Concept of creativity and highlights of the role of creative expressions in overall development of children.
- Creative expressions, Meaning and definition of creativity expressions.
- Role of teacher in planning and fostering creative expressions.
- Creative expressions through a variety of media i.e. painting, Printings.

### Art Activities

- Painting and graphics
  - (a) Painting with brush, drawing with crayons, chalk, rangoli on floor, finger painting. (Some special characteristics of this medium)
  - (b) Values, materials required, use of substitute from indigenous materials.
  - (c) Teacher's role in conducting activities.
  - (d) Stages in child art.
- Tearing, cutting, pasting and collage, mural
  - (a) Values, materials required and Teacher's role in conducting activities.
  - (b) Development stages.
- Printing
  - (a) Types of printing i.e. block vegetables, string, leaf, stencils, spray, crumpled paper, different textured surfaces.
  - (b) Values, materials required techniques.

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## BLOCKS:

- (a) Some special features of this medium.
- (b) Types of blocks: hollow large blocks, unit blocks and small blocks.
- (c) Stages in block play.
- (d) Values, materials and accessories for block play.
- (e) Teacher's role

### Other materials

- Sand
  - (a) Characteristics of the medium.
  - (b) Values, materials required and teacher's role.
- Water.
  - (a) Characteristics of the medium.
  - (b) Values, materials required and teacher's role.

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## **PRACTICALS (ANY TEN)**

### **1. Infancy and Toddlerhood**

1. A file to be prepared to list activities appropriate for age groups - 0-6 months, 7-12 months, 13 to 20 months and 25 to 36 months.
2. Students are encouraged to observe materials available in the locality, Different types of shops, tailor.
3. Develop play materials suitable for each age group.
4. List activities, which can be used for working with different age groups.
  - (a) 0 to 6 months.
    5. Prepare materials and design activities for seeing, hearing touching and feeling.
    6. Sensation and movement for soothing movements and exercises.
  - (b) 7 to 12 months.
    7. Prepare materials and design activities for touching and feeling sensation and movement, and manipulation.
  - (c) 13 to 14 months.
    8. Identify activities for gross motor development and prepare play materials available in the locality.
    9. Prepare play materials and list activities promote manipulation sensory experiences, concepts and language.

### **Art Activities**

10. A few suggestions are given under each category as guideline students are encouraged to explore experiment with each media and understand the characteristics of each medium.
11. Samples of each are included in the resource file which each student is expected to maintain along with description of values materials and technique used.
12. Difficulty level of each activity be considered and decide its suitability for different age groups.
  - Painting and graphics
  - Prepare a variety of brushes from different types of brooms, cotton, wool, strips of cloth, feather etc.

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### **Tearing cutting and pasting**

13. 3-5 years  
Tearing with all fingers, tearing with thumb and two fingers as used in holding pencil, tearing on straight line, curved line.
14. 6-8 years  
Tearing circular rings starting from one corner of the page till centre of page, making designs.
15. 3-5 cutting and pasting  
Cutting a design, pasting, please of paper, cloth, sticks leaves collage, mosaic  
Printing

### **Printing**

16. Printing with strings, leaf, vegetable blocks, stencil printing, thumb," finger, spray painting
17. Keeping coins, leaves with veins below paper and gently coloring with crayon.

### **REFERENCES:**

1. Berk, L.E. 1996: Child Development, New Delhi: Prentice Hall.
2. Craig, G. 1999 : Human Development, N.J. : Prentice Hall
3. Cole, M. & Cole, S. 1995: The Development of Children, NY Freeman & Co., Gardiner, H.W. Mutter, J.D. & Kosmitzki 1998: Lives Across Cultures, Oston, Allyn & Bacon.
4. Lerner, R.M. & Hultsch, D.F. 1983: Human Development: A life Span Perspective. NY. MC Graw Hill
5. Rice, F.P. 1965: Human Development: A life. Span Approach, NJ: Prentice Hall.
6. Santrock, J.W. 1997: Life Span Development, NY Brown & Bench mark.

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**GROUP – IV PAPER – B**  
**CONSUMER ECONOMICS (Paper Code-0578)**

**UNIT-I**

**M.M. 50**

Consumption Economics

- (1) Meaning and definition
- (2) Family as a decision making unit of house hold
- (3) Consumer - definition

Measures of living and consumption

- (1) Place of living
- (2) Level of living.
- (3) Standard of living
- (4) Plan of consumption
- (5) Level of consumption
- (6) Standard of consumption
- (7) Rpce/Price level/cost of living

**UNIT-II**

Consumer income

- (1) Types of income - real, money, psychic, national income, disposable income.

Market

- (2) Definition
- (3) Type of market Segmentation and characteristics
- (4) Functions
- (5) Channels of distribution

**UNIT-III**

Consumer in the market

- (1) Consumer buying habits - Convenience goods
- (2) Buying motives - Primary selective, rational emotional and tottranages.

Types of Products

Advertisement, Sales, Promotion packing

Consumer Buying Problems

- (1) Adulteration
- (2) Faulty weights and measures
- (3) Pricing
- (4) Legal - guarantee and warrantee contracts, installment buying

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## UNIT-IV

### Consumer protection services

- (1) Organisations
- (2) Legislation - import laws for consumer protection
- (3) Consumer representation.

### Consumer and consumers problems

- (1) Definition of consumers
- (2) Choice and buying problems of consumers

### Consumer Protection Law

- (1) Definition of laws, Types of laws importance of law

## UNIT-V

- (1) Consumer Decision making
- (2) Factors effecting consumer decisions in the market
- (3) Good buy man ship
- (4) Consumer aides for decision making Consumer rights and responsibilities

### Consumer protective services

- (1) Indian Standard Institution
- (2) Educational Institution
- (3) Consumer Co-operatives
- (4) Government Agencies Municipality

## PRACTICALS - PROJECTS IN ANY AREA/UNIT

- (1) Selection of relevant topics.
- (2) Written matter (typed 20 pages, double space, A-4 size paper).
- (3) Oral Presentation of 20 minutes, by the student.
- (4) Audio Visual aids to be used in presentation.
- (5) Q.A. session of 10 minutes.
- (6) File presentation by the student.
- (7) List of reference/Source to be written in the report.

## REFERENCES:

1. Lelend, J. Gordan, Stewart, M. Lee 1974 : Economics and consumer, 7th Edu., D'van Nostrand Co., New York, (Unit I, IV)
2. Don Welers (1974) : Who Buys - A study of consumer, (Unit I, IV, VI)

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3. Sherlekar, S.A. 1984 : Trade Practices and Consumerism, Himalaya Publishing House, (Unit I, VI)
4. Sales Management, 5th Edu., Cunliffe Boiling, (Unit II, IV)
5. Kotler Philip, Armstrong Gary (Principles of Marketing, 5 Edu. Prentice Hall of India, New Delhi, (Unit IV)
6. David H. Bangs, Jr. : The Market Planning Guide, 3rd Edu., Galgotra Publications, (Unit IV, VII)
7. Hansen, A.T. 1951 : Business Cycles and National Income, W.W. Norton & Co. Inc. (Unit III, V)
8. Sarkar, A : Problems of Consumers in Modern India, Discovery Publishing House. (Unit VII-X)
9. Beckman, T.R. Moyard.H.H. And Davidson, W.R. 1957: Principles of Marketing, Ronald Press,. (Unit IV, VI)
10. Gordon, L.J. and Lee. S.M. 1972: Economics of Consumers, Dvan Vostrand, (Unit I, II. III)
11. 11. Cochrane, W.W. and Bell, C.S. 1.958: The Economics of Consumption, McGraw Hill.
12. Conoyer, H.C. and Vailes, R.S. 1951: Economics of Income and Consumption, Ronald Press.

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# **DURG VISHWAVIDYALAYA, DURG (C.G.)**

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## **SCHEME OF EXAMINATION & SYLLABUS Of B.Sc. (Home Science) Part-3 Annual Exam UNDER FACULTY OF SCIENCE Session 2017-18**

**(Approved by Board of Studies)  
Effective from July 2017**



**B.SC.HOME SCIENCE**

**III<sup>RD</sup> YEAR**

**2017-2018**

*Asst. Prof.*  
22-07-17

*Don*  
22-7-17

*Devi*  
22-7-17

*P. Singh*  
22-7-17

## B.Sc. (Home Science) PART -

### III

#### MARKING SCHEME

Group	Paper No.	Subject	Theory M. Mark	Practical M. Mark	Theory M. Mark	Practical M. Mark
I		Foundation Course				
	(A)	Hindi Language	75		26	
	(B)	English Language	75		26	
II	(A)	Nutritional Biochemistry	50	25	33	09
	(B)	Food Preservation	50	25		09
III	(A)	Early Childhood Education	50	25	33	09
	(B)	Extension Education	50	25		09
IV	(A)	Foundation of Art and Design	50	25	33	09
	(B)	Apparel Making	50	25		09
Total			600			

#### DISTRIBUTION OF MARKS IN VARIOUS PRACTICAL

S. No.	Name of the Practical	Total Mark	Sessi.	Viva	Distribution	Marks
01.	Nutritional Biochemistry	25	5	5	Titration Identification of CHO Blood	10 05
02.	Food Preservation	25	5	5	Preparation Presentation	10 05
03.	Early Childhood Education	25	5	5	Preparation & Teaching	05+10
04.	Extension Education	25	5	5	Practical - (2)	15
05.	Foundation & Art & Design	25	5	5	Practical - (2)	15
06.	Apparel Making	25	5	-	Embroidry & Texture Stitching or Designing	05+05 10

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**आधार पाठ्यक्रम**  
**हिन्दी भाषा**  
**(पेपर कोड – 0891)**

**प्रथम प्रश्न पत्र**

**पूर्णांक – 75**

(बी.ए., बी.एच.सी., बी.एच.एस-सी., बी.कॉम., तृतीय वर्ष के पुनरीक्षित एकीकृत आधार पाठ्यक्रम एवं पाठ्य सामग्री का संयोजन 2000-2001 से लागू है )

**।। सम्प्रेषण कौशल, हिन्दी भाषा और सामान्य ज्ञान ।।**

आधार पाठ्यक्रम की संरचना और अनिवार्य पाठ्य पुस्तकें—हिन्दी भाषा एवं समसामयिकी— का संयोजन इस तरह किया गया है कि सामान्य ज्ञान की विषय वस्तु — विकासशील देशों की समस्याओं के माध्यम और साथ-साथ हिन्दी भाषा का ज्ञान और उसमें सम्प्रेषण कौशल अर्जित किया जा सके । इसी प्रयोजन से व्याकरण की अन्तर्वस्तु को विविध विधाओं की संकलित रचनाओं और सामान्य ज्ञान की पाठ्य सामग्री के साथ अन्तर्गुम्फित किया गया है । अध्ययन अध्यापन के लिए परी पुस्तक की पाठ्य सामग्री है और अभ्यास के लिये विस्तृत प्रश्नावली है । यह प्रश्नपत्र भाषा का है अतः पाठ्य सामग्री का व्याख्यत्मक या आलोचनात्मक अध्ययन अनेक्षित नहीं है । पाठ्यक्रम और पाठ्य सामग्री का संयोजन निम्नलिखित पांच इकाइयों में किया जाता है । प्रत्येक इकाई को दो भागों में विभक्त किया गया है ।

**इकाई – 1**

1. भारत माता : सुमित्रानंद पंत, परशुराम की प्रतीज्ञा : रामधारी सिंह दिनकर, बहुत बड़ा सवाल : मोहन राकेश, संस्कृति और राष्ट्रीय एकीकरण : योगेश अटल ।
2. कथन की शैलियां : रचनागत उदाहरण और प्रयोग ।

**इकाई – 2**

1. विकासशील देशों की समस्याएँ, विकासात्मक पुनर्विचार, और प्रौद्योगिक एवं नगरीकरण ।
2. विभिन्न संरचनाएं ।

**इकाई – 3**

1. आधुनिक तकनीकी सभ्यता, पर्यावरण प्रदूषण तथा धारणीय विकास ।
2. कार्यलयीन पत्र और आलेख ।

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#### इकाई – 4

1. जनसंख्या : भारत के संदर्भ में और गरीबी तथा बेरोजगारी ।
2. अनुवाद ।

#### इकाई – 5

1. उर्जा और शक्तिमानता का अर्थशास्त्र ।
2. घटानाओं, समारोहों आदि का प्रतिवेदन और विभिन्न प्रकार के निमंत्रण-पत्र ।

**मुल्यांक योजना:** प्रत्येक इकाई से एक-एक प्रश्न पूछा जायेगा । प्रत्येक प्रश्न में आंतरिक विकल्प होगा ।

प्रत्येक प्रश्न के 15 अंक होंगे । प्रत्येक दो-दो खंड (क्रमशः 'क' और 'ख' में ) विभक्त है, इसलिए प्रत्येक प्रश्न के भी दो भाग, कौशल से संबद्ध प्रश्न के अंक 7 होंगे । इस प्रकार पूरे प्रश्न पत्र के पूर्णांक 75 होंगे ।

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**PART - II**  
**(Paper Code)**

**ENGLISH LANGUAGE**

**M.M. 75**

The question paper for B.A./B.Sc./B.Com./B.H.Sc. III Foundation course,  
English Language and General Answers shall comprise the following items :

Five question to be attempted, each carrying 3 marks.

UNIT-I Essay type answer in about 200 words. 5 essay type question to be asked three to be attempted.	15
UNIT-II Essay writing	10
UNIT-III Precis writing	10
UNIT-IV (a) Reading comprehension of an unseen passage	05
(b) Vocabulary based on text	10
UNIT-V Grammar Advanced Exercises	25

Note: Question on unit I and IV (b) shall be asked from the prescribed text. Which will comprise of popular create writing and the following items. Minimum needs housing and transport Geo-economic profile of M.P. communication Educate and culture. Women and Worm in Empowerment Development, management of change, physical quality of life. War and human survival, the question of human social value survival, the question of human social value, new Economic Philosophy Recent Diberaliation Method) Demoration docontralisation (with reference to 73,74 constitutional Amendment.

**Books Prescribed:**

Aspects of English Language and Development - Published by M.P. Hindi  
Granth Academy, Bhopal.

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**NUTRITIONAL BIOCHEMISTRY (Paper Code-0583)**

**UNIT-I**

- (A) Introduction to Biochemistry - definition, objectives, scope and interrelationship between Biochemistry and other biological sciences.
- (B) Carbohydrates - Definition, classifications functions and properties of
- Monosaccharides - Glucose, Fructose, Galactose
  - Disaccharides - Maltose, Lactose, Sucrose
  - Polysaccharides - Dextrin, Starch, Glycogen
- Glycolysis, Gluconeogenesis, Glycogenesis  
Glycogenolysis, Citric and Cycle.  
Blood sugar regulation.

**UNIT-II**

- (A) Lipids – Definition, composition, importance and classification  
Fatty acids - Functions, properties  
Significance of Acid value, Iodine value and saponification value.  
Chemistry and function of Phospholipids, Glycolipids and sterols.  
Metabolism - Beta Oxidation
- (B) Aspects of transport – Passive diffusion, Facilitated diffusion, Active transport

**UNIT-III**

- (A) Proteins - Definition composition function, and classification.  
Amino acids - Essential and Nonessential  
Metabolism - Urea cycle, Nitrogen balance, Amino acid pool
- (B) Enzymes - Definition, properties, classification, Mode of action of enzymes, factors affecting velocity of enzyme catalyzed reactions, coenzymes.

**UNIT- IV**

- (A) Hormones - Biological roles of hormones of Pituitary, Adrenal cortex and medull, Thyroid, Parathyroid, Pancreas, Sex glands.
- (B) Urine - Formation and Composition

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## UNIT-V

- (A) Energy - Definition, Unit, calorimetry, caloric value of foods, BMR, RQ, SDA of Foods.
- (B) Nucleic Acid and Nucleoproteins – Chemistry, composition, structure, functions

### 1. PRACTICALS (Any Six)

1. Identification of Glucose, Fructose, Maltose, Lactose, Sucrose, Starch.
2. Colour and precipitation reactions of Protein.
3. Colour reactions of cholesterol.
4. Estimation of Glucose by Benedict's method.
5. Estimation of Ascorbic acid by Iodometric method.
6. Estimation of Glycine by Titration.
7. Estimation of Haemoglobin by acid haemolysis method.
8. Preparation of Haemin crystals.
9. Action of Salivary amylase on conversion of starch.

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**Group – II PAPER –B**  
**FOOD PRESERVATION**  
**(Paper Code-0584)**

**UNIT-I**

Food and its preservation.

Home and community level including commercial operations.

Principles of food Preservation

Causes of spoilage of food.

**UNIT-II**

Fresh Food Storage

Principles - Plant product.

Storage, animal product

Storage, Effect of Storage

Condition on quality

**Canning** - Principles and methodology influence of canning on food quality. Storage of canned foods.

**UNIT-III**

**Pasteurisation**

Effect on food quality.

Storage of pasteurised food.

**Drying & Dehydration**

Methods used and effect on food quality. Types of driers. Storage and deterioration of dehydrated food products.

**UNIT-IV**

**Use of low temperature**

Refrigeration and freezing methods, principles and applications. Preparation of foods for freezing influence on food components and structure. Self-life of frozen foods

**Pickling and Fermentation**

Pickles, chutneys, ketchups sauces. Fermentation - Types, products and method use  
Establishment of a small scale industry / cottage industry.

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## UNIT-V

Chemical Preservatives

Preparation of Fruit, Juices, Squashes, Fruited Syrups, Cordials, Jam Jelly.

**High Acid & High Sugar Products –**

common defects, Preservation of crystalized and glazed fruits.

### Nutritional Implications of food processing

Causes for loss of vitamins and minerals, Enrichment, Restoration and Fortification

### PRACTICALS: (Any Six)

1. Preparation of Jam, Jellies marmalades.
2. Preparation of Pickles & chutneys.
3. Dehydration of Vegetables & Fruits.
4. Preparation of synthetic syrups & squashes.
5. Preparation of Sauces.
6. Preparation of Papad, Badi, Chips.
7. Survey of market products.
8. Packaging.

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2. William, S.: 16th Ed. JAOAC, Official methods of Analysis, Part I to XI, Manak Bhawan, New Delhi.
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## **GROUP-III**

### **PAPER-A**

**M.M.-50**

#### **EARLY CHILDHOOD EDUCATION (Paper Code-0585)**

**Code - 34113 + 34114 cr T5 + P2 Pol/wk 5 + 4**

#### **FOCUS-**

The course focuses on need to provide various early childhood care and educational facilities through different programmes, for early childhood education. Types and present status of ECCE programmes are covered in this course. The recent policies affectionary young children are also included.

The course introduces students to the concept of curriculum for all round development of children. The main emphasis is on various components of curriculum to be included in daily program through medium of play. Method of learning by doing which forms the basis for understanding and knowledge is extended to the first two years of primary school.

#### **OBJECTIVES:-**

1. To know importance of early childhood care and significance of intervention programmes for early child development.
2. To understand major theoretical approaches and implication for early child development.
3. To become acquainted with current policies and programs in ECCE.
4. To meaning of curriculum and various components to be included in the daily programmes to promote all round development of children.
5. To recognize role of play in children's development.
6. To understand goals, principles, factors and approaches used in programme planning.
7. To recognize the advantages of project method and learn to use integrated approach in the development of daily programme.

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## UNIT-I

Significance and objectives of early childhood care and education.

1. Significance of early childhood years in individual's development.
2. Meaning and need for intervention programmes for better growth and development.
3. Objectives of ECCE.
4. Different types of programs currently offered. Objectives of the program routine and target group covered by each of the following. ECE programme - Balwadi, anganwadi, Nursery school, Kindergarten, Montessori, laboratory nursery school ECCE Program - ICDS and mobile cretch. Play group: day care.

## UNIT-II

Current Status and Expansion of Scope of ECE to ECCE

18

- Expansion from ECE to ECCE.
- Current Status of ECCE programme.
- Objectives: staff qualifications, teacher-children ratio, indoor and outdoor play space and play facilities, equipment, curriculum and evaluation.
- Admission tests and effects on children.
- Effects of pressures on young children due to formal education.
- Need for ECCE programmes to provide quality care where mothers are at work.
- Historical overview of ECCE.
- Global perspective - views of educationists - Froebel, Mac Millan sister, Deweu and Montessori,
- ECE in India: Overview of pre.and post-independence period.
  - Contributions of Ravindranath Tagore, Mohandas Gandhi, Gijubhai Bodheka, Tarabai Modak, Anutai Wagh.

Recent Developments: Policies, Institutions and contributions of NGOs

10

- national policy on children.
- National policy on education 1986.
- Adoption of Ram Joshi Committee Report on Child Education by Government of Maharashtra.
- Role of Indian Association of Preschool Education, National Institute of Public Cooperation and Child Development, National Council for Educational Research and Training, SCERT and NGOs.

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### UNIT-III

- Meaning of curriculum, Foundation of. curriculum development.
- Impact of play as means of development and learning.
- Developmental stages of play.
- Types of Play - Solitary play, parallel play, associative play and cooperative play.
- Functions of play - play as a means of assessing children's development.
- Teachers Role in creating environment and Promoting play.
- Classical theories of play - Surplus energy theory relaxation theory, Pre-exercise & recapitulation theory.

### Programme Planning

- Approaches to learning: Incidental and planned learning.
- Principles of programme planning :
  - from known to unknown, simple to complex, concrete to abstract.
- Balance between individual and group activity, indoor and outdoor play, quiet and active plays, guided and free activities.
- Factors influencing programme planning.
- Formal versus non-formal approach in education: advantages and disadvantages.
- Integrated learning approach or project method that is covering various components of curriculum that is focussing on one topic/theme at a time.
- Short and long term planning.

### UNIT-IV Languages

- Goals of language teaching.
- Readiness for reading and writing. Meaning of readiness.
- Factor to be considered for readiness : Age, Vision, Hearing, Physical, emotional, social, experiential background, attention span, finer motor coordination, eye hand coordination, reading from left to right and top to bottom.

### Mathematics

- Importance of number and mathematics.
- Number as a language and history of its development.
- Abstract nature of number.
- Mathematical readiness.
- Analysis of prerequisite skill for 'number classification, comparing, seriation,

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patterning, counting, shape and space, measurement fractions, vocabulary, numeral operations.

- Decimal system of numeration (base 10)
- Number line-position and relevance of zero.
- Operations and relevant rules and properties; subtraction, multiplication and division.
- Two and three dimension shapes, properties, characteristics.
- Basic principles of measurements 0 time/distance, weight, capacity and money.

#### **Environmental studies (2)**

- Scope of environmental studies.
- Importance and goals of environmental studies.
- Content: to conclude understanding from biological, physical and social environment. .

#### **UNIT-V Project method (2)**

- Introduction
- Meaning and advantages of using project method.
- Planning.
- Resource unit.

#### **Alternative to Home Work (2)**

- Disadvantages of learning by role.
- Suitable alternatives such as observations, exploration, experimentation and reporting orally, picture or at. Something related to the concepts covered in class.

#### **Evaluation**

- Need for evaluation.
- Formative and summative evaluation.
- Methods of evaluation: Observations.
- Evaluation of daily work, tools for evaluation
- Reporting to parents.

#### **PRACTICALS: (any four) (30)**

1. Plan three activities for children: list objectives, analyst tasks to achieve goals, select and organize instructional and learning materials, teacher's role, preparation of evaluation sheets i.e. chick list, rating scale.

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2. Prewriting activities.
3. (a) Mathematics.  
(b) Readiness  
(c) Materials for classifying, comparing, seriations, patterning, counting shapes, fractions, and list vocabulary related to mathematical concepts.  
(d) Material for addition, subtraction, multiplication and divisions.  
(e) Graphs.  
(f) Experiences for understanding time distance weight, capacity and money.
4. Plan science experiences.
5. Plan a project based on lessons of first and second standard, plan activities which children can do at home.

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## Group-III PAPER-B

M.M.-50

### EXTENSION EDUCATION (Paper Code-0586)

#### UNIT-II

1. Concept of Education
  - (a) Meaning of Extension
  - (b) Origin of Extension
2. Extension Education Process
  - (a) Environment for learning
  - (b) Role of educator
  - (c) Role of the people participants
3. Communication Process

#### UNIT-II

1. Concept of adult / non formal education
  - a. Meaning
  - b. Purpose
2. Five Year Plans
  - a. History of planning in India.
  - b. Five year plans and their focus.
3. Planning at different levels - National to Grass roots.

#### UNIT-III

1. Programmes to enhance food production
  - a. National food production programmes.
2. Poverty alleviation efforts
  - a. Programmes for poverty alleviation for rural and urban areas.
  - b. Current programmes for rural and urban poor.

#### UNIT-IV

1. Programmes for women and children

Women as target groups - specific measures for women and children such as DWCRA, ICDS, IMY. Current programmes for women as initiated and implemented by the different ministeries and Departments.
2. Roie of NGOs

Need for participation of Non-Governmental organisations in developmental efforts.  
Encouragement given NGO's - Role of CAPART.

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## UNIT-V

### Advertising Media

1. Different media for advertising - print media, Newspapers and periodicals.
2. Broadcast media - Television - Films.
3. Non-media advertising
4. Outdoor advertisement - Hoardings, Posters, Billboards, Bulletin Boards, and Electronic signs, Litterbins, Aerial methods.
5. Transportation media (Mobile Vehicles)
6. Exhibition and Trade fair.

### PRACTICALS:

1. Visits to Radio / T.V. stations.
2. Script writing for Radio.
3. Visit to Extension Education Unit.
4. Write slogan about Adult-Education.
5. Designing an Advertisement for any product with relevant slogan atleast Two.

*A. E. Gopal*  
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*P. Singh*  
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Group – IV  
**PAPER – A**

**FOUNDATION OF ART AND DESIGN (Paper Code-0587)**

**M.M. 50 Cr - T3 P3**

Introduction to foundation of art

1. Design, Definition and types-: Structural and Decorative
2. Elements of design :-
  1. Line
  2. Size
  3. Form
  4. Structure
  5. Space
  6. Pattern
  7. Shape
  8. Light - Characteristics and Classification
  9. Study of Colour - classification, dimensions, colour schemes and effect.
3. Principles of design - definition and their characteristics and types :-
  1. Balance
  2. Harmony
  3. Scale
  4. Proportion
  5. Rhythm
  6. Emphasis

**UNIT-II**

1. Indian, regional, traditional and contemporary arts and their use in :-
  1. Floor decoration
  2. Home decoration
  3. Accessories
2. Appreciation of art
  1. In terms of principles of art and design
  2. In terms of composition and aesthetic appeal

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### UNIT-III

1. Family's Housing Needs
  1. Protective, economic, affection, social, standard of living, housing goals, style, function occupation.
2. Factors influencing selection and purchase of site for house building
  1. Legal aspects, location, physical feature, soil conditions, cost, services
3. House planning
  1. Reading house plans.
  2. Grouping of rooms, orientation, circulation, flexibility, Privacy spaciousness, services, aesthetics, economy, light and ventilation.
  3. Planning different rooms: living room, dining room, bedrooms, kitchen, store room, toilet, passage, and staircase.
  4. Landscape planning - Principles and application.

### UNIT-IV

1. Financial Considerations :
  1. Availability of funds for housing
  2. Housing Development finance corporation
  3. Cooperative Housing Society
  4. Life Insurance corporation
  5. Cooperative Banks
  6. Loan from provident fund
  7. Finance corporation of India
2. Disability of owning versus renting.
  1. Housing problems, causes and remedial measures.

### UNIT-V

1. Furniture
  1. Styles of furniture - traditional contemporary and modern.
  2. Selection of furniture for comfort, rest and relaxation for work, for storage
  3. Arrangement of furniture for living. Sleeping, dining and multipurpose rooms.
  4. Upholstered furniture materials, techniques and designs.
2. Furnishing fabrics
  1. Types of curtains, draperies, floor coverings rugs and carpets, cushion covers
  2. Selection and use.
    1. Accessories and their role in interiors.

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### **PRACTICALS: (Any Ten)**

1. Freehand drawing: Memory drawing and sketching.
2. Scale drawing, solid geometry, orthographic.
3. Preparation of colour wheel and colour schemes.
4. Elements of design laws of field size, proportion, types of shadows.
5. Residential space planning - scale, lines, abbreviations, metric projections, defining space by shades, shadows.
6. Lettering.
7. Use of colour for wall/floor decoration and making accessories.
8. Application of design principles in flower arrangement, styles of flower arrangement, innovation of new styles.
9. Gift wrapping and preparing decorative articles of fibre, fabric, coir, bamboo, clay, metal etc.
10. Drawing houseplans with standard specification.
11. Furniture layout of living, dining. Kitchen and bedroom designs presentation with furniture layout, sectional elevation, views.
12. Development of designs and construction of any five of the under mentioned items -'. cushions, curtains, carpets, doormats, rugs, table mats.
13. Wall paintings, picture frame design.
14. Graphic designs.

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22/7/17

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22/7/17

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22/7/17

*[Signature]*  
22/7/17

Group - IV

**PAPER - B**

**APPAREL MAKING & FASHION DESIGNING**

**UNIT-I**

Introduction

- Importance of Clothing
- Sociological & psychological aspects of clothing Fabrics to be considered while selecting of fabric for different garment.
- Estimation of material required for different garments (cloth estimation)
- Study of fabric finishes - Meaning, objective facilities, General & special.

**UNIT-II**

Experiments & principles of design: Meaning methods pf creating importance  
Elements of principles of design as applied, to apparel designing - Harmony, balance  
proportion, Rhythm & emphasis.

Element: - Lines, shapes / forms.

Colour consideration: Definition, Dimensions, characteristics colour systems & colour  
schemes.

Classification & Process of  
designing. Structural.

Decorative

. Realistic

Abstract

Stylized

Geometric

Traditional

Big & small design

**UNIT-III**

Fashion - Definition

- Fashion trends in India & changes
- Theories
- Body measurements
- Tailoring tools & Equipment's
- Methods of taking body measurements
- For different garments
- Importance
- Pattern making techniques
- Flat pattern
- Drafting
- Drapping

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22/7/17

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22/7/17

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22/7/17

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22/7/17

#### UNIT-IV

##### Fashion Illustrations:-

##### Disposals of fullness

1. Plackets  
One piece two  
piece seam  
invisible  
Continuous
2. Neck lines
3. Collie's
4. Sleeve details
5. Factories
6. Frill & gatheri
7. Pleats & Tucks
8. Darts
9. Patch work
10. Seams & seam finishes

#### UNIT-V

##### Fundamentals of Embroidery :-

- Techniques, design colour, uses of different combination - threads;
- mbroidery stick – Types
- Types of thread, needle, used for different fabrics.
- Study of traditional Embroideries of India.
- Kasida of Kashmiri
- Kantha of Bengal
- Chichenkari of Lucknow
- Kutch & kathiawan
- Kasuti of Karnataka
- Phulkari of Punjab.
- Gold & Silver (Zari work)
- Applique work

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22.07.17

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22.7.17

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22.7.17

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22.7.17

## PRACTICALS:-TECHNIQUES

(Any seven)

1. Preparation of paper pattern for all age groups
  - (A) Creeping age
  - (B) Preschools
  - (C) For Children wear
  - (D) For men's wear
  - (E) For Ladies wear
2. Adoption of the basic block to various clothes & their stitching Saree - blouses; Salwar; Chudidhar Kameez; Petticoats; Frock; Night Dress.
3. Making samples of traditional embroideries of India (any five) :
  - (i) Kashida of Kashmir
  - (ii) Kantha of Bengal.
  - (iii) Kasuti of Karnataka
  - (iv) Kufch Kathiawar
  - (v) Phulkari of Punjab
  - (vi) Chikankari of Lacknow
  - (vii) Gold & Silver (Zari work)
4. Free hand sketching of simple objects involving various shapes & forms.
5. Drawing designs for various textile articles by adopting, principles of design.
6. Drawing & colouring a colour wheel.
7. Painting designs with different colour schemes.
8. Reducing & enlarging a design.
9. Creating various textures.

### REFERENCES -

1. Bane, A. 1974; Railoring, Magraw Hill.
2. Bane, A. 1979: Flat pattern Design, Mcgraw Hill.
3. Brary Nathalie 1978: Dress Pattern Designing London, Crossby Lockwood & Staples.
4. Gillel, D.A. Berte, B. : Figure Types & Size Ranges, Fairchild Publication.
5. Goublourn M. 1971 : Introduction pattern cutting, Grading and Modelling, London, B.T. Batsford Lts.
6. Goldsworthy 1980: Simple Dressmaking, Londown, Mills and Boon.altd.
7. Littman Connie 1977 : Pattern Making Design, Litton Educational Publishing Inc.
8. Muka A. 1979 : French Touch, Pittsburgh, Wolfson Publishing Co., Inc.

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**DURG UNIVERSITY**  
**DURG,**  
**491001 (C.G.)**

Phone No. 0788-2213300, Website: [www.durguniversity.ac.in](http://www.durguniversity.ac.in)

# **SYLLABUS**



**M.A. ENGLISH**  
**SEMESTER - I & II**  
**Session 2017-18**

## DURG UNIVERSITY

### Syllabus for M.A. English (Semester System)

#### Semester – I (2017-18)

Paper-I	: Poetry-I
Paper-II	: Drama-I
Paper-III	: Prose-I
Paper-IV	: Fiction-I
Paper-V	: History of English Literature

#### Semester – II (2017-18)

Paper-I	: Poetry-II
Paper-II	: Drama-II
Paper-III	: Prose-II
Paper-IV	: Fiction-II
Paper-V	: Modernist Poetry

#### Semester – III (2018-19)

Paper-I	: Critical Theory-I
Paper-II	: Indian Writing in English-I
Paper-III	: American Literature-I
Paper-IV	: Colonial and Post Colonial Studies-I
Paper-V	: Linguistics-I

#### Semester – IV (2018-19)

Paper-I	: Critical Theory-II
Paper-II	: Indian Writing in English-II
Paper-III	: American Literature-II
Paper-IV	: Colonial and Post Colonial Studies-II
Paper-V	: Linguistics-II

The Syllabus for M.A. English (Semester System) is hereby approved by the members of the Board of Studies.

#### Name and Signature

1. Dr. M. Chakraborty - 
2. Dr. Suchita Chakraborty - 
3. ....
4. ....
5. DR. MERILY ROY - 



**Syllabus and Marking Scheme for First/Second/Third/Fourth Semester  
Session 2017-18 & 2018-2019**

Paper No.	Title of the Paper	Marks Allotted in Theory		Marks Allotted in Internal Assessment	
		Max.	Min.	Max.	Min.
I	POETRY-I	80	16	20	04
II	DRAMA-I	80	16	20	04
III	PROSE-I	80	16	20	04
IV	FICTION-I	80	16	20	04
V	HISTORY OF ENGLISH LITERATURE	80	16	20	04
	<b>Total</b>	<b>400</b>		<b>100</b>	

Paper No.	Title of the Paper	Marks Allotted in Theory		Marks Allotted in Internal Assessment	
		Max.	Min.	Max.	Min.
I	POETRY-II	80	16	20	04
II	DRAMA-II	80	16	20	04
III	PROSE-II	80	16	20	04
IV	FICTION-II	80	16	20	04
V	MODERNIST POETRY	80	16	20	04
	<b>Total</b>	<b>400</b>		<b>100</b>	

Paper No.	Title of the Paper	Marks Allotted in Theory		Marks Allotted in Internal Assessment	
		Max.	Min.	Max.	Min.
I	CRITICAL THEORY-I	80	16	20	04
II	INDIAN WRITING IN ENGLISH-I	80	16	20	04
III	AMERICAN LITERATURE-I	80	16	20	04
IV	COLONIAL AND POST COLONIAL STUDIES-I	80	16	20	04
V	LINGUISTICS-I	80	16	20	04
	<b>Total</b>	<b>400</b>		<b>100</b>	

Paper No.	Title of the Paper	Marks Allotted in Theory		Marks Allotted in Internal Assessment	
		Max.	Min.	Max.	Min.
I	CRITICAL THEORY-II	80	16	20	04
II	INDIAN WRITING IN ENGLISH-II	80	16	20	04
III	AMERICAN LITERATURE-II	80	16	20	04
IV	COLONIAL AND POST COLONIAL STUDIES-II	80	16	20	04
V	LINGUISTICS-II	80	16	20	04
	<b>Total</b>	<b>400</b>		<b>100</b>	

**DURG UNIVERSITY**  
**SYLLABUS**

**M.A. ENGLISH I SEMESTER – SESSION 2017-2018**

**PAPER-I**  
**POETRY-I**

<b>Unit-I</b>	<b>Geoffrey Chaucer</b>	<b>: Prologue to the Canterbury Tales</b>	<b>- D</b>
	<b>Edmund Spenser</b>	<b>: Epithalamion</b>	<b>- ND</b>
<b>Unit – II</b>	<b>John Donne</b>	<b>: Death Be not Proud, Exstasie, Valediction: Forbidden Mourning</b>	<b>- D</b>
	<b>Andrew Marvel</b>	<b>: To His Coy Mistress, An Horation Ode Upon Cromwell's Return From Ireland, An Exhortation</b>	<b>- ND</b>
<b>Unit – III</b>	<b>John Milton</b>	<b>: Paradise Lost, Book-I</b>	<b>- D</b>
<b>Unit – IV</b>	<b>John Dryden</b>	<b>: Mac Flecknoe</b>	<b>- ND</b>
	<b>Alexander Pope</b>	<b>: The Rape of the Lock</b>	<b>- D</b>

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

- The Paper is divided into four units and each unit is compulsory.
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- From each Unit questions shall be asked in either of the following pattern:
  - From each Unit two descriptive questions; one from each author shall be asked.
  - Instead of one descriptive question two short answer type questions from an author (carrying 8 marks each) may also be asked.

The candidate shall be required to attempt either one essay type question or two short notes.
- Essay type questions should not exceed 400 words and will carry 16 marks and short notes should be within the limit of 200 words and will carry 8 marks.
- All questions carry equal marks. (5x16 = 80)

Name and Signature of Subject Experts

1. Dr. M. Chakrabarti *M. Chakrabarti* 2. Dr. S. Gupta *S. Gupta* 3. ....  
4. .... 5. .... 6. P.R. MERRILL *P.R. Merrill*

### Recommended Reading

- |     |  |   |   |
|-----|--|---|---|
| 1.  | Tillyard                                     | : | Milton  |
| 2.  | C.M. Bowra                                   | : | From Virgil to Milton                             |
| 3.  | B. Rajan                                     | : | Paradise Lost and 17 <sup>th</sup> Century Reader |
| 4.  | Ifor Evans                                   | : | A Short History of English Literature             |
| 5.  | Bradley                                      | : | Oxford Lectures on Poetry                         |
| 6.  | C.S. Lewis                                   | : | A Preface to Paradise Lost                        |
| 7.  | Mark Van Doren                               | : | John Dryden                                       |
| 8.  | Tillotson                                    | : | On the Poetry of Pope                             |
| 9.  | M. Mack                                      | : | Pope and his Contemporaries                       |
| 10. | Walter Jackson Bate                          | : | From Classic to Romantic                          |
| 11. | R.A. Scott James                             | : | The Making of Literature                          |
| 12. | Sengupta                                     | : | The Poems of John Donne                           |
| 13. | Edward Albert                                | : | A Short History of English Literature             |
| 14. | P. Gurrey                                    | : | The Appreciation of Poetry                        |
| 15. | Robert Penn (Ed.)<br>Warren & Albert Erskine | : | Six Centuries of Great Poetry                     |
| 16. | P. Gurrey                                    | : | The Appreciation of Poetry                        |
| 17. | Boris Ford (Ed.)                             | : | A Guide to English Literature (Seven Volumes)     |

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**M.A. ENGLISH I SEMESTER – SESSION 2017-2018**  
**PAPER-II**  
**DRAMA-I**



Unit-I	Christopher Marlowe	: The Tragical History of Dr. Faustus	- D
	Ben Johnson	: The Alchemist	- ND
Unit-II	John Webster	: The Duchess of Malfi	- D
	William Shakespeare	: Macbeth	- ND
Unit-III	William Shakespeare	: Hamlet	- D
Unit-IV	William Shakespeare	: Tempest	- D
	William Shakespeare	: As You Like It	- ND


**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

- The Paper is divided into four units and each unit is compulsory.
- Question I will consist of 8 passages for explanation with reference to the context from the texts prescribed for detailed study, out of which 4 are to be attempted. Each annotation will carry 4 marks. (4x4 = 16)
- Candidates will answer four other questions from Unit-I to Unit-IV, carrying 16 marks each.
- From each Unit questions shall be asked in either of the following pattern:
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The candidate shall be required to attempt either one essay type question or two short notes.
- Essay type questions should not exceed 400 words and will carry 16 marks and short notes should be within the limit of 200 words and will carry 8 marks.
- All questions carry equal marks. (5x16 = 80)

Name and Signature of Subject Experts

1. Dr. M. Chakrabarty  2. Dr. S. Gupta  3. ....

4. .... 5. .... 6. DR. MERILY ROY 

### Recommended Reading

- |    |                     |   |   |
|----|---------------------|---|---|
| 1. | A.C. Bradley        | : | Shakespearean Tragedy                                     |
| 2. | G. Wilson Knight    | : | The Essential Shakespeare                                 |
| 3. | Boas                | : | Marlowe   |
| 4. | Clough Douglas      | : | Evil and Suffering in the Play                            |
| 5. | A.L. Williams (Ed.) | : | Twentieth Century Interpretations of the works of Marlowe |
| 6. | Nicoll              | : | Theory of Drama   |
| 7. | Marjouri Boulton    | : | Anatomy of Drama  |
| 8. | Compton-Rickett     | : | History of English Literature                             |
| 9. | Wilson Knight       | : | Wheels of Fire  |



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**M.A. ENGLISH I SEMESTER – SESSION 2017-2018**

**PAPER-III**

**PROSE-I**

Unit-I	Francis Bacon	: Of Studies, Of Truth, Of Revenge, Of Great Place	- D
Unit-II	Thomas Browne	: Urn Burial	- ND
	John Milton	: Arcopagitica	- D
Unit-III	Addison & Steele	: Coverley Paper- Essays: 1, 110, 112, 117, 119	- D
	James Boswell	: Life of Dr. Johnson	- ND
Unit-IV	Montaigne	: (Florio's Translation) Of Idleness, Of Readie or Slow Speech, That We Should not Judge of Our Happinesse until after Our Death	- D
	Rousseau	: Confessions	- ND

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

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- Question 1 will consist of 8 passages for explanation with reference to the context from the texts prescribed for detailed study, out of which 4 are to be attempted. Each annotation will carry 4 marks. (4x4 = 16)
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- From each Unit questions shall be asked in either of the following pattern:
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  - Instead of one descriptive question two short answer type questions from an author (carrying 8 marks each) may also be asked.

The candidate shall be required to attempt either one essay type question or two short notes.
- Essay type questions should not exceed 400 words and will carry 16 marks and short notes should be within the limit of 200 words and will carry 8 marks.
- All questions carry equal marks. (5x16 = 80)

Name and Signature of Subject Experts

1. Dr. M. Chakrabarti

2. Dr. S. Ghosh

3. Dr. S. Ghosh

4. ....

5. ....

6. DR. MEKILY ROY

*[Signature]*

### Recommended Reading

- |    |  |   |  |
|----|--|---|--|
| 1. | Sukanta Chowdhary                        | : | Bacon's Essays                             |
| 2. | Hugh Walker                              | : | English Essays and Essayists               |
| 3. | Dobre                                    | : | English Prose Style                        |
| 4. | Smithens                                 | : | Life of Joseph Addison                     |
| 5. | B. Prasad                                | : | An Introduction of the Study of Literature |
| 6. | Montaigne                                | : | Florio's Translation                       |
| 7. | W.H. Hudson                              | : | An Outline History of English Literature   |
| 8. | Oxford's World Literature in Digest Form |   |  |

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**M.A. ENGLISH I SEMESTER – SESSION 2017-2018**  
**PAPER-IV**  
**FICTION-I**

Unit-I	John Bunyan Daniel Defoe	: The Pilgrim's Progress : Robinson Crusoe
Unit-II	Henry Fielding Oliver Goldsmith	: Joseph Andrews : The Vicar of Wakefield
Unit-III	Sir Walter Scott Jane Austen	: Ivanhoe : Pride & Prejudice
Unit-IV	Charles Dickens Thomas Hardy	: Great Expectations : Tess of the D'Urvilles

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

1. The Paper is divided into 4 units and each unit is compulsory.
2. Candidates shall answer 4 essay type questions from Unit I to IV, carrying 16 marks each.
3. The fifth question will comprise of 4 short notes (One from each Unit) out of which 2 are to be attempted.
4. Essay type answers should not exceed 400 words and will carry 16 marks, short notes should be within the limit of 200 words and will carry 8 marks. (8x2 = 16)
5. All questions shall carry equal marks. (16x5 = 80)

Name and Signature of Subject Experts

1. Dr. M. Chakraborty  2. Dr. S. Gupta  3. ....  
4. .... 5. .... 6. Dr. MERILY Roy 



### Recommended Reading

- |    |                 |   |  |
|----|-----------------|---|--|
| 1. | M. Bruce        | : | Representative English Novels                |
| 2. | K. Arnold       | : | An Introduction to English Novel Vol. I & II |
| 3. | Beach J. Warren | : | The Technique of Thomas Hardy                |
| 4. | Edwin Muir      | : | The Structure of the Novel                   |
| 5. | Walter Allen    | : | The English Novel                            |
| 6. | David Cecil     | : | Hardy- The Novelist                          |

**DURG UNIVERSITY**  
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**M.A. ENGLISH I SEMESTER – SESSION 2017-2018**

**PAPER-V**

**The History of English Literature**

**Unit-I**

**The Age of Chaucer (1350-1400)**

1. Development of Poetry in the Age of Chaucer
2. Development of Prose during the Age of Chaucer

**The Age of Shakespeare (1558-1625)**

3. The Renaissance and its influence on Elizabethan Literature
4. University wits and their contribution to the Pre-Shakespearean Drama
5. Elizabethan sonnets and sonneteers
6. Development of English Prose during the latter half of the 16<sup>th</sup> century

**The Age of Milton (1625-1660)**

7. The Puritan Movement in the Age of Milton
8. The Metaphysical Poetry and the poets
9. Cavalier poetry and the Cavalier poets
10. Development of Prose during the Age of Milton

**Unit-II**

**The Restoration Period (1660-1700)**

1. Social, Political and Literary tendencies of the Age.
2. Restoration Satire and Satirists
3. The comedy of manners and the dramatists of this school
4. English Novel in the latter half of the 17<sup>th</sup> Century

**The Age of Pope (1700-1750)**

5. 18<sup>th</sup> Century as an age of Prose & Reason
6. The growth of the 'Periodical Essays' and the causes of its popularity
7. 'Coverley Papers' as the first sketch of the English Novel.

**The Age of Transition/The Age of Dr. Johnson (1750-1798)**

8. Salient features of the Poetry of the 'Transitional Age'
9. The precursors of the 'Romantic Revival' or the poets of Revolt
10. The French Revolution and its influence on English literature
11. The 'Four Wheels' of the novel of the 18<sup>th</sup> Century

**Unit-III**

**The Age of Romanticism (1798-1832)**

1. Characteristics of 'Romanticism'
2. The Romantic Movement as 'The Renaissance of the Wonder'

3. Prose of the age of Romanticism
4. Novel of the age of Romanticism

#### **The Victorian Age (1832-1887)**

1. Salient features of Victorian Poetry
2. The Spasmodic School of Poetry
3. The Pre-Raphaelite Movement in English Poetry and its chief exponents
4. The Oxford Movement
5. Victorian novels and the novelists
6. Women novelists and the Victorian Era

#### **Unit-IV**

#### **The Modern Age/The Age of Interrogation (1890-1950)**

1. General characteristics of the Age
2. Poetry;
  - a. The Transitional poets (Robert Bridges, Hopkins, Yeats)
  - b. The Georgian Poets
  - c. The War Poets
  - d. The Imagist Movement and its exponents
  - e. The Neo-Metaphysical
3. The English Essays and the Essayists during the 20<sup>th</sup> Century
4. Drama in the 20<sup>th</sup> Century
  - a. The Expressionistic School of Drama
  - b. The Problem Play of the 20<sup>th</sup> Century
  - c. The Poetic Drama and the Dramatists
  - d. The Theatre of the Absurd
5. The Stream of Consciousness Novel

#### **DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

1. The Paper is divided into 4 units and each unit is compulsory.
2. Candidates shall answer 4 essay type questions from Unit I to IV, carrying 16 marks each.
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5. All questions shall carry equal marks. (16x5 = 80)

Name and Signature of Subject Experts

- |                       |                 |                   |
|-----------------------|-----------------|-------------------|
| 1. Dr. M. Chakrabarti | 2. Dr. S. Gupta | 3. ....           |
| 4. ....               | 5. ....         | 6. DR. MERILY ROY |

### Recommended Reading

- |    |                                   |   |  |
|----|-----------------------------------|---|--|
| 1. | W.H. Hudson                       | : | An Outline History of English Literature     |
| 2. | Compton-Rickett                   | : | A History of English Literature              |
| 3. | Ifor Evans                        | : | A Short History of English Literature        |
| 4. | Edward Albert                     | : | A Short History of English Literature        |
| 5. | Emile Legouis                     | : | A Short History of English Literature        |
| 6. | Emile Legouis &<br>Louis Cazamian | : | A History of English Literature              |
| 7. | B. Prasad                         | : | A Short History of English Poetry            |
| 8. | B.P. Bagchi                       | : | Pages From the History of English Literature |

**DURG UNIVERSITY**  
**SYLLABUS**

**M.A. ENGLISH II SEMESTER – SESSION 2017-2018**

**PAPER-I**  
**POETRY-II**

<b>Unit-I</b>	<b>Thomas Gray</b>	<b>: Elegy Written in a Country Churchyard - D</b>	
	<b>William Blake</b>	<b>: The Lamb, The Chimney Sweeper</b>	<b>- ND</b>
<b>Unit – II</b>	<b>William Wordsworth</b>	<b>: Immortality Ode, Tintern Abbey</b>	<b>- D</b>
	<b>Samuel Taylor Coleridge</b>	<b>: Kubla Khan,</b>	
		<b>The Rime of the Ancient Mariner</b>	<b>- ND</b>
<b>Unit – III</b>	<b>P.B. Shelley</b>	<b>: Adonais, Stanzas Written in Dejection</b>	<b>- ND</b>
	<b>John Keats</b>	<b>: Ode to a Nightingale</b>	
		<b>Ode On a Grecian Urn</b>	
		<b>Ode On Melancholy</b>	<b>-D</b>
<b>Unit – IV</b>	<b>Alfred Tennyson</b>	<b>: Lotus Eaters, Ulysses</b>	<b>- ND</b>
	<b>Robert Browning</b>	<b>: My Last Duchess, The Last Ride</b>	
		<b>Together, Prospice</b>	<b>-D</b>

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

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- Question I will consist of 8 passages for explanation with reference to the context from the texts prescribed for detailed study, out of which 4 are to be attempted. Each annotation will carry 4 marks. (4x4 = 16)
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- Essay type questions should not exceed 400 words and will carry 16 marks and short notes should be within the limit of 200 words and will carry 8 marks.
- All questions carry equal marks. (5x16 = 80)

Name and Signature of Subject Experts

1. Dr. M. Chakraborty

2. Dr. S. Gupta

3.

4.

5.

6. Dr. MEKILY Roy

*[Signature]*

### Recommended Reading

- |    |                        |  |
|----|------------------------|--|
| 1. | Oxford's Fifteen Poets |  |
| 2. | Basis Welley           | : The Eighteenth Century Background                              |
| 3. | J. Jackson             | : Collected Coleridge  |
| 4. | Graham Hough           | : The Romantic Poets   |
| 5. | Herbert Read           | : The True Voice of Feelings: Studies in English Romantic Poetry |
| 6. | John Spencer Hill      | : The Romantic Imagination                                       |
| 7. | F.R. Leavis            | : Revaluation: Tradition and Development in English Poetry       |



**DURG UNIVERSITY**  
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**M.A. ENGLISH II SEMESTER – SESSION 2017-2018**

**PAPER-II**  
**DRAMA-II**

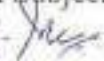


Unit-I	W. Congreve	: The Way of the World	- ND
	Oliver Goldsmith	: She Stoops to Conquer	- D
Unit-II	J.M. Synge	: The Shadow of the Glen	- ND
	G.B. Shaw	: St. Joan	- D
Unit-III	Samuel Becket	: Waiting for Godot	- D
	John Osborne	: Look Back in Anger	- ND
Unit-IV	Ibsen	: A Doll's House	- D
	Antony Chekov	: The Cherry Orchard	- ND

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

- The Paper is divided into four units and each unit is compulsory.
- Question I will consist of 8 passages for explanation with reference to the context from the texts prescribed for detailed study, out of which 4 are to be attempted. Each annotation will carry 4 marks. (4x4 = 16)
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- All questions carry equal marks. (5x16 = 80)

Name and Signature of Subject Experts

1. Dr. M. Chakraborty  2. Dr. S. Gupta  3. ....  
4. .... 5. .... 6. Dr. MERILY ROY 

### Recommended Reading

1. J.L. Styon : Modern Drama in Theory and Practice
2. Nicoll : Theory of Drama
3. John Russell Browne : Modern British Dramatists: A Collection of Critical Essays
4. Martin Esslin : The Theater of the Absurd
5. Martin Esslin : Absurd Drama
6. Ibsen's Doll's House Special Introduction by Ezekiel



**DURG UNIVERSITY**  
**SYLLABUS**

**M.A. ENGLISH II SEMESTER – SESSION 2017-2018**

**PAPER-III**

**PROSE-II**

Unit-I	Charles Lamb	: Dream Children, Imperfect Sympathies Dissertation upon a Roast Pig	- D
	William Hazlitt	: On Going a Journey, On the Ignorance of the Learned	- ND
Unit-II	Thomas Carlyle	: Hero as a Poet	- D
	John Ruskin	: Sesame & Lilies	- ND
Unit-III	Robert Lynd	: The Darkness, The Pleasure of Ignorance- ND (From "A Book of English Essays selected by W.E. Williams", Penguin Books)	
	A.G. Gardiner	: On Painted Face, On Smiles, On Saying "Please"-D	
Unit-IV	J.B. Priestley	: On Doing Nothing My First Article Money For Nothing	- ND
	Aldous Huxley	: Tragedy and the Whole Truth Selected Snobberies	- D

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

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- All questions carry equal marks. (5x16 = 80)

Name and Signature of Subject Experts

1. Dr. M. Chakrabarty

2. Dr. S. Chatterjee

3. Dr. M. Chatterjee

4. ....

5. ....

6. Dr. Merily Roy

### Recommended Reading

- |    |                           |   |                              |
|----|---------------------------|---|------------------------------|
| 1. | Hugh Walker               | : | English Essays and Essayists |
| 2. | MacMillan Edition         | : | Art of the Essayist          |
| 3. | Dobre                     | : | English Prose Style          |
| 4. | Prakash Book Depot (Pub.) | : | Masters of English Prose     |

**DURG UNIVERSITY**  
**SYLLABUS**

**M.A. ENGLISH II SEMESTER – SESSION 2017-2018**

**PAPER-IV**  
**FICTION-II**

<b>Unit-I</b>	<b>James Joyce</b> <b>Virginia Woolf</b>	<b>: Portrait of the Artist as a Young Man</b> <b>: Mrs. Dalloway</b>
<b>Unit-II</b>	<b>D.H. Lawrence</b> <b>E.M. Forster</b>	<b>: Sons &amp; Lovers</b> <b>: A Passage to India</b>
<b>Unit-III</b>	<b>Graham Greene</b> <b>William Golding</b>	<b>: Power and the Glory</b> <b>: The Lord of the Flies</b>
<b>Unit-IV</b>	<b>Gustave Flaubert</b> <b>Dostovesky</b>	<b>: Madam Bovary</b> <b>: Crime and Punishment</b>

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

1. The Paper is divided into 4 units and each unit is compulsory.
2. Candidates shall answer 4 essay type questions from Unit I to IV, carrying 16 marks each.
3. The fifth question will comprise of 4 short notes (One from each Unit) out of which 2 are to be attempted.
4. Essay type answers should not exceed 400 words and will carry 16 marks, short notes should be within the limit of 200 words and will carry 8 marks. (8x2 = 16)
5. All questions shall carry equal marks. (16x5 = 80)

Name and Signature of Subject Experts

1. Dr. M. Chakrabarty

2. Dr. Suchin Gupta

3. Dr. Anjali

4. ....

5. ....

6. DR. MERILY ROY

### Recommended Reading

- |    |                  |   |   |
|----|------------------|---|---|
| 1. | Malcolm Bradbury | : | The Modern British Novel                    |
| 2. | M. Bruce         | : | Representative English Novels               |
| 3. | Casebook Series  | : | D.H. Lawrence, E.M. Forster, Virginia Woolf |
| 4. | J.W. Beach       | : | Twentieth Century Novel                     |
| 5. | E.A. Baker       | : | The History of English Novel Vol. IX        |

**DURG UNIVERSITY**  
**SYLLABUS**

**M.A. ENGLISH II SEMESTER – SESSION 2017-2018**

**PAPER-V**

**Modernist Poetry**

Unit-I	G.M. Hopkins	:	Pied Beauty, Felix Randal, The Wind Hover, God's Grandeur	-ND
	W.B. Yeats	:	The Second Coming, Sailing to Byzantium, Easter 1916	-D
Unit-II	T.S. Eliot	:	The Waste Land	-D
Unit-III	W.H. Auden	:	The Shield of Achilles, September 1, 1937, Spain	-D
	Dylan Thomas	:	Fernhill, Do Not Go Gentle Into That Good Night, Death Shall Have No Domain	-ND
Unit-IV	Khalil Gibran	:	The Prophet	-D
	Omar Khayyam	:	Rubaiyat (No. 7, 49, 51, 67, 69, 70, 73) (Translated by Edward Fitzgerald)	-ND

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

- The Paper is divided into four units and each unit is compulsory.
- Question I will consist of 8 passages for explanation with reference to the context from the texts prescribed for detailed study, out of which 4 are to be attempted. Each annotation will carry 4 marks. (4x4 = 16)
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- Essay type questions should not exceed 400 words and will carry 16 marks and short notes should be within the limit of 200 words and will carry 8 marks.
- All questions carry equal marks. (5x16 = 80)

Name and Signature of Subject Experts

1. Dr. M. Chakraborty

2. Dr. S. Ghosh

3. ....

4. ....

5. ....

6. Dr. Manab Ray

### Recommended Reading

1. Faber book of Modern Verse
2. J.P. Sen : The Progress of T.S. Eliot as Poet and Critic
3. J.P. Sen : Five Modern Poets
4. Paramhansa Yogananda : The Rubaiyat of Omar Khayyam Explained  
(Motilal Banarasidhar Pub. Pvt. Ltd., Delhi)

**DURG UNIVERSITY**  
**DURG,**  
**491001 (C.G.)**

Phone No. 0788-2213300, Website: [www.durguniversity.ac.in](http://www.durguniversity.ac.in)

# **SYLLABUS**



**M.A. ENGLISH**  
**SEMESTER - III & IV**  
**Session 2018-19**



## DURG UNIVERSITY

### Syllabus for M.A. English (Semester System)

#### Semester – I (2017-18)

- Paper-I : Poetry-I  
Paper-II : Drama-I  
Paper-III : Prose-I  
Paper-IV : Fiction-I  
Paper-V : History of English Literature

#### Semester – II (2017-18)

- Paper-I : Poetry-II  
Paper-II : Drama-II  
Paper-III : Prose-II  
Paper-IV : Fiction-II  
Paper-V : Modernist Poetry

#### Semester – III (2018-19)


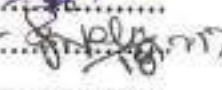

- Paper-I : Critical Theory-I  
Paper-II : Indian Writing in English-I  
Paper-III : American Literature-I  
Paper-IV : Colonial and Post Colonial Studies-I  
Paper-V : Linguistics-I

#### Semester – IV (2018-19)

- Paper-I : Critical Theory-II  
Paper-II : Indian Writing in English-II  
Paper-III : American Literature-II  
Paper-IV : Colonial and Post Colonial Studies-II  
Paper-V : Linguistics-II

The Syllabus for M.A. English (Semester System) is hereby approved by the members of the Board of Studies.

#### Name and Signature

1. Dr. M. Chakraborty - 
2. Dr. Suchilika Gupta - 
3. ....
4. ....
5. Dr. Merily Roy - 



**Syllabus and Marking Scheme for First/Second/Third/Fourth Semester  
Session 2017-18 & 2018-2019**

Paper No.	Title of the Paper	Marks Allotted in Theory		Marks Allotted in Internal Assessment	
		Max.	Min.	Max.	Min.
I	POETRY-I	80	16	20	04
II	DRAMA-I	80	16	20	04
III	PROSE-I	80	16	20	04
IV	FICTION-I	80	16	20	04
V	HISTORY OF ENGLISH LITERATURE	80	16	20	04
	Total	400		100	

Paper No.	Title of the Paper	Marks Allotted in Theory		Marks Allotted in Internal Assessment	
		Max.	Min.	Max.	Min.
I	POETRY-II	80	16	20	04
II	DRAMA-II	80	16	20	04
III	PROSE-II	80	16	20	04
IV	FICTION-II	80	16	20	04
V	MODERNIST POETRY	80	16	20	04
	Total	400		100	

Paper No.	Title of the Paper	Marks Allotted in Theory		Marks Allotted in Internal Assessment	
		Max.	Min.	Max.	Min.
I	CRITICAL THEORY-I	80	16	20	04
II	INDIAN WRITING IN ENGLISH-I	80	16	20	04
III	AMERICAN LITERATURE-I	80	16	20	04
IV	COLONIAL AND POST COLONIAL STUDIES-I	80	16	20	04
V	LINGUISTICS-I	80	16	20	04
	Total	400		100	

Paper No.	Title of the Paper	Marks Allotted in Theory		Marks Allotted in Internal Assessment	
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III	AMERICAN LITERATURE-II	80	16	20	04
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V	LINGUISTICS-II	80	16	20	04
	Total	400		100	

**DURG UNIVERSITY**  
**SYLLABUS**

**M.A. ENGLISH III SEMESTER – SESSION 2018-2019**

**PAPER-I**


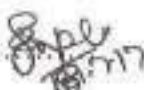
**Critical Theory-I From Aristotle to Walter Pater**

Unit-I	Aristotle	:	Poetics (Classical European Theory)
Unit-II	Longinus	:	On the Sublime (Classical European Theory)
	Philip Sidney	:	An Apology for Poetry
Unit-III	William Wordsworth	:	Preface to Lyrical Ballads
	S.T. Coleridge	:	Biographia Literaria Ch. XIII to XVII
Unit-IV	Mathew Arnold	:	Essays in Criticism
	Walter Pater	:	Appreciations

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

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3. The fifth question will comprise of 4 short notes (One from each Unit) out of which 2 are to be attempted.
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5. All questions shall carry equal marks. (16x5 = 80)

Name and Signature of Subject Experts

1. Dr. M. Chakrabarti -  2. S. Gupta  3. ....

4. ....

5. ....

6. DR. MERILY Ray 

### Recommended Reading

- |     |                     |   |  |
|-----|---------------------|---|--|
| 1.  | Brooks, Cleanth     | : | Irony as a Principle of Structure  |
| 2.  | Brooks, Cleanth     | : | The Making of Literature   |
| 3.  | Seldon, Roman (ed.) | : | The Theory of Criticism from Plato to the Present                          |
| 4.  | Dalton, John        | : | From Literary Theory and Criticism, London,<br>Longman Green & Co. 1931    |
| 5.  | Eliot, T.S.         | : | The Use of Poetry and the use of Criticism                                 |
| 6.  | Daiches, David      | : | Critical Approach to Literature (London, 1964)                             |
| 7.  | M.H. Abrams         | : | The Mirror and the Lamp-Romantic Theory and<br>the Critical Tradition      |
| 8.  | George Saintsbury   | : | A History of Criticism & Literary taste in Europe                          |
| 9.  | Wimsatt W.K.        | : | Literary Criticism Cleanth Brooks  |
| 10. | Butcher (ed.)       | : | Aristotle's Poetics  |
| 11. | J.W.H. Atkins       | : | English Literary Criticism 17 <sup>th</sup> and 18 <sup>th</sup> Centuries |

**DURG UNIVERSITY**  
**SYLLABUS**

**M.A. ENGLISH III SEMESTER – SESSION 2018-2019**

**PAPER-II**

**Indian Writing in English-I**

Unit-I	Toru Dutt	:	Savitri, The Lotus, Our Casuarina Tree	-ND
	Rabindranath Tagore	:	Gitanjali (First Twenty Five Songs)	-D
Unit-II	Kamla Das	:	The Freaks, A Hot Noon in Malabar, The Looking Glass, The Sunshine Cat	-ND
	Nissim Ezekiel	:	Enterprise, Poet, Lover, Birdwatcher, Night of the Scorpion	-D
Unit-III	M.K. Gandhi	:	The Story of My Experiments with Truth	-D
	J.L. Nehru	:	Discovery of India (Last ten chapters)	-ND
Unit-IV	Mulk Raj Anand	:	Two Leaves and a Bud	-ND
	R.K. Narayan	:	The English Teacher	-D

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

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Name and Signature of Subject Experts

1. Dr. M. Chakrabarti

2. Dr. S. Gupta

3. ....

4. ....

5. ....

6. DR. MERILY ROY

*[Signature]*

### Recommended Reading

1. K.R. Srinivasa Iyengar : Indian Writing in English
2. Gokak, V.K. : English in India: Its Present and Future
3. Sarang, Vilas : Indian English Poetry since 1950: An Anthology
4. Pccradena Saleem : Contemporary Indian Poetry in English (ed.) :  
An Assessment and Selection
5. M.K. Naik (ed.) : Aspects of Indian Writing in English (Macmillan)
6. Parthasarthy, R. (ed.) : Ten Twentieth Century Indian Poets (Poems by Keki  
N. Daruwalla, Kamala Das, Nissim Ezekiel, Jayant  
Mahapatra, A.K. Ramanujan)



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**M.A. ENGLISH III SEMESTER – SESSION 2018-2019**

**PAPER-III**

**American Literature-I**

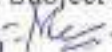
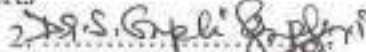

Unit-I	Edgar Allen Poe	: Dream Land, The Raven	- ND
	Walt Whitman	: Song of Myself	- D
Unit-II	Emily Dickinson	: The Soul Selects Its Own Society	- D
		Hope is the thing with Feathers,	
		I felt a Funeral in My Brain	
		After Great Pain a Formal Feeling Comes	
	Wallace Stevens	: The Emperor of Ice-Cream,	- ND
		Sunday Morning	
Unit-III	Robert Frost	: Stopping by the Woods.....	- D
		Birches, Departmental	
	Sylvia Plath	: Daddy, Lady Lazarus,	-ND
		The Bee Meeting	
Unit-IV	Ralph Waldo Emerson	: Self-Reliance	-D
	Henry David Thoreau	: Civil Disobedience	-ND

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

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Name and Signature of Subject Experts

1. Dr. M. Chakrabarty  2. Dr. S. Gupta  3. ....  
4. .... 5. .... 6. Dr. Merily Roy 

### Recommended Reading

1. Forester Norman : American Poetry and Prose V. 4
2. Cox, James M. (ed.) : Robert Frost : Twentieth Century Views.
3. Pearce, Roy Harvey : Whitman : Twentieth Century Views.
4. Barroff, Marie (ed.) : Wallace Stevens : 20<sup>th</sup> Century Views.

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**M.A. ENGLISH III SEMESTER – SESSION 2018-2019**

**PAPER-IV**

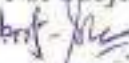

**Colonial & Post Colonial Studies-I**

Unit-I	Leela Gandhi	:	Post Colonial Theory (Post-colonialism & Feminism, The Limits of Post-colonial Theory)
	Homi Bhabha	:	The Other Question
Unit-II	Raja Rao	:	Kanthapura
	Arun Joshi	:	Foreigner
Unit-III	V.S. Naipaul	:	A House for Mr. Biswas
	Arundhati Roy	:	The God of Small Things
Unit-IV	Amitav Ghosh	:	The Glass Palace
	Jhumpa Lahiri	:	Namesake

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

1. The Paper is divided into 4 units and each unit is compulsory.
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5. All questions shall carry equal marks. (16x5 = 80)

Name and Signature of Subject Experts

1. Dr. M. Chakrabarti  2. Dr. S. Gupta  3. ....

4. ....

5. ....

6. Dr. M. K. Roy 



### Recommended Reading

- |    |                                     |   |  |
|----|-------------------------------------|---|--|
| 1. | Appiah, K.A.                        | : | In My Father's House: Africa in the<br>Philosophy of Culture |
| 2. | Ashcroft, B., Griffiths, G., Tiffin | : | The Empire Writes Back                                       |
| 3. | Bhabha, H.                          | : | Literature, Politics & Theory                                |
| 4. | Forster, E.M.                       | : | A Passage to India   |
| 5. | Fanon, F.                           | : | A Dying Colonialism  |
|    |                                     | : | Black Skin, White Masks                                      |
|    |                                     | : | The Wretched of the Earth                                    |

**DURG UNIVERSITY**  
**SYLLABUS**

**M.A. ENGLISH III SEMESTER – SESSION 2018-2019**

**PAPER-V**  
**Linguistics-I**

- Unit-I**
- 1) What is Language? Characteristics of Language.
  - 2) What is Linguistics? Linguistics as a Science.
  - 3) Synchronic, Diachronic and Historical Linguistics
- Unit-II**
- 1) Scope, Levels and Branches of Linguistics
  - 2) Langue and Parole, Competence and Performance
- Unit-III**
- 1) Sociolinguistics: Theories of language variation (Dialect and Socio-dialect, Code, iso-gloss, Registers)
  - 2) Psycholinguistics: Theories of Language Acquisition (Empirical/ Behavioral approach and Rationalistic Approach)
- Unit-IV**
- 1) Morphology: Morphemes, Allomorphs, Free and Bound Morphemes, Zero Morphemes.
  - 2) Introduction to Phrase Structure (P S rules) (Syntax NP-VP)
  - 3) I.C. Analysis, Limitations of I.C. Analysis
  - 4) Models of I.C. Analysis

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

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Name and Signature of Subject Experts

- |                       |                |                   |
|-----------------------|----------------|-------------------|
| 1. Dr. M. Chakrabarti | 2. Dr. S. Saha | 3. ....           |
| 4. ....               | 5. ....        | 6. DR. MERILY ROY |

### Recommended Reading

- |    |                |   |   |
|----|----------------|---|---|
| 1. | D. Crystal     | : | Linguistics   |
| 2. | S.K. Verma     | : | Modern Linguistics: An Introduction N. Krishnaswamy |
| 3. | Saussure       | : | Course in General Linguistics                       |
| 4. | C.F. Hockett   | : | A Course in Modern Linguistics                      |
| 5. | R. Quirk (Ed.) | : | A Grammar of Contemporary English                   |
| 6. | Chomsky        | : | Reflections of Language                             |

**DURG UNIVERSITY**  
**SYLLABUS**

**M.A. ENGLISH IV SEMESTER – SESSION 2018-2019**

**PAPER-I**

**Critical Theory- II**

Unit-I	I.A. Richards	:	Communication and the Artist, Analysis of a Poem
	T.S. Eliot	:	Tradition and the Individual Talent
Unit-II	Bharata	:	Natyashastra (Rasa & Bhava Theory)
	Anandavardhanacharya:		Dhvanyaloka (Dhvani Theory)
Unit-III	Saussure	:	Nature of the Linguistic Sign
	Cleanth Brooks	:	The Language of Paradox
Unit-IV	Sigmund Freud	:	Creative Writers and Daydreaming
	Elaine Showalter	:	Feminist Criticism in Wilderness

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

1. The Paper is divided into 4 units and each unit is compulsory.
2. Candidates shall answer 4 essay type questions from Unit I to IV, carrying 16 marks each.
3. The fifth question will comprise of 4 short notes (One from each Unit) out of which 2 are to be attempted.
4. Essay type answers should not exceed 400 words and will carry 16 marks, short notes should be within the limit of 200 words and will carry 8 marks. (8x2 = 16)
5. All questions shall carry equal marks. (16x5 = 80)

Name and Signature of Subject Experts

- |                       |                 |                   |
|-----------------------|-----------------|-------------------|
| 1. Dr. M. Chakraborty | 2. Dr. S. Gupta | 3. ....           |
| 4. ....               | 5. ....         | 6. Dr. MERILY Roy |

### Recommended Reading

- |                           |   |
|---------------------------|---|
| 1. Sean Lucy              | : T.S. Eliot and the Idea of Tradition                        |
| 2. J.P. Sen               | : The Progress of T.S. Eliot as Poet and Critic               |
| 3. Raman Selden           | : The Theory of Criticism from Plato to the Present: A Reader |
| 4. David Lodge            | : Modern Criticism and Theory                                 |
| 5. Gayle & Green          | : Making a difference Feminist Literary Criticism             |
| 6. Dr. N.P. Unni          | : Natyashastra Vol. 1-4                                       |
| 7. V. Raghavan & Nagendra | : An Introduction to Indian Poetics                           |
| 8. Dr. Kapil Kapoor       | : Literary Theory: Indian Conceptual Frame-Work               |
| 9. V.S. Senturaman        | : Indian Aesthetics: An Introduction                          |
| 10. G.N. Devy             | : Indian Literary Criticism                                   |

**DURG UNIVERSITY**  
**SYLLABUS**

**M.A. ENGLISH IV SEMESTER – SESSION 2018-2019**

**PAPER-II**

**Indian Writing in English- II**



Unit-I	A.K. Ramanujan	: A River, Obituary, Love Poem For a Wife (From Ten Twentieth Century Poets (OUP))	-ND
	Jayant Mahapatra	: Indian Summer, A Missing Person, Dawn at Puri	- D
Unit-II	N.C. Choudhary	: The Autobiography of an Unknown Indian	- ND
	Dr. A.P.J. Abdul Kalam	: Ignited Minds	- D
Unit-III	Anita Desai	: Cry the Peacock	-ND
	Girish Karnad	: Tughlaq: A Play in Thirteen Scenes	- D
Unit-IV	Shashi Deshpande	: The Dark holds no Terror	-D
	Mahesh Dattani	: Final Solution	-ND

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

- The Paper is divided into four units and each unit is compulsory.
- Question I will consist of 8 passages for explanation with reference to the context from the texts prescribed for detailed study, out of which 4 are to be attempted. Each annotation will carry 4 marks. (4x4 = 16)
- Candidates will answer four other questions from Unit-I to Unit-IV, carrying 16 marks each.
- From each Unit questions shall be asked in either of the following pattern:
  - From each Unit two descriptive questions; one from each author shall be asked.
  - Instead of one descriptive question two short answer type questions from an author (carrying 8 marks each) may also be asked.

The candidate shall be required to attempt either one essay type question or two short notes.
- Essay type questions should not exceed 400 words and will carry 16 marks and short notes should be within the limit of 200 words and will carry 8 marks.
- All questions carry equal marks. (5x16 = 80)

Name and Signature of Subject Experts

1. Dr. M. Chakrabarti -  2. Dr. S. B. S.  3. ....

4. ....

5. ....

6. DR. MERILY Roy 

### **Recommended Reading**

- |                          |   |
|--------------------------|---|
| 1. V.K. Gokak            | : English in India: It's Present and Future |
| 2. K.R. Srinivas Iyengar | : Indian Writing in English                 |
| 3. S. Radhakrishnan      | : Recovery of Faith                         |
| 4. M.K. Naik             | : Aspects of Indian Writing in English      |



**DURG UNIVERSITY**  
**SYLLABUS**

**M.A. ENGLISH IV SEMESTER – SESSION 2018-2019**

**PAPER-III**




**American Literature- II**

Unit-I	Eugene O'Neil	:	The Hairy Ape
	Thompton Wilder	:	Our Town
Unit-II	Arthur Miller	:	Death of a Salesman
	Tennessee Williams	:	The Glass Menagerie
Unit-III	William Faulkner	:	The Sound and the Fury
	Ernest Hemingway	:	The Old Man and the Sea
Unit-IV	N. Hawthorne	:	The Scarlet Letter
	Mark Twain	:	Adventures of Huckleberry Finn

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

1. The Paper is divided into 4 units and each unit is compulsory.
2. Candidates shall answer 4 essay type questions from Unit I to IV, carrying 16 marks each.
3. The fifth question will comprise of 4 short notes (One from each Unit) out of which 2 are to be attempted.
4. Essay type answers should not exceed 400 words and will carry 16 marks, short notes should be within the limit of 200 words and will carry 8 marks. (8x2 = 16)
5. All questions shall carry equal marks. (16x5 = 80)

Name and Signature of Subject Experts

1. Dr. M. Chakraborty  2. Dr. S. Gupta  3. ....
4. .... 5. .... 6. Dr. Merily Roy 



### Recommended Reading

- |                       |  |
|-----------------------|--|
| 1. S. Bradley         | : The American Tradition in Literature |
| 2. Rober Weeks (ed.)  | : Hemingway: Twentieth Century Views   |
| 3. Henry Nash Smith   | : Mark Twain: Twentieth Century Views  |
| 4. John Gassner (ed.) | : O'Neil : Twentieth Century Views     |
| 5. A.N. Kaul (ed.)    | : Hawthorne: Twentieth Century Views   |

**DURG UNIVERSITY**  
**SYLLABUS**

**M.A. ENGLISH IV SEMESTER – SESSION 2018-2019**

**PAPER-IV**


**Colonial and Post Colonial Studies- II**

Unit-I	Ashcroft, B., Griffiths, G., and Tiffin, H. Ania Loomba	:	The Empire Writes Back (Introduction & Chapter 1: Cutting the Ground) Colonialism/Post Colonialism (Chapter-1 – Pages 1 to 42)
Unit-II	Edward Said	:	Orientalism
Unit-III	Alice Walker Toni Morrison	:	The Colour Purple The Bluest Eye
Unit-IV	J.M. Coetzee Chinua Achebe	:	Disgrace Things Fall Apart

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**


1. The Paper is divided into 4 units and each unit is compulsory.
2. Candidates shall answer 4 essay type questions from Unit I to IV, carrying 16 marks each.
3. The fifth question will comprise of 4 short notes (One from each Unit) out of which 2 are to be attempted.
4. Essay type answers should not exceed 400 words and will carry 16 marks, short notes should be within the limit of 200 words and will carry 8 marks. (8x2 = 16)
5. All questions shall carry equal marks. (16x5 = 80)

Name and Signature of Subject Experts

1. Dr. M. Chakrabarty  2. Dr. S. Gupta  3. ....

4. ....

5. ....

6. DR. MERIN ROY 

### Recommended Reading

1. Edward Said : Orientalism
2. Mohanty, Chandra Talpade,  
Ann Russo and Lourdes Torres, (eds.) : Third World Women and the Politics of  
Feminism
3. Guha, Ranajit and Gayatri Spivak, (eds.) : Selected Subaltern Studies
4. Guha, Ranajit, (ed.) : Subaltern Studies
5. Christian, Barbara : The Race for Theory

**DURG UNIVERSITY**  
**SYLLABUS**

**M.A. ENGLISH IV SEMESTER – SESSION 2018-2019**

**PAPER- V, LINGUISTICS- II**

**Phonetics and Stylistics**

- Unit-I**      1) The Organs of Speech- Places of Articulation  
                 2) Phonetics: Articulatory, Acoustic & Auditory
- Unit-II**      1) Classification of Consonants and Vowel Sounds  
                 2) Pure Vowels, Clusters, Syllables  
                 3) Supra Segmental and Prosodic Phenomenon Stress, Pitch, Intonation, Juncture  
                 And Rhythm
- Unit-III**    1) Phoneme: Free Variation and Neutralization, Arrangement, Allophones, Received  
                 Pronunciation, Assimilation and Elision, Pattern Congruity, Transcription
- Unit-IV**    1) Essentials of Stylistics  
                 2) Deviation, The Irrational in Poetry, Ambiguity, Foregrounding, Figurative  
                 Language, Patterns of Sound

**DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

1. The Paper is divided into 4 units and each unit is compulsory.
2. Candidates shall answer 4 essay type questions from Unit I to IV, carrying 16 marks each.
3. The fifth question will comprise of 4 short notes (One from each Unit) out of which 2 are to be attempted.
4. Essay type answers should not exceed 400 words and will carry 16 marks, short notes should be within the limit of 200 words and will carry 8 marks. (8x2 = 16)
5. All questions shall carry equal marks. (16x5 = 80)

Name and Signature of Subject Experts

1. Dr. M. Chakrabarti  2. Dr. S. S. Ghosh  3. ....
4. .... 5. .... 6. Dr. Merily Roy 

### Recommended Reading

1. Daniel Jones : An Introduction to Phonetics
2. T. Balasabramanian : A Textbook of English Phonetics

# **DURG VISHWAVIDYALAYA, DURG (C.G.)**

Website - [www.durguniversity.ac.in](http://www.durguniversity.ac.in), Email - [durguniversity@gmail.com](mailto:durguniversity@gmail.com)



## **SCHEME OF EXAMINATION & SYLLABUS of M.A. (Hindi) Semester Exam UNDER FACULTY OF ARTS Session 2017-18**

**(Approved by Board of Studies)  
Effective from July 2017**

# दुर्ग विश्वविद्यालय दुर्ग (छत्तीसगढ़)

पाठ्यक्रम

एम. ए. पूर्व हिन्दी

एम. ए. अंतिम हिन्दी

परीक्षा 2017–18

सेमेस्टर परीक्षा प्रणाली

**सत्र 2017-18 एम.ए. हिन्दी अंक विभाजन सेमेस्टर प्रणाली**  
**प्रथम सेमेस्टर**  
**अंक विभाजन**

प्रश्न पत्र	बाह्य परीक्षा	आंतरिक मूल्यांकन	कुल अंक
प्रथम : (आदिकाल एवं पूर्व मध्यकाल)	80	20	100
द्वितीय : प्राचीन एवं मध्यकालीन काव्य	80	20	100
तृतीय : छायावाद एवं पूर्ववर्ती काव्य	80	20	100
चतुर्थ : नाटक, एकांकी एवं चरितात्मक कृति	80	20	100
			<b>कुल 400 अंक</b>

**द्वितीय सेमेस्टर**  
**अंक विभाजन**

प्रश्न पत्र	बाह्य परीक्षा	आंतरिक मूल्यांकन	कुल अंक
पंचम : (उत्तर मध्यकाल एवं आधुनिक काल)	80	20	100
षष्ठ : मध्यकालीन काव्य	80	20	100
सप्तम : प्रयोगवादी एवं प्रगतिवादी काव्य	80	20	100
अष्टम : उपन्यास, निबंध एवं कहानी	80	20	100
			<b>कुल 400 अंक</b>

**तृतीय सेमेस्टर**  
**अंक विभाजन**

प्रश्न पत्र	बाह्य परीक्षा	आंतरिक मूल्यांकन	कुल अंक
प्रथम : साहित्य के सिद्धांत तथा अलोचना शास्त्र	80	20	100
द्वितीय: भाषा विज्ञान	80	20	100
तृतीय: कामकाजी हिन्दी एवं पत्रकारिता	80	20	100
चतुर्थ : भारतीय साहित्य	80	20	100
			<b>कुल 400 अंक</b>

**चतुर्थ सेमेस्टर**  
**अंक विभाजन**

प्रश्न पत्र	बाह्य परीक्षा	आंतरिक मूल्यांकन	कुल अंक
पंचम: हिन्दी आलोचना तथा समीक्षा शास्त्र	80	20	100
षष्ठ : हिन्दी भाषा	80	20	100
सप्तम : मीडिया लेखन एवं अनुवाद	80	20	100
अष्टम: जनपदीय भाषा और साहित्य (छत्तीसगढ़ी)	80	20	100
			<b>कुल 400 अंक</b>

टीप:- प्रत्येक प्रश्न पत्र में 20 अंकों के आंतरिक मूल्यांकन के अंतर्गत दो आंतरिक मूल्यांकन का आयोजन अनिवार्य होगा एवं इसका मूल्यांकन विभाग के शिक्षकों के द्वारा किया जावेगा तथा प्राप्तांक विश्वविद्यालय को प्रेषित किया जावेगा ।





एम.ए. – हिन्दी – 2017–18

प्रथम सेमेस्टर

प्रश्न पत्र – प्रथम

हिन्दी साहित्य का इतिहास (आदिकाल एवं पूर्व मध्यकाल)

योग : 80

पाठ्य विषय:—

इकाई—1 हिन्दी साहित्य का इतिहास : परम्परा और पद्धति :

हिन्दी साहित्य के इतिहास लेखन की परम्परा, साहित्येतिहास के पुनर्लेखन की समस्याएँ।  
हिन्दी साहित्य के इतिहास का काल—विभाजन और नामकरण, आदिकाल के नामकरण की समस्या।

इकाई —2 आदिकाल :

हिन्दी साहित्य के आदिकाल की सांस्कृतिक पृष्ठभूमि, रासो काव्य, सिद्ध नाथ एवं जैन साहित्य, लौकिक साहित्य, साहित्यिक प्रवृत्तियाँ, प्रतिनिधि रचनाकार।

इकाई —3 पूर्व मध्यकाल (भक्ति काल), भक्ति आंदोलन :

उद्भव और विकास, हिन्दी क्षेत्र में भक्ति आंदोलन की सांस्कृतिक पृष्ठभूमि एवं उसका विकास, भक्ति काल की प्रमुख प्रवृत्तियाँ, तथा दार्शनिक विचारधाराएँ।

इकाई—4 भक्तिकाल की विभिन्न काव्य - धाराएँ :

निर्गुण काव्य : ज्ञानमार्गी काव्यधारा एवं प्रेममार्गी काव्यधारा - परम्परा, प्रवृत्ति एवं उसका विकास। सगुण काव्य : कृष्ण भक्ति काव्य—धारा एवं रामभक्ति काव्य धारा - परंपरा, प्रवृत्ति एवं उसका विकास।

इकाई— 5

लघुउत्तरीय प्रश्न (सम्पूर्ण पाठ्यक्रम से)

इकाई —6

वस्तुनिष्ठ एवं अति लघुउत्तरीय प्रश्न (सम्पूर्ण पाठ्यक्रम से)

अंक विभाजन

इकाई 1 —	1 X 15	=	15 अंक
इकाई 2 —	1 X 15	=	15 अंक
इकाई 3 —	1 X 15	=	15 अंक
इकाई 4 —	1 X 15	=	15 अंक
इकाई 5 —	लघुउत्तरीय 5 X 2	=	10 अंक
इकाई 6 —	वस्तुनिष्ठ 10 X 1	=	10 अंक
	योग	=	80 अंक
	आंतरिक मूल्यांकन		20 अंक

*[Handwritten signatures and marks]*

## निर्धारित पुस्तकें :-

1. हिन्दी साहित्य का इतिहास (संशोधित – आचार्य रामचंद्र शुक्ल)
2. हिन्दी साहित्य का आदिकाल – हजारी प्रसाद द्विवेदी
3. हिन्दी साहित्य का इतिहास (नेशनल पब्लिशिंग हाऊस, दिल्ली) – डॉ. नगेन्द्र
4. आदिकालीन हिन्दी साहित्य (वाराणसी विश्वविद्यालय प्रकाशन) – डॉ. शम्भूनाथ पाण्डेय
5. आदिकालीन हिन्दी साहित्य सांस्कृतिक पीठिका (हिन्दी ग्रंथ अकादमी) – डॉ. राममूर्ति त्रिपाठी
6. हिन्दी साहित्य का दुसरा इतिहास – डॉ. बच्चन सिंह
7. हिन्दी साहित्य और संवेदना का विकास – राम स्वरूप चतुर्वेदी (लोकभारती प्रकाशन)
8. हिन्दी साहित्य का सरल इतिहास – विश्वनाथ त्रिपाठी (ओरियन्ट लॉगमैन)
9. हिन्दी साहित्य उद्भव और विकास – हजारी प्रसाद द्विवेदी।

*[Handwritten signatures and marks at the bottom of the page]*

**एम.ए. (हिन्दी) – 2017–18**  
**प्रथम सेमेस्टर**  
**प्रश्न पत्र – द्वितीय**  
**प्राचीन एवं मध्यकालीन काव्य**  
**(रासो काव्य, लौकिक काव्य एवं निर्गुण काव्य)**

योग : 80

**पाठ्य विषय :-**

व्याख्या एवं विवेचन के लिए निम्नांकित चार कवियों का अध्ययन अपेक्षित है ।

1. चंदबरदाई : पृथ्वीराज रासो, संपादक आचार्य हजारी द्विवेदी, डॉ. नामवर सिंह (पद्मावती समय)
2. विद्यापति पदावली : संपादक रामवृक्ष बेनीपुरी से प्रारंभिक 10 पद ।
3. कबीर ग्रंथावली: संपादक डॉ. श्याम सुंदर दास (50 साखियाँ तथा 15 पद) पद क्रमांक— 11, 16, 24, 26, 27, 45, 49, 64, 70, 72, 89, 93, 110, 111, 268 साखियाँ— गुरुदेव कौ अंग 1 से 10, सुमिरण कौ अंग 1 से 10, विरह कौ अंग 1 से 10, ग्यान विरह कौ अंग 1 से 5, चितावणी कौ अंग 1 से 5, माया कौ अंग 1 से 5, परचा कौ अंग 1 से 5 ।
4. मलिक मोहम्मद जायसी : पद्मावत संपादक आ. रामचंद्र शुक्ल (नागमती विरह खण्ड एवं सिंहल द्वीप खण्ड)

**टीप:-** द्रुत पाठ हेतु निम्नांकित 05 कवियों का एवं उनकी रचनाओं का अध्ययन अनिवार्य है, इन कवियों पर लघुत्तरी प्रश्न पूछे जायेंगे – अमीर खुसरों, मीराबाई, रहीम, रैदास, रसखान ।

**इकाई विभाजन**

- इकाई 1 व्याख्या  
इकाई 2 चंदबरदाई एवं इतिहास  
इकाई 3 कबीर एवं जायसी  
इकाई 4 द्रुत पाठ के कवि  
10 वस्तुनिष्ठ (सम्पूर्ण पाठ्यक्रम से)

3 व्याख्या (कोई तीन)

3 आलोचनात्मक (कोई तीन)

5 लघु – उत्तरीय (सम्पूर्ण पाठ्यक्रम से)

योग =

आंतरिक मूल्यांकन

**अंक विभाजन**

3X10 = 30 अंक

3X10 = 30 अंक

5X2 = 10 अंक

10X1 = 10 अंक

80 अंक

20 अंक

**निर्धारित पुस्तकें:-**

1. डॉ. विपिन बिहारी द्विवेदी – चंदबरदाई
2. कबीर की विचारधारा – डॉ. गोविन्द त्रिगुणायन
3. प्रमुख प्राचीन कवि – डॉ. द्वारिका प्रसाद सक्सेना
4. कबीर साहित्य की परख – परशुराम चतुर्वेदी
5. जायसी की विशिष्ट शब्दावली – डॉ. इंदिरा कुमारी सिंह का विश्लेषणात्मक अध्ययन
6. मलिक मोहम्मद जायसी और उनका काव्य – डॉ. शिवसहाय पाठक
7. अमीर खुसरों और उनका साहित्य – डॉ. भोलानाथ तिवारी
8. कबीर – सं. हजारी प्रसाद द्विवेदी

**एम.ए. पूर्व (हिन्दी) 2017-18**  
**प्रथम सेमेस्टर**  
**प्रश्न पत्र – तृतीय**  
**द्विवेदीयुगीन एवं छायावादी काव्य**

**कुल : 80**

**पाठ्य विषय:-**

व्याख्या एवं विवेचन के लिए निम्नांकित तीन कवियों का अध्ययन अपेक्षित है ।

1. मैथिलीशरण गुप्त – साकेत नवम् सर्ग
2. जयशंकर प्रसाद – कामायनी (चिन्ता, श्रद्धा)
3. सूर्यकांत त्रिपाठी निराला – राम की शक्ति पूजा, सरोज स्मृति
4. महादेवी वर्मा – मैं नीर भरी दुःख की बदली, यह मंदिर का दीप इसे नीरव जलने दो, रूपसी तेरा केश-पाश, मधुर मधुर मेरे दीपक जल ।

**टीप:-** द्रुत पाठ हेतु निम्नांकित 5 कवियों का अध्ययन किया जाएगा ।

श्रीधर पाठक, अयोध्या सिंह उपाध्याय “हरिऔध”, मुकुटधर पांडेय, जगन्नाथ दास रत्नाकर, सुमित्रानन्दन पंत, (लघुत्तरीय प्रश्न द्रुत पाठ एवं पाठ्यक्रम से पूछे जाएंगे।)

**इकाई विभाजन**

इकाई 1 व्याख्या

इकाई 2 मैथिलीशरण गुप्त, जयशंकर प्रसाद

इकाई 3 सूर्यकान्त त्रिपाठी निराला, महादेवी वर्मा

इकाई 4 द्रुत पाठ के कवि ।

**अंक विभाजन**

1- 3 व्याख्या	—	3X10	=	30 अंक
2- 3 आलोचनात्मक	—	3X10	=	30 अंक
3- 5 लघुत्तरीय	—	5X2	=	10 अंक
4- वस्तुनिष्ठ अतिलघुत्तरीय	—	10X1	=	10 अंक

**योग = 80 अंक**  
**आंतरिक मूल्यांकन 20 अंक**



## निर्धारित पुस्तकें :-

1. साकेत एक अध्ययन— डॉ. नगेन्द्र
2. कवि निराला — आचार्य नंद दुलारे वाजपेयी
3. निराला की साहित्य साधना — डॉ. रामविलास शर्मा
4. नया साहित्य नये साधना — आचार्य नंद दुलारे वाजपेयी
5. कामायनी एक पुनर्विचार — मुक्तिबोध
6. प्रसाद का काव्य — प्रेमशंकर
7. हिन्दी साहित्य आधुनिक परिदृश्य — अज्ञेय
8. हिन्दी साहित्य का इतिहास — नगेन्द्र
9. बच्चन की कविताओं का शैलीवैज्ञानिक अध्ययन — डॉ. शीला शर्मा

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**एम.ए. – (हिन्दी) – 2017–18**  
**प्रथम सेमेस्टर**  
**प्रश्न पत्र – चतुर्थ**  
**आधुनिक गद्य साहित्य**  
**(नाटक, एकांकी एवं चरितात्मक तथा आत्मकथात्मक कृति)**

**पूर्णांक : 80**

**पाठ्य विषय :-**

इकाई 1	नाटक	1 चन्द्रगुप्त	– जयशंकर प्रसाद
		2 हानूश	– भीष्म साहनी
		3 अन्धा युग	– धर्मवीर भारती
इकाई 2	एकांकी	1 रीढ़ की हड्डी	– जगदीश चन्द्र माथुर
		2. एक दिन	– लक्ष्मीनारायण मिश्र
		3. ताँबे के कीड़े	– भुवनेश्वर
		4. तौलिए	– उपेन्द्रनाथ अशक
इकाई 3	चरितात्मक कृति	1. पथ के साथी	– निराला भाई
		2. आवारा मसीहा	– विष्णु प्रभाकर
		(संक्षिप्त संस्करण)	
इकाई 4	आत्मकथात्मक कृति	1. जूठन (भाग-एक)	– ओम प्रकाश बाल्मिकी

**इकाई विभाजन**

इकाई- 1	– व्याख्या
इकाई- 2	– नाटक
इकाई- 3	– एकांकी
इकाई- 4	– चरितात्मक कृति, आत्मकथात्मक कृति
इकाई- 5	– लघुउत्तरीय एवं वस्तुनिष्ठ प्रश्न

**अंक विभाजन**

1– 3 व्याख्या	–	3X10	=	30 अंक
2– 3 आलोचनात्मक	–	3X10	=	30 अंक
3– 5 लघुउत्तरीय	–	5X2	=	10 अंक
4– वस्तुनिष्ठ अतिलघुउत्तरीय	–	10X1	=	10 अंक
		<b>योग</b>	<b>=</b>	<b>80 अंक</b>
		<b>आंतरिक मूल्यांकन</b>		<b>20 अंक</b>



## निर्धारित पुस्तकें :-

1. हिन्दी नाटक उद्भव और विकास – डॉ. दशरथ ओझा
2. हिन्दी नाटक सिद्धांत और विवेचन – डॉ. गिरीश रस्तोगी
3. हिन्दी नाटक पुनर्मूल्यांकन – डॉ. सत्येन्द्र तनेजा
4. समसामयिक हिन्दी नाटकों में चरित्र सृष्टि – डॉ. जयदेव तनेजा
5. प्रसाद के नाटकों का शास्त्रीय अध्ययन – जगन्नाथ प्रसाद शर्मा
6. आधुनिक हिन्दी नाटक – नगेन्द्र
7. नाटक रंगमंच और मोहन राकेश – डॉ. सुरेन्द्र यादव
8. प्रसाद युगीन हिन्दी नाटक – डॉ. भगवती प्रसाद शुक्ल
9. प्रसाद के नाटक एवं नाट्य शिल्प – डॉ. शांति स्वरूप गुप्त
10. नाटककार मोहन राकेश – डॉ. सुन्दर लाल कथूरिया
11. हिन्दी एकांकी : उद्भव और विकास – रामचरण महेन्द्र
12. हिन्दी रंगमंच : दषा और दिषा – जयदेव तनेजा
13. भष्म साहनी के उपन्यास और नाटक – डॉ. राकेश कुमार तिवारी

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एम.ए. (हिन्दी) – 2017–18

द्वितीय सेमेस्टर

प्रश्न पत्र – पंचम (उत्तर मध्यकाल से आधुनिक काल तक)

समय 3 घंटे

पूर्णांक : 80

पाठ्य विषय:—

- इकाई 1. उत्तर मध्यकाल (रीतिकाल) काल सीमा, नामकरण, प्रवृत्तियाँ, रीतिकालीन साहित्य की विभिन्न धारायें (रीतिबद्ध, रीतिसिद्ध, रीतिमुक्त) प्रवृत्तियाँ एवं विशेषताएँ । रीतिकाल के प्रतिनिधि रचनाकार एवं रचनाएँ ।
- इकाई 2. आधुनिक काल – आधुनिक काल की सामाजिक, राजनैतिक, आर्थिक एवं सांस्कृतिक पृष्ठभूमि । सन् 1857 की राज्य क्रांति एवं पुनर्जागरण, भारतेन्दु युग— प्रमुख साहित्यकार, साहित्य एवं साहित्यिक विशेषताएँ ।
- इकाई 3. द्विवेदी युग – प्रमुख साहित्यकार एवं साहित्यिक विशेषताएँ, छायावाद— नामकरण और प्रवृत्तियाँ, प्रमुख साहित्यकार, साहित्यिक विशेषताएँ । छायावादोत्तर काल (विभिन्न प्रवृत्तियाँ) प्रगतिवाद, नई कविता, नवगीतवाद तथा समकालीन कविता, स्वच्छन्दतावाद सामान्य परिचय ।
- इकाई 4. हिन्दी गद्य का विकास – आधुनिक काल, गद्य साहित्य के विभिन्न रूपों का उद्भव और विकास, उपन्यास व कहानी का विकास और सामान्य प्रवृत्तियाँ, निबंध का विकास और प्रवृत्तियाँ, नाटक का उद्भव और विकास— सामान्य प्रवृत्तियाँ, गीति— नाटकों का परिचयात्मक विवेचन ।
- इकाई 5. लघुत्तरीय प्रश्न (सम्पूर्ण पाठ्यक्रम से पांच प्रश्न)
- इकाई 6. वस्तुनिष्ठ एवं अतिलघुत्तरीय प्रश्न (सम्पूर्ण पाठ्यक्रम से)

अंक विभाजन

इकाई 1	—	1X 15	= 15 अंक
इकाई 2	—	1X 15	= 15 अंक
इकाई 3	—	1X 15	= 15 अंक
इकाई 4	—	1X 15	= 15 अंक
इकाई 5	— लघुत्तरीय	5X 2	= 10 अंक
इकाई 6	— वस्तुनिष्ठ	10X 1	= 10 अंक

योग = 80 अंक  
आंतरिक मूल्यांकन 20 अंक

*[Handwritten signatures and marks]*



## निर्धारित पुस्तकें :-

1. आधुनिक साहित्य की प्रवृत्तियाँ – डॉ. नामवर सिंह
2. हिन्दी साहित्य बीसवीं शताब्दी – नन्ददुलारे वाजपेयी
3. आधुनिक हिन्दी साहित्य का इतिहास – कृष्ण शंकर शुक्ल
4. गद्य की विविध विधाएँ – डॉ. बापूराव देसाई
5. हिन्दी कहानी – उद्भव और विकास – डॉ. सुरेश सिन्हा
6. हिन्दी उपन्यास की प्रवृत्तियाँ – डॉ. शशि भूषण सिंह
7. हिन्दी नाटक उद्भव और विकास – डॉ. दशरथ ओझा
8. हिन्दी साहित्य का इतिहास – आचार्य रामचन्द्र शुक्ल
9. हिन्दी साहित्य का उद्भव और विकास – आचार्य हजारी प्रसाद द्विवेदी
10. हिन्दी साहित्य की भूमिका – आचार्य हजारी प्रसाद द्विवेदी

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एम.ए. (हिन्दी) – 2017–18

द्वितीय सेमेस्टर

प्रश्न पत्र – षष्ठ

मध्यकालीन काव्य

समय 3 घंटे

पूर्णांक : 80

पाठ्य विषय :- व्याख्या एवं विवेचन के लिए निम्नांकित तीन कवियों का अध्ययन किया जाएगा।

- 1 सूरदास – भ्रमरगीत सार – संपादक आचार्य रामचंद्र शुक्ल (50 पद) पद संख्या – 1 से 10, 21 से 30, 51 से 60, 61 से 70, 81 से 90 तक (50 पद)
- 2 तुलसीदास – रामचरित मानस (सुंदरकाण्ड) गीताप्रेस गोरखपुर
- 3 बिहारी – बिहारी रत्नाकर संपादक जगन्नाथ दास रत्नाकर (प्रारंभिक 100 दोहे)

द्रुत पाठ हेतु निम्नांकित 5 कवियों एवं उनकी रचनाओं का (विषय एवं शिल्पगत) ज्ञान अपेक्षित है।  
केशव, भूषण, पद्माकर, देव, घनानंद, राधा विनोद – खांडेराव भोसले

इन कवियों पर लघुत्तरीय प्रश्न पूछे जाएंगे।

इकाई विभाजन		अंक विभाजन	
इकाई 1 व्याख्या	3 व्याख्या	3X10 =	30 अंक
इकाई 2 सूरदास, तुलसीदास	3 आलोचनात्मक	3X10 =	30 अंक
इकाई 3 बिहारी एवं इतिहास विषयक प्रश्न			
इकाई 4 द्रुत पाठ के कवि	5 लघुत्तरी	5X2 =	10 अंक
इकाई 5 वस्तुनिष्ठ प्रश्न (संपूर्ण पाठ्यक्रम से)	10 वस्तुनिष्ठ अतिलघुत्तरीय	10X1 =	10 अंक
		योग =	80 अंक
		आंतरिक मूल्यांकन	20 अंक

निर्धारित पुस्तकें :-

1. बिहारी- डॉ. विश्वनाथ प्रसाद मिश्र
2. तुलसीदास और उनका युग संदर्भ – डॉ. भगीरथ मिश्र
3. सूरदास के काव्य का मूल्यांकन – डॉ. रामरतन भटनागर
4. तुलसी साहित्य के नये संदर्भ – डॉ. एल.एन.दुबे
5. सूरदास – डॉ. हरबंस लाल वर्मा
6. तुलसीदास – प्रो. सतीश कुमार अशोक प्रकाशन नई दिल्ली
7. सूरदास – मैनेजर पाण्डेय

*[Handwritten signatures and marks]*

**एम.ए. – (हिन्दी) 2017–18**  
**द्वितीय सेमेस्टर**  
**प्रश्न पत्र – सप्तम**  
**(प्रयोगवादी एवं प्रगतिवादी काव्य)**

**कुल अंक : 80**

**पाठ्य विषय—**

स.ही.वात्स्यायन अज्ञेय— नदी के द्वीप, असाध्यवीणा, बावरा अहेरी, कलगी बाजरे की, यह दीप अकेला, उधार, देह वल्ली, सोन मछली ग.मा. मुक्तिबोध — कविता — अंधेरे में ।

नागार्जुन — बसन्त की अगवानी, कोई आए तुमसे सीखे, शिशिर विष कन्या, तो फिर क्या हुआ, यह तुम थी, कोयल आज बोली है, शासन की बंदूक, सिन्दूर तिलकित भाल, अकाल और उसके बाद, बादल को घिरते देखा ।

द्रुत पाठ हेतु निम्नांकित 5 कवियों का अध्ययन किया जायेगा ।

केदारनाथ अग्रवाल, त्रिलोचन शास्त्री, भवानी प्रसाद मिश्र, विनोद कुमार शुक्ल, धूमिल (लघुत्तरी प्रश्न द्रुत पाठ एवं सम्पूर्ण पाठ्यक्रम से पूछे जायेंगे)

**इकाई विभाजन**

इकाई—1 — व्याख्या

इकाई—2 — स.ही. वात्स्यायन अज्ञेय

इकाई—3 — मुक्तिबोध एवं नागार्जुन

इकाई—4 — द्रुत पाठ के कवि

इकाई—5 — वस्तुनिष्ठ अतिलघुत्तरीय प्रश्न

**अंक विभाजन**

1. 3 व्याख्या	—	3X10	=	30 अंक
2. 3 आलोचनात्मक	—	3X10	=	30 अंक
3. 5 लघुत्तरीय	—	5X2	=	10 अंक
4. 10 वस्तुनिष्ठ अतिलघुत्तरीय	—	10X1	=	10 अंक
<b>योग</b>				<b>= 80 अंक</b>
<b>आंतरिक मूल्यांकन</b>				<b>20 अंक</b>

**निर्धारित पुस्तकें :-**

1. मुक्तिबोध की काव्य प्रक्रिया — अशोक चक्रधर
2. अज्ञेय का रचना संसार — डॉ. रामस्वरूप चतुर्वेदी
3. कविता की तीसरी आंख — डॉ. प्रभाकर श्रोत्रिय
4. कविता से साक्षात्कार — मलयज
5. हिन्दी साहित्य का इतिहास — डॉ. रामचन्द्र शुक्ल
6. कविता की संगत — विजय कुमार
7. कविता का अर्थात् — परमानंद श्रीवास्तव
8. नागार्जुन का रचना संसार — विजय बहादुर सिंह
9. छायावादोत्तर प्रबंध काव्यों में ऐतिहासिक, सांस्कृतिक एवं दार्शनिक तत्वों का अनुशीलन — डॉ. ज्योति पाण्डेय
10. छायावादोत्तर काव्यों की विभिन्न प्रवृत्तियों एवं उनका चैन्तनिक पक्ष — डॉ. ज्योति पाण्डेय

**द्वितीय सेमेस्टर**  
**प्रश्न पत्र – अष्टम**  
**आधुनिक गद्य साहित्य (उपन्यास, निबंध एवं कहानी)**

पूर्णांक : 80

**पाठ्य विषय:-**

उपन्यास-

1 गोदान

— प्रेमचंद

2 बाणभट्ट की आत्मकथा

— हजारी प्रसाद द्विवेदी

निबंध —

1 चढ़ती उमर

— बालकृष्ण भट्ट

2 कविता क्या है?

— रामचंद्र शुक्ल

3 माटी की मूर्तें

— रामवृक्ष बेनीपुरी

4 चन्द्रमा मनसो जातः

— विद्यानिवास मिश्र

5 वैष्णव की फिसलन

— हरिशंकर परसाई

कहानी —

1 उसने कहा था

— चन्द्रधर शर्मा गुलेरी

2 पुरस्कार

— जयशंकर प्रसाद

3. ईदगाह

— प्रेमचंद

4. वापसी

— उशा प्रियम्बदा

5. बादलों के घेरे

— कृष्णा सोवती

इकाई-1 — व्याख्या

इकाई-2— उपन्यास

इकाई-3 — निबंध

इकाई-4 — कहानी

इकाई-5 — लघुत्तरीय एवं वस्तुनिष्ठ

**अंक विभाजन**

3 व्याख्या — 3X10 = 30 अंक

3 आलोचनात्मक — 3X10 = 30 अंक

5 लघुत्तरीय — 5X2 = 30 अंक

10 वस्तुनिष्ठ — 10X1 = 10 अंक

**योग = 80 अंक**

**आंतरिक मूल्यांकन 20 अंक**

**निर्धारित पुस्तकें:-**

- |   |   |                     |
|---|---|---------------------|
| 1. प्रेमचंद और उनका युग                 | — | रामविलास शर्मा      |
| 2. गोदान के अध्ययन की समस्याएं          | — | डॉ. गोपाल राय       |
| 3. कथाकार फणीश्वरनाथ रेणु               | — | चंद्रभाव सोनवठी     |
| 4. हिन्दी उपन्यास की शिल्पविधि का विकास | — | सिद्धनाथ तनेजा      |
| 5. हिन्दी उपन्यास उद्भव और विकास        | — | सुरेश सिन्हा        |
| 6. प्रेमचंद : एक अध्ययन                 | — | राजेश्वर गुरु       |
| 7. महादेवी प्रतिनिधि गद्य रचनाएं        | — | सं. रामजी पाण्डेय   |
| 8. हिन्दी निबंध के आधार स्तम्भ          | — | डॉ. हरिमोहन         |
| 9. हिन्दी कहानी : उद्भव और विकास        | — | सुरेश सिन्हा        |
| 10. कहानी : स्वरूप और संवेदना           | — | राजेन्द्र यादव      |
| 11. कहानी : नयी कहानी                   | — | नामवर सिंह          |
| 12. हजारी प्रसाद द्विवेदी               | — | सं. विश्वनाथ तिवारी |
| 13. प्रेमचंद का जीवनदर्शन एवं रंगभूमि   | — | डॉ. शंकर बुन्देले   |

**एम.ए. – (हिन्दी) 2017–18**  
**तृतीय सेमेस्टर**  
**प्रश्न पत्र – प्रथम**  
**साहित्य के सिद्धांत तथा आलोचना शास्त्र**

**पूर्णांक : 80**

**पाठ्य विषय:—**

- इकाई 1 भारतीय काव्य शास्त्र  
काव्य लक्षण, काव्य हेतु, काव्य प्रयोजन और काव्य के प्रकार  
रस सिद्धांत, रस का स्वरूप, रस निष्पत्ति और साधारणीकरण, रस के अंग ।
- इकाई 2 अलंकार सिद्धांत रीति सिद्धांत, वक्रोक्ति सिद्धांत, ध्वनि सिद्धांत और औचित्य सिद्धांत
- इकाई 3 पाश्चात्य काव्य शास्त्र प्लेटो – काव्य सिद्धांत अरस्तु– अनुकरण का सिद्धांत, विरेचन सिद्धांत, लॉजाइनस–उदात्त की अवधारणा
- इकाई 4 मैथ्यू आर्नल्ड– कला की अवधारणा टी.एस. इलियट – कला की निर्वैयक्तिकता, कॉलरिज–कल्पना सिद्धांत स्वच्छदतावाद – मार्क्सवाद
- इकाई 5 पाठ्यक्रम में से कोई पांच लघुत्तरीय प्रश्न
- इकाई 6 पाठ्यक्रम में से वस्तुनिष्ठ प्रश्न या अतिलघुत्तरीय प्रश्न पूछे जायेंगे ।

**अंक विभाजन**

इकाई 1	—	1X 15	=	15 अंक
इकाई 2	—	1X 15	=	15 अंक
इकाई 3	—	1X 15	=	15 अंक
इकाई 4	—	1X 15	=	15 अंक
इकाई 5	—	लघुत्तरीय 5X 2	=	10 अंक
इकाई 6	—	वस्तुनिष्ठ 10X 1	=	10 अंक
<b>योग</b>			<b>=</b>	<b>80 अंक</b>
<b>आंतरिक मूल्यांकन</b>				<b>20 अंक</b>

1. डॉ. गणपति चन्द्रगुप्त – भारतीय एवं पाश्चात्य काव्य सिद्धांत
2. डॉ. भगीरथ मिश्र – पाश्चात्य काव्य शास्त्र, इतिहास, सिद्धांत एवं वाद
3. डॉ. राममूर्ति त्रिपाठी– भारतीय काव्य शास्त्र के नये क्षितिज
4. डॉ. शिवकुमार मिश्र– मार्क्सवादी साहित्य के सिद्धांत
5. डॉ. नगेन्द्र – भारतीय काव्य शास्त्र की भूमिका
6. डॉ. निर्मला जैन – पाश्चात्य साहित्य चिंतन
7. मुलजी भाई– भारतीय और पाश्चात्य काव्य शास्त्र
8. डॉ. गंगा प्रसाद विमल – आधुनिकता, साहित्य के संदर्भ में ।



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**तृतीय सेमेस्टर**  
**प्रश्न पत्र – द्वितीय**  
**(भाषा विज्ञान)**

**पूर्णांक : 80**

**पाठ्य विषय:-**

- इकाई-1 भाषा और भाषा विज्ञान, भाषा की परिभाषा और अभिलक्षण, भाषा व्यवस्था और भाषा व्यवहार, भाषा संरचना, भाषा विज्ञान स्वरूप एवं व्याप्ति, अध्ययन की दिशाएँ—वर्णनात्मक, ऐतिहासिक और तुलनात्मक ।
- इकाई-2 स्वन प्रक्रिया : स्वन विज्ञान का स्वरूप और शाखाएँ, वागवयव और उनके कार्य, स्वन की अवधारणा और स्वनों का वर्गीकरण, स्वन गुण, स्वनिम परिवर्तन। स्वनिम विज्ञान का स्वरूप, स्वनिम की अवधारणा, स्वनिम के भेद ।
- इकाई 3 व्याकरण : रूप विज्ञान का स्वरूप और शाखाएँ, रूपिम की अवधारणा और भेद, मुक्त – आबद्ध अर्थदर्शी और संबंधदर्शी रूपिम और शाखाएँ, रूपिम के भेद और प्रकार्य। वाक्य के भेद, वाक्य—विश्लेषण, निकटस्थ अवयव विश्लेषण ।
- इकाई 4 अर्थ विज्ञान : अर्थ की अवधारणा, शब्द और अर्थ का संबंध, पर्यायता, अनेकार्थता, विलोमता अर्थ परिवर्तन।
- इकाई 5 पाठ्यक्रम में से पांच लघुत्तरीय प्रश्न
- इकाई 6 पाठ्यक्रम में से वस्तुनिष्ठ प्रश्न अतिलघुत्तरीय प्रश्न पूछे जायेंगे।

**अंक विभाजन**

इकाई 1 —	1X 15	=	15 अंक
इकाई 2 —	1X 15	=	15 अंक
इकाई 3 —	1X 15	=	15 अंक
इकाई 4 —	1X 15	=	15 अंक
इकाई 5 —	5X 2	=	10 अंक
इकाई 6 —	10X 1	=	10 अंक
<b>योग</b>		<b>=</b>	<b>80 अंक</b>
<b>आंतरिक मूल्यांकन</b>			<b>20 अंक</b>

**निर्धारित पुस्तकें :-**

1. सामान्य भाषा विज्ञान— डॉ. बाबूराम सक्सेना
2. भाषा विज्ञान — डॉ. भोलानाथ तिवारी
3. भारत के भाषा परिवार — डॉ. रामनिवास शर्मा
4. भाषाशास्त्र की रूपरेखा — उदयनारायण तिवारी
5. हिन्दी शब्दानुशासन — किशोरी दास बाजपेयी
6. भाषा विज्ञान और भाषा शास्त्र — कपिलदेव द्विवेदी
7. सामान्य भाषाविज्ञान — बाबूराम सक्सेना
8. हिन्दी और उसका संक्षिप्त इतिहास — भोलानाथ तिवारी
9. हिन्दी और उसकी विविध बोलियाँ — प्रो. दीपचंद जैन
10. भाषा विज्ञान के सिद्धांत और हिन्दी भाषा — द्वारिका प्रसाद मिश्र

**एम.ए. – (हिन्दी) 2017–18**  
**तृतीय सेमेस्टर प्रश्न**  
**पत्र – तृतीय**  
**(कामकाजी हिन्दी एवं पत्रकारिता)**

**पाठ्य विषयः—**

**पूर्णांक : 80**

- इकाई—1 हिन्दी के विभिन्न रूप — सर्जनात्मक भाषा, संचार भाषा, राजभाषा, माध्यम भाषा, कार्यालयीन हिन्दी (राजभाषा) के प्रमुख प्रकार्य— प्रारूपण, पत्र लेखन, संक्षेपण, पल्लवन, टिप्पणी ।
- इकाई—2 पारिभाषिक शब्दावली, स्वरूप एवं महत्व, पारिभाषिक शब्दावली निर्माण के सिद्धांत, ज्ञान—विज्ञान के विभिन्न क्षेत्रों की पारिभाषिक शब्दावली। हिन्दी कम्प्यूटर— कम्प्यूटर परिचय, उपयोगिता क्षेत्र, वेब पेज पब्लिशिंग परिचय ।
- इकाई—3 इंटरनेट संपर्क उपकरणों का परिचय, प्रकार्यात्मक रख-रखाव एवं इंटरनेट समय मितव्ययता के सूत्र । इंटरनेट एक्सप्लोइट अथवा नेट स्केप । हिन्दी साफ्टवेयर पैकेज ।
- इकाई—4 पत्रकारिता का स्वरूप एवं प्रकार, हिंदी पत्रकारिता का संक्षिप्त इतिहास । समाचार लेखन कला, संपादन के आधारभूत तत्व, व्यवहारिक प्रूफशोधन, शीर्षक संरचना, लीड, इंट्रो एवं शीर्षक, संपादकीय लेखन, पृष्ठ सज्जा, साक्षात्कार, पत्रकारवार्ता एवं प्रेस प्रबंधन, प्रमुख प्रेस कानून एवं आचार संहिता ।
- इकाई—5 संपूर्ण पाठ्यक्रम से पांच लघुत्तरीय प्रश्न
- इकाई—6 संपूर्ण पाठ्यक्रम में से वस्तुनिष्ठ प्रश्न अतिलघुत्तरीय प्रश्न ।

**अंक विभाजन**

इकाई 1 —	1X 15	=	15 अंक
इकाई 2 —	1X 15	=	15 अंक
इकाई 3 —	1X 15	=	15 अंक
इकाई 4 —	1X 15	=	15 अंक
इकाई 5 —	5X 2	=	10 अंक
इकाई 6 —	10X 1	=	10 अंक
<b>योग</b>			<b>= 80 अंक</b>
<b>आंतरिक मूल्यांकन</b>			<b>20 अंक</b>

**निर्धारित पुस्तकेंः—**

- |  |   |  |
|--|---|--|
| 1. प्रयोजन परक हिन्दी                        | — | प्रो. सूर्यप्रसाद दीक्षित                |
| 2. प्रशासनिक हिन्दी                          | — | पुष्पा कुमारी, क्लासिक पब्लिक कम्पनी     |
| 3. पत्रकारिता के छह दशक                      | — | जगदीष प्रसाद चतुर्वेदी                   |
| 4. हिन्दी पत्रकारिता का प्रतिनिधि संकलन      | — | तरुशिखा सुरजन, राजकमल प्रकाशन, नई दिल्ली |
| 5. हिन्दी पत्रकारिता                         | — | कृष्ण बिहारी मिश्र                       |
| 6. भारतीय समाचार पत्रों का संगठन एवं प्रबंधन | — | डॉ. सुकुमार जैन                          |
| 7. पत्रकारिता का इतिहास एवं जनसंचार माध्यम   | — | डॉ. संजीव भनावत                          |
| 8. कम्प्यूटर के भाषिक अनुप्रयोग              | — | विजय मल्होत्रा                           |
| 9. कम्प्यूटर एप्लीकेशन                       | — | गौरव अग्रवाल                             |

**पाठ्य विषय :-**

- इकाई-1 भारतीय साहित्य का स्वरूप, भारतीय साहित्य के अध्ययन की समस्याएँ, भारतीय साहित्य में आज के भारत का बिम्ब, हिन्दी साहित्य में भारतीय मूल्यों की अभिव्यक्ति ।
- इकाई -2 हिन्दीतर साहित्य का इतिहास जो तीन वर्गों में विभक्त है –
1. दक्षिणात्य भाषा वर्ग से मलयालम
  2. पूर्वांचल भाषा वर्ग में बँगला
  3. पश्चिमोत्तर भाषा वर्ग में मराठी
- प्रत्येक विद्यार्थी इन तीनों विकल्पों में से एक भाषा चयन करेंगे बशर्ते वह भाषा अपनी क्षेत्रीय भाषा से भिन्न भाषा वाले वर्ग से संबंधित हो। विद्यार्थी एक भाषा वर्ग (मलयालम, बंगला, मराठी) में से किसी एक के इतिहास का अध्ययन करेंगे।
- इकाई -3 हिन्दी भाषा साहित्य एवं बंगला भाषा साहित्य का तुलनात्मक अध्ययन ।
- इकाई- 4 उपन्यास – अग्निगर्भ (बंगला- महाश्वेता देवी)  
नाटक – हयवदन (कन्नड़-गिरीश कर्नाड)  
कविता संग्रह – कोच्चि के दरख्त (मलयालम- के.जी. शंकर पिल्लै)
- इकाई चार के अंतर्गत केवल आलोचनात्मक प्रश्न पूछे जाएँगे ।
- इकाई- 5 संपूर्ण पाठ्यक्रम से पांच लघुत्तरीय प्रश्न
- इकाई -6 संपूर्ण पाठ्यक्रम से वस्तुनिष्ठ एवं अतिलघुत्तरीय प्रश्न ।

**अंक विभाजन**

इकाई 1 –	1X 15	=	15 अंक
इकाई 2 –	1X 15	=	15 अंक
इकाई 3 –	1X 15	=	15 अंक
इकाई 4 –	1X 15	=	15 अंक
इकाई 5 –	5X 2	=	10 अंक
इकाई 6 –	10X 1	=	10 अंक

**योग = 80 अंक**

**आंतरिक मूल्यांकन 20 अंक**

**निर्धारित पुस्तकें :-**

1. मलयालम साहित्य – परख और पहचान – प्रो. आर. सुरेन्द्रन ।
2. राष्ट्रीय चेतना और मलयालम साहित्य – प्रो. आर. सुरेन्द्रन ।
3. मराठी भाषा और साहित्य – राजमल वोरा
4. मलयालम साहित्यकारों से साक्षात्कार – प्रो. आर. सुरेन्द्रन ।
5. बंगला भाषा और साहित्य का इतिहास – भारतीय भाषा संस्थान, इलाहाबाद
6. भारतीय साहित्य – डॉ. नगेन्द्र
7. भारतीय साहित्य रत्नमाला – सं.कृष्णदयाल भार्गव
8. भारतीय साहित्य के इतिहास की समस्याएँ – डॉ. रामविलास शर्मा
9. भारतीय भाषाओं के साहित्य का इतिहास – केन्द्रीय हिन्दी निर्देशालय, दिल्ली ।
10. भारतीय साहित्य : अवधारणा, समन्वय एवं सादृश्यता- जगदीश गुप्त



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**चतुर्थ सेमेस्टर**  
**प्रश्न पत्र – पंचम**  
**(हिन्दी आलोचना तथा समीक्षा शास्त्र)**

**पूर्णांक : 80**

**पाठ्य विषय :-**

- इकाई 1 मनोविश्लेषण वाद, अस्तित्ववाद, अभिजात्यवाद, स्वच्छंदतावाद, अभिव्यंजनावाद, मार्क्सवाद, आधुनिक समीक्षा की विशिष्ट प्रवृत्तियाँ, संरचनावाद, शैलीविज्ञान, उत्तर आधुनिकता
- इकाई 2 हिन्दी कवि आचार्यों का काव्य शास्त्रीय चिंतन— लक्षण काव्य परम्परा — आचार्य रामचन्द्र शुक्ल, आचार्य नंददुलारे वाजपेयी, डॉ. रामविलास शर्मा, केशव, देव
- इकाई 3 आधुनिक हिन्दी आलोचना की प्रमुख प्रवृत्तियाँ— शास्त्रीय, ऐतिहासिक, मनोविश्लेषणवादी, सौंदर्य शास्त्रीय, शैली वैज्ञानिक
- इकाई 4 व्यवहारिक समीक्षा : काव्यांश की स्वविवेक के अनुसार व्याख्या
- इकाई 5 संपूर्ण पाठ्यक्रम में से कोई पांच लघुत्तरीय प्रश्न
- इकाई 6 संपूर्ण पाठ्यक्रम में से वस्तुनिष्ठ प्रश्न या अतिलघुत्तरीय प्रश्न पूछे जायेंगे ।

**अंक विभाजन**

इकाई 1 —	1X 15	=	15 अंक
इकाई 2 —	1X 15	=	15 अंक
इकाई 3 —	1X 15	=	15 अंक
इकाई 4 —	1X 15	=	15 अंक
इकाई 5 — लघुत्तरीय	5X 2	=	10 अंक
इकाई 6 — वस्तुनिष्ठ	10X 1	=	10 अंक
	<b>योग</b>	<b>=</b>	<b>80 अंक</b>
	<b>आंतरिक मूल्यांकन</b>		<b>20 अंक</b>

**निर्धारित पुस्तकें :-**

1. डॉ. गोविंद त्रिगुणायत — शास्त्रीय समीक्षा के सिद्धांत भाग 1 एवं 2
2. डॉ. भगवत स्वरूप मिश्र — हिन्दी आलोचना : उद्भव और विकास
3. डॉ. रामेश्वर खण्डेलवाल — हिन्दी आलोचना के आधार स्तम्भ
4. डॉ. शिवकरण सिंह — आलोचना के बदलते मानदण्ड और हिन्दी साहित्य
5. डॉ. नंदकिशोर नवल — हिन्दी आलोचना का विकास
6. योगेन्द्र शाही — अस्तित्ववाद किर्कगार्ड से कामू तक
7. रणधीर सिन्हा — आलोचनात्मक रामविलास शर्मा



**एम.ए. – (हिन्दी) 2017–18**  
**चतुर्थ सेमेस्टर**  
**प्रश्न पत्र – षष्ठ**  
**(हिन्दी भाषा)**

**पूर्णांक : 80**

**पाठ्य विषय:-**

- इकाई-1 हिन्दी की ऐतिहासिक पृष्ठभूमि : प्राचीन भारतीय आर्य भाषाएँ – वैदिक तथा लौकिक संस्कृत और उनकी विशेषताएँ । मध्यकालीन भारतीय आर्यभाषाएँ – पालि, प्राकृत, शौरसेनी, अर्धमागधी, मागधी, अपभ्रंश और उनकी विशेषताएँ । आधुनिक भारतीय भाषाएँ और उनका वर्गीकरण ।
- इकाई-2 हिन्दी का भौगोलिक विस्तार – हिन्दी की उपभाषाएँ, पश्चिमी हिन्दी, पूर्वी हिन्दी, राजस्थानी, बिहारी तथा पहाड़ी और उनकी बोलियाँ । खड़ी बोली, ब्रज और अवधी की विशेषताएँ ।
- इकाई-3 हिन्दी के विविध रूप- संपर्क भाषा, राष्ट्रभाषा, राजभाषा के रूप में हिन्दी, माध्यम भाषा, संचार भाषा, हिन्दी की संवैधानिक स्थिति ।
- इकाई-4 हिन्दी में कम्प्यूटर सुविधाएँ – आंकड़ा संसाधन और शब्द संसाधन, वर्तनी शोधक, मशीनी अनुवाद, हिन्दी भाषा शिक्षण । देवनागरी लिपि : विशेषताएँ और मानकीकरण ।
- इकाई-5 संपूर्ण पाठ्यक्रम से पांच लघुत्तरीय प्रश्न ।
- इकाई-6 संपूर्ण पाठ्यक्रम से वस्तुनिष्ठ अतिलघुत्तरीय प्रश्न ।

**अंक विभाजन**

इकाई 1 –	1X 15	=	15 अंक
इकाई 2 –	1X 15	=	15 अंक
इकाई 3 –	1X 15	=	15 अंक
इकाई 4 –	1X 15	=	15 अंक
इकाई 5 – लघुत्तरीय	5X 2	=	10 अंक
इकाई 6 – वस्तुनिष्ठ	10X 1	=	10 अंक
	<b>योग</b>	<b>=</b>	<b>80 अंक</b>
	<b>आंतरिक मूल्यांकन</b>		<b>20 अंक</b>

**निर्धारित पुस्तकें:-**

1. हिन्दी भाषा का संक्षिप्त इतिहास – भोलानाथ तिवारी
2. हिन्दी और उसकी विविध बोलियाँ – प्रो. दीपचंद जैन
3. भाषा भूगोल – कैलाशचंद भट्टिया हिन्दी समिति उ.प्र. शासन लखनऊ
4. हिन्दी भाषा की रूप संरचना – भोलानाथ तिवारी
5. राष्ट्रभाषा हिन्दी समस्याएँ और समाधान – देवेन्द्रनाथ शर्मा
6. नागरी लिपि और हिन्दी – अनंत चौधरी
7. सामान्य भाषा विज्ञान – डॉ. बाबूराम सक्सेना
8. भाषा विज्ञान – डॉ. भोलानाथ तिवारी

**एम.ए. – (हिन्दी) 2017–18**  
**चतुर्थ सेमेस्टर**  
**प्रश्न पत्र – सप्तम**  
**(मीडिया–लेखन एवं अनुवाद)**

**पूर्णांक : 80**

**पाठ्य विषयः—**

- इकाई—1 मीडिया लेखन जनसंचार : प्रौद्योगिक एवं चुनौतियाँ, विभिन्न जनसंचार—माध्यमों का स्वरूप— मुद्रण, श्रवण, दृश्य—श्रव्य, इंटरनेट, श्रवण—माध्यम (रेडियो), मौखिक भाषा की प्रकृति । समाचार लेखन एवं वाचन, रेडियो नाटक, उद्घोषणा लेखन, विज्ञापन—लेखन, फीचर तथा रिपोर्टाज ।
- इकाई—2 दृश्य—श्रव्य माध्यम (फिल्म, टेलीविजन एवं रेडियो), दृश्य—माध्यमों में भाषा की प्रकृति, दृश्य एवं श्रव्य सामग्री का सामंजस्य, पार्श्व वाचन (वॉयस ओवर) पटकथा—लेखन, टेली—ड्रामा, संवाद—लेखन, साहित्य की विधाओं का दृश्य माध्यमों में रूपान्तरण, विज्ञापन की भाषा ।
- इकाई—3 अनुवाद — सिद्धांत एवं व्यवहार अनुवाद का स्वरूप, क्षेत्र, प्रक्रिया एवं प्रविधि । हिन्दी की प्रयोजनीयता में अनुवाद की भूमिका । कार्यालयीन हिन्दी और अनुवाद, जनसंचार माध्यमों का अनुवाद, विज्ञापन में अनुवाद, वैचारिक साहित्य का अनुवाद, वाणिज्यिक अनुवाद, वैज्ञानिक तकनीकी तथा प्रौद्योगिकी क्षेत्रों में अनुवाद, विधि साहित्य की हिन्दी और अनुवाद ।
- इकाई—4 व्यावहारिक अनुवाद अभ्यास, कार्यालयीन अनुवाद, कार्यालयीन एवं प्रशासनिक शब्दावली, प्रशासनिक प्रयुक्तियाँ, पदनाम, विभाग, आदि पत्रों के अनुवाद, पदनामों—अनुभागों—दस्तावेजों—प्रतिवेदनों के अनुवाद, साहित्यिक अनुवाद के सिद्धांत एवं व्यवहार—कविता, कहानी, नाटक, सारानुवाद, दुभाषिया—प्रविधि ।

**अंक विभाजन**

इकाई 1 —	1X 15	=	15 अंक
इकाई 2 —	1X 15	=	15 अंक
इकाई 3 —	1X 15	=	15 अंक
इकाई 4 —	1X 15	=	15 अंक
इकाई 5 —	5X 2	=	10 अंक (पांच लघुत्तरीय)
इकाई 6 —	10X 1	=	10 (दस वस्तुनिष्ठ)
	<b>योग</b>	<b>=</b>	<b>80 अंक</b>

**आंतरिक मूल्यांकन 20 अंक**

**निर्धारित पुस्तकेंः—**

1. जनसंचार माध्यमों में हिन्दी — डॉ. चन्द्रकुमार (क्लासिकल पब्लिक कंपनी)
2. जनमाध्यम एवं पत्रकारिता — प्रवीण दीक्षित (सहयोगी साहित्य संस्थान)
3. पत्रकारिता का इतिहास एवं जनसंचार माध्यम— डॉ. संजीव भागवन्त (उ.प्र. जयपुर)
4. पत्रकारिता के विविध आयाम — वेदप्रताप वैदिक
5. दूरदर्शन : हिन्दी के प्रयोनमूलक विविध प्रयोग : डॉ. कृष्णकुमार रत्तू (मीनाक्षी प्रकाशन, जयपुर)
6. जनमाध्यम एवं पत्रकारिता — प्रवीण दीक्षित (सहयोगी साहित्य संस्थान)
7. अनुवाद के सिद्धांत — सुरेश कुमार
8. अनुवाद सिद्धांत की रूपरेखा — सुरेश कुमार
9. अनुवाद — बोध — डॉ. गार्गी गुप्त (भारतीय अनुवाद परिषद् दिल्ली)

एम.ए. — (हिन्दी) — 2017-18  
चतुर्थ सेमेस्टर  
प्रश्न पत्र — अष्टम  
जनपदीय भाषा और साहित्य (छत्तीसगढ़ी)

पूर्णांक : 80

**पाठ्य विषय :-**

- इकाई-1 छत्तीसगढ़ी भाषा-भौगोलिक सीमा, नामकरण, भाषिक स्वरूप एवं व्याकरणिक विशेषताएँ ।  
इकाई-2 छत्तीसगढ़ी साहित्य की युग प्रवृत्तियाँ एवं इतिहास ।  
इकाई-3 छत्तीसगढ़ी कविता एवं कवि —  
(1) सुंदरलाल शर्मा  
(2) मुकुटधर पाण्डेय  
(3) हरि ठाकुर  
(4) डॉ. नरेन्द्र देव वर्मा  
इकाई-4 छत्तीसगढ़ी नाटक एवं उपन्यास  
1. करमछड़हा (नाटक) — डॉ. खूबचंद बघेल  
2. आवा (उपन्यास) — परदेशीराम वर्मा  
इकाई-5 द्रुतपाठ हेतु निम्नलिखित रचनाकार का अध्ययन (पांच लघुत्तरीय प्रश्न पूछे जायेंगे)  
(1) लखन लाल गुप्त (2) लक्ष्मण मस्तुरिहा  
(3) केयूर भूषण (4) मुकुन्द कौशल  
(5) लोचन प्रसाद पाण्डेय (6) लाला जगदलपुरी  
(7) पवन दीवान (8) कोदूराम दलित  
इकाई-6 संपूर्ण पाठ्यक्रम से दस वस्तुनिष्ठ अतिलघुत्तरीय प्रश्न ।

**अंक विभाजन**

इकाई 1 —	1X 15	=	15 अंक
इकाई 2 —	1X 15	=	15 अंक
इकाई 3 —	1X 15	=	15 अंक
इकाई 4 —	1X 15	=	15 अंक
इकाई 5 —	5X 2	=	10 अंक
इकाई 6 —	10X 1	=	10 अंक
	<b>योग</b>	<b>=</b>	<b>80 अंक</b>
	<b>आंतरिक मूल्यांकन</b>		<b>20 अंक</b>

**निर्धारित पुस्तकें:-**

1. छत्तीसगढ़ी भाषा का उद्विकास — डॉ. नरेन्द्र देव वर्मा
2. छत्तीसगढ़ी, हलबी, भतरी भाषाओं का भाषा वैज्ञानिक अध्ययन — भालचंद्र राव तैलंग
3. छत्तीसगढ़ी परिचय— डॉ. बलदेव मिश्र
4. छत्तीसगढ़ी लोकसाहित्य का अध्ययन — दयाशंकर शुक्ल
5. छत्तीसगढ़ी लोकजीवन और लोकसाहित्य का अध्ययन — डॉ. शकुन्तला वर्मा
6. छत्तीसगढ़ी भाषा का शास्त्रीय अध्ययन— डॉ. शंकर शेष
7. प्राचीन छत्तीसगढ़ी बोली — प्यारेलाल गुप्त
8. छत्तीसगढ़ी लोक साहित्य और भाषा — डॉ. बिहारीलाल साहू
9. छत्तीसगढ़ी भाषा और साहित्य — डॉ. सत्यभामा आडिल
10. छत्तीसगढ़ के साहित्यकार — देवीप्रसाद वर्मा
11. मानक छत्तीसगढ़ी व्याकरण — चंद्रकुमार चंद्राकर

# **DURG VISHWAVIDYALAYA, DURG (C.G.)**

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## **SCHEME OF EXAMINATION & SYLLABUS of M.A. (Political Science) Semester Exam UNDER FACULTY OF ARTS Session 2017-18**

**(Approved by Board of Studies)  
Effective from July 2017**

## M.A. Political Science

### Semester-I and semester-II

PAPER	SEMESTER-I	MARKS		SEMESTER-II	MARKS	
		Theory	Internal		Theory	Internal
I	भारतीय राजनीतिकचिंतन (Indian Political Thought)	80	20	पाश्चात्य राजनीतिकचिंतन (Western Political Thought)	80	20
II	भारतीय शासन एवं राजनीति (Indian Govt. and politics)	80	20	भारत के राज्यों की राजनीति (Politics of State in India)	80	20
III	तुलनात्मक राजनीति (Comparative Politics)	80	20	विकासशील देशों की तुलनात्मक राजनीति (Comparative Politics in Development Countries)	80	20
IV	अंतर्राष्ट्रीय संगठन (International Organization)	80	20	भारत की विदेश नीति (Indian Foreign Policy)	80	20
Total=400				Total=400		

## M.A. Political Science

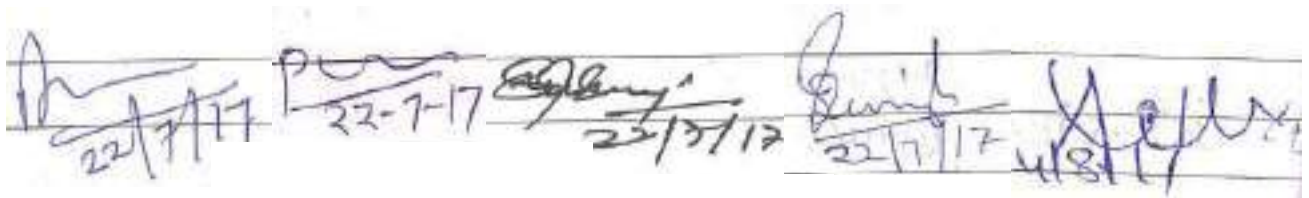
### Semester III and M.A. Semester IV

PAPER	SEMESTER-III	MARKS		SEMESTER-IV	MARKS	
		Theory	Internal		Theory	Internal
I	अंतर्राष्ट्रीय राजनीति के सिद्धांत (Principal of International Politics)	80	20	अंतर्राष्ट्रीय राजनीति के समकालीन मुद्दे (contemporary issues of International Politics)	80	20
II	लोकप्रशासन भाग-1 (Public Administration Part-I)	80	20	लोकप्रशासन भाग-2 (Public Administration Part-II)	80	20
III	शोध प्रविधि भाग-1 (Research Methodology Part-I)	80	20	शोध प्रविधि भाग-2 (Research Methodology Part-II)	80	20
IV	छत्तीसगढ़ का शासन एवं राजनीति (Govt. and Politics of Chhattisgarh)	80	20	छत्तीसगढ़ का राजनीतिक इतिहास (Political History of Chhattisgarh)	80	20
	Total=400			Project work VIVA-VOCE		
				Total=500		

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## नियमावली—

1. उपर्युक्त समस्त प्रश्न पत्र अनिवार्य होंगे।
2. प्रत्येक प्रश्न पत्र में (सभी सेमेस्टर में) सैद्धान्तिक परीक्षा में 80 पूर्णांक होगा और 20 अंको का आन्तरिक मूल्यांकन होगा। इस प्रकार सभी प्रश्न पत्र में पूर्णांक 100 होगा।
3. प्रत्येक प्रश्न पत्र में आन्तरिक मूल्यांकन होगा की दो परीक्षाएं होगी जिसके सर्वोच्च अंक विश्वविद्यालय को प्रेषित किए जाएंगे।
4. प्रथम, द्वितीय और तृतीय सेमेस्टर में पूर्णांक 400 होगा। चतुर्थ सेमेस्टर में पूर्णांक 500 होगा।
5. एम. ए. चतुर्थ सेमेस्टर में 100 अंको की मौखिक परीक्षा होगी जिसमें 50 अंक परियोजना कार्य पर होंगे और 50 अंको की मौखिक परीक्षा होगी।
6. परियोजना कार्य कौशल विकास, रोजगार मुखी एवं मतदान व्यवहार, ग्रामीण विकास देश के महापुरुष, प्रमुख राजनीतिज्ञ एवं राष्ट्रपति एवं प्रधानमंत्री, छत्तीसगढ़ की राजनीति और शासन व्यवस्था पर आधारित होगा।
7. इस प्रकार एम.ए. राजनीति विज्ञान में कुल पूर्णांक 1700 होगा।
8. प्रत्येक प्रश्न पत्र 4 इकाइयों में विभाजित होगा।

The bottom of the page features several handwritten signatures and dates. From left to right, there is a signature dated 22/7/17, a signature dated 22-7-17, a signature dated 22/7/17, a signature dated 22/7/17, and a signature dated 22/7/17. The signatures are written in blue ink on a white background.

**एम. ए. राजनीति विज्ञान सेमेस्टर-I**  
**M.A. POLITICAL SCIENCE SEMESTER-I**

**प्रथम प्रश्न पत्र— भारतीय राजनीतिक चिंतन(Indian Political Thought)**

इकाई-1	महाभारत के शांति पूर्व में राजनीतिक विचार, कौटिल्य (Political Thought in Shantiparv of Mahabharata and Kautilya.)
इकाई-2	स्वामी विवेकानंद एवं महात्मा गांधी के विचार (Thought of Swami Vivekananda and Mahatma Kautilya.)
इकाई-3	डॉ. भीमराव अम्बेडकर एवं जयप्रकाश नारायण के विचार (Thought of Fr. Bhimrao Ambedkar and Jaiprakash Narayan)
इकाई-4	एन. एन. राय राममनोहर लाहिया के विचार (Thought of M.N. Roy and Ram Manohar Lohia.)

**द्वितीय प्रश्नपत्र: भारतीय शासन एवं राजनीतिक(Indian Government and Politics)**

इकाई-1	भारतीय संविधा की पृष्ठभूमि, संगठन, कार्यप्रणाली वैचारिक आधार स्रोत प्रस्तावना, भारतीय संविधान की विशेषताएँ (Background of Indian Constitution, Organization Ideological basis Source, Preamble, Features of Indian Constitution)
इकाई-2	मौलिक अधिकार मौलिक कर्तव्य, नीति निर्देश कर्तव्य संविधान संशोधन प्रक्रिया (Fundamental Rights, Fundamental Duties, Directive Principles of State Policy, Amendment Process.)
इकाई-3	संघीय कार्यपालिका राष्ट्रपति, संसद, प्रधानमंत्री एवं मंत्री परिषद (Union Executive President, Prime Minister and Council of Ministers)
इकाई-4	संघीय न्यायपालिका, सर्वोच्च न्यायालय, न्यायिक सक्रियता, न्यायिक सुधार (Union Judiciary Supreme Court, Judicial Activism] Judicial Reforms.)
इकाई-5	भारतीय राजनीति की चुनौतियाँ: जातिवाद, क्षेत्रवाद, भाषावाद, धर्म, भ्रष्टाचार, सम्प्रदायवाद एवं अपराधीकरण (Challenges before Indian Polity: Casteism, Regionalism, Linguism, Religion, Corruption, Communalism and Criminalisation.)

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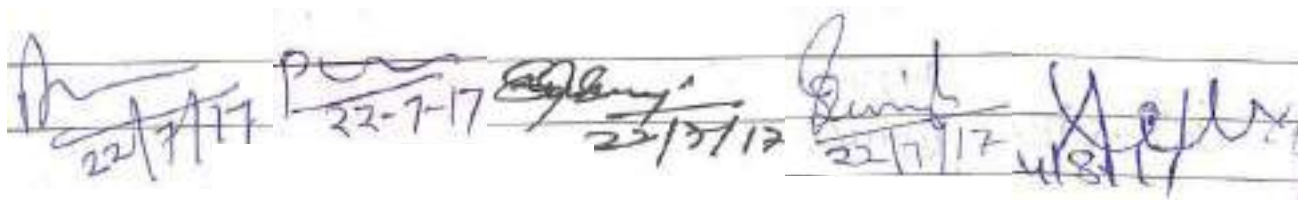


## तृतीय प्रश्न पत्र: तुलनात्मक राजनीति(Comparative Politics)

ईकाइ-1	तुलनात्मक राजनीति अर्थ, प्रकृति क्षेत्र एवं समस्याएं राजनीतिक व्यवस्था का महत्व (Comparative Politics Meaning, Nature, Scope and Problem, Importance of Political System)
ईकाइ-2	राजनीति व्यवस्था के अध्ययन के उपागम-डेविड ईस्टन व्यवस्था के सिद्धांत, आमण्ड, एवं पावेल संरचनात्मक प्रकार्यात्मक (Approaches to the Study of Political System, System Theory-David Easton Amond and Powell Structural Functional)
ईकाइ-3	परम्परागत एवं आधुनिक राजनीतिक अध्ययन की विशेषताएं व्यवहारवाद एवं उत्तर व्यवहारवाद (Characteristics of Traditional and Modern Political Studies Behavioursism and Post Behavioursism)
ईकाइ-4	राजनीतिक संस्कृति, राजनीतिक समाजीकरण, राजनीतिक संचार, (Political culture, Political Socialisation, Political Communication)

## चतुर्थ प्रश्न पत्र: अंतराष्ट्रीय संगठन

ईकाइ-1	अंतराष्ट्रीय संगठन की प्रकृति एवं विकास अंतराष्ट्रीय संगठन राष्ट्र, राज्य एवं अंतराष्ट्रीय व्यवस्था का समन्वय (Nature and Evolution of International Organization Coordination among Nation] State and International System)
ईकाइ-2	राष्ट्र संघ-निर्माण, संरचना, कार्य, सफलता एवं असफलता एवं मुल्यांकन (League of Nation-Formation, Function, Achievements, Merits and Demerit and evaluation.)
ईकाइ-3	संयुक्त राष्ट्र संघ निर्माण, संरचना विवादों के समाधान के शान्तिपूर्व एवं बाध्यकारी उपाय, आर्थिक एवं सामाजिक विकास में संयुक्त राष्ट्र संघ की भूमिका (United Nation-Formation Structure and the Pacific and Coercive Measures to Settle the Disputes in United Nations The role of UN to Social and Economic Development)
ईकाइ-4	क्षेत्रीय संगठन-सार्क, आसियान, युरोनियन, ब्रिक्स (Regional Organization-SAARC, ASEAN EUROPEEN UNION, BRICS)


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## एम.ए. राजनीति विज्ञान सेमेस्टर-II

### प्रथम प्रश्न पत्र-पाश्चात्य राजनीतिक चिंतन (Western Political Thought)

ईकाइ-1	प्लेटो, अरस्तु (Plato, Aristotle)
ईकाइ-2	होब्स, लॉक, रूसो, मैकियावेली (Hobbes, Locke, Rousseau, Machiavelli)
ईकाइ-3	बैथम, जे. एस. कमल, ग्रीन (Bentham, J.S. Mill, Green)
ईकाइ-4	माक्स, माओ, जेनिन (Marx, Mao, Lenin.)

### द्वितीय प्रश्न पत्र-भारत में राज्यों की राजनीति (State Politics in India)

ईकाइ-1	राज्य की कार्यपालिका: राज्यपाल, मुख्यमंत्री एवं मंत्री परिषद (State Executive: GOVERNOR, CHIEF MINISTER and Council of Ministers)
ईकाइ-2	राज्य की व्यवस्थापिका: विधानसभा एवं विधान परिषद राज्य की न्यायपालिका: उच्च न्यायालय एवं अधिनस्थ न्यायालय (State Legislature: Vidhan Sabha and Vidhan Parishad State Judiciary: High Court and Subordinate Courts)
ईकाइ-3	राज्य स्वायत्ता की मांग नये राज्यों के गठन कर मांग अंतराज्यीय नदी जल विवाद, भारत में राज्य राजनीति का प्रभावित करने वाले कारक (Demand for State Autonomy, Demand For the Creation of New State, Inter State River Water Disputes, Factors influencing State Politics in India)
ईकाइ-4	राज्य योजना आयोग, राज्य वित्त आयोग राज्य निर्वाचन आयोग, भारत राजनीति की प्रमुख प्रवृत्ति (State Planning commission, State Finance Commission State Election Commission, Major Trends in State Politics of India.)

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## तृतीय प्रश्न पत्र—विकासशील देशों की तुलनात्मक राजनीति (Comparative Politics of Developing Countries)

ईकाई-1	सरकार का वर्गीकरण— एकात्मक संघात्मक, संसदीय अध्यक्षतात्मक सरकार, संघवाद (Classification of Government- Unitary] Federal, Parliamentary, Presidential, Federalism)
ईकाई-2	राजनीतिक संस्थाएं— व्यवस्थापिका, कार्यपालिका एवं न्यायपालिका, शक्ति पृथक्करण सिद्धांत। (Political Institutions- Legislature, Executive and Judiciary, Theory of Separation of Powers)
ईकाई-3	राजनीतिक दल एवं दबाव समूह, नौकरशाही संरचना कार्य एवं भूमिका (political Parties and Pressure Groups Bureaucracy- Structure Function and Role)
ईकाई-4	राजनीतिक विकास, राजनीति अभिजन, राजनीतिक समाजीकरण राजनीतिक आधुनिकीकरण (Political Development, Political Elites, Political Socialisation, political Modernization.)

## चतुर्थ प्रश्न पत्र— भारत की विदेश नीति (Indian Foreign Policy)

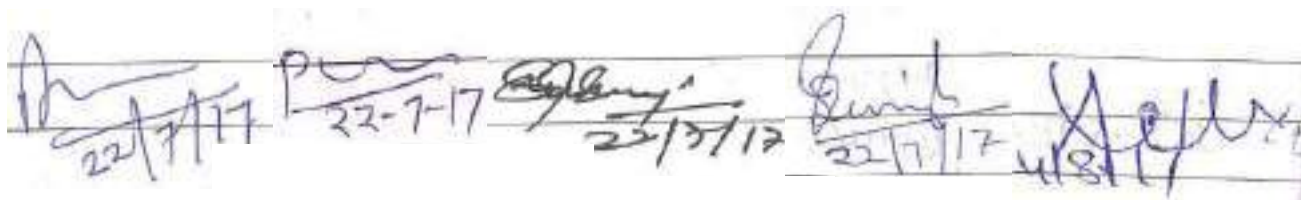
ईकाई-1	विदेश नीति: अर्थ, प्रकृति एवं निर्धारण तत्व भारतीय विदेशनीति के निर्धारण तत्व आन्तरिक एवं बाह्यय भारतीय विदेशनीति के सिद्धांत एवं उद्देश्य Foreign Policy: Meaning, Nature and Determinants Determinants of India Foreign Policy: Internal and External Principles and Objectives of Indian Foreign Policy
ईकाई-2	भारत और अमेरिका, भारत एवं रूस (India and the USA, India and Russia)
ईकाई-3	भारत एवं पाकिस्तान, भारत एवं चीन, भारत एवं श्रीलंका (India and Pakistan, India and China, India and Srilanka)
ईकाई-4	भारत एवं संयुक्त राष्ट्र संघ भारत एवं अण्विक निःशस्त्रीकरण India and the U.N.O India and Nuclear Disarmament

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### एम.ए राजनीति विज्ञान सेमेस्टर-III

प्रथम प्रश्न पत्र—अंतराष्ट्रीय राजनीति के सिद्धांत(Principles of International Politiecs)

ईकाइ-1	अंतराष्ट्रीय राजनीतिका विषय के रूप में विकास, प्रकृति एवं क्षेत्र। अध्ययन पद्धति—परम्परा एवंवैज्ञानिक। (Evolution of International Politics as discipline, Nature, Scope, Method of Study-Traditional and Scientific.)
ईकाइ-2	अंतराष्ट्रीय राजनीति के सिद्धांत— यथार्थवाद, आदर्शवाद, साम्यावस्था, निर्णय—निर्माण, खेल, संचार एवं व्यवस्था सिद्धांत (Theories of International Polities, Realism Idealism, Equilibrium, Decision marking, Game, communication & System Theory.)
ईकाइ-3	शक्ति की अवधारणा राष्ट्रीय शक्ति के तत्व एवं सीमाएं। शक्तिसंतुलन। सामूहिकसुरक्षा.—नवसाम्राज्यवाद राष्ट्रहित और अंतराष्ट्रीय विचारधारा एवं नैतिकता। (Concept of Power-Elements and limitations of National Power-Balance of Power-Collective Security, New colonialism. National Interest and International Ideology and Morale.)
ईकाइ-4	निशस्त्रीकरण, परमाणु अप्रसार—सी टी बी टी, एन पी टी, क्षेत्रीय संगठन—सार्क, एसिआन, ओपेक। (Disarmament, Nuclear Non Proliferation-CTBT NPT. Regional Organization- SAARC, ASEAN, OPEC.)

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## द्वितीय प्रश्नपत्र—लोक प्रशासन भाग—I (Public Administration) Part-I

### 2. लोकप्रशासनभाग—I

इकाई-1	लोकप्रशासन: परिभाषा, प्रकृति, क्षेत्र, निजीप्रशासन से अंतर अध्ययन के उपागम—व्यावहारिकवादी, तुलनात्मक, निर्णय पर का विकास—प्रशासन एवं नवीन लोकप्रशासन (Public Administration-Definition, Nature, Scope, Difference between Private Administration; Approaches to Study-Behaviourisms, Comparative Decision Oriented Development Administration & New Public Administration.)
इकाई-2	संगठन के सिद्धांत: नियंत्रण का क्षेत्र, आदेश की एकता, पदसोपान, प्रत्यायोजन, समन्वय। (Theory of Organization:-Hierarchy,Unity of Command Span of Control, Delegation of Power, Coordination.)
इकाई-3	केन्द्रीयकरण, विकेन्द्रीकरण, मुख्य कार्यपालिका—प्रकार एवं भूमिका, सूत्र एवं स्टाफ अभिकरण, विभागीय संगठन, स्वतंत्र नियामकीय आयोग (Centralisation and Decentralisation, Chief Executive- Types and Role. Line and Staff Agencies, Departmental Organization, Independent Regulatory Commission.)
इकाई-4	लोक निगम भर्ती, पदोन्नति, प्रशिक्षण, सेवानिवृत्ति, संघ लोकसेवाआयोग, नौकरशाही। (Public Corporation, Recruitment, Promotion and Training, Retirement, Union Public Service Commission, Bureaucracy.)

### तृतीय प्रश्न पत्र—शोध प्रविधि भाग—I (Research Methodology Part I)

इकाई-1	समाजिक शोध की प्रकृति, महत्व एवं उपयोग शुद्ध एवं व्यावहारिक शोध समस्या की पहचान, शोध अभिकल्प, उपकल्पना का निर्माण एवं परीक्षण (Nature of Social Research, Importance and uses, Deference between Pure and AppliesResearch, Identification of Research Problem Research Design, Hypotheses Formulation and testing.)
इकाई-2	समाजिक सर्वेक्षण—उद्देश्य, महत्व, प्रक्रिया, तथ्य संकलन की तकनीकि, तथ्यों के प्राथमिक एवं द्वितीय स्रोत (Social Survey- Amis, Importance, process, Data Collection, Primary and Secondary Source of Facts.)
इकाई-3	अवलोकन पद्धति, साक्षात्कार पद्धति, प्रश्नावली एवं अनुसूची (Observational Method, Interview Method, Question ire and Schedules.)
इकाई-4	अध्ययन के विभिन्न प्रकार—पैनलकेस क्षेत्रीय अध्ययन— (Types of Study- Panel , Case and Field Study-)

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**चतुर्थ प्रश्न पत्र:-छत्तीसगढ़ का शासन एवं राजनीति (GOVT AND POLITICS OF CHHATISGARH)**

इकाई-1	राज्यों का पुनर्गठन (2000) तथा छत्तीसगढ़ का निर्माण छत्तीसगढ़ राज्य निर्माण हेतु आन्दोलन, छत्तीसगढ़ की राजनीति के निर्धारण तत्व एवं विशेषता (Reorganization of state (2000) and Formation of Chhattisgarh, Determinants and Characteristics of Chhattisgarh Politics)
इकाई-2	छ.ग. में स्थानीय स्वशासन एवं पंचायती राज छ.ग. में जिला प्रशासन एवं जिलाधीश की भूमिका (Local Self Government and Panchayati Raj District Administration in Chhattisgarh, Role of A Collector)
इकाई-3	छत्तीसगढ़ में लोकसभा एवं विधानसभा चुनाव, मतदान व्यवहार (Loksabha and vidhansabha elections in Chhattisgarh Voting Behaviour.)
इकाई-4	छ.ग. की राजनीति की उभरती प्रवृत्ति: जनजातीय राजनीति, किसान आन्दोलन, नक्सलवादी समस्या एवं समाधान के उपाय छ.ग. में विकास की राजनीति एवं विकास की योजनाएं Emerging Trends in Chhattisgarh Politics: Politics of Tribal's Personal MOVMENT' Problem and Solution of Naxalism. Politics of Development in Chhattisgarh and Scheme of Development.

22/7/17 22-7-17 22/7/17 22/7/17 22/7/17



## राजनीति विज्ञान सेमेस्टर IV

### प्रथम प्रश्न पत्र— अंतराष्ट्रीय राजनीति के समाकालीत मुद्दे (CONTEMPORARY OF INTERNATIONAL POLITICS)

#### 1. अंतराष्ट्रीय राजनीति के समाकालीत मुद्दे:—

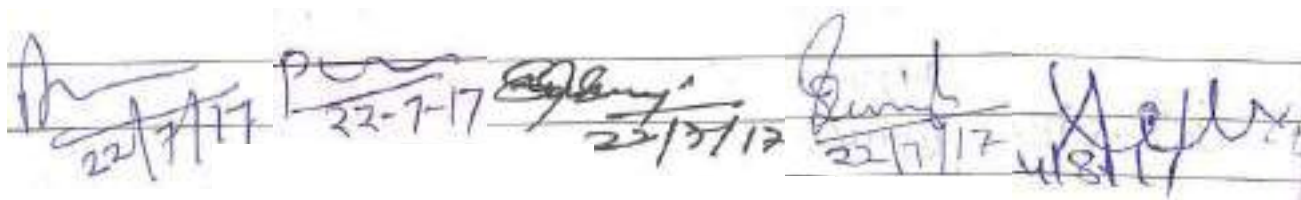
इकाई-1	अंतराष्ट्रीय राजनीति में असंलग्नता—आधार, भूमिका, महत्व एवं प्रासंगिकता। (Non-Alignment in International Politics Basis, Role, Importance and Relevance.)
इकाई-2	शीतयुद्ध एवं शीतयुद्ध की समाप्ति— कारण एवं परिणाम। नई विश्व व्यवस्था (Cold War and End of Cold War- Cause and results. New World Order.)
इकाई-3	उत्तर शीतयुद्ध कालीन महत्वपूर्ण मुद्दे— वैश्वीकरण, मानवाधिकार, पर्यावरण, आतंकवाद (Important issues in post cold war era- Globalisation Rights, Environment, Terrorism.)
इकाई-4	प्रमुख राष्ट्रों की विदेश नीतियां—भारत, संयुक्त राज्य अमेरिका, चीन, रूस (Foreign Policy of Important Countries India, USA, China and Russia.)

#### द्वितीय प्रश्न पत्र—लोक प्रशासन भाग-II (Public Administration) Part-II)

इकाई-1	कर्मिकों की समस्याओं के निवारण की व्यवस्था (भारतीय प्रशासन के विशेष कार्मिक प्रशासन संदर्भ में)। Personnel Administration- System to Solve the Problem of Personnel (In reference to Indian Administration.)
इकाई-2	वित्तीय प्रशासन: अर्थ, प्रकृति, विशेषण। बजट—सिद्धांत एवं महत्व, भारत में बजट निर्माण प्रक्रिया, कार्यपालिका, न्यायपालिका एवं जनसमूह का प्रशासन पर नियंत्रण। (Financial Administration Memoirs, Nature, Characteristics, Budget- Theory and Importance; Budget making process in India; Control over administration by Executive] judiciary and public gathering.)
इकाई-3	प्रशासनिक व्यवहार—नेतृत्व, निर्णय, संचार जवाबदेहिता (Administration Behaviour & Leadership, Decision making, Communication and answerability.)
इकाई-4	लोक प्रशासन में भ्रष्टाचार आम्बुड्समैन, लोकपाल, लाकायुक्त एवं लोक संपर्क स्थानीय स्वायत्तशासी संस्थाओं की भूमिका एवं लोक संपर्क। (Corruption in Public Administration, Ombudsman, Lokpal, Lokayakta, and Public relation. Role of Local Autonomous Intimation and Publication.)

### तृतीय प्रश्न पत्र-शोध प्रविधि भाग-I (Research Methodology Part I)

ईकाई-1	निदर्शन, अनुमसपन प्रविधियों, प्रक्षेपी प्रविधिया (Sampling, Scaling Techniques, Projections Techniques.)
ईकाई-2	अनुसंधान दल, अनुसंधान की समस्या, तथ्यों का वर्गीकरण एवं सारणीयन (Research Team, Problems of Research, Classification of Facts and Tabulation.)
ईकाई-3	तथ्यों का विश्लेषण एवं व्याख्या । प्रतिवेदन लेखन तथ्यों को चित्रमय प्रदर्शन (Analysis and Interpretation of Facts. Report writing Diagrammatic Presentation of Data.)
ईकाई-4	समाजिक अनुसंधान में संख्यिकी का प्रयोग एवं सीमाएं । मीन, मोड, मीडियम कम्प्युटर का उपयोग (The use and limitation of Statistics. Mean Mode, Medium, and Use of computer.)

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## चतुर्थ प्रश्न पत्र:— छत्तीसगढ़ का राजनीतिक इतिहास

### **(Political History of Chhattisgarh)**

ईकाई-1	छत्तीसगढ़ की ऐतिहासिक, भौगोलिक एवं सांस्कृतिक पृष्ठभूमि (Historical, Geographical and Cultural Background of Chhattisgarh.)
ईकाई-2	छत्तीसगढ़ में ब्रिटिश प्रशासन (1854 से 1947) स्वतंत्र भारत में छत्तीसगढ़ (1947–2000 तक) (British Administration in Chhattisgarh (1854 to 1947) Chhattisgarh in Independence India (1947 to 2000)
ईकाई-3	राष्ट्रीय आन्दोलन में छत्तीसगढ़ का योगदान: अहिंसक एवं क्रान्तिकारी संघर्ष
ईकाई-4	छत्तीसगढ़ के राजनीतिक चिंतन: पं. रविशंकर शुक्ल, ठाकुर प्यारेलाल सिंह, डॉ. खुबचंद बघेल (Political Thinker in Chhattisgarh: Pt. Ravishankar Shukla, Thakur Pyarelal Singh, Dr. Khubchand Baghel. छत्तीसगढ़ के सामाजिक चिंतक: गुरु धासीदास, पं. सुन्दरलाल शर्मा, स्वामी आत्मानंद Social Thinker of Chhattisgarh: Guru Ghasidash, Pt. Sundarlal Sharma, Swami Atmanand

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# **DURG VISHWAVIDYALAYA, DURG (C.G.)**

Website - [www.durguniversity.ac.in](http://www.durguniversity.ac.in), Email - [durguniversity@gmail.com](mailto:durguniversity@gmail.com)



## **SCHEME OF EXAMINATION & SYLLABUS of M.A. (Sociology) Semester Exam UNDER FACULTY OF ART'S Session 2017-19**

**(Approved by Board of Studies)  
Effective from July 2017**

**COURSE OF STUDIES FOR M.A. EXAMINATION IN SOCIOLOGY,  
UNDER SEMESTER SYSTEM IN AFFILETED COLLEGES OF  
DURG VISHWAVIDYALAYA, DURG (C.G.)  
EFFECTIVE FROM THE ACADEMIC SESSION (2017- 19)**

**M.A. Examination in Sociology shall be conducted in four semesters,  
each having 500 hundred marks, totalling to 2000 marks.**

The detailed Course Structure Semester wise is mentioned below.

Sl. No.	Paper No.	Title	Marks		
A. FIRST SEMESTER:					
Sr. No.	Paper	Subject	I	T	Total
1	Paper-I/CC1	Classical Sociological Tradition	20	80	100
2	Paper-II/CC2	Philosophical and Conceptual Foundation of Research Methodology	20	80	100
3	Paper-III/CC3	Social Change in India	20	80	100
4	Paper-IV/CC4	Rural Sociology	20	80	100
5	Paper-V/P 1	Practical-I			100
B. SECOND SEMESTER					
6.	Paper-VI/CC5	Classical Sociological Thinkers	20	80	100
7.	Paper-VII/CC6	Quantitative Research Techniques in Sociology	20	80	100
8.	Paper-VIII/CC7	Sociology of Development	20	80	100
9.	Paper-IX/CC8	Indian Rural Society	20	80	100
10.	Paper-X/P2	Practical-II			100
C. THIRD SEMESTER					
11.	Paper-XI/CC9	Classical Sociological Theories	20	80	100
12.	Paper-XII/CC10	Social Movements in India	20	80	100
13.	Paper-XIII/CC11	Perspectives of Study to Indian Society	20	80	100
14.	Paper-XIV/CC12	Industry and Society in India	20	80	100
15	Paper-XV/CC13	Criminology	20	80	100

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<b>D. FOURTH SEMESTER</b>					
16	Paper- XVI/CC14	Modern Sociological Theories	20	80	100
17	Paper- XVII/CC15	Comparative Sociology	20	80	100
18	Paper- XVIII/CC16	Contemporary Issues in Industry	20	80	100
19	Paper- XIX/CC17	Criminology: Correctional administration	20	80	100
20	Paper- XX/P3	Project Report	-	-	100

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## **FIRST SEMESTER**

**Paper No. I/CC1**

**Marks-80**

### **CLASSICAL SOCIOLOGICAL TRADITION**

#### **Unit-I: Historical Background of the Emergence of Sociology**

- a. Traditional Feudal Economy and Social Structure
- b. Impact of Industrial Revolution and New Mode of Production on Society and Economy.
- c. Emergence of Capitalist Mode of Production- Nature and Feature of Capitalism
- d. Enlightenment and Its Impact on Thinking and Reasoning

#### **Unit-II: Auguste Comte**

- a. Social Statics and Dynamics
- b. Law of Three Stages
- c. Hierarchy of Sciences
- d. Positivism

#### **Unit-III: Emile Durkheim**

- a. Social Facts
- b. Mechanical and Organic Solidarity
- c. Division of Labour
- d. Theory of Suicide

#### **Unit-IV: Vilfredo Pareto**

- a. Logical and Non- Logical Action
- b. Residues and Derivations
- c. Theory of Social Change
- d. Contributions to Methodology

#### **Unit-V: Herbert Spencer**

- a. Social Darwinism
- b. Evolution
- c. Synthetic Philosophy

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## References:

1. Abraham, F and Morgan, J.H. 1985      Sociological Thought from Comte to Sorokin  
Macmillan, New Delhi.
2. Adams, B.N. and Sydie, R.A. 2002      Sociological Theory  
Vistaar Publications, New Delhi
3. Aron, R. 1965      Main Currents in Sociological Thought  
Vol. I and Vol.II Penguin, New Delhi.
4. Coser, L.A. 2001      Masters of Sociological Thought  
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Paul, London
6. Turner, J.H. 2001      The Structure of Sociological Theory  
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7. Zeitlin, I.M. 1981      Ideology and the Development of Sociological  
Theory, Prentice Hall, London.
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Contemporary Theory. Rawat Publishers,  
Jaipur.

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**PHILOSOPHICAL AND CONCEPTUAL FOUNDATION OF RESEARCH  
METHODOLOGY**

**Unit-I: Philosophical Roots of Social Research**

- a. Issues in the Theory of Epistemology: Forms and Types of knowledge, Validation of knowledge
- b. Positivism and Its Critique: Contributions of Comte, Durkheim and Popper.
- c. Methodological perspectives in Sociology.

**Unit-II: Values and Theories in Sociology**

- a. Debates on values: Value Neutrality V/S Value Loadedness.
- b. Theories in Sociology Classical V/S Modern
- c. Problems of concept and theory- Transfer to developing countries.

**Unit-III: Nature of Social Reality and Approaches to It**

- a. Research Design: Steps and Processes of Its Formulation
- b. Type of Research Design: Exploratory, Descriptive, Explanatory, Diagnostic and Experimental
- c. Role of concepts and Hypotheses
- d. Problems of Objectivity

**Unit-IV: Qualitative Methods in Social Research**

- a. Techniques and methods of Qualitative Research: Observation and Interview Guide
- b. Case study, Content Analysis
- c. Participatory Rural Appraisal (PRA)
- d. Encounters and Experiences in Field work

**Unit-V: Issues in Social Research**

- a. Inter disciplinary Research
- b. Issues in Qualitative Research
- c. Theoretical Vs. Applied Research
- d. Processing of Data: Classification, Tabulation and Interpretation.

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## References:

1. Bailey, K.D. 1979 Methodology of Social Research Macmillan, Free Press- London
2. Barnes, J.A. 1979 Who should know what? Social Science, Privacy and Ethics, Penguin, London.
3. Beteille, A Madan, T.N. 1975 Encounter and Experience: Personal Accounts of field work, Vikas, new Delhi
4. Bose, P.K. 1995 Research methodology, ICSSR, New Delhi.
5. Bryman, A 1988 Quality and Quantity in Social Research Unwin Hyman, London.
6. Madge, J 1970 The Origins of Scientific sociology Tavistock, London
7. Mukherjee, P.N. 2000 Methodology in Social Research: Dilemmas and perspectives Essays in Honour of Ramakrishna Mukherjee Sage, New Delhi.
8. Mukherjee, R.K. 1979 What will it be? Explorations in Inductive Sociology Allied, Bombay.
9. \_\_\_\_\_ 1993 Systemic Sociology Sage, New Delhi.
10. Popper, K 1999 The Logic of Scientific Discovery Routledge and Kegan Paul London
11. Punch, K 1986 Introduction to Social Research Sage, New Delhi
12. Sjoberg, G and Roger, N., 1997 Methodology of Social research Rawat, Jaipur
13. Srinivas, M.N. and Shah, A.M., 1979 Field worker and the Field Oxford, New Delhi.
14. Weber, M 1974 The Methodology of Social Sciences Free Press, Chicago
15. Young, P.V. 1977 Scientific Social Surveys and Research Prentice Hall, New Delhi.

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## **SOCIAL CHANGE IN INDIA**

### **Unit-I: Conceptual and Theoretical Frame work**

- a. Concept
- b. Forms
- c. Linear Theory
- d. Cyclic Theory

### **Unit-II: Factors of Social change**

- a. Techno- Economic
- b. Socio- Psychological
- c. Cultural and Religious d. Media

### **Unit-III: Trends and Processes of Change in Modern India**

- a. Sanskritization
- b. Secularization
- c. Gandhian
- d. Globalization

### **Unit- IV: Changes in Tribal and Rural India**

- a. Changes in Tribal and Rural Economy
- b. Changes in Socio-cultural spheres
- c. Land Alienation
- d. Welfare Measures and Consequent Changes

### **Unit-V:- Changes in Urban and Industrial India**

- a. In Migration and Growth of informal sector.
- b. development of Slums.
- c. Development of Criminal Activities.
- d. Welfare measures and Consequent Changes.

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## References:

1. Beteille, A. 2003 The Idea of natural inequality and other essays. Oxford, New Delhi.
2. Desai, AR 2001 Rural Sociology in India. Popular, Bombay
3. Jhingan, M.L. 2003 The economics of Development and Planning. Vrinda Publications, New Delhi
4. Kanungo, S. 2002 Making Information Technology Work, Sage, new Delhi
5. Mathur, H.M. (ed) 1994 Development, Displacement and Resettlement: focus on Asian experiences Vikas, New Delhi.
6. Preston, P. 2001 Reshaping communications, Technology Information and Social Change. Sage, New Delhi.
7. Ramachandran, P.S. et al (ed) 2002 Traditional Ecological Knowledge for managing Bio-sphere reserves in south and central Asia. Oxford, New Delhi.
8. Reid, Suctitus 1976 Crime and Criminology, Illiois: Deyen Press
9. Schuurman, F.J. 1999 Globalization and Development, Vistaar, new Delhi.
10. Parekh, B 1999 Colonialism, Tradition and Reform: An analysis of Gandhi's Political Discourse Sage, New Delhi.
11. Sharma, K.L. 1997 Social Stratification in India: Issues and Themes. Sage, New Delhi.
12. Shiva, V. and Bedi, G. 2002 Sustainable Agriculture and food scarcity Sage New Delhi.
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**RURAL SOCIOLOGY**

**Unit-I: Characteristics and Approaches**

- a. Concept and Characteristics of Peasant Society
- b. Concept and Characteristics of Agrarian Society
- c. Caste and Jhami Approach
- d. Sub- Altern Approach

**Unit-II: Agrarian Institutions**

- a. Land Ownership and Its Types: After Independence
- b. Agrarian Relations and Modes of Production
- c. Agrarian Social Structure

**Unit- III: Planned Change**

- a. Rural leadership
- b. Factionalism
- c. Panchayati Raj before and after 73<sup>rd</sup> Amendment
- d. Five Year's Plans in India

**Unit-IV: Rural Development and Change**

- a. Green Revolution
- b. Land Reform
- c. Globalization and its Impact on Agriculture

**Unit-V: Welfare measures and consequent Changes**

- a. Self-help Group(SHG)
- b. MNREGA
- c. SSA

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## References:

1. Basu, K. (ed) 2000 Agrarian Questions Oxford, New Delhi.
2. Berbergglu, B. (ed) 1992 Class, State and Development in India sage, New Delhi.
3. Beteille, A. 1974 Six essays in comparative sociology oxford, New Delhi.
4. \_\_\_\_\_ 1974 Studies in Agrarian social structure oxford, New Delhi.
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15. Thorner, D. 1956 The Agrarian prospects in India University press, New Delhi.
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**Paper No. V/P1**

**Marks-100**

**PRACTICAL-I**

Practical based on Field Work & Preparation of tools  
Interview Guide and case study

Scheme of Evaluation- 50% by Internal Examiner and rest 50%  
by Viva-Voce Examination evaluated both by the Internal and  
External Examiner.

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## **SECOND SEMESTER**

**Paper No. –VI/CC 5**

**Marks-80**

### **CLASSICAL SOCIOLOGICAL THINKERS**

#### **Unit-I: Karl Marx**

- a. Materialistic Interpretation of History
- b. Class and Class Struggle
- c. Alienation

#### **Unit-II: Thurstein Veblen**

- a. Theory of Leisure class
- b. Concepts of Social Change
- c. Comparison of Marx and Veblen's theories

#### **Unit-III: Max Weber**

- a. Theory of Social Action
- b. Concepts of Status, Class and power
- c. Sociology of Religion and Economic Development

#### **Unit-IV Talcott Parsons**

- a. Social Action
- b. Pattern variables
- c. Social System

#### **Unit-V: Robert K. Merton**

- a. Reference Group
- b. Social Conformity and Anomie
- c. Functional Paradigm

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1. Abraham, F and Morgan, J.H. 1985 Sociological Thought from Comte to Sorokin Macmillan, New Delhi.
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13. \_\_\_\_\_ 1996 Rethinking Sociology Rawat, Jaipur

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**QUANTITATIVE RESEARCH TECHNIQUES IN SOCIOLOGY**

**Unit-I: Sampling**

- a. Rational
- b. Types
- c. Sampling error
- d. Survey Vs. Sampling based study in sociology

**Unit-II: Quantitative method and survey Research**

- a. Techniques of Survey Research: Interview
- b. Tools of Research; Preparation of Questionnaire and Interview Schedule
- c. Processing of Data: Classification, Tabulation and Interpretation
- d. Use of Computer in Data Processing

**Unit-III: Measurement and Scaling Techniques**

- a. Levels of Measurements: Types of Scales- Nominal and Ordinal
- b. Reliability and Validity of Scaling
- c. Measures of Social Distance: Thurston, Lickert and Bogardus Scale
- d. Sociometry

**Unit-IV: Statistics in Social Research**

- a. Measures of Central Tendency: Mean, Median and Mode
- b. Measures of Dispersion- Standard Deviation
- c. Correlation Analysis- Chi Square
- d. Quantitative Vs. Qualitative research in sociology

**Unit-V: Qualitative and Quantitative research method**

- a. Triangulation; mixing Qualitative and Quantitative methodologies
- b. Social Research, Action research and Participatory research
- c. Application of computers in Social research; MS office.
- d. Ethical issues in social research.

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## References:

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1979                                  Macmillan, Free Press.
2. Bryman, Allan                      Quality and Quantity in Social Research  
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**SOCIOLOGY OF DEVELOPMENT**

**Unit-I: Perspectives on Development**

- a. Modernization
- b. Marxist
- c. Dependency
- d. Alternative

**Unit-II: Changing Conception of Human Development**

- a. Mainstream vs. Indigenous Model of Development
- b. Human Indicator Index
- c. Sustainable Development: Socio- Cultural
- d. Impact of Bio-Technology and Information Technology on Development.

**Unit-III: Indian Experience on Development**

- a. Sociological Appraisal of Five Year Plans
- b. Social Consequences of Economic Reforms
- c. Socio Cultural Impact of Globalization
- d. Social Implication of InfoTech and Bio-Tech Revolution

**Unit-IV: Consequences of Development**

- a. Development and Displacement
- b. Development and Socio- Economic Disparities
- c. Ecological Degradation
- d. Development and Migration.

**Unit-V: Issues and development in Contemporary India.**

- a. Social Exclusion
- b. Gender Discrimination
- c. Privatization and unfavourable Service condition.
- d. Sustainability.

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**INDIAN RURAL SOCIETY**

**Unit-I: Tribal Society as Agrarian Society**

- a. Tribe Concept and Characteristic
- b. Tribe class
- c. Changing problems of Tribal Land

**Unit-II: Social Issues**

- a. Migration
- b. Land Alienation
- c. Loss of Livelihood

**Unit-III: Contemporary Issues**

- a. Health
- b. Education
- c. Changing status of Rural Women
- d. Inequality

**Unit-IV: Peasant Movement**

- a. Causes
- b. Types
- c. Tebhaga
- d. Telengana

**Unit-V: Naxlite movement in Contemporary India.**

- a. Origin and affected area
- b. Causes
- c. Present status; Governments measures and people's response.

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## References:

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**Paper No. X/P2 PRACTICAL-II**

**Marks-100**

Practical based on Field Work & Preparation of tools

Questionnaire, Interview Schedule Preparation and Tabulation.

**Scheme of Evaluation-** 50% by Internal Examiner and rest 50% by Viva-Voce Examination evaluated both by the Internal and External Examiner.

**THIRD SEMESTER**

**Paper No. XI/CC9**

**Marks-100**

**CLASSICAL SOCIOLOGICAL THEORIES**

**Unit-I: Positivism**

- a. Origin and Basic Postulates
- b. Contributions of Comte
- c. Contributions of Durkheim
- d. Criticism

**Unit-II: Functionalism**

- a. Origin and Basic Postulates
- b. Contributions of Parsons
- c. Contribution of Merton
- d. Criticism

**Unit-III: Conflict theory**

- a. Contribution of L.A Coser
- b. Contributions of Karl Marx
- c. Contribution of Dahrendorf
- d. Criticism

**Unit-IV: Structuralism**

- a. Origin and Basic Postulates
- b. Contribution of Red Cliff Brown
- c. Contribution of Levistrauss
- d. Criticism

**Unit-V:Exchange Theory**

- a. Origin and Basic postulates
- b. Contribution of peter Blau
- c. Contribution of George Homans.
- d. Criticism

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## References:

1. Abraham, M.F. 2001 Modern Sociological Theory: An Introduction Oxford, New Delhi.
2. Alexander, J.C. 1987 Twenty Lectures; Sociological theories since World War- II Columbia University press- New York.
3. Coser, L.A. 2001 Masters of Sociological thoughts Rawat, Jaipur
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**Paper No.XII/CC10**

**Marks-100**

**SOCIAL MOVEMENTS IN INDIA**

**Unit-I: Nature and Types**

- a. Characteristics
- b. Types
- c. Reasons
- d. Power Structure and Social Movements

**Unit –II: Basis of Social Movement**

- a. Class, Caste, Ethnicity and Gender
- b. Types of leadership and relationship between leaders and masses
- c. Political institution and social movement.
- d. Role of media in social movement.

**Unit-III: Theoretical Perspectives**

- a. Marxian and Post-Marxian
- b. Weberian Perspectives
- c. Structural-Functional
- d. Postmodernist

**Unit-IV: Traditional Social Movements**

- a. Labour and Trade Union
- b. Tribal
- c. Peasant
- d. Nationalist

**Unit-V: New Social Movements**

- a. Dalit
- b. Women
- c. Ethnic
- d. Environmental

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### References:

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**PERSPECTIVES OF STUDY TO INDIAN SOCIETY**

**Unit-I: Indological / Textual**

- a. Approach of Study
- b. G.S. Ghurye
- c. Louis Dumont
- d. Criticism

**Unit-II: Structural Functionlism**

- a. Approach of Study
- b. M.N. Srinivas
- c. S.C. Dube
- d. Criticism

**Unit-III: Marxism**

- a. Approach of Study
- b. D.P.Mukharjee
- c. A.R. Desai
- d. Criticism

**Unit-IV: Subaltern Perspective**

- a. Approach of Study
- b. B.R. Ambedkar
- c. David Hardiman
- d. Criticism

**Unit-V: Civilization**

- a. Approach of study
- b. N.K. Bose
- c. Surjeet Sinha
- d. Criticism

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**INDUSTRY AND SOCIETY IN INDIA**

**Unit-I: Industrial Sociology and Classical Sociological Tradition**

- a. Classical Scientific Management
- b. Division of Labour
- c. Bureaucracy and Rationality
- d. Production Relations and Alienation

**Unit-II: Industrial Organizations**

- a. Formal and Informal Organizations, Structure and Function
- b. Line and Staff Organization
- c. Contemporary Organization Realities

**Unit-III: Problems through Industrialization process**

- a. Family
- b. Stratification
- c. Habitat and Settlement
- d. Environmental

**Unit-IV: Subjective Experience of Work**

- a. Work Ethics, Work Value, Work Attitude and Work Process
- b. Motivation to Work,
- c. Work Satisfaction, Incentives and Its Effects

**Unit-V: Technological Change and Automation**

- a. Technology and Social Structure in Industry
- b. Organizational Choice and Technological Change
- c. Resistance to Automation and Change

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## References:

1. Agrawal R.D. 1972 Dynamics of Indian labour relations in India (A Book regarding Mc-Graw Hill, Bombay)
2. Aziz Abdul 1984 Labour problems of developing economy Ashis Publishing house, New Delhi
3. Gilbert S.J. 1985 Fundamentals of Industrial Sociology Tata Mc-Graw hill Bombay
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10. \_\_\_\_\_, 1978 Industrial Relations in India OUP, new Delhi
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**CRIMINOLOGY**

**Marks-100**

**Unit-I: Conceptual and Theoretical Approaches**

- a. Legal and Sociological,
- b. Concept of Crime, Crime Causes, prevention and Control
- c. Theories on Crime Causation; Sociological and Geographical

**Unit-II: Type of Criminals and Crime**

- a. Juvenile delinquency
- b. Women and Crime
- c. White collar crime

**Unit-III: Changing Profile of Crime and Criminals;**

- a. Corruption: Types, Causes, and Consequences.
- b. Cyber Crime: Causes, Prevention and Control
- c. Crime Against Women: Causes, Prevention and Control

**Unit-IV: Theories of Punishment**

- a. Retributive, Deterrent: Theories and Criticism
- b. Reformatory Theory: Probation and Parole
- c. Open Prison- Its Success and Failure

**Unit-V: Terrorism**

- a. Concept of Terrorism and Its Characteristics
- b. Terrorism in India
- c. Social and Legal Measures for Its Prevention and Control

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## References:

1. Ahuja, R. 1969 Female offenders in India Meenakshi Prakashan, Meerut
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8. Singh, S. and Srivastava, S.P. (ed) 2001 Gender equity through women's empowerment. Bharat book center, Lucknow.
9. Sirohi, J.P.S. 1992 Criminology and Criminal Administration Allahabad Law agency. Allahabad.
10. Vadackumchery, J. 1996 The police and Delinquency in India. APH Publishing corporation, New Delhi.

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## **FOURTH SEMESTER**

Paper No. XVI/CC14

Marks-100

### **MODERN SOCIOLOGICAL THEORIES**

#### **Unit-I: Symbolic Interactionism**

- a. Origin and Basic Postulates
- b. Contributions of G.H. Mead
- c. Contribution of H. Blumer
- d. Criticism

#### **Unit-II: Phenomenology**

- a. Origin, Basic Postulates of Phenomenology
- b. Contributions of Schutz
- c. Contributions of Berger
- d. Criticism

#### **Unit- III: Ethnomethodology**

- a. Origin Basic postulates of Ethnomethodology
- b. Contribution of Garfinkel
- c. Contribution of Goffman
- d. Criticism

#### **Unit-IV: Critical Theory**

- a. Origin and Development
- b. Contributions of Adorno
- c. Contributions of Habermas
- d. Criticism

#### **Unit-V: Post Modernism**

- a. Origin and Development
- b. Contributions of Foucault
- c. Contributions of Derrida
- d. Criticism

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## References:

1. Abraham, M.F. 2001 Modern Sociological Theory: An introduction Oxford, New Delhi
2. Adams, B.N. and Sydie, R.A. 2001 Sociological Theory, Vistaar, New Delhi
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7. Coser, L.A. 2001 Masters of Sociological thought Rawat, Jaipur.
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**COMPARATIVE SOCIOLOGY**

**Unit-I: Historical and Social Context of Emergence of Sociology in the West**

- a. Emergence of growth of Sociology in West
- b. Eurocentric Moorings Western Sociological Tradition
- c. Americanization of Sociology

**Unit-II: Central Themes in Comparative sociology**

- a. Modernity and Development
- b. Diversity and multy Culturalism
- c. Enviornment Globalization

**Unit-III: Theoretical Concern,s in Comparative sociology**

- a. Problems of theoring in sociology
- b. Theoretical and Methodological approaches in sociology
- c. Policy issues: Formulation and Evaluation

**Unit IV: Current Debates**

- a. Contextitualization
- b. Indianization
- c. Use of Native Categories
- d. Criticism.

**Unit-V: Debate on “For Sociology of India”**

- a. Sociology of India
- b. Sociology in India
- c. Sociology For India
- d. Criticism

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## References:

- 1 Anderski, S 1961: Elements of Comparative Sociology( London , Widenfeld and Nicolson)
- 2 Beteille, Andre 1987: Essays in Comparative Sociology( New Delhi: Oxford University Press)
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- 14 Parekh, Bhikhu 2000 Rethinking Multiculturalism: Cultural Diversity and Political Theory (London: Macmillian)
- 15 Saraswati B.N.1994: Interface of Cultural Identity and Development (New Delhi: Indira Gandhi National Centre of the Arts)
- 16 World Commiss ion on environment and Development, 1987: (New Delhi: Oxford University Press)
- 17 Wallerstein, Immanuel 1974 Modern World System (New York: Oxford University Press)

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**CONTEMPORARY ISSUES IN INDUSTRY**

**Unit-I: Industrial Relation**

- a. Importance of Human Relations at work
- b. Conflict: Causes and Types, Resolution of Conflict
- c. Conciliation and Collective Bargaining
- d. Workers Participation in Management

**Unit-II: Trade Union and Industrialization**

- a. History of Trade Unionism in India
- b. Objectives and Functions
- c. ILO and Trade Unions in India
- d. Trade Unionism in Globalization

**Unit-III: Industry and Society**

- a. Impact of Industry on Family
- b. Impact of Industry on Stratification
- c. Industrialization and Migration
- d. Industrialization and Religion

**Unit-IV: Industrilization in Third world Countries in the Era of Globlization**

- a. FDI and Third World
- b. International Agencies: World Bank and Third world countries
- c. Status of Industries in Third World Countries

**Unit-V: Contemporary Issues**

- a. Industrialization and Women Labour
- b. Industrialization and Child Labour
- c. Industrialization and Environment
- d. Problem of Industrialization in Developing Countries

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## References:

1. Agrawal R.D. 1972 Dynamics of Indian labour relations in India (A Book regarding Mc-Graw Hill, Bombay)
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5. Laxmana, C et al 1990 Workers Participation and industrial democracy: Global perspectives: Ajanta publication, New Delhi.
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**CRIMINOLOGY: CORRECTIONAL AND ADMINISTRATION**

**Unit-I: Roots of Correction to prevent Crime**

- a. Socialization
- b. Family values
- c. Role of education

**Unit-II: Correction and It's Forms**

- a. Meaning and Significance of Correction; Prison Based and Community Based
- b. Correctional Programmes in Prison; History of Prison Reforms in India
- c. After Care and Rehabilitation Programme.

**Unit-III: Problem of Correctional Administration**

- a. Overcrowding; Lack of Inter Agency Co-Ordination among Police Prosecution, Judiciary and Prison
- b. Prison Offences
- c. Problem of Criminal Justice Administration

**Unit-IV: Victimological Perspective**

- a. Victim's Responsibility in Crime
- b. Violation of Prisoner's Human Rights
- c. Problems of Women Offenders.

**Unit-V: Community Policing**

- a. Concept and Objectives
- b. Types
- b. Significance

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## References:

1. Ahuja, R. 1981 The Prison System Sahitya Bhawan, Agra
2. \_\_\_\_\_, 1997 Contemporary Social problems in India Rawat, Jaipur.
3. Advani, NH, 1978 Perspectives on Adult Crime and correction. Abhinav Publication, New Delhi
4. Bedi, K. 1998 It is always possible sterling, New Delhi.
5. Devasia, L and Devasia, V.V. (ed) 1989 Female Criminals and female victims. . An Indian Perspective Dattsons, Nagpur
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7. Mohanty, S 1990 Crime and Criminals in India Ashish Pub. House New Delhi.
8. Reid, S. 1976 Crime and Criminology Deydan press, Illinayse
9. Shankardas, R.D. 2000 Punishment and the Prison: India and International perspective, Sage, New Delhi.
10. Sutherland, E.H. and Donald, R.C., 1968 Principles of Criminology the Times of India Press, Bombay.
11. William, H.E. 1990 The correction Profession Sage, New Delhi.

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Paper No.-XX/P3

Marks-100

**PROJECT REPORT**

**On Rural and Urban Problems**

Scheme of Evaluation- 50% by Internal Examiner and rest 50%  
by Viva-Voce Examination evaluated both by the Internal and  
External Examiner.

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19/12/2012

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# **DURG VISHWAVIDYALAYA, DURG (C.G.)**

Website - [www.durguniversity.ac.in](http://www.durguniversity.ac.in), Email - [durguniversity@gmail.com](mailto:durguniversity@gmail.com)



## **SCHEME OF EXAMINATION & SYLLABUS of M.A.(Economics) Semester Exam UNDER FACULTY OF ARTS Session 2017-18**

**(Approved by Board of Studies)  
Effective from July 2017**

**SYLLABUS FOR UNIVERSITY TEACHING DEPARTMENT AND AFFILIATED  
COLLEGES IN P.G. CLASSES**

M.A. in Economics: Semester Examination 2017-18

At post graduate level, candidates are required to study 15 papers in First, Second and Third semester (5 papers in each semester) and 04 papers in fourth semester examination. This is to be treated as the nineteen papers of the course structure. So there shall be 19 papers in the post graduate examination in Economics. Viva - voce examination be treated as a compulsory paper for M.A. fourth semester examination. Each paper shall carry 100 marks out of which 80 marks will be for theory paper and 20 marks for internal assessment. There shall be 2000 marks in M.A. Candidates shall have secure 36 percent marks in aggregate of all papers in order to pass the M.A. Examination. Examination and result shall be treated according to rules and regulations of ordinance no. 13.

**M.A. SEMESTER-I and SEMESTER-II**

PAPER	SEMESTER-I	Marks		SEMESTER-II	Marks	
		Theory	Internal Assessment.		Theory	Internal Assessment
PAPER-I	Micro Economics-I	80	20	Micro Economics-II	80	20
PAPER-II	Macro Economics-I	80	20	Macro Economics-II	80	20
PAPER-III	Quantitative Methods	80	20	Research Methods & Computer Application	80	20
PAPER-IV	Indian Economy	80	20	Indian Economic Policy	80	20
PAPER-V	Industrial Economics	80	20	Labour Economics	80	20

**M.A. SEMESTER-III and SEMESTER-IV**

PAPER	SEMESTER-III	Marks		SEMESTER-IV	Marks	
		Theory	Internal Assessment		Theory	Internal Assessment
PAPER-I	Economics of Growth	80	20	Economics of Development & Planning	80	20
PAPER-II	International Trade	80	20	International Economics	80	20
PAPER-III	Public Finance	80	20	Public Economics	80	20
PAPER-IV	Environmental Economics	80	20	Economics of Social Sector	80	20
PAPER-V	Demography	80	20	Viva-Voce	100	--


  
 D. S. Singh (L.K. Bhatnagar)

**SEMESTER – I**  
**Micro Economics -1**  
**Paper - I**

- Unit-I Introduction: - Concept of Equilibrium, Economic Models, Neo Classical Demand Analysis. Elasticity of Demand (Price, Income & Cross), Elasticity of supply.
- Unit- II Indifference curve, Marginal Rate of Substitution. Income & substitution effect, Hicks and Slutsky theorem, Revealed preference theory. Hicks's Revision of Demand, Hicksian Consumer surplus.
- Unit – III Theory of Production – Production function, The short period & long period production function, the law of variable proportion (isoquant approach), Marginal rate of Technical Substitutions, Returns to a factor and returns to scale. Expansion path, Cobb-Douglas Production function, CES production function.
- Unit- IV Theory of cost and Revenue analysis, Perfect Competition - equilibrium of firm in Perfect Competition. Monopoly - short run and long run equilibriums, price discrimination under monopoly competition, monopoly control and regulation. Comparison between monopoly and perfect competition.
- Unit – V Monopolistic Competition – price and output determination under monopolistic competition, Group equilibrium, theory of excess capacity. Oligopoly – non- collusive oligopoly model: The kinked demand curve. The collusive oligopoly – Cartels: joint profit maximization or perfect cartels, price leadership : the low cost price leadership model.

**Text Books**

1. Jhingan M. L. (2014), Advanced Economic Theory, Vrinda Publication, New Delhi
2. Jhingan M. L. (2014), Micro Economics , Vrinda Publication, New Delhi
3. Agarwal , A (2014), Micro Economic analysis , Sahitya Bhawan Publication, New Delhi

**Reference Books**

1. Kraps, David M. (1990) A course in micro economics theory -Princeton university press, Princeton.
2. Koutsayiannis; A (1979) modern Micro economics (2nd Edition), Macmillan press, London.
3. Layard, PRG and P.W. Watters (1978), Micro economic theory, McGraw Hill, New York.
4. San A (1999) Micro economics theory and Applications, Oxford University Press, New Delhi;
5. Stigler, G. (1996) Theory of Price (4th edition), Princeton Hall of India, New Delhi.
6. Varian, H (2000) Micro economics Analysis, W.W. Norton, New York.
7. Baumol W.J., (1982) Economic theory and operations Analysis, Princeton Hall of India, New Delhi.
8. Handersan, J.M. and R.E. Quandt (1980) Micro economics theory - A Mathematical approach, Mc Graw Hill New Delhi.
9. Hirshleifer, J. And A Glazer (1997), Price theory and Application, Prentise Hall of India, New Delhi.

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**SEMESTER – I**  
**MACRO**  
**ECONOMICS-1**

**Paper – II**

- Unit – I National Income and Accounts – Concept of National Income and National Product, Problems of Measurement, Different forms of National Income Accounting – Social Accounting, Input Out-put Accounting, Flow of Funds, Balance of Payment – Accounting. Circular flow of Income – Two, Three and Four Sector Economy
- Unit – II Classical Theory of Employment, Say's Law of Market, Principle of Effective Demand, Keynesian & Pigou Theory of Employment, Comparison of Classical and Keynesian Models. National Income Determination of Keynesian Model - Two, Three and Four Sector Economy.
- Unit- III Consumption Function- Keynesian Psychological Law of Consumption, Short Run & long run Consumption Function. Theory of Consumption Function – Absolute Income Hypothesis, Duesenberry's Relative Hypothesis, Life Cycle and Permanent Income Hypothesis.
- Unit –IV Investment Function- Marginal Efficiency of Capital and Investment. Saving and Investment Equality, Multiplier and its working, Accelerator and its working, Super- Multiplier. Supply of Money, Determinants of Money Supply, Measurement of Money supply, Control of Money Supply. High Powered Money, Money Multiplier.
- Unit – V Demand for Money –Fisher and Cash Balance (Cambridge) Approach, Fundamental Equation of Keynes. Friedman's re-formulation of the quantity theory of money.  
Post Keynesian Approach to Demand for Money- Patinkin, Baumol's, James Tobin, Friedman, and Gurley & Shaw's Approaches.

**Text books**

- 1 Sethi, T.T. (2008) Macro Economics, Laxminarayan Agrawal, Agra.
- 2 Jhingan, M.L. (2010) Monetary Economics, Vrinda publications pvt. ltd.
- 3 Jhingan, M.L. (2000) Macro Economic theory, Vrinda publications pvt. ltd.
- 4 Shinghai G.C & Mishra J.P. (2013) Macroeconomic Analysis, Sahitya bhawan publication Agra.



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**SEMESTER- I**  
**QUANTITATIVE METHODS**  
**Paper – III**

Unit – I	Skewness – Symmetrical and asymmetrical distribution, Measurement of skewness – Karl Pearson's coefficient of Skewness, Bowley coefficient of skewness. Simple correlation- Measurement of correlation – Karl Pearson's coefficient of correlation and Spearman's rank correlation, Coefficient of correlation by the method of least square, Probable error and Standard error in correlation, coefficient of determination of correlation.
Unit – II	Regression analysis – Regression and Correlation, regression lines and regression coefficient, regression equations. Simple regression analysis, Multiple regression analysis (up to three variables only). Standard error of the estimates of simple regression analysis. Interpolation and extrapolation- Method of fitting a parabolic curve, Newton's advancing difference method, Direct binomial expansion method and Lagrange's method.
Unit – III	Association of Attributes – Meaning and types of association, Consistency of data, Methods of determining association – Method of comparison of proportion, Coefficient of association using Yule's method. Probability – meaning and definition, Permutation and combination, Types of events, measurement of Probability – addition and multiplication theorem, conditional probability.
Unit – IV	Index Number- Fisher's Ideal Index number, Reversibility Test – Time reversibility & factor reversibility tests. Time series Analysis – Components of time series, Measurement of long term trend- semi-average method, Moving average method and method of least squares.
Unit - V	Functions: Meaning and types of functions, Differentiation: Meaning and rules of differentiation, Integration: Meaning and rules of integration, Problems related to differentiation and integration, Auto correlation.

**Reference:**

1. Shukla, S.M. and S.P. Sahay – Quantitative methods Sahitya Bhawan Publications, Agra.
2. Agrawal, D.R.- Quantitative methods. Vrinda Publications (P) Ltd.
3. Sancheti, D.C.- Quantitative methods. Sultanchand and Sons, New Delhi.
4. Gupta, S.P. and others,- Quantitative Techniques. Sultanchand and Sons, New Delhi.
5. मेहता एवं मदनानी, 'अर्थशास्त्र में प्रारंभिक गणित', लक्ष्मीनारायण अग्रवाल, आगरा-3.


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**SEMESTER- I**  
**INDIAN ECONOMY**  
**Paper –IV**

- Unit – I Indian Economy: Meaning, basic characteristics and major issues of development of Indian Economy, GDP and National Income of India – Components and Structure of GDP, Role of Primary, Secondary and Tertiary Sectors in GDP, National Income and Per Capita Income, Growth Rates of GDP and Per Capita Income.
- Unit – II Demographic Features of India – Size, Growth Rate, Sex Ratio, Age-Composition, Literacy and Density of Population, Migration, Rural-Urban Migration, Urbanization and Civic Amenities, Occupational Structure, National Population Policy, Demographic Features of Chhattisgarh State.
- Unit – III Agricultural Development in Indian Economy – Agricultural Growth and Productivity, Causes of Low Productivity and Measures to Increase it, Agricultural Marketing and Warehousing, Institutional Structure- Land Reforms in India, The Green Revolution, National Agricultural Policy and Food Security in India, Rural credit in India, NABARD and its role in rural credit.
- Unit – IV Industrial Development in India, Industrial Policies of 1956 and 1991, Public Sector Enterprises and their Performance, Privatization and Disinvestment, Small Scale Sector and Minor Medium Enterprises, Unorganized Sector and Informalisation of the Indian Economy and Knowledge Economy.
- Unit – V Infrastructure- Infrastructure and Economic Development, Energy, Power, Transportation- Road, Railway, Water and Civil Aviation in India, Private Investment in Infrastructure: Outlook and Prospect, Concept of Social Sector and Social Infrastructure, Education, Health and Family Welfare.

**Reference:-**

- 1 Ahulwalia, I. J. and I. M. E. Litle (Eds.) 1999): India's Economic Reforms and Development (Essays for Manmohan Singh), Oxford University Press, New Delhi
- 2 Bardhan, P. K. (9<sup>th</sup> Edition) (1998): The Political Economy of Development in India, Oxford University Press, New Delhi.
- 3 Bawa, R.S. and Raikhy (Ed.) (1997): Structural Change in Indian Economy, Guru Nanak Dev University Press. Amritsar (PB).
- 4 Brahmananda, P. R. and V. R. Panchmukhi (9<sup>th</sup> Eds.) (2001): Development Experience in the Indian Economy: Interstate Perspectives, Bookwell, Delhi.
- 5 Chakravarty, S. (1987): Development Planning: The Indian Experience, Oxford University Press, New Delhi.
- 6 Dantwala, M. L. (1996): Dilemmas of Growth: the Indian Experience, Sage Publication, New Delhi.



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**SEMESTER- I**  
**INDUSTRIAL ECONOMICS**  
**Paper –V**

- Unit – I      Concept and Organization of a Firm-Ownership, Control and Objectives of the Firm. Rationale of Industrialization: Agriculture and Industrialization – patterns, process, speed, Implications of Industrialization. Theories of Industrial location, Alfred Weber and Sergeant Florence Theory. Factors Affecting Industrial Localization.
- Unit – II      Industrial Productivity, Efficiency and Capacity. Industrial Policy in India, Role of Public and Private Sector industries in India. Recent Trends in Industrial Growth. Strategies for Industrial Growth, Regional Development of Industries.
- Unit – III      Owned, External and Other Components of Funds, Nature, Volume and Types of Institutional Finance – IDBI, IFCI, SFCs, SIDC, Commercial Bank.
- Unit – IV      Structure of Industrial Labour, Employment Dimensions of Indian Industry. Industrial Legislation, Industrial Relations, Exit policy and Social Security.
- Unit – V      Large scale industries:- Iron and Steel, Cement, Jute, Sugar , Paper industry . Development of Small-Scale and Cottage Industries in India.

**Text books**

1. Ahluwalia, I.J. (1985): Industrial Growth in India, Oxford University Press, New Delhi.
2. Barthwal, R.R. (1985): Industrial Economics, Wiley Eastern Ltd., New Delhi.
3. Chernilam, F (1994): Industrial Economics : Indian Perspective (3<sup>rd</sup> Edition), Himalaya Publishing House, Mumbai.
4. Desai, B. (1999): Industrial Economic in India (3<sup>rd</sup> Edition), Himalaya Publishing house Mumbai.
5. Kuchhal .S.C.: The industrial economy of India , Chaitanya publishinghouse.

**Reference**

1. Divine, P.J. and R.M. Jones et. At. (1976): An Introduction to industrial economics, George Allen and Unwin Ltd., London.
2. Government of India, Economic Survey (Annual)
3. Hay, D. and D.J. Morries (1979): Industrial Economics : Theory and Evidence, Oxford University Press, New Delhi.
4. Kuchhal, S.C. (1980) : Industrial Economy of India (th Edition), Chaitanya Publishing House Allahabad.
5. Reserve Bank of India Report on Currency and Finance (Annual).
6. Singh, A. and A. Sadhu (1988): Industrial Economics, Himalaya Publishing House



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**SEMESTER- II**  
**MICRO ECONOMICS-II**  
**Paper –I**

- Unit – I      Sales maximization model: Baumol's model (price-output determination of a product without advertisement and optimal advertising outlay), Managerial theories of the firm: Williamson's model of managerial discretion, Marris theory of the firm. Theory of limit pricing: Bain's model.
- Unit- II      Theory of distribution: marginal productivity theory of distribution (Marshall – Hicks version), Product Exhaustion theorem. NEO-Classical Approach of Distribution: relative share of labor and capital, technological progress and factor shares in income, Determinants of rent, wages, interest and profit (Only modern Theory).
- Unit- III      Linear Programming and Game Theory (Geographical and Simplex methods)
- Unit – IV      Concept of Equilibrium: Static and Dynamic equilibrium, Partial and General equilibrium. Walrasian Excess Demand.
- Unit – V      Welfare economics – Introduction, Value judgment, Classical welfare economics, Pigovian Welfare economics, Pareto optimal conditions. New welfare economics: Compensation principle of Kaldor - Hicks. Social welfare function: Bergson – Samuelson social welfare function, Arrow's impossibility theorem.

**Text Books**

1. Jhingan M. L. (2014): Advanced Economic Theory, Vrinda Publication, New Delhi
2. Jhingan M. L. (2014): Micro Economics , Vrinda Publication, New Delhi
3. Agarwal , A (2014): Micro Economic analysis , Sahitya Bhawan Publication, New Delhi

**Reference Books**

1. Mansfield, E. (1997): Microeconomics (9<sup>th</sup> Edition), W.W. Norton and Company, New York.
2. Ray, N.C. (1975): An Introduction to Micro economics, Macmillan Co. of India Ltd., Delhi.
3. Ryan, W.J.L. (1962): Price Theory, Macmillan and Co. Limited, London.
4. Samuelson, P.A. and W.D. Nordhaus (1998): Economics, Tata McGraw Hill, New Delhi.
5. Stonier, A.W. and D.C. Hague (1972): A Textbook of Economic Theory, ELBS and Longman Group, London.

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**SEMESTER- II**  
**MACRO ECONOMICS**  
**Paper –II**

- Unit – I      Theory of Inflation – Classical, Keynesian and Monetarist Approaches to Inflation, Semi And Full inflation, Theory of Structural Inflation, Stagflation, Control of Inflation.  
Philips Curve Analysis – Short Run and Long Run Philip's Curve.  
The Natural Rate of Unemployment Hypothesis, Tobin's Modified Philip Curve.
- Unit – II      Business Cycles- Main Features of Business Cycles, Types of Business Cycle, measures to control business cycle. Theories of Business Cycles :- Hawtrey's Monetary Theory of Trade Cycle, Schumpeter's, Keynes, Hicks, Samuelson's, Friedman, Kaldor Model of Trade Cycle.
- Unit – III     Monetary Policy-Meaning of Monetary Policy, Instrument of Monetary Policy, Objective of Monetary policy, Limitations of Monetary Policy, Monetary Policy and Economic Development. Fiscal Policy – Meaning of Fiscal Policy, Instruments of Fiscal Policy, Objectives of Fiscal Policy, Fiscal Policy and Economic Growth, Effectiveness of Fiscal Policy, Monetarism Vs Fiscalism – The Debate, Similarities between Monetary Policies and Fiscal Policies.
- Unit – IV      IS-LM Model, The Product Market Equilibrium, The Money Market Equilibrium, Equilibrium of Product and Money Market, Merits and Demerits of IS-LM Curve, Extension of IS-LM Models With Flexible Prices and Labour Market.
- Unit – V      The Rational Expectation Hypothesis: - Adaptive Expectations, Rational Expectations. The New Classical Macro - Economics, Policy implications of New Classical Macro- Economics. Supply side economics: - main features, policy prescriptions.

**Text books**

1. Sethi, T.T. (2009-10): Macro economics, Laxminarayan Agrawal, Agra.
2. Jhingan, M.L. (2008): Monetary Economics, Vrinda Publications Pvt. Ltd.
3. Jhingan, M.L. (2010): Macroeconomic theory, Vrinda Publications Pvt. Ltd.
4. Shinghai G.C. & Mishra J.P. (2013): Macro Economic Analysis, Sahitya Bhawan Publication Agra.

Handwritten signatures of examiners, including one that appears to read 'D. C. Singh' and another 'Jhingan'.

## Reference

1. Blackhouse, R. and A. Salansi (Eds.) (2000), Macroeconomics and the Real World (2 vols) Exford University Press, London.
2. Branson, W.A. (1989), Macroeconomics Theory and Policy, (3<sup>rd</sup> Edition), Harper and Row, New York.
3. Aornbusch, R and F. Stanley (1997), Macroeconomics, McGraw Hill, inc., New York
4. Hall, R.E. and J.B. Taylor (1986), Macroeconomics, W.W>Norton, New York.
5. Heijdra, B.J. and V.P. Frederick (2001), Foundations of Modern Macroeconomics, Oxford University Press, New Delhi.
6. Jha, R. (1991), Contemporary Macroeconomic Theory and Policy, Wiley Eastern Ltd. New Delhi.
7. Romer, DL. (1996), Advanced macroeconomics, McGraw Hill Company Ltd., New York.
8. Scarte, B.L. (1997), Cycles, Growth and inflation, McGraw Hill, New York.
9. Markeley, G. (1978), Macroeconomics Theory and Policy, macmillan, New York.

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**SEMESTER - II**  
**RESEARCH METHODOLOGY AND COMPUTER APPLICATION**  
**Paper –III**

Unit – I	Research methodology and research methods, Research: Meaning, types of research, motivation of research, main stages of statistical research, primary and secondary data, methods of collecting primary data, secondary data-different sources, precautions while constructing questionnaire/schedule, editing of primary data.
Unit – II	Sampling- Meaning and need for sampling, size of sampling, merits and limitations of sampling, sampling and non- sampling errors, sampling frame, how to judge the reliability of samples. Various methods of sampling. Sampling design- meaning and steps in sample design.
Unit – III	Classification and tabulation of data- meaning and objectives of classification, types of classification, tabulation of data, parts of a table, types of tables. Processing and analysis of data- processing operations, some problems in processing, Elements/types of analysis.
Unit – IV	Hypothesis: Meaning of hypothesis, basic concepts concerning testing of hypothesis, procedure for hypothesis testing, test of significance based on students 't' test, Chi-square test 'F' ratio test and Paired T test. Practical problems related to Students 't' test, Chi-square test, F ratio test and paired T test .
Unit – IV	Computer: What is a Computer? Important characteristics of a computer, history of computer, different parts of a computer - hardware and software, various types of computer, main characteristics of a computer, elementary knowledge of INTERNET and MS office, role of computer in economic research.

**Reference Books**

1. Kothari, C.R.: Research Methodology
2. Sharma, Dr. Ramnath: Methods and Techniques of Social Survey and Research, Rajhans Publications
3. Bajpai, Dr. S. R.: Methods of Social Survey and Research, Kitab Ghar, Kanjpur-3.
4. मुखर्जी, रविन्द्रनाथ: सामाजिक शोध एवं सांख्यिकी, विवेक प्रकाशन, जवाहर नगर, दिल्ली – 7
5. शुक्ला एवं सहाय: सांख्यिकीय, साहित्य भवन पब्लिकेशन्स, आगरा

  
D. C. Singh  
J. K. Bhatnagar  
Sharma  
Sharma

**SEMESTER- II**  
**INDIAN ECONOMIC POLICY**  
**Paper – IV**

- Unit – I      Planning in India– Objectives and Strategies of Planning, Twelfth Five Year Plan, Development Strategy, LPG Model of Development, PURA- A Neo Gandhian Approach to Development, Developing Grass-root Organization: Panchayats, NGO's.
- Unit – II      Problem of Poverty and Inequality – The Concept of Poverty, Measurement and Estimation of Poverty in India, International Comparison of Poverty and Inequality of Incomes, Poverty Eradication Programmes, Causes of Failure to Remove Poverty.
- Problem of Unemployment in India- Nature of Unemployment, Various Schemes to Reduce the Unemployment, Balanced Regional Development- Indicators, Causes, Changing Scenario and Policy Measures to remove Regional Disparity.
- Unit – III      Indian Finance System – An overview, Functions of the Reserve Bank of India, Commercial Banking system, Progress of Banking since 1969, RRBs, DFIs and NBFCs, Financial Sector Reforms in India, Stock Exchange in India, Composition of Indian Capital Market, SEBI and Capital market reform.
- Unit – IV      Foreign Trade of India- Importance of Foreign Trade for a developing Economy, Foreign Trade since 1991, Structure and Direction of Foreign Trade, Balance of Payments of India, Issues in Export Import Policies, External value of the Rupee and Foreign Exchange Reserves, FEMA, SEZs, Trade Reforms in India.
- Unit – V      WTO and its Impact on the Different Sector of Economy, Economic Reforms – Rational of Internal and External Reforms, Cooperative movement in India- Organization, Structure and Development of different types of Cooperatives in India.

**Reference:-**

1. Ahulwalia, I. J. and I. M. E. Litle (Eds.) 1999): India's Economic Reforms and Development (Essays for Manmohan Singh), Oxford University Press, New Delhi,.
2. Bardhan, P. K. (9<sup>th</sup> Edition) (1998): The Political Economy of Development India, Oxford University Press, New Delhi.
3. Bawa, R.S. and Raikhy (Ed.) (1997): Structural Change in Indian Economy, Guru Nanak Dev University Press. Amritsar (PB).
4. Brahmananda, P. R. and V. R. Panchmukhi (9<sup>th</sup> Eds.) (2001): Development Experience in the Indian Economy : Interstate Perspectives, Bookwell, Delhi.
5. Chakravarty, S. (1987): Development Planning: The Indian Experience, Oxford University Press, New Delhi.
6. Dantwala, M. L. (1996): Dilemmas of Growth: the Indian Experience, Sage Publication, New Delhi.

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**SEMESTER- II**  
**LABOUR ECONOMICS**  
**Paper – V**

- Unit – I      Labour Economics - Definition, Nature, Scope & Importance. Labour Market – Nature and Characteristics of Labour Markets in India .Supply of Labour - Labour force,factors affecting Law of Labour Supply. Demand for Labour – Labour productivity, Demand for Labour by Industrialist..
- Unit – II      Theories of labour market:- Classical Theory of labour, Marginal productivity theory of Labour Concept of wages – Real Wages , Nominal Wages, Factors Affecting Real wages , Theories of Wage Determination - Classical Theory, New Theory, The theory of Collective Bargaining.
- Unit – III      Theories of Labour Movement- Labour Unions in India, Rise and Growth of Labour Union, Achievements of Labour Unions. Structure and Pattern of Trade Union- Objectives, Growth, Achievements and Failures.
- Unit – IV      Labour Legislation in Indian Labour, Laws and Practices in Relation to International Labour Standards. State and Labour, State and Social Security of Labour, Concept of Social Security and its Evolution.
- Unit – V      Labour Welfare in India, Rural and Agricultural Labour in India, Child Labour, Female Labour, Concept of Industrial Peace, Settlement of Industrial Dispute, Second National Labour Commission.

**Text books**

1. Goyal, Sunil & Goyal, M.L.(2008): Labour Economics, R.B.S.A. Publications, Jaipur.
2. Saxsena, R.C.(2010): Labour Problems & Social Welfare, K. Nath and Company Publication, Meerut.
3. Singh, Dilip Kumar,(2008): Workers Participation in Management and Industrial Relation, Rawat Publication, Jaipur & Delhi.
4. Singh, Usha & Singh, H.P.(2011): Child Labour in India :Problem and Solutions, Classical Publication ,New Delhi
5. Gupta, P.K.: labour economics , Vrinda publications .



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**SEMESTER – III**  
**ECONOMICS OF GROWTH**  
**PAPER – I**

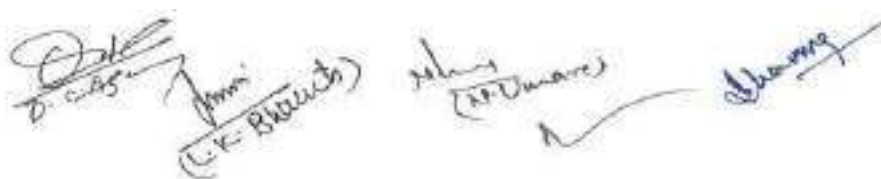
- Unit-I Economic Growth: Economic Growth and Development, Measurement of Economic Growth, Vicious Circle of poverty, Physical Quality of Life Index. Human development Index, Gender Development index, Gender empowerment measure, UNDP's Human Development Report 2015.
- Unit-II The Concept of Capital Output Ratio, Input-Output Analysis, Project Evaluation and its methods and Cost–Benefit analysis, Shadow Prices.
- Unit-III Theories of Growth:- Harrod-Domar model, Joan Robinson model, Mead's Neo -Classical Model, Solow Long- Run, Kaldor model of Distribution.
- Unit- IV Approaches to Growth:- Kaldor model of Growth, The Pesinetti Model of Profit and Growth, The Models of Technical Change, The Golden rule of Accumulation model.
- Unit- V Steady State Growth, Growth Accounting, The Friedman Model, The Mahalanobis Four Sector Model.

**Text Books**

1. Jhingan, M.L. (2008) 31<sup>ST</sup> edition, The economics of development and planning, Vrinda publication pvt. Ltd.
2. Shinghai G.C. & Mishra J.P. (2013): Macroeconomic Analysis, Sahitya bhawan publication Agra.
3. Mishra, J.P. (2012): Economics of Growth and development, Sahitya bhawan publication Agra.

**Reference Books**

1. Hajela P.D. (1998): Labour Restructuring in India: A Critique of the New Economic Policies, Commonwealth Publishers, New Delhi.
2. Jhabvala, R. and R.K. Subrahmanya (Eds.) (2000): The Un-organised Sector : Work Security and Social Protection. Sage Publication, New Delhi.
3. Lester, R.A. (1964): Economics of Labour (2<sup>nd</sup> Edition), Macmilan, New York.
4. McConnell, C.R. and S.L. Brue (1986): Contemporary Labour Economics, McGraw-Hill New York.
5. Papola, T.S., P.P. Ghosh and A.N. Sharma (Eds. 1993): Labour, Employment and Industrial Relations in India, B.R. Publishing Corporation, New Delhi.
6. Rosenberh M.R. (1998): Labour Markets in Low income Countries in Chenery, H.B. and T.N. Srinivasan, (Eds.) The Handbook of Development Economics, North-Holland, New York.
7. Venkata Ratnam, C.S. (2001): Globlization and Labour- Management Relations Dynamics of change, Sage publications/ Response Books, New Delhi.

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**SEMESTER- III**  
**INTERNATIONAL TRADE**  
**Paper – II**

- Unit – I      Theory of International Trade– Meaning and Distinguishing Features of Inter-regional and International Trade, The Comparative Cost Theory, Refinements of the Comparative Cost Theory, Opportunity Cost Theory, Theory of Reciprocal Demand.
- Unit – II      Modern Theory of International Trade, Factor Price Equalization, Theorem of International Trade, Stopler Samuelson and Rybezynski Theorems.
- The Terms of Trade– Concepts, Determination of Terms of Trade, Factors affecting Terms of Trade, Terms of Trade & Economic Development, Its Empirical Relevance and Policy Implications for Less Developed Countries, Terms of Trade & Welfare Implications.
- Unit – III      The Theory of Intervention– Tariffs, Quotas, and Non-tariff Barriers, Economic Effects of Tariff and Quotas on National Income, Output, Consumption, Price, Employment, Terms of Trade & Income Distribution, The Stopler – Samuelson Theorem of Tariff on Income Distribution, The Learner's Paradox.
- Unit – IV      Balance of Payments– Meaning and components, Equilibrium and Disequilibrium in the BOP, Measures to Correct the Adverse BOP, Adjustment Mechanisms of BOP, Devaluation- The 'J' curve effect, Marshall-Lerner's Conditions under Devaluation, Expenditure Reducing and Expenditure Switching Policies and Direct Control.
- Unit – V      Income Adjustment- Foreign Trade Multiplier, Foreign Repercussion or Back-Wash Effect, Foreign Exchange Rate- Spot and Forward Exchange Rates, Fixed and Flexible Exchange Rates- their Merits and Demerits, Hybrid Exchange Rate, Floating Rate of Exchange, Managed Floating System.

**Reference:-**

1. Bhagwati, J. (Ed). (1981): International Trade, Selected readings, Cambridge, University Press, Massachusetts.
2. Carbough, R.J. (1999): International Economics, International Thompson Publishing, New York.
3. Chacholiades, M. (1990): International Trade: Theory and Policy, McGraw Hill, Kogakusha, Japan.
4. Dana, D. S. (2000): International Economics: Study Guide and Work Book, (5<sup>th</sup> Edition), Routledge Publishers, London.
5. Dunn, R. M., and J. H. Mutti (2000): International Economics, Routledge, London.
6. Kenen, P.B. (1994): The International Economy, Cambridge University Press, London.
7. Kindleberger, C. P. (1973): International Economics and International Economic Policy A Ready, McGraw Hill International, Singapore.
8. Krugman, P. R. and M. Obstfeld (1994): International Economics : Theory and Policy, Glenview, Foresman.

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**SEMESTER- III**  
**PUBLIC FINANCE**  
**Paper – III**

- Unit – I      Definition, Nature and scope of Public Finance, Role of Public Finance in developing Countries, Principles of Maximum Social Advantages. Taxation– features of a good tax system, Objectives of Taxation, Principles of Taxation, canons of Taxation, Shifting, Effects and Incidence of Taxation. Impact of Tax under Laws of Returns and Perfect Competition.
- Unit – II      Public Expenditure:- Meaning and Scope, Different Forms of Expenditure, Canons of Public expenditure, Structure and Growth of Public Expenditure in India. Trends in Central Government Expenditure. Economic Effects of Public Expenditure on Production and Distribution. Public Expenditure and Economic Growth.
- Unit – III      Public Revenue:- Meaning, classification, sources, principles and effects of public revenue. Classification of taxation: - Indirect & Direct Tax, Goods and service tax GST) New Direct tax, Central Excise, Custom Duties, Taxes on Land and Agriculture, Value Added Tax, Modvat, Service Tax. Taxable Capacity.
- Unit – IV      Public Debt– Meaning and Objectives of public debt, Different Sources of Public Debt, Redemption of Public Debt. Principle of Public Debt Management, Growth of Public Debt in India, Burden of Public Debt.
- Unit – V      Budget– Meaning, Objectives, Different forms of Budget, Budgetary Process in India, Kinds of Budget– traditional Budget, Performance Budget, Zero Based Budget, Out-come Budget, Gender Budget. Budget Theory– Classical Viewpoint (Balance Budget), Modern View Point (Imbalanced Budget.)

**Text Book**

1. Lekhi, R.K.,(2014): Public Finance, Kalyani Publication Ludhiana New Delhi
2. S.K., Sing, (2013): Principal of Public Finance Sahitya Bhavan Publication, Agra.
3. Pant, K.C., (2012): Public Finance
4. Sinha, V.C.,(2013): Public Finance and Economic, Sahitya Bhavan Publication.

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### Reference Books

1. Atkinson, A.B. and J.E. Siglitz (1980): Lectures on Public Economics, Tata McGraw Hill, New York.
2. Auerbach, A.J. and M. Feldstern (Eds.): Handbook of Public Economics, Vol. 1, North Holland, Amsterdam.
3. Government of India (1992): Reports of the Tax Reforms Committee – Interim and Final (Chairman : Raja J. Chelliah).
4. Chelliah, Raja J. et. Al (1981): Trends and issues in India's Federal Finance, NIPFP. New Delhi.
5. Peacock, A and G.K. Shaw (1976): The Economic Theory of Fiscal Policy, George Alen and Unwin, London.
6. Sahni, B.S. (Ed.) (1972): Public Expenditure Analysis: Selected Readings, Rotherdam University Press.
7. Musgrave, R.A. and P.B. Musgrave (1976): Public Finance in Theory and Practice, Mcgraw Hill, Kogakusha, Tokyo.
8. 14th Finance commission Report-2015
9. Central Govt. and Stat Govt. Budget- 2015

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**SEMESTER- III**  
**ENVIRONMENTAL ECONOMICS**

**Paper – IV**

**Unit – I** The Economics of Environment - Environmental Micro Economics and Macro Economics, The Circular Flow Model. Theory of Resources Environment and Economic Development - Economic Growth and The Environment, Future of Economic Growth and The Environment. Criterion of Social Welfare- Bentham Criteria, Pareto Optimality Criteria, Kaldor-Hicks Compensation Criterion.

**Unit – II** Economic Theory of Environmental Issues - The Theory of Environmental Externalities, Accounting for Environmental Cost, Internalizing Environmental Cost, Positive Externalities. Welfare Analysis of Externalities - Property Rights and The Environment. Common Property Resources and Public Goods - Common Property, Open Excess and Property Rights, Market Failure and Public Goods, Social choice of optimum pollution, Pigovian Taxes and subsidies, Maximization of Social Welfare Under Perfect Competition.

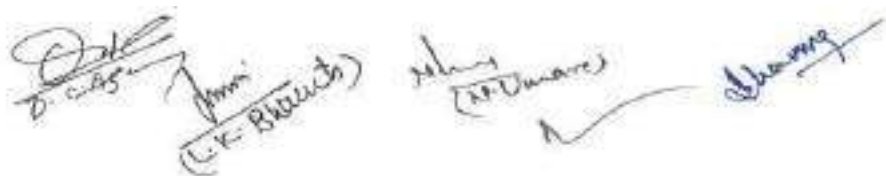
**Unit – III** Population, Agriculture and The Environment - Population and the Environment- Demographic Transition and Environment, Population Growth and Economic Growth, Population Policy for the 21st Century, Agriculture, Food and Environment, Sustainable Agriculture for the Future, Environment and Neo-Classical Model of Natural Resources, Energy and Resources.

**Unit – IV** Ecological Economics, National Income and Environmental Accounting - Ecological Economics Basic Concept, Natural Capital and Accounting for Changes in Natural Capital, Macro Economic Scale, Model of Economic and Ecological System. National Income and Accounting - Natural Capital, System of Environment and Economic Accounts (SEEA).

**Unit – V** Environmental Value and Methods - Use Value, Option Value and Non Use Value, Cost Benefit Analysis, Methods of environmental valuation- Hedonic Pricing. Household Production Function, Travel Cost Method, Averting Behavior Approach, Contingent Valuation Method, International Carbon Tax. Environment and W.T.O.

**Reference**

1. Madhu Raj – Environmental Economics.
2. Steve Baker – Environmental Economics.
3. D.W. Pearce – Environmental Economics.
4. Baurnol, W.J. and W.E. Oates. (1988): The Theory of Environmental Policy, (2nd Edition), Cambridge University Press, Cambridge.
5. Thomas and Callan (2009): Environmental Economics.
6. Charles D. Kolasted (2005): Environmental Economics, Oxford University Press.
7. Brian Roach, Jonathan M. Harries and Anne Marie codur (2015): Microeconomics and the environment, Global Development and Environment Institute, Tufts University, Medford.
8. Jonathan M. Harries and Anne-Marie codur (2004): Macroeconomics and the environment, Global Development and Environment Institute, Tufts University, Medford.



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**SEMESTER- III**  
**DEMOGRAPHY**  
**Paper – V**

- Unit – I      Demography – Meaning and Importance, Theories of Population – Theory of Optimum Population and Theory of Demographic Transition. Measures of Population Change and Distribution – Rate of Population Change and Distribution, Measures of Degree of Concentration of Population – Lorenz Curve and Gini Concentration Ratio.
- Unit – II      Migration – Kinds and Factor Affecting of Migration, Hurdles of Migration, Measurement of Internal Migration, Migration Rates and Ratio. Urbanization- Factors Influencing Urbanization and Effects of Urbanization, Population and Economic Development. Human Resource Development in India.
- Unit – III      Mortality – Meaning and Sources of Mortality Data, Causes of High Death Rate in India, Trends in Death Rate in India, Measurement of Mortality Based on Death Statistics, Crude Death, Specific Death Rate, Infant Mortality Rate and Standardized Death Rate, Child Mortality Rate, Maternal Mortality Rate, Life Table – Functions and Construction of Life Table. Problems Related to Death Rates and Life Table.
- Unit – IV      Fertility– Meaning, Causes of High Birth Rate in India, Trends in Birth Rate in India, Measurement of Fertility and Reproduction – Crude Birth Rate, General Fertility Rate, Age- Specific Fertility Rate, Total Fertility Rate. Gross Reproduction Rate and Net Reproduction Rate. Problems Related to Fertility and Reproduction Rates.
- Unit – V      Women Empowerment- Economic Status, Women in Decision Making, Women and Labour Market; Women Work Participation: Concept and Analysis of Women's Work Participation, Structure of Wages across Regions and Economic Sectors, Determinants of wage Differentials, Gender and Education.

**Text Books**

1. Agrawal, S. N.: India's Population Problems, Tata Mc-Graw Hill co. Bombay.
2. Bogue, D. J.: Principles of Demography, Honwiley, New York.
3. Sinha, V. C. and Pushpa Sinha: Principles of Demography, Mayur Paper backs.
4. Mishra, Jai Prakash, Demography: Sahitya Bhawan Publications, Agra.
5. Pathak, K. B. and F. Ram,: Techniques of Demographic Analysis, Himalaya Publishing House.
6. Jhingan, M. L. and others: Demography, Vrinda Publications (P) Ltd.
7. Srinivasan, K.: Basic Demographic Techniques and Applications, Sage Publication.

**Reference Books**

1. Census India SRS Bulletins, Registrar General of India, Govt. of India, 2011
2. Rural-Urban distribution *Census of India: Census Data 2001: India at a glance >> Rural-Urban Distribution*. Office of the Registrar General and Census Commissioner, India. Retrieved on 2008-11-26.
3. Number of Villages *Census of India: Number of Villages* Office of the Registrar General and Census Commissioner, India. Retrieved on 2008-11-26.
4. Urban Agglomerations and Towns *Census of India: Urban Agglomerations and Towns*. Office of the Registrar General and Census Commissioner, India. Retrieved on 2008-11-26.
5. Preston, S.H.(1976):Family Sizes of Children and Family Sizes of Women. *Demography* 13(1): 105-114.
6. Pritchett, L.H. (1994). Desired Fertility and the Impact of Population Policies. *Population and Development Review* 20(1): 1-55.

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**SEMESTER - IV**  
**ECONOMICS OF DEVELOPMENT AND PLANNING**  
**Paper – I**

- Unit – I      Economic Planning; Objectives, Achievements and Failures of Indian Plans, Resource Mobilization in Indian Plans, Strategy of Indian Plan. Saving, Capital Formation and Overall Growth Rate, Twelfth Five Year Plan (2012-17), Achievement of Eleventh Five Year Plan.
- Unit – II      Theories of Development:- The Marxian Model, The Schumpeterian Model, Keynesian Theory of Development, Rostow's Stages of Economic Growth.
- Unit – III      Approaches to Development:- Arther Lewis Model of Unlimited Supply of Labour, Ranis & Fie Model, Leibenstein's Critical Minimum Effort thesis, The Big push theory.
- Unit – IV      Development Models:- The doctrine of Balanced Growth, the concept of Unbalanced Growth, The Limits to Growth Model, Myrdal's theory of Circular Causation.
- Unit - V      Investment Criteria in Economic Development; The social Marginal Productivity Criteria, The capital Turnover Criteria, The Re-investment Criterion, Time Series Criterion, the Choice of Techniques.

**Text books**

1. Jhingan, M.L. (2003): The Economics of development & planning, Vrinda publication pvt. Ltd.
2. Shinghai, G.C. & Mishra, J.P. (2013): Macro Economic Analysis, Sahitya bhawan publication Agra.
3. Mishra, J.P. (2012): Economics of Growth and Development, Sahitya bhawan publication Agra.

**Reference Books**

1. Todaro, M.P. (1996) (6<sup>th</sup> edition): Economic Development, Longman London.
2. Solow, R.M. (2000): Growth Theory An Exposition, Oxford University Press, Oxford.
3. United Nations, Human development Department report 2005.
4. Behrman, S. and T.N. Shrinivasan (1995): Hand book of Development Economics, Vol 1, 2 & 3, Elsevier; Amsterdam.
5. Ghatak, S. (1986): An introduction to development Economics, Allen & elnein, London.
6. Sen, A.K. (Ed.) 1990 growth Economics, Penguin, Harmondsworth.
7. Dasgupta, P.A.K. Sen and S. Marglin (1972): Guidelines for project Evaluation, UNIDO, Vienna,
8. Mehrotra, S. and J. Richard (1998): Development with a Human Face, Oxford University Press New Delhi.



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**SEMESTER- IV**  
**INTERNATIONAL ECONOMICS**  
**Paper – II**

- Unit – I Foreign Trade and Economic Development, The Theory of Regional Blocks- Customs Union, Static and Dynamic Effects of a Customs Union and Free Trade Area, Rational of Economic Progress of SAARC, ASEAN, IBSA and BRICS.
- Unit – II Regionalism of European Union, The Euro-Dollar Market, NIEO, WTO- Functions of WTO, Multilateralism and WTO, TRIPS, TRIMS, Agriculture, Market- Access, Textile Clothing, Patent Rights, Ministerial Conferences of WTO, UNCTAD.
- Unit – III Theory of Short Term & Long Term Capital Movement and International Trade– Port Folio Investment and International trade, FDI and International Trade, Merits & Demerits of Long Term Capital Movement in International Trade, Factors Affecting International Capital Movement, The Transfer Problem, Optimum Currency Area, Global Financial Crises.
- Unit – IV International Monetary System, International Liquidity, IMF, World Bank, The World Bank Group, ADB, Foreign Capital in India.
- Unit – V International Organisations- G-20, G-15, BIMSTEC, OPEC, NAFTA, OECD, Working and Regulations of MNCs in India.

**Reference:-**

1. Bhagwati, J. (Ed).(1981): International Trade, Selected Readings, Cambridge, University press, Massachusetts.
2. Carbough, R. J. (1999): International Economics, International Thompson Publishing, New York.
3. Chacholiades, M. (1990): International Trade: Theory and Policy, McGraw Hill, Kogakusha, Japan.
4. Dana, M.S. (2000): International Economics: Study Guide and Work Book, (5<sup>th</sup> Edition), Routledge Publishers, London.
5. Dunn, R. M. And J. H. Mutti (2000): International Economics, Routledge, London.
6. Kenen, P. B. (1994): The International Economy, Cambridge University Press, London.
7. Kindleberger, C. P. (1973): International Economics and International Economic Policy A Reader, McGraw Hill International, Singapore.
8. Krugman, P. R. and M. Obstfeld (1994): International Economics: Theory and Policy, Glenview, Foresman.

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**SEMESTER- IV**  
**PUBLIC ECONOMICS**  
**Paper – III**

- Unit – I      Role of Public Finance in Economic Development, Major Fiscal Function, Concept of Social Goods. Fiscal Federalism in India, Principles of Fiscal Federalism, Vertical and Horizontal Imbalances.
- Unit – II      Federal Finance– Principle of Federal Finance in India, Centre–State Financial Relation, Resource Transfer From Centre to States, Gadgil's Formula. Fourteen Finance Commission.
- Unit – III      Indian Tax System:- Salient Features, Merits, Demerits, Measures for improvement of Indian Tax system Government measures for improvement:- Taxation enquiry Commission (1953-54), Wanchoo committee, Jha Committee, Kelkar Committee Report, Chelliah Committee Recommendations for reforming the taxation system.
- Unit – IV      Analysis of Centre & Chhattisgarh Govt, Budget. Taxable and Non Taxable Income of Chhattisgarh. Performance of the Chhattisgarh government budget.
- Unit – V      Financial Responsibilities and Budget Management Act. Structure and Growth of Public Expenditure in Chhattisgarh, Revenue Expenditure and Capital Expenditure. Plan & Non Plan Expenditure in Chhattisgarh.

**Text Books**

1. Lekhi, R.K.(2014): Public Finance, Kalyani Publication, Ludhiana New Delhi.
2. S.K.Singh,(2013): Principal of Public Finance Sahitya Bhavan Publication, Agra.
3. Pant, K.C. (2012): Public Finance
4. Sinha, V.C.(2013) : Public Finance and Economic, Sahitya Bhavan Publication.

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1. Government of India (1992), reports of the Tax Reforms Committee – Interim and Final (Chairman : Raja J. Chelliah).
2. Chelliah, Raja J. et. Al (1981): Trends and issues in India's Federal Finance, NIPFP. New Delhi.
3. Peacock, A and G.K. Shaw (1976): The Economic Theory of Fiscal Policy, George Allen and Unwin, London.
4. Sahni, B.S. (Ed.) (1972): Public Expenditure Analysis: Selected Readings, Rotherdam University Press.
5. Jha, R. (1998): Modern Public Economics, Routledge, London.
6. Musgrave, R.A. and P.B. Musgrave (1976): Public Finance in Theory and Practice, McGraw Hill, Kogakusha, Tokyo.
7. Cornes, R. and T. Sandler (1986): The Theory of Externalities, Public Goods and Club Goods, Cambridge University Press. Cambridge.
8. Economic Survey Centre and State (2014-15)
9. 14<sup>th</sup> Finance commission Report-2015
10. Central Govt. and State Govt. Budget- 2015

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**SEMESTER- IV**  
**ECONOMICS OF SOCIAL SECTOR**  
**Paper – IV**

**Unit-1** Pollution- classification of pollution, Air, Water and Land Pollution, Cause & Effects of pollutant. Problem of solid waste management, Pollution control strategies, Equi Marginal law of pollution, Global environmental issues- Climate change, Global warming, Green House Effect, Ozone depletion.

**Unit-2** Development and Environment: Relation between development & environmental stress, The Environmental Kuznets Curve, The concept of Sustainable Development, Indicators of sustainability, Measuring sustainable development, Green Economy.

**Unit-3** Economics of Resources- Classification of resources, Renewable & Non-renewable resources, Optimum use of resources. Land resources, Forest resources, Social forestry, Peoples participation in the management of Common & forest land. Energy- Sources of energy, energy efficiency & environment, Alternative sources of energy.

**Unit-4** Economics of Education- Expenditure on education, Productive expenditure on education, Productivity of education, the return of education, Human capital, Human capital Vs Physical capital, Educational reforms and Right to Education Act.

**Unit-5** Health Economics- Determinants of health care, Malnutrition. The concept of Human life, Inequalities in health- class & gender, Perspective HDI, GDI, GEM and HPI.

**Reference**

1. Baurnol, W.J. and W.E. Oates (1988): The Theory of Environmental Policy, (2nd Edition), Cambridge University Press, Cambridge.
2. Berman, P. (Ed.) (1995): Health Sector reform in Developing Countries: Making health development sustainable, Boston: Harvard Series on Population and International health.
3. Blaug, M. (1972) : Introduction to Economics of Education J Penguin, London.
4. Bromely, D.W. (Ed.) (1995): Handbook of Environmental Economics, Blackwell, London.
5. Cohn, E. and T. Gaske (1989): Economics of Education, Pergamon Press, London.
6. Fisher, A.C. (1981): resource and Environmental Economics, Cambridge University Press, Cambridge.
7. Hanley, N.J.F. Shogern and B. White (1997): Environmental Economics in Theory and Practice, Macmillan.
8. Hussen, A.M. (1999) : Principles of Environmental Economics, Routledge. London.
9. Jeroen, C.J.M. van den Bergh (1999): Handbook of Environmental and Resource Economics, Edward Elgar Publishing Ltd. U.K.
10. Thomas and Callan (2009): Environmental Economics.

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# **DURG VISHWAVIDYALAYA, DURG (C.G.)**

Website - [www.durguniversity.ac.in](http://www.durguniversity.ac.in), Email - [durguniversity@gmail.com](mailto:durguniversity@gmail.com)



## **SCHEME OF EXAMINATION & SYLLABUS of M.A./M.Sc.(Geography) Semester Exam UNDER FACULTY OF SCIENCE Session 2017-18**

**(Approved by Board of Studies)  
Effective from July 2017**

# **Durg Vishwavidyalaya, Durg (C.G.)**

## **M.A./M. Sc. GEOGRAPHY**

### **SEMESTER I (2017-18)**

M. A. /M. Sc. Geography Semester I shall consist the following papers:

S. No.	Paper	Title	M. M.		
			Written	Inte. Asse.	Total
1.	I	Geomorphology	80	20	100
2.	II	Climatology	80	20	100
3.	III	Geographical Thought	80	20	100
4.	IV	Geography of India	80	20	100
5.	V	Practical-I : Advanced Cartography	---	---	100

1. The M. A. /M. Sc. Semester I examination in Geography shall consist of 500 marks.

There shall be four theory papers each of 100 marks and one practical of 100 marks as follows:

Paper I	Geomorphology
Paper II	Climatology
Paper III	Geographical Thought
Paper IV	Geography of India
Paper V	Practical-I: Advanced Cartography

2. The theory papers shall be of three hours duration.
3. Candidates will be required to pass separately in theory and practical examinations.
4. (a) In the practical examination the following shall be the allotment of time and marks.

(i)	Practical record	20%
(ii)	Lab work (up to three hours)	70%
(iii)	Viva on i. ii.	10%

(b) The external and internal examiners shall jointly submit marks.

(c) All the candidates shall present at the time of the practical examination their practical record regularly signed by the teachers concerned.

## PAPER –I (2017-18)

### GEOMORPHOLOGY

- UNIT – I Nature and scope of Geomorphology; Fundamental concepts; Interior of the earth; Earth movement: epeirogenic and orogenic movements With reference to the evolution of the Himalaya: Forces of Crustal instability, Isostasy, Geosyncline, Plate tectonic, Mountain building, Earthquake and Vulcanicity.
- UNIT – II Exogenic processes: concept of gradation; Agents and processes of gradation: weathering, wasting and erosion, aggradation; Climatic Geomorphology and morphogenetic regions; slope evolution, Arid Semi-Arid and Karst topography.
- UNIT – III Concept of Geomorphic cycle and its controversy; Dynamic of glacial and periglacial processes and resulting landforms, Complications of fluvial geomorphic cycle and resulting landforms.
- UNIT – IV Geological structure and landform: development of landscape and drainage on uniclinal, folded and domal structures and Erosion surfaces, Applied Geomorphology.

#### SUGGESTED READINGS:

1. Ahnmed, E.: Coastal Geomorphology of India.
2. Chorley, R. J.: Spatial Analysis in Geomorphology, Methuen, London, 1972.
3. Cooke R.IJ.and Doornkamp, J.C. : Geomorphology in Environmental Management. An Introduction, Clarendon press, Oxford, 1974.
4. Dury, G.H.: The Face of the Earth, Penguin Hormondsworth 1959.
5. Fairbridge, R.W. Encyclopedia of Geomorphology, Reinholdts, New York, 1968.
6. Goudie, A.: The Nature of the Environment Oxford & Blackwell, London, 1993.
7. Garner, H.F. : The Origin of landscape- A Synthesis of Geomorphology, Oxford University Press. London, 1974.
8. Holms, A.: Principles of Physical Geology, Thomas Nelson, London.
9. Mitchell, C.W.: 'l'erra.ii'i Evaluation. Longman, London, 1973.
10. Oilier, C.D. : Weathering, Longman, London, 1979.
11. Pitty, A.F.: Introduction to Geomorphology, Methuen, London, 1971.
12. Stoddart, D.R. (ed.) : Process and Form in Geomorphology, Roulledge, New York, 1996.
13. Skinner, B.J. & Porter, S.C.: The Dynamic Earth John Wiley. New York, 1995.
14. Sparks, B.W. Geomorphology, Longman, London, 1960.
15. Sharma, H.S. (cd.): Perspective in Geomorphology, Concept, New Delhi, 1980.
16. Singh, S : Geomorphology, Prayag Publication, Allahabad, 1998.
17. Steers, J.A. : The Unstable Earth Methuen, London.
18. Thornbury, W.I.). Principles of Geomorphology, John Wiloy, New York, 1960.
19. Strahler, A.N.: Physical Geography, Willey, New York.
20. कौशिक,एस.डी.: भू-आकृति विज्ञान
21. नेगी, बी,एस., भू-आकृति विज्ञान
22. दयाल परमेश्वर, भू-आकृति विज्ञान
23. यादव तथा रामसुरेश., भू-आकृति विज्ञान, ग्रनयि, कानपुर
24. सिंह,सविन्द्र के, भू-आकृति विज्ञान, शारदा पुस्तक भवन, इलाहाबाद



## PAPER - II (2017-18)

### CLIMATOLOGY

- UNIT – I Nature and scope of climatology and its relationship with meteorology; composition of atmosphere; Insolation, heat balance of the earth, stability and instability, greenhouse effect, vertical and horizontal distribution of temperature.
- UNIT – II Jet stream; General circulation in the atmosphere; Acid rain; concept of air masses and Front. EL Nino and La Nino. Monsoon winds and cyclones.
- UNIT – III The application of general principles of elementary physical and synoptic meteorology to the study and classification of climate. Climatic classification of Koeppen and Thornthwaite. Major climate of the world-tropical, temperate, desert and mountain climate.
- UNIT – IV Climatic changes during geological and historical times, evidences, possible causes, global warming, Applied climatology.

### SUGGESTED READINGS:

1. Barry, R.G. and Chorley P..1.; Atmosphere, Weather and Climate, Roulledge, London and New York, 1998.
2. Critchfiedid, J.H. : General Climatology, Prentico Hall, India, New Delhi, 1993.
3. Das, P.K. : Monsoons 'National Book Trust, New Delhi, 1987.
4. Fein, J.S. and Slephens, P.N. : Monsons. Wiley Interscience, 1987.
5. India Met. Deptt : Climatologically Tables of Observatories in India, Govt. of India 1968.
6. Lal, D.S. : Climatology, Chaitanaya Publications, Allahabad, 1986.
7. Lydolph, P.H. : The Climate of the Earth, Rowiman, 1985.
8. Menon, P.A. : Our Weather, N.B.T., New Delhi, 1989.
9. Pelerson, S. : Introduction to Meteorology, Me G-r-aw Hill Book, London, 1969.
10. Robinson, P.J. and Henderson S. : Contemporary Climatology, Henlow, 1999.
11. Thompson, R.D. and Perry, A (ed.) : Applied Climatology, Principles and Practice. Raoutledge, London. 1997.
12. तिवारी अनिल कुमार : जलवायु विज्ञान, राजस्थान हिन्दी ग्रंथ अकादमी

UNIT – I	The Field of geography, its place in the classification of science, geography as a social science, and natural science. Definition, scope and functions of geography; Geography as science of relationship, as science of areal differentiation, as spatial science, Spatial Organization, Geography and environmentalism: forms of man-nature relationship and current view; Dualism in geography; Regional Concept.				
UNIT – II	<p>The growth of geographical knowledge from earliest times up to the 15th century. Contributions of Greek and Roman thinkers. Arab Geographers and their contributions. Geographical information in Ancient Indian literature. The dark age in Geography. The Great Age of Maritime Discovery and Exploration.</p> <p>Contributions of various schools of thought in modern Geography:</p> <table border="0"><tr><td>(i) German School</td><td>(ii) French School</td></tr><tr><td>(iii) British School</td><td>(iv) American (v) Russian Schools.</td></tr></table>	(i) German School	(ii) French School	(iii) British School	(iv) American (v) Russian Schools.
(i) German School	(ii) French School				
(iii) British School	(iv) American (v) Russian Schools.				
UNIT – III	Scientific explanations: routes to scientific explanation (inductive/deductive); Type of explanation: cognitive description, cause and effect, temporal, functional/ecological, systems; Laws, theories and models in geography; Quantitative revolution and philosophy of positivism.				
UNIT – IV	Responses to positivism, behaviourism and humanistic, relevance movement and radical geography; Changing paradigms; Status of Indian Geography; Future of Geography.				

## SUGGESTED READINGS:

1. Abler, Ronald; Adams, John S. Gold, Peler : Spatial Organization : The Geographer's view of the world. Prentice Hall, N.J. 1971.
2. Ali S.M. : The Geography of Puranas, Peoples Publishing House, Delhi, .1968.
3. Amedeo, Douglas : An Introduction to Scientific Reasonign in Geography, John Wiley, U.S.A. 1971.
4. Dikshit, R.D. (ed.): The Art & Science of Geography Rand Me Nally & Co., 1959.
5. Hartshorne, R.: Perspectives on Nature of Geography Rand Me Nally & Co., 1959.
6. Husain, M. : Evolution of Geographic Thought, Rawat Pub., Jaipur, 1984.
7. Johnston, R.J.: Philosophy and Human Geography, Edward Arnold, London, 1983.
8. Johnston, R.J.: The Future of Geography, Methuen, London, 1988.
9. Minshull, R.: The Changing Nature of Geography, Hutchinson University Library, London, 1970.
10. Ali, S. M.- Arab Geography.
11. Taylor, G.: Geography in the 20th Century.
12. Dikshit, R.D.: Geographical Thought : A Contextual History of Ideas, Prentice Hall of India, New Delhi.
13. Harvey D. : Explanation in Geography.
14. सिंह उजागर : भौगोलिक चिन्तन का विकास
15. त्रिपाठी एवं बिरले: भौगोलिक चिन्तन का विकास एवं विधितंत्र
16. कौशिक, एस.डी.: : भौगोलिक विचारधाराओं का इतिहास एव विधितंत्र
17. सिंह, जगदीश : भौगोलिक चिंतन का मूलाधार.



## **PAPER – IV (2017-18)**

### **GEOGRAPHY OF INDIA**

- UNIT – I      Physical and Biological elements in the Geography of India: Geological structure, relief, climate, Drainage, vegetation and soils.
- UNIT – II      Agriculture: Major characteristics and problems, Impact of infrastructural and institutional factors on agriculture. Important crops-wheat, rice, cotton, sugarcane, oil-seeds, tea and coffee, Agricultural regions. Green revolution, Agro-climatic regions.
- UNIT – III      Sources of power: Coal; Petroleum, Natural gas. Hydroelectricity and Atomic energy. Mineral resources with special reference to iron ore, manganese and bauxite. Industrial development with special reference to iron and steel, cement, cotton, jute, sugar and paper industries; Industrial regions.
- UNIT – IV      Regional division of India: Purpose and Methodology. Major schemes of regions of India: O.H.K. Spate and R.L. Singh. Physical and cultural geography of Chhattisgarh State.

#### **SUGGESTED READINGS:**

1. Centre for Science & Environment (1988) State of India's Environment, New Delhi.
2. Desphande C.D. India : a Regional Interpretation ICSSR & Northern Book Centre 1992.
3. Dreza, Jean & AMartya. Sen (ed.) India Economic Development and Social opportunity Oxford University Person, New Delhi. 1996.
4. Kundu A. Raza Moonis : Indian Economy : the Regional Dimension Speclaum Publishers, New Delhi, 1992.
5. Robinson, Francs : The Cambridge Encyclopedia of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan & Maldives Cambridge University Press, London, 1989.
6. Singh R.L. (ed.) : India - A Regional Geography National Geographical Society, India Varanasi, 1971.
7. Spale OHK & ATA Learnont-India & Pakistan Methuen, London. 1967.
8. Tirtha R. & Gopal Krishna, Emerging India Reprinted by Rawat Publications, Jaipur 1996.
9. Sharma T.C. and O. Coutinho : Economic and Commercial Geography of India.
10. अग्रवाल पी.सी. भारत का भौतिक का भूगोल, एशिया प्रकाशन कं., रायपुर 2003
11. बंसल सुरेशचन्द्र : भारत का भौतिक का भूगोल, मिनाक्षी प्रकाशन , मेरठ.
12. वर्मा रामविलास, भारत : एक भौगोलिक विवेचन , भवदीय प्रकाशन श्रृंगारघाट – अयोध्या, फैजाबाद, पिन –224123, 2007



## PAPER – V (2017-18)

### PRACTICAL I - ADVANCED CARTOGRAPHY

**Graphs and Diagrams:** Triangular graph. Logarithmic and semi logarithmic graphs, scatter graphs; climatograph. Proportional circles, spheres and cubes.

**Thematic Maps:** Choropleth maps, isolines, Flow maps, isochrones and class intervals. Morphometric Analysis: Profiles, Slope Analysis; Altimetric, and Clinographic curves; Block Diagrams.

#### SUGGESTED READING:

1. Monk house F.J. & H.R. Wilkinson: Maps and Diagrams, Methuen, London.
2. मॉक हाउस तथा विल्किन्सन (अनु.प्रो.प्रेमचन्द अग्रवाल) : मानचित्र तथा आरेख म.प्र. हिंदी ग्रंथ अकादमी
3. हीरालाल: प्रायोगिक भूगोल.
4. शर्मा, जे. पी. प्रायोगिक भूगोल,



## SEMESTER – II

Practical record regularly signed by the teachers concerned.

*Shahadash*

## PAPER- VI (2017-18)

### ECONOMIC AND NATURAL RESOURCE MANAGEMENT

- UNIT – I Nature and scope of economic Geography; fundamental concepts in economic geography; classification of economies, sectors of economy (primary, secondary, tertiary). Meaning, nature and classification of resources, Resource appraisal: human wants and social objective, technological status and resources. Appraisal of quality and quantity of human resources, relation between population and resource, natural resources and economic development, resource adequacy and scarcity, limits to growth. Resource use, concept of absolute and relative abundance of resources, optimum, under use, misuse and over use of resources.
- UNIT – II World pattern of major natural resources: land and soils, biotic resources, water resources mineral and energy resources, oceanic resources.
- UNIT – III Classification of Industries, Theories of industrial location; case studies of selected industries; Iron and Steel; Aluminium, Chemical, Textile. Means of transport, International trade, trade blocks, globalization and Indian economy.
- UNIT– IV Conservation and management of resources; evolution of the concept, principles, philosophy and approaches to conservation, resource conservation and management methods. Policy making and resource management; sustainable development of resources.

### SUGGESTED READING:

- |                                       |   |  |
|---------------------------------------|---|--|
| Ahemd, Jaleel                         | - | Natural Resources in Low Income Contries.                |
| Bennet, II.II.                        | - | Elements of Soil Conservation.                           |
| Ciriacy, Wantrup,S.V.& Persons (eds.) | - | Natural resources: Quality & Quantity                    |
| Betall,R.C. & R.O.Buehanan            | - | Industrial Activity and Economic Geography.              |
| Edvard and Rosers                     | - | Agricultural Resources.                                  |
| Freeman, T.W.                         | - | Geography and Planning.                                  |
| Fryer, D.M.                           | - | World Economic Development.                              |
| Isard, Walter                         | - | Method of Regional Analysis.                             |
| Mehta, M.M.                           | - | Human Resource Development Planning.                     |
| Owen, O.S.                            | - | Natural Resource Conservation.                           |
| Peach, W.N.& James, A.                | - | Zimmerman's World Resources Contenting and Conservation. |
| Parkin's,E.A. & J.R. Whitakr          | - | Our Natural Resource and their conservation.             |
| Renner, G.T.                          | - | Conservation of National Recourses.                      |
| Stamp, L.D.                           | - | Land of Britain Its use and Misue.                       |
| Smith, G.H.(ed.)                      | - | Conservation. of Natural Recourses.                      |
| Symoos, L.                            | - | Agriculture Geography.                                   |
| Thomas W.L.(et.al.reds.)              | - | Man's Role in Changing the face of the Earth.            |
| Wales, H.& H.O. Lathrop               | - | The Conservation of Natural Recourses.                   |
| Wheeler, T.O. et al                   | - | Economic Geography, John Wiler New York 1995.            |

## PAPER – VII (2017-18)

### OCEANOGRAPHY

- UNIT – I Nature and scope of Oceanography; Distribution of land and water; Major features of ocean basins; Marine sediments. Physical and chemical properties of sea water.
- UNIT – II Interlink between atmospheric circulation and circulation pattern in the oceans, surface currents, Thermohaline, waves and tides.
- UNIT– III Marine-biological environment : Bio-geochemical cycle in the ocean. biozones, types of organisms; plankton, nekton and benthos, food and mineral resources of the sea. Major marine environments; coastal : estuary, deltas, barrier island, rocky coasts : Open : reefs, continental shelf, continental slope and deep : Pelagic environment and floor of the ocean basins.
- UNIT – IV Impact of Humans on the marine environment. Law of the sea; exclusive economic zone; marine deposits and formation of coral-reefs.

#### SUGGESTED READINGS:

1. Davis Richard J.A. : "Oceanography-An Introduction to the Marine Environment". Wm. C. Brown Iowa, 1986.
2. Duxbury, C.A. and Duxbury B. : An Introduction to the world's Oceans-C. Brown. Iowa 2nd ed., 1986.
3. Garrison, T. : "Oceanography - An Introduction to Marine Science" Books/Cole, Pacific Grove, USA, 2001.
4. Gross, M. Grant : Oceanography, a View of the earth, prantice-Hall inc, New Delhi, 1987.
5. King C.A.M. Oceanography for Geographers 1962.
6. Sharma, R. C. "The Oceans" Rajesh N. Delhi, 1985.
7. Urnmerkuty, A.N.P. Science of the Eceans and Human life, NBT, New Delhi, 1985.
8. Ornmany, F.D. : The Ocean.
9. Sharma, R. C. & M. Vital : Oceanography : A Brief Introduction kisluya Pub. New Delhi.
10. Siddartha, K.. : Oceanography : A Brief Introduction, Kislya Pub. New Delhi.
11. नेगी ,बी.एस.: जलवायु तथा समुद्र विज्ञान.
12. सिंह, सविन्द्र सिंह – समुद्र विज्ञान, प्रयाग पुस्तक भवन, इलाहाबाद (उ.प्र.) 2011
13. लाल, डी. एस – समुद्र विज्ञान,



## **PAPER – VIII (2017-18)**

### **REGIONAL DEVELOPMENT AND PLANNING**

- UNIT – I      Regional Planning: Definition, Scope, evolution and Objectives. Region and Regionalism, Planning Regions: Concept and Delineation. Type of Regions. Central Place Theory, Concept of core and periphery Friedmann's Model of Spatial Organisation and Economic Growth.
- UNIT – II      Regional Development Theories: Development Theories of Myrdal and Hirschman, Economic and Export Base model, Frank's Theory of Under development.
- UNIT – III      Approaches and Strategies of Regional Development: Growth Pole Theory Agropolitan Development, Community Development, River Basin Planning, Metropolitan Planning (with reference to India).
- UNIT– IV      Regional Planning in India. Regional Imbalances and Inequalities, Indicators of Regional Development; Regional Policies in Five Year Plans, Centre State Relations and Multilevel Planning, Planning for special problem Regions: Hill areas, Tribal areas, Drought prone areas, Command areas and River basins. Regional development and planning in India.

#### **SUGGESTED READING:**

1.      Daysch, C.H.J. & others: Studies in Regional Planning.
2.      Deckinsonm R.E. : City Region and Regionalism.
3.      Freeman, E.W. : Geography arid Planning.
4.      Golksin A. : Regional Planning and Development.
5.      Keeble, L. : Principle and Practice of Town and Country Planning.
6.      Stamp L.D. : The Land of Britain : Its use and Misure.
7.      Sdasyuk. Gatina and Dengupta, P. : Economic Regionalization of India problems and Approaches.
8.      Desai, P.B. & others : Regional Perspective of Industrial and Urban Growth the case of Kanpur, Bombay, 1969.
9.      Prakash, Rao V.L. & S.P. : Regional Planning.
10.      Censuts of India : Economic and Socio Cultural Dimensions of regionalization (An Indo-USSR Collaborative Study)



11. Friedmann J. & Alonso : Regional Development and Planning, M.I.T. Press.
12. Misra R.P. (ed.) : Regional Planning : Concept; Techniques, Policies and case studies Mysore 1969.
13. Misra, R.P. & others : Regional Development and Planning in India.
14. Timbergen : Essays on World Regional Planning.
15. Lord, W. : Methods of Regional Analysis, M.I.T., 1960.
16. Zimmerinan, E.W. : World Resources and Industries.
17. Burton & Kates : Reading in Resource Management Conservation.
18. Burton & Kates : Regional Planning in India.
19. Ahamed, Enayet : Regional Planning with particular Reference to India. Vol. I and II New Delhi.
20. Bhatt L.S. and others: Micro level planning - A Case Study of Karnal Area, Haryana (K.B. Publishing, New Delhi)
21. Bhatt LS : Regional Planning in India, Statistical Publishing Society, Calcutta, 1973.
22. Gosal GS, and G. Krishanan : Regional Disparities in levels of Socio-economic Development in Punjab, Vishal Publications Kurukshetra, 1984.
23. Chandna, R.C. : Regional Planning : A comprehensive Text-Kajyani Publishers.
24. Ray Choudhari, Jayasri : An Introduction to Development and Regional Planning Orient Longman.
25. Sundaram, KV (ed) Geography and Planning, Essays in honour of VLS Prakasa Rao, Concept Publishing Co., New Delhi, 1985.
26. Raza, Meomis (ed) Regional Development, Heritage Publishers, Delhi, 1988.
27. Mishra R.P. et al : Multilevel Planning, Heritage Publishers Delhi, 1980.
28. श्रीवास्तव व्ही .के. एवं अन्य : प्रादेशिक नियोजन एवं संतुलित विकास.
29. ओझा, रघुनाथ: प्रादेशिक नियोजन का भूगोल,.
30. शर्मा, राजीवलोचन : प्रादेशिक एवं नगरीय नियोजन.
31. चन्द्राकर, इन्द्रमण : व्यावहारिक भूगोल, वसुन्धरा प्रकाशन, गोरखपुर, 1998.

**PAPER – IX (2017-18)**  
**SOCIAL GEOGRAPHY**

- UNIT– I      Definition, meaning and scope of Social geography and its Nature and relationship with other Social sciences. Development of Social Geography, Approaches to the study of Social Geography.
- UNIT– II      Concept of Society – Social Environment, Geographic bases of Social Formation. Social Geography of India - Social Stratification, Caste and Class. Social organization and groups, Social transformation and change in India, Religion and linguistic group of India. Evolution of Socio-Cultural Regions of India.
- UNIT – III    Social well- being– meaning and indicators of Social well- being. Quality of life, Pattern and bases of rural and urban society. Deprivation and discrimination issues relating to women and under privileged groups. Cultural Realms and Cultural Region of the World.
- UNIT – IV    Social development planning – meaning and importance. Public policy and social planning in India: Review of Five year Plans strategies to improve social well-being in tribal, hill, drought and flood prone Areas.

**SUGGESTED READINGS:**

- 1 Ahmad Aijazuddin, Social Geography, Rawat Publication, New Delhi, 1999.
- 2 De Blij. H.D. Human Geography. John Wiley and son, New York.
- 3 Dreze Jean, Amariya Sen, Economic Development and Social opportunity. Oxford University Press. New Delhi. 1996
- 4 Dubey. S.C : Indian Society. National Book Trust, New Delhi, 1991.
- 5 Gregory. D . and J. Larry (Eds.) Social. relations and spatial structures. MC Millan. 1985.
6. Haq. Mahbubul : Reflections on Human Development. Oxford University Press, New Delh6.
7. Jones, Emrys, Reading in Social Geography, Oxford University Press, Ely House, London, 1977.
8. Jones, Emrys and John Eyles, An Introduction to Social Geography, Oxford University Press, London, 1977.
9. Maione. Clarence: People of South Asia, Winston, New York, 1974.
10. Planning Commission, Government of India: Report on Development of Tribal areas, 1981.
11. Rao, M.S.A.. Urban Sociology in India, Orient Iongman, 1970.
12. Schwartzberg Joseph : An Historical Atlas of South Asia, University of Chicago Press, (Chicago, 1978.
13. Sen, Amartya & Dreze Jean. Indian Development : Selected Regional Perspectives. Oxford University Pres-s, 1996
14. Smith, David: Geography : A welfare Approach, Edward Arnold, London, 1977.
15. Sopher, David. An Expoloration of Inda, Cornell University Press, 1980.
16. Subba. Rao. Personality of India : Pre and Proto Historic foundation of India and Pakistan, M.S. University Baroda. Vadodai'a, 1958
17. मौर्य, एस.डी., सामाजिक भूगोल शारदा पुस्तक भवन, 11 युनिवर्सिटी रोड इलाहाबाद-2, 2004.

## **PAPER – X (2017-18)**

### **PRACTICAL II- MAP PROJECTIONS, INTERPRETATION AND SURVEYING**

Map Projections: Mathematical/Graphical construction of world

projections. Interpretation of Maps: Geological Maps.

Principles and methods of topographical surveying involving the use of Theodolite and Dumpy level. Solution of problems in Surveying.

Topographical Information – International series, South east Asia Series, Indexing, Classification & Interpretation of topographical sheets.

### **SUGGESTED READINGS:**

1. Davis, R. C. & E. S. Forte : Surveying : Theory and Practical.
2. Kanetkar, T.R. & S.V. Kulkarni: Surveying and leveling part I & II A.V.G. Prakashan, Poona.
3. Monkhouse F.J. & H.R. Wilkinson: Maps and Diagrams, Methuen, London.
4. मॉक हाउस तथा विल्किन्सन (अनु.प्रो.प्रेमचन्द अग्रवाल) : मानचित्र तथा आरेख म.प्र. हिंदी ग्रंथ अकादमी .
5. हीरालाल: प्रायोगिक भूगोल.



# Durg Vishwavidyalaya, Durg (C.G.)

## M.A./M. Sc. GEOGRAPHY SEMESTER III (2017-18)

M.A. /M. Sc. Geography Semester III shall consist the following papers:

S. No.	Paper	Title	M. M.		
			Written	Inte. Asse.	Total
1.	XI	Population Geography	80	20	100
2.	X II	Settlement Geography	80	20	100
3.	XIII (A)	Remote Sensing Techniques	80	20	100
	<b>OR</b>	<b>OR</b>			
4.	XIII (B)	Biogeography and Ecosystem	80	20	100
5.	XIV	Research Methodology	80	20	100
	XV	Practical-III : Remote Sensing and Quantitative Techniques	---	---	100

1. The M.A. /M. Sc. Semester III examination in Geography shall consist of 500 marks.

There shall be four theory papers each of 100 marks and one practical of 100 marks as follows:

Paper XI : Population Geography

Paper XII : Settlement Geography

Paper XIII (A) : Remote Sensing Techniques

**OR**

Paper XIII (B) : Biogeography and Ecosystem

Paper XIV : Research Methodology

Paper XV : Practical – III: Remote Sensing and Quantitative Techniques

2. The theory papers shall be of three hours duration.
3. Candidates will be required to pass separately in theory and practical examinations.
4. (a) In the practical examination the following shall be the allotment of time and marks.
  - (i) Practical record : 20%
  - (ii) Lab work (up to Four hours) : 70%
  - (iii) Viva on i.& ii. Above : 10%
- (b) The external and internal examiners shall jointly submit marks.
- (c) All the candidates shall present at the time of the practical examination their practical record regularly signed by the teachers concerned.



## **SEMESTER – III (2017-18)**

### **PAPER - XI**

#### **POPULATION GEOGRAPHY**

- UNIT – I      Definition and scope of Population Geography. Relation of Population Geography with other subjects of social sciences. Historical development of Population Geography in western countries and in India. Sources of population data, Census and its history.
- UNIT – II      Distribution of Population: The concept of population density and its types. Factors affecting population distribution. Distribution & Density of population in the world with special reference to Europe, Asia and India. Growth of population: Measure of decennial and annual rates of population growth, prehistoric and modern trends of population growth in the world. Regional aspect of population growth in India. Population theories. Demographic transition.
- UNIT– III      Population composition in terms of age and sex, rural, urban residence, educational status and occupational structure. Significance of these elements in population analysis, factors affecting their composition in population, broad world patterns and detailed spatial patterns in India. Fertility and Mortality of population: Significance and factor. Indices and rates. World pattern and pattern in India. Human Development Index and its Components.
- UNIT– IV      Migration of population: Causes, characteristics and types. Methods of estimating value of internal migration. Important international migrations of the world, internal migration in India: Population and Resources: Population-Resource regions. Population Regions: Concept and methods, population regions of India, population policies of India.

#### **SUGGESTED READINGS:**

1. Bilasboruw, Richard Ii and Daniel Hogan, Population and Deforestation in the Humid Tropics, International Union for the Scientific Study of Population, Belgium 1999.
2. Boglia, D.J. Principles in Demography, John Wiley, New York 1969.
3. Bose, Ashish et al. : Population in India's Development (1947-2000); Vikas Publishing House, New Delhi, 1974.
4. Census of India, India : A State Profile, 1991.
5. Chandna, R. C. Geography of Population, Concept, Determinants and Patterns. Kalyani Publishers, New York, 2000.
6. Clarke, John I. Population Geography, Pergamon Press, Oxford, 1973.
7. Crook, Nigel Principles of Population and Development Pergamon Press. New York 1997.

8. Daugherty, Helen Gin, Kenneth C.W. Kammeyir, An Introduction to Population (Second Edition), The Guilford Press, New York, London, 1998.
9. Garnier, B.J. Geography of population Longman, London. 1970.
10. oclihar, Rajesh, The Veclic People : Their History and Geography Orient I ongman Ltd., New Delhi, 2000.'
11. Mamoria, C.B. India's Population Problem, Kitab Mahal New Delhi, 1981.
12. Mjtra, Ashok India's Population : Aspects of Quality and (control Vol I & 11. Abhiman Publications, New Delhi, 1978.
13. Premi, M.K. India's Population : Heading Towards a Billion, B.R., Publishing Corporation 1991.
14. Srinivasan, K. and M. Vlassoff, Population Development Nexus in India :Challenges for the New Millennium Lata Me Graw-Hill, New Delhi, 2001.
15. Srinivasan K. Basic Demographic Techniques and Applications Sage, Publications, New Delhi, 1998.
16. Sunda.ra.m K. V. a.nd Sudesh Nangia., (ed.) Population Geography, Henlage Publications, Delhi, 1986.
17. UNDP : Human Development Report, Oxford University Press, Oxford, 2000.
18. United Nations, Methods for Projections of urban and Rural Population No. VIII, New York, 1974.
19. Woods R.. Population Amalysis' in Geography Longman, London, 1979.
20. Zeiinsky Wilbur, A Prologue to Population Geography, Prentic Hall, 1966.
21. बघेल, अनुसुइया : अनुसूचित जातियों एवं अनुसूचित जनजातियों में प्रजननता प्रतिरूप : छत्तीसगढ़ राज्य के रायपुर संभाग के विशेष संदर्भ में, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर, 2002.
22. बघेल, अनुसुइया : शिशु मर्त्यता : सिंघई पब्लिशर्स एण्ड डिस्ट्रीब्यूटर, रायपुर, 2004.
23. शर्मा, सरला : औद्योगिक नगरों में जनसंख्या आप्रवास (भिलाई एवं कोरबा नगर के विशेष संदर्भ में), पं.रविशंकर शुक्ल विश्वविद्यालय, रायपुर, 2002.
24. शर्मा, सरला : छत्तीसगढ़ बेसिन में ग्रामीण शिशु मर्त्यता प्रतिरूप. . पंडा, बी.पी. : जनसंख्या भूगोल.
25. ओझा, रघुनाथ : जनसंख्या भूगोल. हीरालाल : जनसंख्या भूगोल.
26. चन्दना, आर.सी. : जनसंख्या भूगोल. त्रिपाठी,
27. रामदेव : जनसंख्या भूगोल.

## SEMESTER – III (2017-18)

### PAPER - XII SETTLEMENT GEOGRAPHY

- UNIT – I      Meaning, Objectives and Scope of Settlement Geography; Evolution, Distribution, Types and Patterns of Rural Settlements; Rural House Types; Rural Service Centers.
- UNIT – II      Evolution and growth of urban settlements; The Geographical setting of Urban Centers: Site, Situation and Location.
- UNIT – III      Rank- size-relationship; Cities as Central Places, Central Place Theory, Growth Centre Theory.
- UNIT – IV      City- Country Relationship: Umland, Rural-Urban Fringe.

#### SUGGESTED READINGS:

1. Abercrombee, Sir P. : Town and Country planning 1961.
2. Alani, Shah Manzoor : Hyderabad Secuidrabad (Twin Cities) A. study in urban geography)
3. Alam, S.M. & V.V. Tokshishevesky : Urbanization in developing countries.
4. Berry Brain .1. L. : Geographic Prospective on Urban .Systems.
5. Bresse, C. & D.F. Whiteman : An approach to Urban Planning
6. Dickinson, R.E, : City, Religion and Regionalism.
7. Gallion and Fisher : The Urban Pattern.
8. Grifitth, , J.P : A study of Urban constructions in India.
9. Gibbs : Urban Research Methods.
10. Mayor, H.M. & (.,'.1". Kohn : Readings in Urban Geography.
11. Morgan, F.W. : Ports and Harbours.
12. Mumford L. : Culture of cities.
13. Robson, W.A. : Great cities of world.
14. Robson, B.T. : Urban Growth : An approach, Methuen, London.
15. Carter, Harold : Study of Urban Geography, London, Edward Arnold, 1979.
16. Singh R.I., & K.N. Singh : Readings in Rural Settlement Geography, NGSi Varanasi, 1975.
17. सिंह, उजागिर : नगरीय भूगोल

## SEMESTER – III (2017-18)

### PAPER – XIII (A) REMOTE SENSING TECHNIQUES

- UNIT– I      Historical development of remote sensing as a technology - Relevance of remote sensing in Geography - Concepts and basics: Energy source, energy and radiation principles, energy interactions in the atmosphere and earth surface features, remote sensing systems: platform sensors and radiation records. Microwave sensing interpretation of SLAR imageries, thermal imageries.
- UNIT– II      Remote Sensing Satellite: platforms LANDSAT, SPOT, NOAA, RADARSAT, IRS, INSAT: principles and geometry of scanners and CCD arrays, orbital characteristics and data products - MSS, TM, LISS I & II, SPOTPLA & MLA, SLAR.
- UNIT– III      Image Processing: Types of imagery, techniques of visual interpretation, ground verification transfer of interpreted thematic information to base maps-digital processing: rectification and restoration, image enhancement - contrast manipulation, Classification: Supervised and Unsupervised, post-classification analysis and accuracy assessment.
- UNIT– IV      Applications: Air photo and image interpretations, arid mapping land use and land cover, land evaluation, urban land use, landform and its processes, weather studies and studies of water resources: integration of Remote Sensing and GIS. Remote sensing and hazard management, remote sensing and environmental management.

#### SUGGESTED READINGS:

1. American Society of Photogrammetry: Manual of Remote Sensing. ASP, Falls Church V.A., 1983.
2. Barrett E.C. and L.F. Curtis : Fundamentals of Remote Sensing and Air Photo Interpretation on, Memillan, New York, 1992.
3. Compbell J.: Introduction to Remote Sension, Guilford, New York, 1989.
4. Curran, Paul J.: Principles of Remote Sensing. Longman, London, 1985.
5. Hord R.M. : Digital Image Processing of Remotely Sensed Date, Academic, New York, 1983.
6. Luder D., Aerial Photography Interpretation: Principles and Application, CcGraw Hill, New York, 1959.
7. Pratt W.K. Digital Image Processing. Wiley, New York, 1978.
8. Rao D. P. (eds.): Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hederabad, 1998.
9. Thomas M. Lollesand and Ralph W. Kefer, Remote Sensing and Image Interpretation, Wiley & sons, New York, 1994.
10. Aronoff S. Geographic Information Systems : A. Management Perspective, Publication Offiawa, 1989.
11. Burrough P.A. Principles of Geographic Information Systems for Land Reson Assessment Oxford University Press, New York, 1986.
12. Fraser Taylor D.R. Geographic information Systems. Pergamor Press, Oxford 1990.
13. Maquire D.J.M.F. Goodchild and D.W. Rhind (eds.). Geographic information System 'Principles arid Application. Taylor & Francis, Washingron, 1991.
14. Mark S. Monmonier. Computer - assisted Cartography, Prentice-Hall, Englewood Cliff, Jersey, 1982.
15. Peuquet D. .1. and D.F.- Marble, Introductory Reading in Geographic. Information System Taylor & Francis, Washington, 1990.
16. Star J. and J. Estes, Geographic Information Systems : An Introduction, Prentice Englewood Cliff, New Jersey, 1994.
17. चौनियाल, देवी दत्त : सुदूर संवेदन एवं भौगोलिक सूचना प्रणाली.

## **PAPER – XIII (B) (2017-18)**

### **BIOGEOGRAPHY AND ECOSYSTEM**

- UNIT– I      Definition and scope of Biogeography Environment, Habitat and Plant-animal association, Biome Types.
- UNIT– II      Elements of plant geography, distribution of forests and major communities. Plant successions in newly formed land forms. Zoogeography and its Environmental Relationship. Palaeo botanical and Palaeo climatological records of environmental change.
- UNIT– III      Ecosystems: concept and components, Ecosystem-form and function: tropic level, ecological pyramids, ecological niche, energy and nutrients in the ecosystem, hydrological cycle, food chains and food webs. Major terrestrial ecosystems of the world: agriculture, forests, grassland and desert. Population growth and environment.
- UNIT– IV      Biodiversity and its Conservation. Preservation and conservation of the ecosystem through resource management, Environment legislation. The Stockholm conference, the Earth summit, Environmental laws in India (the Wild Life Act, Water Act, Forest Act, Environment Protection Act and National Environment Tribunal Act).

#### **SUGGESTED READINGS -**

1. Agrawal D.P. : Man and Environment in India through Ages, Book & Books, 1992.
2. Bradshaw, M.J. : Earth and Living Planet, ELBS. London, 1979.
3. Cox, C.D. and Moore, P.D. : Biogeography : An Ecological and Evolutionary Approach 5<sup>th</sup> edn. Blackwell, 1993.



## SEMESTER – III (2017-18)

### PAPER - XIV RESEARCH METHODOLOGY

- UNIT – I      Research Methodology-An Overview; Procedure of scientific Research, Defining Research Problem; Formulating Hypothesis; Research Design.
- UNIT – II      Methods of Data Collection: Observation, Questionnaire, Schedule and Interview; Sampling: Sampling Methods, Size of Sample;
- UNIT – III      Processing and Analysis of Data: Processing- Editing, Coding, Classification and Tabulation, Analysis – Measurement of Central Tendency, Dispersion, Correlation.
- UNIT – IV      Preparation of Research Reports: Steps, Layout and Types of Reports

1. Gaur, R. : Environment and Ecology of Early Man in Northern India R. B. Publication Corporation 1987.
2. Hoyt, J.B. Man and the Earth, Prentice Hall, U.S.A. 1992.
3. Huggett. R.J. : Fundamentals of Biogeography, Routledge, U.S. A. 1998.
4. Illes, J. : Introduction to Zoogeography, Mcmillan, London, 1974.
5. Khoshoo, T. N. and Sharma. M. (eds) : Indian Geosphere-Biosphere Har-Anand Publication, Delhi 1991
6. Lapedes, D.N.(ed) : Encyclopedia of Environmental Science, McGraw Hill, 1974.
7. Mathur H.S. : Essentials of Biogeography, Anuj Printers, Jaipur, 1998.
8. Pears, N. : Basic Biogeography, 2<sup>nd</sup> edn. Longman, London, 1985.
9. Simmons, I.G. Biogeography, Natural and Cultural, Longman, London, 1974.
10. Tivy J. : Biogeography: A Study of Plants in Ecosphere 3<sup>rd</sup> edn. Oliver and Boyd, U.S. A., 1992.
11. Ackerman, E.A. : Geography as a Fundamental Research Discipline, University of Chicago Research Papers, 1958
12. Agarwal, A. and Narain, S. : The Citizens Fifth Report. Centre for Science and Environmental, New Delhi, 1999.
13. Bertalanffy, L. : General Systems Theory, George Bragiller, New York, 1958.
14. Bodkin, E. : Environmental studies, Charles E Merrill Pub. Co., Columbus, Ohio, 1982.
15. Chandana, R.C. : Environmental Awareness, Kalyani Publishers, New Delhi, 1958.
16. Chorley, R.J. : Geomorphology and General Systems Theory, U.S.G.S. Professional Paper, 500B, 1962.
17. Eyre, S.R. and Jones, G.R.J. (eds) Geography as Human Ecology, Edwares Arnold, London, 1966.
18. Kormondy, E.J. : Concepts of Ecology, Prentice Hall, 1989.
19. Manners, I.R. and Mikesell, M.W. (eds.) Prespectives on Environment, Commission on College Geography, Publ. No. 13 Washington, D.C., 1974.
20. Nobel and Wright : Environmental Science, Prentice Hall, New York, 1996.
21. Odum, E.P.: Fundamentals of Ecology, W.B. Saunders, Philadelphia, 1971.
22. Russwurm, L.H. and Sommerville, E. (eds.) : Man's Natural Environment-A Systems Approach, Duxbury, Massachuselts, 1985.
23. Sharma, H.S. : Ranthambhore Sanctuary – Dilemma of Eco-development, Concept, New Delhi, 2000.
24. Simmons, I.G. : Ecology of Natural Resources, Edward Arnold, London, 1981.
25. Singh S. : Environmental Geography, Prayag Publications, Allahabad, 1991.
26. Smith, R.L. : Man and his Environment : An Ecosystem Approach, Harper & Row, London, 1992.
27. U.N.E.P. : Global Environmental Outlook, U.N. Pub. , New ork, 1998.
28. World Resources Institute : World Resoources, (Latest Report) Washington.
29. कुलश्रेष्ठ, कामता प्रसाद: जैव भूगोल.

## SUGGESTED READING:

1. Selltitz, C.M. Jahoda, M. Deutsch and others. Research Methods in Social Relations, Holt, . New York, 1961.
2. Goode, W and P.K, Hatt Methods in Social Research, Mc Graw Hill, .Tokyo, 1962.
3. Harvey, David . Explanation in Geography, Edward Arnold, London, 1971
4. Chorley, R.J. and P. Haggett (ed) Models in Geography, Methuen, London, 1967.
5. Minshull, R. Introduction to Models in Geography. Longman London, 1975.
6. Sheskin, I.M. Survey Research for Geographers Scientific Publisher, Jodhpur, 1987.
7. Kothari, C. R. Research Methodology : Methods and Techniques, Wishwa Prakashan, 1994.
8. Misra H.N. and V.P. Singh Research Methodology in Geography: Social, Spatial and Policy Dimensions, Rawat Publications New Delhi, 1998.
9. Har Prasad Research Methods and Techniques in Geography, Rawat Publications, New Delhi. 1992.





## SEMESTER – III (2017-18)

### PAPER - XV

### PRACTICAL -III

#### **Remote Sensing, Interpretation of Topographical Sheets and Quantitative Techniques**

1. **Principles of Photogrammetry:** - Air Photo- Stereo test, Orientation of stereo model under mirror stereoscope, Preparation of photo/line index and determination of photo scale, Use of parallax bar and determination of heights, Identification of features on aerial photograph, Tracing of details from stereo pair, Interpretation of physical and cultural details, Preparation of Land use map pre field interpretation, Field visit for ground truthing.
2. **Remote Sensing:**– Study of satellite Image – Annotation Identification of features on FCC imageries, Tracing of details from satellite imageries, Basic Principles of Image interpretation, Interpretation of Physical and Cultural details and preparation of land use and land cover map using IRS Images. Pre field visit.

#### **Statistical Techniques:**

Product moment and Rank Correlation Coefficients, Linear Regression. Hypothesis Testing: Chi-Square test, t-test & F test, Sampling Techniques, Point, Line and Area Sampling.

#### **SUGGESTED READINGS:**

1. American Society of Photogrammetry : Manual of Remote Sensing. ASP, Falls Church V.A. 1983.
2. Barren E.C. and I...F. Clirtis : Fundamentals of Remote Sensing and Air Photo Interpretation 'on, Memillan, New York, 1992.
3. Conipbell .1. : Introduction to Remote Sension, Glinford, "New York, 1989.
4. Clirran, Paul J. : Principles of Remote Sensing. Longman, London, 1985.
5. Hord R.M. : Digital Image Processing of Remotely Sensed Date, Academic, New York, 1983
6. Luder D., Aerial Photograpliy Interpretation : Principles and Application, Cc Graw Hill, New York, 1959.
7. Pratt W.K. Digital Image Processing. Wiley, New York, 1978.
8. Rao D. P.. (eds.) : Remote Sensing for Earth Resources, Association of Exploration Geophysicisi, Hederabad, 1998.
9. Thomas M. Lollesand and Ralph W. Keler, Remote Sensing and Image Interpretation, Wiley & sons. New York, 1994.
10. Aronoff S. Geographic Information Systems: A Management Perspective, Publication Offawa, 1989.
11. Burroligh P..A. Principles of Geographic Information Systems for Land Reson Assessment Oxford University Press, New York, 1986.
12. Fraser Taylor D.R. Geographic information Systems. Pergamor Press, Oxford 1990.
13. Maquire D.J.M.F. Goodchiln and D.W. Rhind (eds.). Geographic information System Principles and Application. Taylor& Francis, Washingron, 1991.
14. Mark S. Monrnonicr. Computer-assisted Cartography, Prentice Hall, Englewood Cliff, Jersey, 1982.
15. Peuquer D.J. and D.F. Marble, Introductory Reading in Geographic Information System Taylor & Francis, Washington, 1990.
16. Star J. and J. Estes, Geographic Information Systems; An Introduction, Prentice Eaglewood Cliff, New Jersey. 1994.



## M.A./M. Sc. GEOGRAPHY SEMESTER IV (2017-18)

M.A./M.Sc. Geography Semester IV shall consist the following papers:

S. No.	Paper	Title	M. M.		
			Written	Int. Ass.	Total
1.	XVI	Urban Geography	80	20	100
2.	XVII	Agricultural Geography	80	20	100
3.	XVIII (A)	Geographical Information System	80	20	100
	<b>OR</b>	<b>OR</b>			
4.	XVIII (B)	Environmental Geography	80	20	100
5.	XIX	Field Work (Physical and Socio- Economic)	---	---	100
6.	XX	Practical-IV :Geographical Information System and Quantitative Techniques	---	---	100

- The M.A./M.Sc. Semester IV examination in Geography shall consist of 500 marks.

There shall be three theory papers and one Field Work report each of 100 marks and one practical of 100 marks as follows.

S. No.	Paper	Title
1.	XVI	: Urban Geography
2.	XVII	: Agricultural Geography
3.	XVIII (A)	: Geographical Information System
	<b>OR</b>	
4.	XVIII (B)	: Environmental Geography
5.	XIX	: Field Work (Physical and Socio- Economic)
6.	XX	: Practical-IV :Geographical Information System and Quantitative Techniques

- The theory papers shall be of three hours duration.
- Candidates will be required to pass separately in theory and practical examinations.
- Candidates will be required to submit their Field Report in three copies in hard bound at least one hundred pages for Valuation.
- (a) In the practical examination the following shall be the allotment of time and marks
  - Practical record 20%
  - Lab Work (up to Four Hours) 70%
  - Viva on i & ii above 10%
- (b) The external and internal examiners shall jointly submit marks.
- (c) All the candidates shall present at the time of practical examination their practical record regularly signed by the teacher concerned.

## SEMESTER – IV (2017-18)

### PAPER-XVI

#### URBAN GEOGRAPHY

- UNIT – I Definition, Objective and Scope of urban geography, General Nature of City Structure.
- UNIT – II Internal structure: Morphology and Land use. Theories of Urban Structure: The Concentric Zone Theory, the Sector Theory, the Multiple Nuclei Theory. Commercial Structure of Cities; The Central Business District (CBD),
- UNIT – III Centrifugal and Centripetal forces in Geography, Economic Base of Towns: Basic, Non-basic concept. Urban Functions: Functional Classification of Towns: Webb, Harris, and Nelson.
- UNIT – IV Contemporary Urban Issues: Urban renewal, Urban sprawl, Slums, Environmental Pollution, Urban Planning; Landuse Planning, Urban and Metropolitan Planning in India.

#### SUGGESTED READINGS:

1. Abercrombee, Sir P. : Town and Country planning 1961.
2. Alam, Shah Manzoor : Hyderabad Securdabad (Twin Cities) A. study in urban geography)
3. Alam, S.M. & V.V.Tokshishevesky : Urbanization in developing countries.
4. Berry Brain .I. L. : Geographic Prospectives on Urban .Systems.
5. Bresse, C. & D.F. Whiteman : An approach to Urban Planning
6. Dickinson, R.E. : City, Religion and Regionalism.
7. Gallion and Fisher : The Urban Pattern.
8. Grifitth, , J.P. : A study of Urban constructions in India.
9. Gibbs : Urban Research Methods.
10. Hall P. : Urban and Regional Planning, Rout ledge, London, 1992.
11. Kundu, A. : Urban Development and Urban Research in India, Khanna Publication, 1992.
12. Mayor, H.M. & Kohn : Readings in Urban Geography.
13. Morgan, F.W. : Ports and Harbours.
14. Mumford L. : Culture of cities.
15. Nangia Sudesh : Delhi Metropolitan Region ; A Study in Settlement Geography, Rajesh Publication, 1976.
16. Robson, W.A. : Great cities of world.
17. Robson, B.T.: Urban Growth : An approach, Methuen, London.
18. Smailes, A E : The Geography of Town, Hutchinson, London, 1953.
19. Tewari, Vinod K, Jay A : Indian Cities : Ecological
20. Weinstein, VLS Prakash Rao (editors) : Perspectives, Concept, 1986.
21. Carter, Harold: Study of Urban Geography, London, Edward Arnold, 1979.
22. Singh R.I., & K.N. Singh: Readings in Rural Settlement Geography, NGSI Varanasi, 1975.
23. सिंह,उजागर : नगरीय भूगोल.
24. करन,एम.पी. : नगरीय भूगोल.
25. बंसल सुरेश चन्द : नगरीय भूगोल.
26. सिंह, ओमप्रकाश : नगरीय भूगोल.
27. तिवारी आर.सी.: आधिवास भूगोल प्रयाग पुस्तक भवन, इलाहाबाद 1997.
28. करण एवं यादव: आधिवास भूगोल.
29. यादव रामसुरेश : आधिवास भूगोल.

**SEMESTER – IV (2017-18)**  
**PAPER – XVII**  
**AGRICULTURAL GEOGRAPHY**

- UNIT – I Nature, scope, significance and development of agricultural geography. Approaches to the study of agricultural geography: Commodity, systematic and regional systems. Origin and dispersal of agriculture. Sources of agricultural data.
- UNIT – II Determinants of agricultural land use - Physical, economic, social, and technological Land holding and land tenure systems, Land reforms, land use Agriculture policy and planning. Selected agricultural concepts and their measurements; cropping pattern, crop concentration, intensity of cropping, degree of commercialization, diversification and specialization, efficiency and productivity, crop combination regions and agricultural development.
- UNIT – III Theories of agricultural location based on several multi-dimensioned factors:-Von Thunen's theory of agricultural location and its recent modifications; Whittlesey's classification of agricultural regions; land use and land capability.
- UNIT – IV Contemporary Issues: Food, nutrition and hunger, food security, drought and food-security, food aid Programmes; role of irrigation, fertilizers, insecticides and pesticides, technological know-how. Employment in the agricultural sector: landless labourers, woman, children: occupational and agricultural activities.

**SUGGESTED READINGS:**

1. Bayliss Smith, IP.: The Ecology of Agricultural Systems. Cambridge University London, 1987.
2. Berry, B.J.L et. al. : The Geography of economic Systems. Prentice Hall, New York, 1976.
3. Brown, L.R. : The Changing World Food Prospects - The Nineties and Beyond, World Watch Institute, Washington D.C., 1990.
4. Dyson, T. : Population and Food - Global Trends and Future Prospects. Routledge. London, 1996.
5. Gregor, H.P. : Geography of Agriculture. Prentice Hall, New York, 1970.
6. Grigg, D.B. : The Agricultural Systems of the World. Cambridge University Press, New York 1974.
7. Hartshorn, T.N. and Alexander, J.W. : Economic Geography. Prentice Hall, New Delhi, 1988
8. Mannion, A.M. : Agriculture and Environment Change, John Wiley, London, 1995.
9. Morgan W.B. and Norton, R.J.C. : Agricultural Geography. Mathuen, London, 1971.
10. Morgan, W.B.:Agriculture in the Third World - A Spatial Analysis. Westview Boulder, 1978.
11. Sauer, C.O. : Agricultural Origins and Dispersals,. M.I.T. Press, Mass, U.S.A., 1988.
12. Singh, J. and Dhillon, S.S. : Agricultural Geography. Tata McGraw Hill' Pub.; Delhi, 1988.
13. Tarrant, J.R. : Agricultural Geography. Wiley, New York, 1974.
14. कुमार प्रमीला एवं शर्मा : कृषि भूगोल, म.प्र. हिन्दी ग्रंथ अकादमी.



## SEMESTER – IV (2017-18)

### PAPER – XVIII (A)

#### GEOGRAPHICAL INFORMATION SYSTEM

- UNIT – I Spatial Science : Geography as a spatial science, maps and spatial information dynamics of spatial information, elements of information technology, Geographic objects and their relations definition and development of GIS, computer environment for GIS.
- UNIT – II Spatial Data: Elements of spatial data: data sources: Primary and secondary census and sample data, quality and error variations Raster and vector data structures, data conversion comparison of raster and vector data bases, methods of spatial interpolation – GIS data formats for the computer environment.
- UNIT – III GIS Technology: Coordinate system-basic principles of cartography and computer assisted cartography for GIS – remote sensing data as a data source for GIS integration of GIS and remote Sensing-GPS and GIS: technology, data generation and limitations – visualization in GIS-Digital Elevation Models (DEM and TINS).
- UNIT – IV GIS Application: GIS as a Decision Support System –expert system for GIS-basic flow chart for GIS application – GIS standard legal system and national GIS policy application of GIS in Land Information System, Urban Management, Environmental Management and Emergency Response System.

#### SUGGESTED READINGS:

1. American Society of Photogrammetry : Manual of Remote Sensing. ASP, Falls Church V.A., 1983.
2. Barrett E.C. and L.F. Curtis : Fundamentals of Remote Sensing and Air Photo Interpretation on, Memillan, New York, 1992.
3. Compbell J. : Introduction to Remote Sensing, Guilford, New York, 1989.
4. Curran, Paul J. : Principles of Remote Sensing. Longman, London, 1985.
5. Hord R.M.:Digital Image Processing of Remotely Sensed Date, Academic, New York, 1983.
6. Luder D., Aerial Photography Interpretation : Principles and Application, CcGraw Hill, New York, 1959.
7. Pratt W.K. Digital Image Processing. Wiley, New York, 1978.
8. Rao D. P. (eds.) : Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hederabad, 1998.
9. Thomas M. Lollesand and Ralph W. Kefer, Remote Sensing and Image Interpretation, Wiley & sons, New York, 1994.
10. Aronoff S.Geographic Information Systems: A. Management Perspective, Publication Offiawa, 1989.
11. Burrough P.A. Principles of Geographic Information Systems for Land Reson Assessment Oxford University Press, New York, 1986.
12. Fraser Taylor D.R. Geographic information Systems. Pergamor Press, Oxford 1990.
13. Maquire D.J.M.F. Goodchild and D.W. Rhind (eds.). Geographic information System 'Principles arid Application. Taylor & Francis, Washingron, 1991.
14. Mark S. Monmonier. Computer-assisted Cartography,Prentice-Hall, Englewood Cliff, Jersey, 1982.
15. Peuquet D. .1. and D.F.- Marble, Introductory Reading in Geographic. Information System Taylor & Francis, Washington, 1990.
16. चौनियाल, देवी दत्त.: सुदूर संवेदन एवं भौगोलिक सूचना प्रणाली.

**SEMESTER – IV (2016-17)**  
**PAPER – XVIII (B)**  
**ENVIRONMENTAL GEOGRAPHY**

- UNIT – I      Environment: Meaning, definition, concepts and theories related to environment. Environment and its components: Classification, Characteristics and their interdependent relationship, Development of the environmental studies and their approaches: Development of environmentalism in Geography.
- UNIT – II    Environment and development. Ecological concepts; Geography as human ecology; Ecosystem: meaning definition, Concept and components. Main terrestrial ecosystems of the world-forests and agriculture.
- UNIT – III    Environmental hazards- natural and human made, environmental pollution : meaning definition, nature and types-air, water, noise and others. Ecological impacts of pollution. Resource use and ecological imbalance with special reference to soil, forests and water resources.
- UNIT – IV    Environmental Management: meaning, importance and approaches, need for environmental policy and laws. Preservation and conservation of environment through resource management (Green revolution, Chipko movement, National Parks). Environmental Actions: concept, need and importance Stockholm Conference, Earth Summit, E.I.A. definition and methods and need for EM Environmental education and People's participation.

**Suggested Readings :**

1. Agrawal, Anil and Sunita Narain. Dying Wisdom : The Fourth citizen Report. Centre for Science and Environment, New Delhi, 1998.
2. Burton I.; R.W. Kates & G.F. Whiley. The Environment as Hazards. O. U.P. New York, 1978, Carledge, Bryen. Population and the Environment, O.U.P., New York, 1995.
3. Chandna, R.C. Environmental Awareness Kalyani Punlishers, New Delhi, 1998.
4. Dawson, J. and J.C. Doornkamp, eds.: Evaluating the Human Environment. Edward Arnold, London, 1975
5. Detwyler, J.R.: Man,s impact on Environment. Pelican, 1970.
6. Edington, J.M. & M.A. Edington : Ecology and Environmental Planning. Chapmap & Hall, London, 1977.
7. Goudie, Andrew. The Human Impact on the Natural Environment, Blackwell Oxford, U.K. 1994
8. Jain, R. K., L.V. Urban and G.S. Stacy; Environmental Impact Analysis-A New Dimension in Decision-Making. Van Norstrand Reinhold Co. New York, 1977.
9. Khoshoo, T.N. Environmental Concepts and Strategies. Ashish Publishing House, New Delhi.
10. Mohan, M. Ecology and Development. Rawat Publications; Jaipur, 2000.
11. Munn, R.E. Environmental Impact Assessment : Principles and Procdures. John Wiley & Sons, New York, 1979.
12. Narain, Sunita. The Citizen Fifth Report. Centre for Science and Environment, New Delhi 2003.



13. Mukherji, A and V. K. Agnihotri : Environment and Development. Concept Pu. Co. New Delhi, 1993.
14. Rudig Wolfgang. Environmental Policy Edward Elger Publishing Ltd. UK. 1998.
15. Saxena, H.M. Environmental Geography. Rawat Publications, Jaipur, 1999
16. Saxena, H.M. Environmental Management. Rawat Publications, Jaipur, 2000
17. Sharma, B.L. & Puar P: Global Environmental Challenges. Rohini Books, Publishers & Distributors, Jaipur, 2004.
18. Singh, K.N. and D.N. Singh : Population Growth, Environment and Development Issues, Impacts and Responses. Environment & Development Study Centre, Varanasi, 1991.
19. Singh, R. B. and S. Mishra : Environmental Law in India : Issues and responses, Concept Pub. Co. New Delhi, 1966.
20. Singh, S. Environmental Geography. Prayag Pustak Sadan, Allahabad, 2000.
21. Smith, R.L. : Man and his Environment: An Ecosystem Approach. Harper & Row. London, 1992.
22. U.N.E.P.: Global Environmental Outlook. U.N. Pub. New York.
23. अवस्थी एन. एम. एवं आर.पी. तिवारी पर्यावरण भूगोल, मध्यप्रदेश ग्रंथ अकादमीए भोपाल ।
24. नेगी, पी. एस. : परिस्थितिकीय विकास एवं पर्यावरण भूगोल, रस्तोगी एन्ड कम्पनी, मेरठ, 1995 ।
25. रघुवंशी अरुण और चन्द्रलेखा रघुवंशी : पर्यावरण तथा प्रदूषण, मध्यप्रदेश हिन्दी ग्रंथ अकादमी, भोपाल, 1989
26. सविन्द्र सिंह : पर्यावरण भूगोल, प्रयाग पुस्तक सदन इलाहाबाद, 1993 ।
27. शर्मा, बी एल : पर्यावरण : साहित्य भवन, आगरा, 1992 ।
28. तिवारी, विजय कुमार : पर्यावरण और परिस्थितिकी, हिमालय पब्लिशिंग हाउस, दिल्ली 1998 ।
29. तिवारी, विजय कुमार, : पर्यावरण अध्ययन, हिमालय पब्लिशिंग हाउस, दिल्ली, 1998 ।



## **SEMESTER – IV, (2017-18)**

### **PAPER - XIX**

#### **FIELD WORK (PHYSICAL AND SOCIO- ECONOMIC)**

- UNIT – I Trace the prominent features of area to be surveyed. Identify salient landform features of selected area on a topographical sheet. Identify the landforms on the surface, while in the field. Also note the agents of erosion, transportation and deposition associated with the landforms.
- UNIT – II Identity and classify the Bio-diversity in the area (Flora & fauna). Observe the relationship of various landforms, flora and fauna with land-use, settlement structure and life style of people.

#### **Socio – Economic**

- UNIT – III Procure a cadastral map of the village/town for field mapping of the features of land-use and land quality. Procure/prepare the settlement –site map through rapid survey to map the residential, commercial, recreational (parks, playground), educational, religious and other prominent features. Conduct a socio-economic survey of the households with a structured questionnaire. Supplement the information by personal observations and perceptions.
- UNIT – IV Based on observations of the land-use and results of the socio-economic enquiry of the households, prepare a critical field-survey report. Photographs and sketches, in addition to maps and diagrams, may supplement the report.





**SEMESTER – IV, (2016-17)**

**PAPER - XX PRACTICAL-IV**

**GEOGRAPHICAL INFORMATION SYSTEM AND QUANTITATIVE TECHNIQUES**

**Geographical Information System**

An overview of GIS software, Elements of GIS: Data capture-verification and preprocessing-data storage and maintenance of databases-Database Management Systems: Spatial data creation, Editing the layers and table creation, Creation of non Spatial data, data manipulation, analysis (integrated analysis of spatial and attribute data, overlay analysis, neighborhood operations and connectivity functions) and spatial modeling-output format and generation. Buffer analysis, Network Analysis, Creation of DEM & TIN Generation of thematic map.

GPS – Demonstration and handling of Hand held GPS receivers, Checking and updating of existing map, Use of GPS to Check/update the existing topographical map, Ground truthing by GPS.

**Quantitative Techniques:**

Running mean, Mean centre, Nearest Neighbor Analysis; Lorenz Curve, Normal distribution curve, Probability.

**SUGESSTED READINGS:**

1. Singh, R.L. & P.K. Dutt : Elements of Practical Geography Students trends.
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# **DURG VISHWAVIDYALAYA, DURG (C.G.)**

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## **SCHEME OF EXAMINATION & SYLLABUS of M.A. (Home Science) Semester Exam UNDER FACULTY OF SCIENCE Session 2017-19**

**(Approved by Board of Studies)  
Effective from July 2017**

M.A. (Home Science)

Session 2017-19

1<sup>st</sup> Semester

S.No.	Paper No.	Title	credit
1	Paper I	Basics of Food & Nutrition	4
2	Paper II	Clinical & Therapeutic Nutrition	4
3	Paper III	Extension Education I	4
4	Paper IV	Research Methodology	4
	<b>Practical</b>	Food Science & Nutrition	4
<b>Total credit</b>			<b>20</b>

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M.A. (Home Science)

**Session 2017-19**

**2<sup>nd</sup> Semester**

S.No.	Paper No.	Title	credit
1	Paper v	Textile & clothing	4
2	Paper VI	Textile Designing	4
3	Paper VII	Extension Education II	4
4	Paper VIII	Statistics and Computer Application	4
	<b>Practical</b>	Textile & clothing	4
<b>Total credit</b>			<b>20</b>

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**Session 2017-19**

**3<sup>rd</sup> Semester**

S.No.	Paper No.	Title	credit
1	Paper IX	Human Development I	4
2	Paper X	Human Development II	4
3	Paper XI	Nutrition of Women & Children	4
4	Paper XII	Health & Fitness	4
	<b>Practical</b>	Human Development	4
<b>Total credit</b>			<b>20</b>

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M.A. (Home Science)

**Session 2017-19**

4<sup>th</sup> Semester

S.No.	Paper No.	Title	credit
1	Paper XIII	Resource Management I	4
2	Paper XIV	Resource Management II	4
3	Paper XV	Food Preservation	4
4	Paper XVI	Entrepreneurship	4
	<b>Practical</b>	Resource Management & Entrepreneurship	4
<b>Total credit</b>			<b>20</b>

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## Syllabus for MA (Home Science)

### I Semester Part-I Theory

		Theory	Test	Semi	Total
I	Basics of Food Nutrition	80	10	10	100
II	Clinical & Therapeutic Nutrition	80	10	10	100
III	Extension Education -I	80	10	10	100
IV	Research Methodology	80	10	10	100
	Practical – Food Science and Nutrition				100
	Total				500

### II Semester

		Theory	Test	Semi	Total
V	Textile & Clothing	80	10	10	100
VI	Textile Designing	80	10	10	100
VII	Extension Education – II	80	10	10	100
VIII	Statistics & Computer Application	80	10	10	100
	Practical – Textile & Clothing				100
	Total				500

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### III Semester

		Theory	Test	Semi	Total
IX	Human Development – I	80	10	10	100
X	Human Development – II	80	10	10	100
XI	Nutrition of Women & Children	80	10	10	100
XII	Health & Fitness	80	10	10	100
	Practical – Human Development				100
	Total				500

### IV Semester

		Theory	Test	Semi	Total
XIII	Resource Management – I	80	10	10	100
XIV	Resource Management – II	80	10	10	100
XV	Food Preservation	80	10	10	100
XVI	Entrepreneurship	80	10	10	100
	Practical – Resource Management and Entrepreneurship				100
	Total				500

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**MA (Home Science) I Semester**  
**Paper I**  
**BASICS OF FOOD AND NUTRITION**

**Marks : 80**

**Objectives:**

This course will enable the student to

1. Understand the functions of food and the role of various nutrients, their requirements and the effects of deficiency and excess (in brief).
2. Learn about the structure, composition, nutritional contribution and selection of different foodstuffs.
3. Be familiar with the different methods of cooking, their advantages and disadvantages.
4. Develop an ability to improve the nutritional quality of food.

**Theory: Unit-1**

1. Concept of Nutrition – Food; Nutrients, Nutrition, Under and over Nutrition, Health.
2. Functions of Food.
3. Food groups, Balanced diet.

**Unit-2 Nutrients: Macro nutrients**

Classification, sources, functions Recommended dietary allowances Deficiency and excess (in brief) Water  
Carbohydrates Fats  
Protein Fiber

**Unit-3 Calcium**

Iron Magnesium Zinc Fluorine  
Iodine, Selenium, Copper, Manganese Fat-soluble vitamins (A,D,E,K)  
Water soluble vitamins (Thiamine, Riboflavin, Niacin) Vitamin C, Folic acid  
Pyridoxine, Pantothenic acid, B12

**Unit-4 Food Production (in brief), Food Composition Structure nutritional contribution and selection factors for the following**

Cereals and millets Pulses  
Fruits Vegetables  
Milk and milk products Nuts and oilseeds  
Meat, fish and poultry  
Eggs  
Sugar  
Tea, coffee, cocoa, chocolate and other beverages  
Condiments and spices  
Processed foods

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## Unit-5 Methods of Cooking, their Advantages and Disadvantages and Effect on Nutritive Value

Improving Nutritional Quality of Foods  
Germination  
Fermentation  
Supplementation  
Substitution  
Fortification and enrichment

### References:

Robinson, C.H., Lawler, M.R. Chenoweth W.L. and Garwick, A.E. (1986): Normal and therapeutic Nutrition, 17<sup>th</sup> Ed., Macmillan Publishing Co.

Swaminathan, M.S. (1985): Essentials of Food and Nutrition VI: Fundamentals Aspects VII: Applied Aspects.

Hughes, O., Bennion, M. (1970): Introductory Foods, 5<sup>th</sup> Edn., MacMillan Company.

Williams, S.R. (1989): Nutrition and Diet Therapy, 4<sup>th</sup> Edn., C.V. Mosby Co.

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**MA (Home Science) I Semester**  
**Paper II**  
**CLINICAL AND THERAPEUTIC NUTRITION**

**Marks : 80**

**Focus:**

The course encompasses the various stages of the life cycle and how nutrition is critical at various stages. It briefly familiarizes students with the role of nutrition in common elements.

**Objectives:**

This course will enable the student to

1. Understand the concept of an-adequate diet and the importance of meal planning.
2. Know the factors affecting the nutrient needs during the life cycle and the RDA for various age groups.
3. Gain knowledge about dietary management in common ailments.

**Theory:**

**Unit-1 Definition of Health & Nutrition**

Dimensions of Health (Physical, Psychological, emotional & Spiritual)

**Energy Requirements – Factors affecting energy requirements.**

BMR, Activity, age, climate, diet – induced thermogenesis (SDA physiological conditions).

**Concept of nutritionally adequate diet and meal planning.**

- (a) Importance of meal planning
- (b) Factors affecting meal planning

Nutritional, Socio-cultural, Religious, Geographic, Economic Availability of time.

**Unit-2 Nutrition through the life cycle.**

(At different activity and Socio economic levels) requirements, nutritional problems, food selection.

- (a) Adulthood
- (b) Pregnancy
- (c) Lactation
- (d) Infancy

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### Unit-3 Principles of diet therapy

Pre-school

Adolescence

Old age

Modification of normal diet for therapeutic purposes, full diet, soft diet, Fluid diet, Bland diet.

Energy modification and Nutrition for weight management.

Identifying the over-weight and obese factors contributing to obesity, prevention and treatment, low energy diets.

### Unit-4 Etiology, symptoms & diet management of the following-

Underweight – etiology and assessment, high energy diet. Diet for Febrile conditions & surgical condition.

Nutritional Anemia

Fevers – Typhoid

Diarrhea, Constipation, Peptic ulcer, Jaundice, Viral Hepatitis, Cirrhosis.

### Unit-5 Diet in disease of the endocrine-

Pancreas – Diabetes mellitus – classification, symptoms, diagnosis, dietary case & nutritional, management of diabetes mellitus. Insulin therapy, oral hypoglycemic agents, special dietetic food, sweetness & sugar substitutes, diabetic coma, Juvenile diabetes.

Disease of the cardio vascular system –

Atherosclerosis Etiology & risk Factors.

Hypertension – Etiology, prevalence Nutritional management & prevention.

Renal diseases – Etiology, characteristic.

Symptoms & Dietary management of Glomerulonephritis Acute & Chronic.

### References :

1. Krause, M.V. and Mohan, L.K. 1986: Food, Nutrition and Diet Therapy, Alan R. Liss. Saunders Co., London.
2. Passmore, R. and Davidson, S. 1986: Human Nutrition and Dietetics, Livingstone Publishers.
3. Robinson, C.H., Laer, M.R. Chenoweth, W.L. Ganwick, A.E. 1986: Normal and Therapeutic Nutrition, MacMillan Publishing Company, New York.
4. Williams, S.R. 1989: Nutrition and Diet Therapy, 4<sup>th</sup> Ed., C.V. Mosby Co.
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**MA (Home Science)**  
**I Semester**  
**Paper III**  
**EXTENSION EDUCATION - I**

**Marks : 80**

**Theory:**

**Unit-1** 1. Concept of Education

- (a) Meaning of Extension
- (b) Origin of Extension
- 2. Extension Education Process
  - (a) Environment for learning
  - (b) Role of educator
  - (c) Role of the people participants.

**Unit-2** 1. Concept of adult / non-formal education

- (a) Meaning
- (b) Purpose
- 2. Communication process
- 3. Planning at different levels – National to Grassroots.

**Unit-3** 1. Programmes to enhance food production

- (a) National food production programmes.
- 2. Poverty alleviation efforts.
  - (a) Programmes for poverty alleviation for rural and urban areas.
  - (b) Current programmes for rural and urban poor.

**Unit-4 Programmes for women and children**

Women as target groups – specific measures for women and children such as DWCRA, ICDS, IMY. Current programmes for women as initiated and implemented by the different ministries and departments.

**Unit-5 Advertising Media**

Different media for advertising – print media, newspapers and periodicals.

Broadcast media – Television – Films.

Non-media advertising.

Outdoor advertisement – Hoardings, Posters, Black Board, Bulletin Boards, Electronic signs, Letter bins, Aerial methods.

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**MA (Home Science)**  
**I Semester**  
**Paper IV**  
**RESEARCH METHODOLOGY**

**Marks: 80**

**Unit-1**

1. 1. Science, scientific methods and approach
2. 2. Social research and survey: Meaning, definition, nature, scope, objects, types.  
Distinction between social survey and research.
3. 3. Pretesting and pilot survey.

**Unit-2**

1. 1. Fact, theory and concept.
2. 2. Hypothesis: Definition, sources, characteristics, importance, main difficulties in the formation of hypothesis, disadvantages.
3. 3. Sources of data: Primary and secondary sources.

**Unit-3**

1. 1. Methods or techniques of data collection.
  - a. a. Observation
  - b. b. Interview
2. 2. Schedule
3. 3. Questionnaire
4. 4. Case-study

**Unit-4**

1. 1. Sampling: Meaning, characteristics, advantages and disadvantages.  
Types : - Random sampling
  - a. a. Purposive sampling
  - b. b. Stratified sampling
  - c. c. Other sampling method
2. 2. Classification and tabulation of data

**Unit-5**

Analysis and interpretation of data.  
Preparation of the report.  
Diagrammatic presentation of data.

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**PRACTICAL**  
**(Food Science and Nutrition)**

**Marks: 100**

**Theory:**

1. To acquire skills in food preparation techniques
  2. To use appropriate methods of cooking for preparation of specific food products.
- 
1. Weights and Measures standard and household measures for raw and cooked food.
  2. Cereal and flour mixtures – basic preparations (15+3).
    - i. Boiled rice and rice pulao
    - ii. Chapati, puri, paratha
    - iii. Sandwiches
    - iv. Pastas
    - v. Pancakes, biscuits, cookies, cakes
  3. Pulses and legumes – using whole dehusked and sprouted
  4. Vegetables Preparation of Simple salads , Dry vegetables & Curries
  5. Planning and preparation of normal and therapeutic diet in relation to special nutrient requirements
    1. Infancy & Childhood
    2. Pregnancy & Lactation
    3. Constipation & Diarrhoea
    4. Under-weight & Overweight
    5. Peptic ulcer
    6. Jaundice, Viral Hepatitis, Cirrhosis
    7. Acute glomerulonephritis
    8. Chronic glomerulonephritis
    9. Diabetes mellitus
      - (i) With Insulin
      - (ii) Without Insulin
    10. Hypertension, Atherosclerosis

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## MA (Home Science)

### II Semester

#### Paper V

#### TEXTILE & CLOTHING

Marks : 80

#### Objectives:

1. To develop and understanding of different types at fibers, yarns and finishes.
2. To gain practical knowledge of dyeing, printing and weaving.
3. To develop the skills of making paper pattern for different types of garments.

#### Theory:

##### Unit-1

1. Classification of Textile fibers – Manufactures process, properties and uses of – Natural fibres – Cotton, Silk, Wool, Synthetic fibres – Polyester, Nylon, Acetate.
2. Types of yarns – Simple, Novelty, Textured yarn, Yarn formation – Mechanical and chemical spinning uses of yarns.

##### Unit-2

**Knitting** – Types of knits – Warp & weft knit advantages and disadvantages of knits and their uses.

**Non-woven** – Felts, Bonded fabric, their uses, Braiding.

##### Unit-3

1. Finishes – Purpose of finishes
2. General finishes – Scouring, Bleaching, Tentoring, Singeing and Sizing.
3. Special finishes – Mercerizing, special calendaring waterproof and water repellent fire proof wrinkle resistant, shrinkage control.

##### Unit-4

1. Dyeing – Classification of dyes – Natural and Synthetic.
2. Different types and their suitability to different fibre, direct, acid, basic mordant, Vat Sulphur, Reactive acetate, Azo dyes and pigment colors.
3. Different dyeing methods – Fiber dyeing, yarn dyeing and piece dyeing.

##### Unit-5 Principles of Clothing Construction

General principles of clothing construction. Drafting and making paper patterns.

Taking body measurements for different types of garments. Preparation of fabrics for garment making. Laying out of patterns, cutting and marking.

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**MA (Home Science)**

**II Semester**

**Paper VI**

**TEXTILE DESIGNING**

**Marks : 80**

**Theory:**

**Unit-1**

Experiments and principles of design: Meaning methods of creating importance.

Elements of principles of design as applied, to apparel designing – Harmony, balance proportion, Rhythm & emphasis.

Elements: Lines, shapes / forms.

Colour consideration: Definition, Dimensions, characteristics colour systems and colour schemes.

**Unit-2**

Classification & Process of designing – Structural

Decorative Realistic Abstract Stylized Geometric Traditional

Big & small design

**Unit-3 Fashion – Definition**

- Fashion trends in India & changes
- Theories
- Body measurements
- Tailoring tools and equipment's
- Methods of taking body measurements
- For different garments
- Importance

**Unit-4 Fashion Illustrations –**

- Pattern making techniques
- Flat pattern
- Drafting
- Draping

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- Disposals of fullness
- Plackets
- Frill and gather
- Pleats and tucks
- Darts
- Patchwork
- Seams and seam finishes

#### **Unit-5 Fundamentals of Embroidery –**

- Techniques, design colour, uses of different combination –threads;
- Embroidery stick –Types
- Types of thread, needle, used for different fabrics.
- Study of traditional Embroideries of India.
- Kasida of Kashmiri
  - o Kantha of Bengal
  - o Chichenkari of Lucknow
  - o Kutch & kathiawan
  - o Kasuti of Karnataka
  - o Phulkari of Punjab
  - o Gold & Silver (Zariwork)
  - o Appliqué work

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**MA (Home Science)**  
**II Semester**  
**Paper VII**  
**EXTENSION EDUCATION-II**

**Marks : 80**

**Objectives: To enable students to -**

1. To enable students understand the methods of teaching Home Science.
2. To acquaint the students about the role of extension – education in community development.
3. To create awareness about the role of NGO's in community development.
4. To create an awareness about the importance of public relations.
5. To understand the various programmes, favoring the wellbeing of the community.
6. To develop faith in the capacity of the people to take responsibility for their own development.
7. To understand the role of “leaders” in community development.

**Theory:**

**Unit-1**

1. Definition, Philosophy and objectives of Home – Science, Career opportunities in various branches of Home –Science.
2. Methods of teaching Home Science, Importance of Methods.
3. Selecting the methods and making the method effective. Role of Home Science in helping to solve the problems of the community.

**Unit-2**

1. Definition, scope, philosophy and objectives of extension education. Methods of teaching Extension – education, classification of the methods.
2. Role of the extension worker in community development. Role, function and contribution of Gram Sevika, Mahila Mandals, Youth Clubs, NGOs and other local agencies in Extension – Education.
3. Contribution of U.N. Agencies towards Extension – education – UNESCO, UNICEF, UNDP, ECOSOC, U.N. resolution1325.

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### Unit- 3 Public Relations

1. Need for public relations prospects, of advertisement, campaign and propaganda in effective communication.
2. Media for social changes: Role of media in social change. Development, communication planning, organization, administration and evaluation of development communication programmes.
3. New avenues for development communication, literacy, women and development, human rights, environment. Research and feedback.

### Unit- 4

1. Adult education its meaning and objectives. Various adult education programmes in India.
2. Population education: Definition causes and effect of population growth. Scope of Family planning services health aspect of family planning, National Family Welfare Programmes.
3. Social education: Its meaning and objectives. Social education programmes in India.

### Unit- 5 Leadership in Extension

1. Definition of leadership, need and importance, types of leadership.
2. Methods of identifying and selecting local leaders in extension work. Role and qualities of local leaders.
3. Leadership training.

### References:

1. Dr. S.V. Supe. An introduction to Extension –Education.
2. Reddy A. (1997). Extension education, Sri Lakshmi Press.Bapatla.
3. Education and communication for Development.
4. O.P. Dahama and D.P.IBhatnagar.
5. C.L. Adivi Reddy – Extension Education
6. Ray G.L. – Naya Prakash, Calcutta (1999).Extension
7. Communication and Management.

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**MA (Home Science)**  
**II Semester**  
**Paper VIII**  
**STATISTICS AND COMPUTER APPLICATION**

**Marks : 80**

**Theory:**

**Unit-1**

1. Statistics: Meaning, definition, scope, importance, characteristics, distrust of statistics.
2. Measurement of central tendency:
  - a. Mean
  - b. Median
  - c. Mode

**Unit-2 Graphic presentation of data: Importance, types**

- Histogram
- Frequency polygon
- Frequency curve
- Correlation: Definition, meaning and types.
- Methods of determining coefficient of correlation
  - o Product moment method
  - o Rank correlation

**Unit-3 Introduction to computers**

What is computer? Characteristics, components of computer system, block diagram of computer, CPU, I/O devices and memory (RAM and ROM), secondary storage devices (Hard disk, floppy disk, magnetic tape etc.)

Analysis of variance

- One way method: Direct and short-cut.

**Unit-4 Computer generations**

Classification of computer: Analog, digital, hybrid, general and special purpose computers.

Types of computer: Micro, mini, mainframe and super computer.

Chi-square test and goodness to fit.

Application of student t test for small samples.

**Unit-5 Working with MS-Word :**

1. Getting started with word, formatting text and paragraph. Applying text and language tools. Designing pages with columns and tables, using graphics.
2. Methods of dispersion and variation
  - a. Mean deviation
  - b. Standard deviation
  - c. Quartile deviation

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## PRACTICAL: (Textile & and Clothing)

Marks : 100

1. Preparation of paper pattern for all age groups
  - a. Creeping age
  - b. Preschools
  - c. For Children wear
  - d. For men's wear
  - e. For Ladies wear
2. Adoption of the basic block to various clothes & their stitching Saree – Blouses, Salwar, Chudidar Kameez, Petticoats, Frock.
3. Making samples of traditional embroideries of India (any five)
  - a. Kashida of Kashmir
  - b. Kantha of Bengal
  - c. Kasuti of Karnataka
  - d. Kutch Kathiawar
  - e. Phulkari of Punjab
  - f. Chikankari of Lucknow
  - g. Gold & Silver (Zariwork)
4. Free hand sketching of simple objects involving various shapes and forms.
5. Drawing designs for various textile articles by adopting principles of design.
6. Drawing and colouring a colour wheel.
7. Painting designs with different colour schemes.
8. Reducing & enlarging a design.
9. Creating various textures.
10. Identification of Textile Fibres
  - a. Visual, Microscopic, burning and chemical
11. Garment Construction
  - a. Drafting, cutting and stitching of simple garments, such as vest and bib. A- Line Dress and Knickers. Sun suit /romper.

### References:

1. Bane, A. 1974: Tailoring, MacgrawHill.
2. Bane, A. 1979: Flat pattern design, McgrawHill.
3. Brary Nathalie 1978: Dress Pattern Designing London, Crossby Lockwood & Staples.
4. Gillelle, D.A. Berte, B.: Figure Types and Size Ranges, Fairchild Publication.
5. Goublourn M. 1971: Introduction pattern cutting, Grading and Modelling, London, B.T. BatsfordLtd.
6. Goldsworthy 1980: Simple Dressmaking, Londown, Mills and BoonLtd.
7. Littman Conie 1977: Pattern making design, Litton Educational Publishing Inc.
8. Muka A. 1979: French Touch, Pittsburgh, Wolfson Publishing Co.,Inc.

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**M.A. (Home Science)**  
**III Semester**  
**Paper IX**  
**Human Development-I**

**Max Marks 80**

**Objective:-**

- To Make Students aware of Human Development.
- To enable students become aware of early childhood education.
- To make students aware of changes and problems of adolescents.
- To enable students understand the importance and use of different psychometric tests.
- To get acquainted with the process of counseling.

Theory

**Unit I-**

**The study of Human Development**

i. The Three domain

- Biosocial Development
- Cognitive Development
- Psychological Development.

ii. Methods of child study.

- Scientific method, Steps.
- Observation method—  
Theoretical perspective: Use of checklist, establishing reliability in observation, maintaining observation record, report writing and evolution.
- Interview method—
- Theoretical perspective, Development of different types of interview Protocols, analysis and coding of interview data.

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## Unit II-

- Questionnaire method–

Theoretical perspectives, development of different types of questionnaire protocols, analysis and coding of questionnaire data.

- Experimental method–

Theoretical perspectives, merits and demerits.

### **Case Study.**

Theoretical perspectives, development of different types of case study protocol, analysis and coding of data.

## Unit III

- iii. Psychological Testing –Nature and Uses of psychological tests function and origin Psychometric method.

- Scale for infant assessment
- The Wechsler battery of tests
- Children Apperception test
- Draw a man test

## Unit IV

- House tree person
- Raven's progressive Matrices
- Self Esteem Inventory
- Sex role inventory

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## Unit V

### i. Theories of personality

- a. Type approach – Hippocrates, Kreshmer, sheldon and Jung
- b. Trait approach -Cattel's
- c. Type and trait approach – Eyesenk's Theory
- d. Conclusion – Humanistic perspective and development Theory.

### ii. **Cognition** – Meaning of cognitive psychology.

Piaget's theory of cognitive development.

### iii. Contribution and short coming of theory

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**M.A. 3<sup>rd</sup> Semester (Home Science)**  
**Paper-X**  
**Human Development-II**

**Max. Marks-80**

**Unit-I**

**Early Childhood care and education ECCE.**

- i. Importance, need and scope of ECCE  
Objective of ECCE Type of preschools- play centers, day care, Montessori, kindergarten, Balwadi, anganwadi etc.
- ii. ECCE in India  
Pre Independence Period, Post Independence-  
Kothari commission, Contribution of five year plan to ECCE Yashpal committee, Maharashtra preschool centre Act.

**Unit II**

- i. Organization of preschool Centers.  
Concept of Organization and administration of early childhood centers, Building and equipment:-  
Location and site arrangement of rooms, different types and size of room, play ground storage facility, selection of different types of indoor and outdoor equipments.
- ii. Role and responsibilities of care giver/ teacher.  
Record and Report.  
Types – aim and purpose/need, general, characteristic, e.g. anecdotal, cumulative sample work, medical etc.

**Unit III**

**Childhood, creativity and counseling**

- i. Early Childhood –characteristics, Developmental task skills of early childhood, Emotions during early childhood, Socialization and social behavior, Happiness and Hazards during early childhood.
- ii Late childhood –characteristics, developmental tasks, skills of late childhood, hazards and happiness of late childhood, moral Development.  
Theory of Kohlberg – behavior during late childhood.

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## Unit IV

- i Definition and concept of creativity types and degree of creativity (everyday creativity and eminent creativity Domains Insight and problem solving as related to creativity. Approaches to the study of creativity mystical approach (divine gift)
- Psychology dynamical approach(Freud)
  - Psychometric approach (Guilford and Torrance)
  - Cognitive approach(Weisberg)
  - Social personality approach(Weisberg)
  - Social personality approach(Mackinnon)
  - Confluence approach (Gardner – enhancing creativity –Brain Storming problem solving, creative dynamics and visualization.)
- ii Counseling - History of counseling Meaning – Need, Objectives, Functions, Qualities and Skills of counselor, Distinction, between Guidance and counseling,

## Unit V Puberty and adolescence

- Puberty - Characteristics causes of Puberty, Primary and Secondary Sex Characteristics, Developmental, Tasks, problems during puberty, Happiness and interest, Vocational interest, self-discipline and family relationship, Adolescence – Characteristics, Developmental Tasks, physical changes, during Adolescence, sex interest and sex behavior and causes of family during adolescence, Hazards and Happiness.
- Mental health needs: Sense of identity autonomy, individualism, problems relate to physical appearance development and relationship. Problems related to sexuality.

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## Reference Books

1. Child Development by Elizabeth Hurlock
2. Developmental psychology by Elizabeth Hurlock
3. Nursery school by Katherina Road
4. Nursery in India by Pramila Barookh
5. The psychology of Adolescents – A.T. Jersild 7<sup>th</sup> Edition Prentic Hall

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## MA (Home Science) III Semester

### Theory: Unit-I Paper XI

#### Nutrition of Women and Children

#### Marks: 80

1. Role of women in national development.
2. Women in family and community:  
Demographic changes, menarche, marriage, fertility, morbidity, mortality, life expectancy, sex ration, ageing, widowhood.

#### Unit-II

##### Women and health:

1. Policies and programs for promoting maternal and child nutrition and health.
2. Concept of small family. Methods of family planning merits and demerits.

#### Unit-III

##### Importance of Maternal Nutrition

1. Importance of Nutrition prior to and during pregnancy – prerequisites for successful outcome. Effect of under nutrition on mother and child including pregnancy outcome and maternal and child health – short term and long term effect.
2. Nutritional requirements during pregnancy:  
Adolescent pregnancy, pregnancy and T.B., IUGR, gestational diabetes.

#### Unit-IV

##### 1. Lactation:

Development of mammary tissue and role of hormones.

Physiology and endocrinology of lactation – Synthesis of milk components – lactation, effect of breast feeding on maternal health

2. Human milk composition and factors effecting breast feeding. Human milk banking.
3. Management of Lactation:  
Prenatal breast feeding, skill education, Rooming in problems- sore nipples engorged breast, inverted breast.
4. Exclusive breastfeeding

#### Unit-V

##### 1. Infant physiology:

Pre-term and low birth weight infant – implication for feeding and management.

2. Feeding of infants and children and dietary management.
3. Malnutrition – Etiology and management.

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**MA (Home Science) III Semester**  
**Paper XII Health and Fitness**

**Marks: 80**

**Theory: Objective**

This course will prepare the students to –

- Understand the components of health and fitness and the role of nutrition.
- Make nutritional, dietary and physical activity recommendations to achieve fitness and well-being.
- Develop ability to evaluate fitness and well-being.

**Unit-I**

**1. Definition, components of fitness**

- a. Anatomical fitness
- b. Physiological fitness
- c. Psychological fitness

- Physiological fitness:

(a) Growth and development (b) Strength (c) Speed (d) Skill (e) Stamina or endurance, specific fitness, general fitness and health status.

2. Holistic approach to the management of fitness and health: Energy input and output, physical fitness and health inter-relationship.

**Unit-II**

- 1. Review of different energy systems for endurance and power activity:
  - a. Endurance: Definition, classification of endurance, factors effecting endurance.
  - b. Fuels and nutrients to support physical activity:
- 2. Nutrition in sports: Sports specific requirement.

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### Unit-III

1. Pre game and Post game meals. Assessment of different mutagenic acids commercial supplements.
2. Diets for persons with high energy requirement, stress.
3. Water electrolyte balance: Effect of dehydration.

### Unit-IV

1. Significance of physical fitness in the prevention and management of:  
i. Diabetes mellitus ii. Cardiovascular disorders iii Bone health and obesity
2. Nutrition and exercise regimes for pre and post natal fitness.

### Unit-V

1. A. Defining nutritional goals/guidelines appropriate to health and prevention and management of the chronic degenerative disorder-  
(a) Cardiovascular disorders (b) Diabetic mellitus  
B. Various dietary regimes for weight reduction.
2. Alternative systems for health and fitness like Ayurveda, yoga,

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**M.A. (Home Science)**  
**III Semester**  
**Practical (Human Development)**

**Max Marks 100**

1. Visits to various centers, which cater to the preschool stage e.g. Day care center, Balwadi, Anganwadi, Mobile Crèches.
2. Preparing a resource unit file on the basis of play way method/approach.
3. Preparing teaching material kit and presentation in mock setup.
4. Story and their techniques, types of puppets and mobiles? Art and craft portfolio, song booklet and low cost musical instruments. Readiness games and material picture tails and object talk related materials etc.
5. Tests of creativity Torrance test of creative thinking (TTCT) Bagyet Mehdi's Indian adaptation.
6. Use of Parne's 5 stage method creative problem solving.
7. Use of consensual assessment technique to rate the creative work of children and adults (stories, poems and art work)
8. Conducting parent teacher meetings.
9. Reports and resource files to be maintained by students.

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**M.A. (Home Science)**  
**IV Semester**  
**Paper XIII**  
**Resource Management -I**

**Max Marks 80**

**Objective:-To enable students to –**

1. Understand various concepts and principles of management and its functions.
2. Understand the significance of management in changing environment.
3. To develop the ability to use motion and time techniques.
4. To create awareness about resources.

**Theory**

**Unit -I**

1. Aspect of home management–
  - a. Concepts of home management.
  - b. Activities involved in home Management
  - c. Development of Managerial ability.
  - d. Methods of evaluating ability.
2. Decision Making
  - a. Steps of decision making
  - b. Modes of decision making –individual group, scientific, snap.
  - c. Techniques and tools for decision making
  - d. The role of decision making in home management
  - e. Stress and conflict during decision making.

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## Unit –II

### 1. Management as a system-

- a. Definition and elements of general system theory.
- b. Advantages and limitations of system approach.
- c. Comparison of linear and systems thinking.
- d. Application of Resource Management in families and institutions

### 2. Time Management–

- b. Nature of Time
- c. Time demands in different stages of family lifecycle.
- d. Leisure's.

### 3. Energy Management–

- a. Nature of Energy.
- b. Energy demands in different stages of family lifecycle
- c. Fatigue – (i) Physiological (ii) Psychological

## Unit –III

### 1 Money Management

- a. Definition, meaning and importance
- b. Role of woman in managing family income budgets.
- c. Techniques used in money management.
- d. Contribution of working woman in improving economic conditions.
- e. Family security.

### 2 Household equipments and ergonomics

- b. Trends in equipments available in market.
- c. Equipments in the Indian Homes. Rural and Urban families.
- d. Selection of households' equipments according to ergonomics.
- e. Ergonomics in Home – Anthropometric dimension of workers at work and at rest normal and maximum vertical and horizontal reaches.

### 3 Work Simplification

- a. Meaning and Importance of work simplification.
- b. Principles and techniques of work simplification.
- c. Wrong works Practices.

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## Unit –IV

### 1 Community Services/Resources:

- a. Definition, importance in daily life, local and National development.
- b. Reality and problems of community services.
- c. Role of home makers in management of these resources.

### 2 Resident Course:

- a. Concept and Importance of residence course.
- b. Values, Goals, Standards, and decision making in resident course.
- c. Organization of house.
- d. Rotation of duties.
- e. Evolution of managerial abilities

## Unit –V

### 1 Employment status of woman in India.

- a. Need of Self-employment.
- b. Agencies promoting self-employment to woman
- c. Function of Commercial Banks, Districts Industries Co-operative societies

### 2. Family Health Management.

- a. Contribution of public and private agencies in maintaining family health.
- b. Planning of preventive measures.
- c. Annual budget for family medical care.

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## References:

1. Management for Modern families – Gross and Crandall
2. Management in family living – Nickel and Dorsey
3. Motion and Time Study – Alph M.Barnes
4. Work Simplification \_ Gerold Nadler
5. Time and Motion study–Mundel
6. Money Management context & concepts R.E. Dean and F.M. Fire bough (Houghton Muffin Co-Bostan1975)
7. Modern Management Issues and Ideas –Davud R.Hampton.
8. Management a decision making approach – Young Stanley.
9. Ergonomics of Home –Francis and TaylonCo.
10. प्रगत गृह व्यवस्थपन – डॉ आशा निर्मलकर

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**M.A. (Home Science)**  
**IV Semester**  
**Paper XIV Resource Management -II**

**Max Marks 80**

**Objective:-To enable students to –**

To enable students –

1. To recognize the family needs in relation to housing responsibilities, housing and interiors.
2. To acquire basic knowledge of principles involved in residential houses and its interiors.
3. To provide knowledge of the principles of the principles and methods of creating attractive interiors.

**Theory**

**Unit –I**

**1. History of housing-**

- Concept of housing.
- Changes in housing need and standards.
- Housing values and goals at the present time.

**2. Housing in India as affected by trends in-**

- Population
- Economics Status.
- Occupation and family mobility.
- Social and cultural status.

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## Unit –II

### 1. Cost of house and finance for housing-

- Factors influencing house.
- Estimation of the cost of housing.
- Ways to control and economizing the cost of housing.
- Different public and private loan scheme for housing.

### 2. Concept of Vastu shastra in housing

- Historical background
- Placement of rooms
- Location of wall
- Placement of doors
- Placement of accessories

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## Unit –III

### 1. Landscaping

- Importance.
- Approaching, landscape design with an artistic touch space, line form texture, color balance rhythm scale and proportion.

### 2. Bonsai

- History
- Preparation of soil
- Selection of plants
- Potting and repotting
- Selection of containers
- Care

## Unit –IV

### 1. Furniture-

- An important component of interiors
- Modern trends-wrought iron, nu-wood, syntax, press –woods, cane and molded furniture.

### 2. Home Furnishing-

- Window Treatment – 1 draperies 2. curtains 3. roller shades 4. valences 5. Venetian blinds

### 3. Upholstery fabrics-

- Selection of fabrics
- Wall treatment – wall paper, paints, tiles.
- Accessories a. hanging b. relation of pictures to room other accessories.

## Unit –V

### 1. Environment Management-

- Fundamental principles of environment and natural resources management.
- Basic concept of ecology and its application in industrial ecology.

### 2. Role of International organizations in environment management.

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**M.A. (Home Science)**  
**IV Semester**  
**Paper XV Food Preservation**

**Max Marks 80**

**Theory**

**Unit I**

1. Food and It's Preservation
2. Home and Community level Including commercial operations.
3. Principles of food preservation.
4. Causes of spoilage of food.

**Unit II**

1. Fresh food storage
2. Principles Plant product.
3. Storage, animal product.
4. Storage. Effect of Storage.
5. Condition on Quality
6. Canning – Principles and methodology influence of caning on food quality storage of canned foods.

**Unit III      Pasteurization**

1. Effect of food quality
2. Storage of pasteurized food.
3. Drying & Dehydration

Methods Used and effect on food quality. Types of driers. Storage and deterioration of dehydrated food products.

**Unit IV      Use of low temperature**

Refrigeration and freezing methods, principles and application, preparation of foods for freezing influence on food components and structure self-life of frozen foods.

Fermentation

Pickles, Chutneys, ketchups sauces, fermentation- types, products and method uses

Establishment of a small scale –industry/cottage industry.

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## Unit V      **Chemical Preservatives**

Preparation of Fruit, Juices squashes, Fruit Syrups, Cordials, Jam , Jelly.

### **High Acid & High Sugar Products**

Common defects, Preservation of crystallized and glazed fruits

### **Nutritional Implications of food processing**

Causes for loss of vitamins and minerals. Enrichment. Restoration and fortification.

### **Reference:-**

1. Oser. B.L. 1965: 14 Ed Hawk's Physiological Chemistry, MC Graw Hill Book Co.
2. William S.: 16 The Ed JAOAC Official Methods of Analysis Part I to XI, Manak Bhawan New Delhi.
3. West E.S. Todd W.R. Mason, H.S. and Van Barageen J.T. 1974 4<sup>th</sup> Ed Text book of Biochemistry, Amerind publishing Co. Pvt. Ltd.
4. Devlin, T.M. 1986: 2<sup>nd</sup> Ed. Textbook of Biochemistry with clinical Correlations John Wiley and sons.
5. Murray R.K. Granner, D.K. Mayes P.A. and Rodwell V.W. 1993 : 23<sup>rd</sup> Ed. Harper's Biochemistry Large Medical Book.

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**M.A. (Home Science)**  
**IV Semester**  
**Paper XVI Entrepreneurship**

**Max Marks 80**

**Theory**

**Unit I**

1. Meaning and definition of Entrepreneur and Entrepreneurships.
2. Qualities of a good Entrepreneur.
3. Entrepreneur and his desire for Achievements

**Unit II**

**1. Different Forms of Business/Service Establishment:**

- a. Franchising
  - b. excusing agents
  - c. Distributors
  - d. Whole sellers
  - e. Retailers
  - f. Broker/commission agent
2. Information of different activities required for entrepreneurship.
  3. Capacity of problem solving in entrepreneurs and managers

**Unit III**

1. Conducting Market surveys and collection of required data
2. How to become successful salesperson marketing skills.
3. Identification of business opportunities.

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## Unit IV

### 1. Soft Skill development.

- a. Communication
- b. Information seeking

1. Preparation of Preliminary Project Report(PPR)
2. General Insurance a brief knowledge

## Unit V

1. Ethics of Business
2. Accounting : introduction procedure
3. Working Capital / Management of cash
4. Calculation of cost of products & Price fixation

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**M.A. (Home Science)**  
**Practical**  
**(Resource Management and Entrepreneurship)**

**Max Marks 100**

**Section A**

1. Designing of Terrace Garden.
2. Designing of partly outdoor & Indoor Landscaping.
3. Bonsai.
4. Drawing house plan for various income groups.
5. Drawing sketching of interior decorative aspect like –interior schemes of room.
6. Study of building materials.
7. Preparation of art object.
8. Floor decoration – Alpana, Rangoli.
9. Flower arrangement.

**Section B**

1. Preparation of preliminary Project Report.
2. Visit Project Report of Small scale industries.
3. Conduction of Market survey

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# **DURG VISHWAVIDYALAYA, DURG (C.G.)**

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## **SCHEME OF EXAMINATION & SYLLABUS of M.Com. Semester Exam UNDER**

**FACULTY OF COMMERCE  
Session 2017-19**

**(Approved by Board of Studies)  
Effective from July 2017**

एम.कॉम. सेमेस्टर परीक्षा  
पाठ्यक्रम (सत्र 2017-18 से लागू)

M.Com. I<sup>st</sup> Semester

प्रश्न	प्रश्न पत्र का नाम	पूर्णांक	पेपर
प्रश्नपत्र I Paper I	प्रबंधकीय अर्थशास्त्र Managerial Economics	80 + 20	101
प्रश्नपत्र II Paper II	वृहत (उच्चतर) लेखांकन Advanced Accounting	80 + 20	102
प्रश्नपत्र III Paper III	आयकर विधान एवं लेखे (Income Tax Law and Accounts)	80 + 20	103
प्रश्नपत्र IV Paper IV	सांख्यिकीय विश्लेषण Statistical Analysis	80 + 20	104
प्रश्नपत्र V Paper V	निगमित विधि संरचना Corporate Legal Framework	80 + 20	105

M.Com. II<sup>nd</sup> Semester

प्रश्न	प्रश्न पत्र का नाम	पूर्णांक	पेपर
प्रश्नपत्र VI Paper VI	व्यवसायिक अर्थशास्त्र Business Economics	80+20	201
प्रश्नपत्र VII Paper VII	विशिष्टकृत लेखांकन Specialized Accounting	80+20	202
प्रश्नपत्र VIII Paper VIII	कर नियोजन एवं प्रबन्ध (Tax Planning and Management)	80+20	203
प्रश्नपत्र IX Paper IX	उच्चतर सांख्यिकी Advanced Statistics	80 + 20	204
प्रश्नपत्र X Paper X	व्यावसायिक सन्नियम Business Laws	80 + 20	205

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M.Com. I<sup>st</sup> Semester

PAPER-I  
MANAGERIAL ECONOMICS

M.M. 80+20

OBJECTIVE:

This course develops managerial, perspective to economic fundamentals as aids to decision making under given environmental constraints.

COURSE INPUTS:

- UNIT-1 Nature and Scope of Managerial, Economics: Objective of a firm; Economics theory and managerial theory; Managerial economist's role and responsibilities.
- UNIT-2 Fundamental economic concepts-incremental principle, opportunity cost principle, discounting principle. equi-marginal principle.
- UNIT-3 Demand Analysis: Individual and Market demand functions Law of demand; determinants of demand; Elasticity of demand-its meaning and importance, Price elasticity; income elasticity and cross elasticity; Using elasticity 'in managerial decisions.
- UNIT-4 Theory of consumer Choice: Cardinal utility approach, indifference approach, revealed preference and theory of consumer choice under risk; Demand estimation for major consumer durable and non-durable products; Demand forecasting tech. technique.
- UNIT-5 Production Theory: Production function-production with one and two variable inputs, Stages of production; Economics of scale; Estimation of production function.

PAPER - II  
ADVANCED ACCOUNTING

M.M. 80+20

OBJECTIVE:

The objective of this course is to expose students to accounting issues and practices such as maintenance of company accounts and handling' accounting adjustments.

COURSE INPTS:

- UNIT-1 Accounting for issue, Forfeited and redemption of shares and debentures.
- UNIT-2 Final accounts and financial statements of companies.
- UNIT-3 Accounting issues relative to amalgamation and reconstruction of companies.
- UNIT-4 Accounting for holding and subsidiary companies.
- UNIT-5 Accounts relating to Liquidation of companies.

REFERENCES.

Beams, F.A. : Advanced Accounting, Prentice Hall, ,New Jersey., Dearden, J. and S.K. Bhattacharya: Accounting for Management, Vikas Publishing House, New Delhi.

Engler, C.L.A Bernstein. and K.R. Lambert: Advanced Accounting, with Chicago. Fischer, P.M.,W.J. Taylor and J.A. Leer: Advanced Accounting, South-Western, Ohio. Gupta. R.L.: Advanced Financial Accounting, S.Chand & Co., New Delhi.

Keiso D.E. and J.J. Weygand: Intermediate Accounting, John Wiley and Sons, NY.

Maheshwari, S.N.: Advanced Accountancy- Vol.II Vikash Publishing House, New Delhi

Monga, J.R. : Advanced Financial Accounting, Mayoor Paperbacks, Noida Narayanaswamy, R: Financial Accounting: A Managerial Perspective, Prentice Hall of India, Delhi.

Neigs, R.F. : Financial Accounting. Tata McGraw Hill, New Delhi.

Shukla, M.G. 'and T.S.Grewal : Advanced Accou'ntancy, Sultan Chand & Co. New Delhi.

Warren, C.S. and P.E. Fess: Principles of Financial and Managerial Accounting, South Western, Ohio.

RECOMMENDED BOOKS: .

- 1 Plekles and Duakerley : Accountancy
- 2 Wilson: Company Accounts



- 3 Diskson: Accountancy
- 4 J.R. Batlboi : Advanced Accounting
- 5 R.R.Gupta: Advanced Accounting
- 6 S.M. Shukla : Advanced Accounting
- 7 Shukla and Grewal: Advanced Accounting
- 8 H Chakravarty : Advanced Accounts
- 9 Dr.Shukla Avam Agrawal: Advanced Accountancy
- 10 Dr.S.S. Gupta: Advanced Accounts
- 11 Dr.Karim,Dr.Khanuja & Pro.Mehata : Advanced Accounting
- 12 डॉ. करीम, डॉ. खनूजा एवं प्रो.मेहता : वृहत लेखाकर्म
- 13 जे. के.अग्रवाल तथा आर.के.अग्रवाल : उच्च वित्तीय एवं कम्पनी लेखांकन
- 14 आर.के.गुप्ता : उन्नत लेखांकन
- 15 Basu Das : Advanced Accounting

**M. Com - 1<sup>st</sup> Semester**

**आयकर विधान एवं लेखे (प्रश्नपत्र & III)**

**Income Tax Law and Accounts (Paper - Third)**

**M.M.: 80**

**OBJECTIVE**

The objective of this course is to help student understand and conceptual framework of Income tax.

<b>Unit - I</b>	<b>Law relating to Income tax :</b> Brief study of the main provisions of the Indian Income Tax Act. Important definitions. Income exempted from tax, Residence and Tax liability.
<b>Unit - II</b>	<b>Calculation of taxable income under the head :</b> Salary and House property.
<b>Unit - III</b>	<b>Depreciation and Development allowance, Calculation of taxable Income under the head:</b> Business and Profession, capital gains, income from other sources.
<b>Unit - IV</b>	Set off and carry forward of losses, Deduction from gross total Income Calculation of taxable Income and tax of an individual, and Hindu undivided Families.
<b>Unit - V</b>	Appeals & Revisions Reference of High Court and Supreme court, offences & penalties, Income tax authorities.

### M. Com – 1<sup>st</sup> Semester

(Compulsory) Paper – IV (Paper Code.....)

STATISTICAL ANALYSIS

M.M.: 80

#### OBJECTIVE

The Objective of this course is to help student learn the application of statistical tools and techniques for decision making.

- UNIT-1 Statistics - Definitions, Characteristics, Scope and Nature, Functions, limitations, Distrust and misuse importance & Statistical Investigations., Classification & Tabulation,
- UNIT-2 Data Sources: Primary and Secondary, Primary data collection techniques, Schedule, Questionnaire and interview & Sources' of Secondary data.
- UNIT-3 Dispersion, Co-efficient of variance and skewness, correlation - Karl- Pearsons and spearman's ranking method and Regression analysis, Two variables case.
- UNIT-4 Probability Theory: Probability classical, relative and subjective probability, Addition and multiplication probability models - Conditional probability and Baye's Theorem.
- UNIT-5 Probability Distributions - Bionomial, poisson and Normal Distributions, Their characteristics and applications.

### M. Com – 1<sup>st</sup> Semester

UNDER MANAGEMENT BOARD

(Compulsory) Paper – V (Paper Code\_\_\_\_\_)

CORPORATE LEGAL FRAMEWORK

M.M.: 80

#### OBJECTIVE

The Objective of this course is provide knowledge of relevant provisions of various laws influencing business operations.

- UNIT-1 The Companies Act, 1956 (Relevant Provisions): Definition, types of companies
- Memorandum of association; Articles of association; Prospectus; Share capital and membership.
- UNIT-2 Meetings and resolutions - Company management; Managerial remuneration; Winding up and dissolution of companies.
- UNIT-3 The Negotiable Instruments Act, 1881 - Definition, types of negotiable instruments; Negotiation; Holder and holder in due course; payment in due course;
- UNIT-4 Endorsement and crossing of cheque; Presentation of negotiable instruments.
- UNIT-5 Legal Environment for Security Markets: SEBI Act. 1992-organisation and objectives of SEBI

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M.Com. II<sup>nd</sup> Semester

PAPER - VI  
BUSINESS ECONOMICS

M.M. 80+20

OBJECTIVE -

This course develops managerial perspective to economic fundamentals' as aids to decision making under given environmental constraints.

- UNIT-1 Cost Theory and Estimation, economic value analysis, Short and long run cost functions- their nature, shape and inter-relationship; Law of variable proportions; -Law of returns to scale.
- UNIT-2 Price Determination under Different Market Conditions: Characteristics of different market structures; Price determination and firm's equilibrium in short-run and long-run under perfect competition, monopolistic competition, oligopoly and monopoly,
- UNIT-3 Pricing Practices: Methods of price determination in practice, pricing of multiple products; price discrimination; International price discrimination and dumping; Transfer pricing.
- UNIT-4 Business Cycles: Nature and phases of the business cycle; Theories of business cycles- psychological, profit, monetary, innovation, cobweb, Samuelson and Hicks theories.
- UNIT-5 Inflation: Definition, Characteristics and types; Inflation in terms of demand- pull and cost-push factors; Effects of inflation.

PAPER - VII  
SPECIALISED ACCOUNTING

M.M. 80+20

OBJECTIVE.

The objective of this course -is to expose students to accounting issues and practices such as maintenance of company accounts and handling accounting adjustments.

- UNIT-1 Accounts of General Insurance Companies.
- UNIT-2 Accounts of Banking Companies.
- UNIT-3 Accounts of Public Utility concerns: Double Accounts System.
- UNIT-4 Royalty accounts.
- UNIT-5 Investment accounts.



**M. Com – 2<sup>nd</sup> Semester**

कर नियोजन एवं प्रबन्ध (प्रश्नपत्र – VIII)

**TAX PLANNING AND MANAGEMENT (Paper – VIII)**

**M.M. 0: 80**

**OBJECTIVE –**

This course aims at making students conversant with the concept of corporate tax planning and Indian tax laws, as also their implications for corporate management.

<b>Unit – I</b>	<b>Calculation of taxable Income and tax of Firm and Companies.</b>
<b>Unit – II</b>	Return of Income, Provisional Regular, Expert and emergency assessment, Re opening of assessment.
<b>Unit – III</b>	Concept of tax Planning ; Tax avoidance and tax evasions ; Tax planning with reference of location, nature and form of organization of new
<b>Unit – IV</b>	Tax planning to capital structure, decision dividend policy ; Inter corporate dividends and bonus shares.
<b>Unit – V</b>	Preparation of income tax returns, Computation of Income tax, Tax deduction at source; Advance payment of tax.

(Compulsory) Paper - IX (Paper Code \_\_\_\_\_)  
ADVANCE STATISTICS

M.M. : 80

OBJECTIVE

The Objective of this course is to help student learn the application of statistical tools and techniques for decision making.

UNIT-1 Statistical Decision Theory: Decision environment, Expected profit under uncertainty and assigning probabilities and utility theory.

UNIT-2 Statistical Estimations. and Testory: Point and interval estimation of population mean, proportion and variance Statistical Testing - Hypothesis and Errors, Sample size - Large and Small Samplingtest Z tests, T Tests & F Tests.

UNIT-3 Association of Attributes : Two Attributes, consistency of data, measurement of Association of Attributes - Percentage method, Co-efficient of Association, Comparison of Actual and (you Ie method) Expected frequency's & Issusery Association. .

UNIT-4 Statistical Quality Control: Causes of Variations in quality characteristics, Quality Control charts-purpose and logic, Process under control and out of control, warning limits, control charts for attributes-fraction defectives and number of defects, Acceptance sampling.

UNIT-5 Interpolation and Extrapolation - Prabolic Bionomial, Newton and long rages method.

(Compulsory) Paper - X (Paper Code .....)  
Business Laws

M.M. 80

OBJECTIVE

The Objective of this course is providing knowledge of relevant provisions of various laws influencing business operations.

UNIT-1 SEBI Act-1992: Organization and objectives of SEBI, Functions and Role of SEBI Rights and Power of SEBI.

UNIT-2 MRTP Act 1969: Monopolistic Trade Practice Meaning, essentials, Restrictive Trade Practices - Meaning, Unfair trade practice, MRTP commission offences and Penalties.

UNIT-3 Consumer Protection Act 1986: Needs of Act, Rights of consumers, Objectives of Act., Grievance redressal Machinery, District Forum, State Commission, National Commis-sion.

UNIT-4 FEMA Act 1999: Objectives; Regulation and Management of FEMA, Penalties Appeal.

UNIT-5 W.T.O.: Brief History of WTO, Objectives and Functions, Organisation, W.T.O. and India, Regional groupings, anti-dumping duties and other NTBs, Doha declaration, Dispute settlement system, TRIP, TRIMS and GATS.

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M. Com. III<sup>rd</sup> Semester (Compulsory Papers)

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper - I प्रश्नपत्र - I	प्रबन्ध की अवधारणा (Management Concept)	80+20	301
Paper - II प्रश्नपत्र - II	संगठनात्मक व्यवहार (Organisational Behaviour)	80+20	302
Paper - III प्रश्नपत्र - III	उच्चतर लागत लेखांकन (Advance Cost Accounting)	80+20	303
Paper - IV प्रश्नपत्र - IV	प्रबंधकीय लेखांकन (Management Accounting)	80+20	304
Paper - V प्रश्नपत्र - V	प्रबंधकीय निर्णय के लिए लेखांकन (Accounting for managerial decision)	80+20	305



**M. Com. IV<sup>th</sup> Semester**

Special attention to the Students. Students are required to select any one Specialization out of four suggested below.

**Optional - Specialization**

Optional Group - (A) Marketing

Optional Group - (B) Management

Optional Group - (C) Banking and Insurance

Optional Group - (D) Taxation and  
Accounting

**Optional Group - (A) विपणन (Marketing)**

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper - A I प्रश्न पत्र- A I	विपणन के सिद्धान्त (Principle of Marketing)	80+20	401
Paper - A II प्रश्न पत्र - A II	विज्ञापन एवं विक्रय प्रबन्ध (Advertising & Sales Management)	80+20	402
Paper - A III प्रश्न पत्र- A III	विपणन अनुसन्धान (Marketing Research)	80+20	403
Paper - A IV प्रश्न पत्र -A IV	अन्तर्राष्ट्रीय विपणन (International Marketing)	80+20	404



**Optional Group – (B) प्रबन्ध (Management)**

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper – B I प्रश्न पत्र – B I	वित्तीय प्रबन्ध (Financial Management)	80+20	411
Paper – B II प्रश्न पत्र – B II	कार्मिक प्रबन्ध (Personnel Management)	80+20	412
Paper – B III प्रश्न पत्र– B III	उत्पादन प्रबन्ध (Production Management)	80+20	413
Paper – B IV प्रश्न पत्र– B IV	व्यूहरचना प्रबन्ध (Strategic Management)	80+20	414

**Optional Group – (C) बैंकिंग एवं बीमा (Banking and Insurance)**

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper – C I प्रश्न पत्र– C I	बैंकिंग व्यवहार (Banking Practices)	80+20	421
Paper – C II प्रश्न पत्र– C II	भारत में बैंकिंग संस्थाएँ (Banking Institution in India)	80+20	422
Paper – C III प्रश्न पत्र– C III	जीवन बीमा (Life Insurance)	80+20	423
Paper – C IV प्रश्न पत्र– C IV	सामान्य बीमा (General Insurance)	80+20	425

**Optional Group – (D) करारोपण एवं लेखांकन (Taxation and Accounting)**

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper – D I प्रश्न पत्र— D I	भारत में प्रत्यक्ष कर (Direct Tax in India)	80+20	431
Paper – D II प्रश्न पत्र— D II	अप्रत्यक्ष कर (Indirect Tax)	80+20	432
Paper – D III प्रश्न पत्र— D III	सेवा के क्षेत्र में लेखांकन (Accounting in Service Sector)	80+20	433
Paper – D IV प्रश्न पत्र— D IV	लेखांकन पद्धतियाँ (Accounting Methods)	80+20	434

महत्वपूर्ण नोट :

1. सत्र 2014—15 से एम. कॉम. प्रथम, द्वितीय एवं तृतीय सेमेस्टर में सभी प्रश्न—पत्र अनिवार्य होंगे। उक्त परीक्षा में वैकल्पिक प्रश्न—पत्र चयन की व्यवस्था नहीं होगी।
2. एम. कॉम. चतुर्थ सेमेस्टर में विशिष्टीकरण समूह (A), (B), (C) या (D) में से किसी भी एक वैकल्पिक समूह का चयन कर उस समूह के सभी चार प्रश्न—पत्र अनिवार्य रूप से लेने होंगे।
3. एम. कॉम. चतुर्थ सेमेस्टर में उपरोक्त विशिष्टीकरण समूह के अतिरिक्त 50 अंक की मौखिक परीक्षा तथा 50 अंक का परियोजना प्रतिवेदन(अधिकतम 50 पृष्ठों का) तैयार करना अनिवार्य होगा। यह प्रतिवेदन वाणिज्य या प्रबन्ध विषय से सम्बन्धित होगा।
4. सभी प्रश्न—पत्रों में लिखित परीक्षा 80 अंकों की तथा 20 अंकों की आन्तरिक मूल्यांकन परीक्षा होगी। आन्तरिक मूल्यांकन के अंक परीक्षार्थियों की उपस्थिति, सेमीनार, शोध एवं शैक्षणिक कार्य में भागिता, इकाईवार मूल्यांकन परीक्षा आदि के आधार पर प्रदान किये जायेंगे।
5. आन्तरिक परीक्षा एवं बाह्य परीक्षा में प्रश्नपत्रवार न्यूनतम उत्तीर्णांक 20: होगा। जो अध्यादेश क्रमांक 170 के प्रावधानों के अनुसार बंधनकारी होगा।

**M.Com. Third Semester (Compulsory Paper)**

एम. कॉम. तृतीय सेमेस्टर – अनिवार्य प्रश्नपत्र

प्रबन्ध की अवधारणा (प्रश्नपत्र प्रथम)

**MANAGEMENT CONCEPT (Paper –First)**

**M.M. : 80**

**OBJECTIVE -**

The Objective of this course is to help student understand and conceptual framework of management and organizational behaviour .

<b>Unit – I</b>	<b>Schools of Management Thought</b> : Scientific, process, human behaviour and social system school; Decision theory school; Quantitative and system school; Contingency theory of management; Functions of a manager.
<b>Unit – II</b>	<b>Managerial Functions</b> : Planning - concept, significance, types; Organizing - concept, principles of authority, theories, types of organizations, authority, responsibility, power, delegation, decentralization;
<b>Unit – III</b>	<b>Staffing; Directing; Coordinating; Control</b> - nature, process, and techniques.
<b>Unit – IV</b>	<b>Motivation</b> : Process of motivation; Theories of motivation - need hierarchy theory, theory X and theory Y, two factor theory, Alderfer's ERG theory, McClelland's learned need theory, Victor Vroom's expectancy theory, Stacy Adams equity theory.
<b>Unit – V</b>	<b>Group Dynamics and Team Development</b> : Group dynamics - Definition and importance, types of groups, group formation, group development, group composition, group performance factors; Principle-centered approach to team development.



**ORGANIZATIONAL BEHAVIOUR (Paper – Second)**

**M.M. : 80**

**OBJECTIVE -**

The Objective of this course is to help student understand and conceptual framework of management and organizational behavior.

<b>Unit – I</b>	<b>Organizational Behaviour</b> : concept and significance; Relationship between management and organizational behaviour; Emergence and ethical perspective; Attitudes; Perception; Learning; Personality; Transactional analysis.
<b>Unit – II</b>	<b>Leadership</b> : Concept; Leadership styles; Theories - trait theory, behavioural theory, Fielder's contingency theory; Harsey and Blanchard's situational theory; Managerial grid; Likert's four systems of leadership.
<b>Unit – III</b>	<b>Organizational Conflict</b> : Dynamics and management; Sources, patterns, levels, and types of conflict; Traditional and modern approaches to conflict; Functional and difunctional organizational conflicts; Resolution of conflict.
<b>Unit – IV</b>	<b>Interpersonal and Organizational Communication</b> : Concept of two-way communication; Communication process; Barriers to effective communication; <b>Types of organizational communication</b> ; Improving communication; Transactional analysis in communication.
<b>Unit – V</b>	<b>Organizational Development</b> : Concept; Need for change, resistance to change; Theories of planned change; Organizational diagnosis; Organizational Development intervention.

**ADVANCED COST ACCOUNTING (Paper – Third)****M.M.: 80****OBJECTIVE -**

This course exposes the students to the basic concepts and the tools used in cost accounting.

<b>Unit – I</b>	Introduction – Cost Analysis, concepts and classification, Materials control – Techniques of Materials control.
<b>Unit – II</b>	Labour cost – Computation and control, Overheads – Accounting and Control.
<b>Unit – III</b>	Job, Batch, Contract Costing and operating costing.
<b>Unit – IV</b>	Process Costing, Joint products & By – products costing. Uniform costing and Estimate costing.
<b>Unit – V</b>	Budgetary control – Importance of budgets in accounting. Nature of budgetary control, Organization for budgetary control preparation zero base budgeting, performance budgeting. Cash Budget, Production and sales Budget.

**Paper – IV****प्रबंधकीय लेखांकन (Management Accountin)****OBJECTIVE**

The objective of this course is to acquaint student with the accounting concepts, tools and techniques for managerial decisions.

**COURSE INPUTS-**

- UNIT-1 Introduction of Accounting: Management accounting as a area accounting; Objectives, nature and scope of management accounting, techniques of management accounting, difference between financial accounting, cost accounting and management accounting, Management accounting and managerial decisions; Management accountant's position, role and responsibilities.
- UNIT-2 Accounting Plan and Responsibility Centers: Meaning and significance of responsibility accounting; Responsibility centers-cost centre, profit centre and investment centre, Problems in transfer pricing, Objectives and determinates of responsibility centers.
- UNIT-3 Budgeting.: Definition of Budget; Essentials of budgeting; Types of budgets functional, master etc. .Fixed and' flexible budget
- UNIT-4 Standard Costing and Variance Analysis:, Standard costing as a control technique; Setting of standards and their revision; Variance analysis-meaning and importance; ; Kinds of variances and their uses-material, labour and overhead variances; Disposal: of variances; Relevance of variance analysis to budgeting and standard costing.

UNIT-5 Marginal Costing: Concept of marginal cost; Marginal costing and absorption, costing,  
Marginal costing versus direct, costing;

REFERENCE

- Anthony, Robert: Management Accounting, Tarapore-wala, Mumbai. Barfield, Jessie, Ceily A. Raiborn and Michael R. Kenney: Cost Accounting: Traditions and Innovations, South-Western College Publishing, Cincinnati, Ohio. Decoster, Don T. and Elden L. Schafe : Management Accounting: A Decision Emphasis, John Wiley and Sons Inc., New York.
- Garrison, Ray H. and Eric W. Noreen: Management Accounting, Richard D. Irwin, Chicago.
- Hansen, Don R. and Maryanne M. Moreen: Management Accounting, South-Western College Publishing, Cincinnati, Ohio.
- Horngran, C.T., Gary L. Sundem and William O. Stratton: Introduction to Management Accounting, Prentice Hall, Delhi.
- Horngran, Charles T., George Foster and Srikant M. Dalor: Cost Accounting: A Managerial Emphasis, Prentice Hall, Delhi.
- Lall, B.M. and I.C. Jain: Cost Accounting: Principles and Practice, Prentice Hall, Delhi.
- Pandey, I.M.: Management Accounting, Vani Publication, Delhi.
- Welsch Glenn A., Ronald W. Hilton and Paul N. Gordon: Budgeting, Profit Planning and Control, Prentice Hall, Delhi

BOOKS RECOMMENDED:

1. Anthony Robert N. : Management Accounting
2. Gillet: Management and the account
3. Wills more : Business, Business Budget and Budgetary Control
4. Rose U. Fahri : Higher Management Control
5. Guthmann H.G. : Analysis of financial Statement
6. Smith and Ashburn: Financial and Administrative Accountancy
7. Pinkless and Duakaraley : Accountancy
8. Manmohan A: Goyal: Management Accounting
9. जे.के.अग्रवाल, आर.के.अग्रवाल : प्रबंधकी लेखांकन
10. ए.पी.गुप्ता : प्रबंधकीय लेखांकन
11. एस.एन.माहेश्वरी : प्रबंध लेखांकन
12. के.जी.गुप्ता : प्रबंधकीय लेखांकन
13. एम.आर.अग्रवाल : प्रबंधकीय लेखांकन
14. पी.मिश्रा : प्रबंध लेखांकन
15. डॉ.बी.पी.अग्रवाल, डॉ.मेहता : प्रबंधकीय लेखाविधि



**M. Com – 3rd Semester**

**Paper – V**

**प्रबंधकीय निर्णय के लिए लेखांकन (Accounting for managerial decisions)**

**OBJECTIVE**

The objective of this course is to acquaint student with the accounting concepts, tools and techniques for managerial decisions.

**COURSE INPUTS-**

- UNIT-1 Break-even-analysis; Assumptions and practical applications of break-even-analysis; cost volume profit analysis, Decisions regarding sales-mix, make or buy decisions and discontinuation of a product line etc.
- UNIT-2 Analyzing financial Statements: Method, objects and ratio analysis.
- UNIT-3 Cash flow analysis and Fund flow analysis.
- UNIT-4 Contemporary Issues in Management Accounting: Value chain analysis; Activity bases costing, Quality costing, Target and life cycle costing.
- UNIT-5 Reporting to Management : Objectives of reporting, reporting needs at different managerial levels; Types of ,reports," modes of reporting; reporting at different levels of management .

**REFERENCE :**

- Anthony, Robert: Management Accounting, Tarapore-wala, Mumbai. Barfield, Jessie,. Ceily A. Raiborn and Michael R. Kenney: Cost Accounting: Traditions and Innovations, South-Western College Publishing, Cincinnati, Ohio. Decoster, Don T. and Elden L. Schafe : Management Accounting: A Decision Emphasis, John Wiley and Sons Inc., New York. Garrison, Ray H. and Eric W. Noreen: Management Accounting, Richard D. Irwin, Chicago. Hansen, Don R. and Maryanne M. Moreen: Management Accounting, South-Western College Publishing, Cincinnati, Ohio.
- Horngran, C.T., Gary L. Sundem and William O. Stratton: Introduction to Management Accounting; Prentice Hall, Delhi.
- Horngren, Charles T., George Foster and Srikanth M. Dalior : Cost Accounting: A Managerial Emphasis, Prentice Hall, Delhi. Lall, B.M. and I.C.Jain : Cost Accounting: Principles and Practice, Prentice Hall, Delhi. Pandey I.M. : Management Accounting, Vani Publication, Delhi.
- Welsch Glenn A., Ronald W. Hilton and Paul N. Gordon: Budgeting, Profit Planning and Control, Prentice Hall, Delhi:

**BOOKS RECOMMENDED:**

1. Anthony Robert N. : Management Accounting
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3. Willsmore: Business, Business Budget and Budgetary Control
4. Rose U. Fahri : Higher Management Control
5. Guthmann H.G. : Analysis of financial Statement
6. Smith and Ashburn: Financial and Administrative Accountancy
7. Pinkless and Duakaraley : Accountancy.
8. Manmohan A. Goyal: Management Accounting
9. जे.के.अग्रवाल, आर.के.अग्रवाल : प्रबंधकीय लेखांकन
10. ए.पी.गुप्ता : प्रबंधकीय लेखांकन
11. एस.एन.माहेष्वरी : प्रबंध लेखांकन
12. के.जी.गुप्ता : प्रबंधकीय लेखांकन
13. एम.आर.अग्रवाल : प्रबंधकीय लेखांकन
14. पी.मिश्रा : प्रबंध लेखांकन
15. डॉ.बी.पी.अग्रवाल : डॉ.मेहता : प्रबंधकीय लेखाविधि

एम.कॉम. चतुर्थ सेमेस्टर – (M.Com. Fourth Semester)

विशिष्टीकरण: (A) विपणन

**Specialization: (A) Marketing**

(1) विपणन के सिद्धान्त (प्रश्नपत्र – रु।-प्रथम)

**PRINCIPLE OF MARKETING (Paper – :A-First)**

**M.M.: 80**

**OBJECTIVE –**

The Objective of this course is to facilitate understanding of the conceptual framework of marketing and its applications in decision making under various environmental constraints.

<b>Unit – I</b>	<b>Introduction</b> – Meaning, nature, scope and importance of marketing; Marketing concept and its evolution; Marketing mix; Strategic marketing planning – an overview.
<b>Unit – II</b>	<b>Market Analysis and Selection</b> – Marketing environment – macro and micro components and their impact of marketing decisions ; Market segmentation and positioning ; Buyer behaviour ; Consumer versus organizational buyers ; Consumer decision – making process.
<b>Unit – III</b>	<b>Product Decisions</b> – Concept of a product ; Classification of products ; Major product decisions ; Product line and product mix ; Branding ; Packaging and labeling ; Product lifecycle – strategic implications ; New product development and consumer adoption process.
<b>Unit – IV</b>	<b>Pricing Decisions</b> – Factors affecting price determination ; Pricing policies and strategies ; Discounts and rebates.
<b>Unit – V</b>	<b>Distribution Channels and Physical Distribution Decisions</b> – Nature, functions, and types of distribution channels ; Distribution channel intermediaries ; Channel management decisions ; Retailing and wholesaling. Physical Distribution Management.

(1) विज्ञापन एवं विक्रय प्रबन्ध – (प्रश्नपत्र रू 1 – द्वितीय)

**ADVERTISING & SALES MANAGEMENT (Paper: A – Second)**

**M.M.: 80**

<b>Unit – I</b>	<b>Introduction:</b> Concept, Scope, Objectives and Functions of Advertising. Role of Advertising in marketing mix and the advertising process. Legal, ethical and social aspect of advertising.
<b>Unit – II</b>	<b>Pre-launch Advertising Decision:</b> Determination of target audience, Advertising Media and their choice. Advertising messages, Layout of advertisement and Advertising Appeal, Advertising Copy.
<b>Unit – III</b>	<b>Promotional Management:</b> Advertising Department, Role of Advertising Agencies and their Selection, Advertising Budget, Evaluation of Advertising Effectiveness.
<b>Unit – IV</b>	<b>Personal Selling:</b> Meaning and Importance of Personal Selling, - Difference between Personal Selling, Advertising and Sales Promotion. Methods and Procedure of Personal Selling.
<b>Unit – V</b>	<b>Sales Management:</b> Concept of Sales Management, Objectives and Functions of Sales Managements. Sales Organization, Management of Sales force and Sales force objectives, Sales force Recruitment:- Selection, Training, Compensation and Evaluation.



(3) विपणन अनुसंधान (प्रश्नपत्र रु । – तृतीय)

**MARKETING RESEARCH (Paper: A – Third)**

**M.M.: 80**

<b>Unit – I</b>	Marketing Research: An Introduction ; Marketing Decisions ; Marketing Research and Information System.
<b>Unit – II</b>	Marketing Research Methodology, Research Design.
<b>Unit – III</b>	Organization of Marketing Research. Specialized areas of application of marketing research.
<b>Unit – IV</b>	Specialized Techniques of Marketing Research. Motivation Research.
<b>Unit – V</b>	Advertising Research: Planning and Procedure, New Product Research.



(4) अन्तर्राष्ट्रीय विपणन (प्रश्नपत्र रू। – चतुर्थ)

**INTERNATIONAL MARKETING (Paper: A – Fourth)**

**M.M.: 80**

<b>Unit – I</b>	International Marketing; Meaning; Scope, benefits and difficulties of International Marketing: International marketing and Domestic Marketing, reasons for entering International marketing. International marketing environment; Identifying and selecting foreign market.
<b>Unit – II</b>	Foreign market entry mode: Product designing, standardization Vs. Adaptation; Branding, Packaging and Labeling.
<b>Unit – III</b>	Quality issues and after sales service; International pricing; International price quotation; payment terms and methods of payment.
<b>Unit – IV</b>	Promotion of products and services abroad: International channels of distribution; Selection and appointment of foreign sales agents. Logistic decision.
<b>Unit – V</b>	Export policy and practices in India, Trends in India's foreign trade, steps in starting export business; Export finance, documentation and procedure.

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विशिष्टीकरण: (B) प्रबन्ध

**Specialization: (B) Management**

(1) वित्तीय प्रबन्ध (प्रश्नपत्र—रूठ प्रथम)

**FINANCIAL MANAGEMENT (Paper: B -First)**

**M.M.: 80**

**OBJECTIVE**

The objective of this course is to help students of understand the conceptual framework of financial management, and its applications under various environmental constraints.

**COURSE INPUTS**

<b>Unit – I</b>	<b>Financial Management:</b> Meaning, nature and scope of finance; Finance functions - investment, financing and dividend decisions. <b>Capital Budgeting :</b> Nature of investment decisions; Investment evaluation criteria - net present value, internal rate of return, profitability index, payback period, accounting rate of return; NPV and IRR comparison; Capital rationing; Risk analysis in capital budgeting.
<b>Unit – II</b>	<b>Cost of Capital:</b> Meaning and significance of cost of capital; Calculation of cost of debt, preference capital, equity capital and retained earnings; Combined cost of capital (weighted); Cost of equity and CAPM.
<b>Unit – III</b>	<b>Operating and Financial Leverage:</b> Measurement of leverages; Effects of operating and financial leverage on profit; Analyzing alternate financial plans; Combined financial and operating leverage. <b>Capital structure Theories:</b> Traditional and M.M. hypotheses - without taxes and with taxes; Determining capital structure in practice.
<b>Unit – IV</b>	<b>Dividend Policies :</b> Issues in dividend decisions, Walter's model, Gordon's model, M-M hypothesis, dividend and uncertainty, relevance of dividend; Dividend policy in practice; Forms of dividends; Stability in dividend policy; Corporate dividend behavior.
<b>Unit – V</b>	<b>Management of Working Capital:</b> Meaning, significance and types of working capital; Calculating operating cycle period and estimation of working capital requirements; Financing of working capital and norms of bank finance; Sources of working capital; Factoring services; Various committee reports on bank finance; Dimensions of working capital management. <b>Management of cash, and inventory.</b>

(2) सेविवर्गीय प्रबन्ध (प्रश्नपत्र रु B – द्वितीय)

**PERSONNEL MANAGEMENT (Paper: B – Second)**

**M.M. : 80**

<b>Unit – I</b>	Concept, Definition, Importance & Objectives of Personnel Management, Historical Development of Personnel Management, Nature, scope planning, Philosophy and Principles of personnel Management and its relation with behavioral sciences.
<b>Unit – II</b>	Personnel policies, programmers & procedures. Personnel Department; Personnel Functions, Position of personnel Department & Organization of Personnel Management.
<b>Unit – III</b>	Man power planning Recruitment and Selection, Training & Development of Employees & Executives. Promotion, Demotion, Transfers, Absenteeism & Turnover.
<b>Unit – IV</b>	Performance Appraisal and Merit Rutting, Discipline. Job evaluation Wage & Salary Administration, plans of Remuneration & Financial Rewards/Incentive payments.
<b>Unit – V</b>	Employees Fringe Benefits & Services - Safety, Health & Security programmer and welfare. Motivation and Moral.



(3) उत्पादन प्रबन्ध (प्रश्नपत्र रु B – तृतीय)

**PRODUCTION MANAGEMNT (Paper: B – Third)**

**M.M.: 80**

<b>Unit – I</b>	Fundamentals of production management, Nature, Scope, Functions; Problems, Production and Productivity organizing for production. Types of manufacturing systems.
<b>Unit – II</b>	Production planning, Objectives, Factors affecting Production Planning. Planning future activities, forecasting. Qualitative & Quantative forecasting Methods, long range forecasts, project planning method (P.E.R.T. and C.P.M.) Process planning System. Techniques of process planning: Assembly charts, process charts make or buy analysis.
<b>Unit – III</b>	Process design, Factors affecting design Relation with types of manufacturing plant location and layout: Factors affecting location. Types of plans layout, evaluation of alternative layout.
<b>Unit – IV</b>	Work measurement and work standards Uses of work measurement date, procedure for work measurement. Direct work measurement. Time study, activity sampling, Indirect work measurement: Syntetic timing, Predetermined motion time system, analytical estimating. Methods analysis: Areas of application, Approaches to methods design, Tools for methods analysis, work simplification programme.
<b>Unit – V</b>	Production Control – Control functions: Routing Londing, Scheduling, Despatching, Follow up. Quality control & inspection: place of quality control in modern enterpriss, organisation of qualit control. Statistical quality control, inspection location for inspection, inspection procedure and records, Inspection devices.

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(4) व्यूह रचना प्रबन्ध (प्रश्नपत्र रु B – चतुर्थ)

**STRATEGIC MANAGEMENT (Paper: B – Fourth)**

**M.M.: 80**

<b>Unit – I</b>	<p><b>Concept of Strategy:</b> Defining strategy, levels at which strategy operates; Approaches to strategic decision making; Mission and purpose, objectives and goals; Strategic business unit (SBU); Functional level strategies.</p> <p><b>Environmental Analysis and Diagnosis:</b> Concept of environment and its components; Environment scanning and appraisal; Organisational appraisal; Strategic advantage analysis and diagnosis, SWOT analysis.</p>
<b>Unit – II</b>	<p><b>Strategy Formulation and Choice of Alternatives :</b> Strategies - modernisation, diversification, integration, Merger, take-over and joint strategies; Turnaround, divestment and liquidation strategies; Process of strategic choice-industry, competitor and SWOT analysis; Factors affecting strategic choice; Generic competitive strategies- cost leadership, differentiation focus, value chain analysis, bench marking, service blue printing.</p>
<b>Unit – III</b>	<p><b>Functional Strategies :</b> Marketing, production / operations and R &amp; D plans and policies.</p> <p><b>Functional Strategies :</b> Personnel and financial plans and policies.</p>
<b>Unit – IV</b>	<p><b>Strategy Implementation:</b> Inter-relationship between formulation and implementation; Issues in strategy implementation; Resource allocation.</p> <p><b>Strategy and Structure:</b> Structural considerations, structures for strategies; Organisational design and change.</p>
<b>Unit – V</b>	<p><b>Strategy Evaluation:</b> Overview of strategic evaluation; Strategic control; Techniques of strategic evaluation and control.</p> <p><b>Global Issues in Strategic Management.</b></p>

विशिष्टीकरण: (C) बैंकिंग एवं बीमा

**Specialization : (C) Banking and Insurance**

(1) बैंकिंग व्यवहार – (प्रश्नपत्र : C – प्रथम)

**BANKING PRACTICES (Paper: C – First)**

**M.M.: 80**

**OBJECTIVE –**

This course enables the students to know the working of the Indian banking system and fundamentals of insurance.

<b>Unit – I</b>	Bank: Concept, Functions and Services, Prohibited Business, Nature of Banking, Qualities of Banker, Bank and Customer Relationship, Concept of Customer, general Relationship, Bankers, Rights and obligations, Termination of Relationship.
<b>Unit – II</b>	Accounts of Customers: Various Customers' Accounts, Opening an account, Nomination facility, Special Types of Customers Minors, Pardanashin Women, Lunatics, Intoxicated Persons, Joint Hindu Family, Limited Companies and Non Trading Concern.
<b>Unit – III</b>	Employment of Bank Funds, Importance of Liquidity, Cash Reserve, Money at call and short notice, Investments, Statutory provisions regarding liquid Assets, Principles of lending, Types of loan, Interest Tax Act.
<b>Unit – IV</b>	Purchase/Discounting of Bills, Legal Position, Bill Market scheme, Lodgment of bills, Vaghul Working Group Report, Letters of Credit, Concept and types, Crossing and endorsements of cheque.
<b>Unit – V</b>	Securities for Advances: General Principles, Advances against Goods, Stock Exchange Securities, Real Estate, Life Policies, Fixed Deposits, Gold, Silver, Bond and Debenture. Lien and Mortgage, Types of mortgage, Hypothecation, pledge.

2) भारत में बैंकिंग संस्थाएँ – (प्रश्नपत्र रु C – द्वितीय)

**BANKING INSTITUTION IN INDIA (Paper: C – Second)**

**M.M. : 80**

<b>Unit – I</b>	Indian Banking System : Indigenous Bankers, Money Landers, Nationalization of commercial Bank and their Effects, Classification of Banking Institutions, Commercial Banks, Regional Rural Banks, Cooperative Banks.
<b>Unit – II</b>	Development Banking in India: IFCI, ICICI, SIDBI, Credit Guarantee Institutions; Export Credit Guarantee Corporation of India, Deposit Insurance and Credit Guarantee Corporation of India.
<b>Unit – III</b>	R.B.I. : Organization, function, Central Banking functions, Promotional functions, Control of credit by RBI, NBFC and RBI, Commercial Banks and RBI, Power of RBI.
<b>Unit – IV</b>	Banking Regulation Act 1949: Important features, Forms of Business of a Bank, Regulation for Capital, Control over Management, Restrictions on loans and advances winding up of a Banking Company, Amalgamation of Banks.
<b>Unit – V</b>	Emerging trends in Banking Sector: Narasimham Committee Report, Committee on Banking Sector Reforms, Bridge Loan and Privatization of Banks and its impact.



(3) जीवन बीमा—(प्रश्नपत्र रु C – तृतीय)

**LIFE INSURANCE (Paper: C – Third)**

**M.M. : 80**

<b>Unit – I</b>	<b>Life insurance : introduction</b> , History of life insurance, Utility, Object, Characteristics and importance of life insurance, procedure of getting life insurance, non – medical insurance, Insurance of sub – standard lives, insurance of female lives and Minors.
<b>Unit – II</b>	<b>Life insurance policy:</b> Conditions and kinds of Life insurance policies, some important plans of life insurance.
<b>Unit – III</b>	<b>Premium and Annuity:</b> Elements of premium; methods of premium computation, Natural premium plan, level premium plan, Gross and net premium, Loading mortality table – meaning, characteristics and importance in life insurance; Kinds of mortality table. Annuity: meaning, objects, advantages and kinds of annuity, annuity Vs Life insurance.
<b>Unit – IV</b>	Life Insurance agent and his working, settlements of Life insurance claims. Guidelines and procedures, Organisation and management of life insurance corporation of India, working and progress.
<b>Unit – V</b>	Privatization of Life insurance in India, Insurance Regulatory & Development Authority Act, 1999, - powers and functions of authority.



(4) सामान्य बीमा – (प्रश्नपत्र रु C –चतुर्थ)

**GENERAL INSURANCE (Paper: C – Fourth)**

**M.M. : 80**

<b>Unit – I</b>	<b>Introduction : Origin and Development of Insurance :</b> Advantages, Importance and Functions of Insurance, Fundamental principles of Insurance – insurable interest, utmost good faith, other principles – indemnity, subrogation, contribution, mitigating of loss warranties, Proximate cause etc.
<b>Unit – II</b>	<b>Classification and Re-insurance:</b> General Principles, various methods of re-insurance, under insurance, Over-insurance, double insurance Classification and organisation of Insurance.
<b>Unit – III</b>	<b>Marine Insurance:</b> Introduction, Evolution & Development of marine insurance. Necessary elements of marine insurance contract Peril & Scope of marine insurance. Procedure of Taking out Marine Insurance Policy, kinds of Marine insurance Policies, Computation of Marine Insurance Premiums and Returns, Marine Losses – Total loss, Actual and Constructive, Partial Loss – particular average loss and general average loss, Settlements of Claims and Recoveries, Salvage and Particular Charges.
<b>Unit – IV</b>	<b>Fire insurance :</b> Physical and moral hazards, functions of fire insurance, history of fire insurance ; principles of fire insurance, meaning of fire, characteristics of fire insurance, contract rights of insurer under a fire insurance contract, procedure of fire insurance policy, fire policy conditions, settlement of claims.
<b>Unit – V</b>	<b>Miscellaneous Insurance:</b> Personal accident Insurance, Motor, employer's liability fidelity guarantee, burglary, livestock, crop. And workmen's compensation insurance, Cattle Export Risks; Engineering; Aircraft insurance.

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विशिष्टिकरण: (D) करारोपण एवं लेखांकन

**Specialization: (D) Taxation and Accounting**

(1) भारत में प्रत्यक्ष कर (प्रश्नपत्र रु D – प्रथम)

**DIRECT TAX IN INDIA (Paper: D – First)**

**M.M.: 80**

<b>Unit – I</b>	Basic Concepts and Definitions, Residential Status and Tax incidence. Exempted Income, Deemed Income, Clubbing of Income, Deductions under Section – 80.
<b>Unit – II</b>	Computation of Tax Liabilities of Individual. Taxation on Agriculture Income.
<b>Unit – III</b>	Return of Income and Assessment, Various Types of Return, types of Assessment.
<b>Unit – IV</b>	Advance payment of Tax, Tax Deducted at Source, Penalties and Prosecution, Refund of Excess Payment.
<b>Unit – V</b>	Income Tax Authorities, Appeal and Revisions, Settlement of cases.



(2) अप्रत्यक्ष कर (प्रश्नपत्र रू D – द्वितीय)

**INDIRECT TAX (Paper: D – Second)**

**M.M. : 80**

<b>Unit – I</b>	Concepts of Indirect Taxes, Basic conditions of Excise liability, Concept of goods, Excisable goods, Manufacture, Manufacturer. Principles of Classification.
<b>Unit – II</b>	Valuation of Excisable goods, Definition of Assessable Value, Inclusion and exclusion from Assessable Value, Maximum Retail Price Valuation.
<b>Unit – III</b>	Assessment Procedure, Demand, Refund and Appeal. Central Excise Value Added Tax Credit System (CENVAT). C.G.VAT
<b>Unit – IV</b>	Nature of customs duty, Types of customs duties, valuation for customs, duty, inclusion and exclusion, valuation under customs act, Procedures for import and export under Custom Duty.
<b>Unit – V</b>	Export incentives, Duty drawback, Powers of customs officers, penalties, confiscation of goods.



(सेवा के क्षेत्र में लेखांकन (प्रश्नपत्र: D-तृतीय)

**Accounting in Service Sector (Paper: D – Third)**

**M.M.: 80**

<b>Unit – I</b>	Accounts of Hotel Companies – Introductions, Sources of Income, Heads of Expenditures, Cash Book, Visitor's ledger, final accounts. Accounting for Transport Undertaking – Introduction – Railways, Trams and Buses, Roadways, Shipping. Preparation of Daily Log book and final accounts (Problems on roadways only)
<b>Unit – II</b>	Accounts for Hospitals – Introduction, preparation of final accounts, capital and revenue expenditure, OPD and IPD register. Accounts of Professional people.
<b>Unit – III</b>	Accounting for educational institutions – General cash book, Collection Ledger, Donors Register, Stock book Register, Salary and wages Register, Types of Govt. Grants and its accounting, Annual statement of accounts.
<b>Unit – IV</b>	Accounts of Co-operative Societies – Accounts of Agricultural Farms.
<b>Unit – V</b>	Government Accounting: Basic principles of government Accounting, Commercial Accounting Vs Government Accounting, Consolidated funds contingency fund and public Accounts.



(4) लेखांकन पद्धतियाँ (प्रश्नपत्र : D – चतुर्थ)

**Accounting Methods (Paper: D – Fourth)**

**M.M. : 80**

<b>Unit – I</b>	Preparation of Accounts from incomplete records and single entry system.
<b>Unit – II</b>	Branch Accounts – Independent and foreign branch. Departmental accounts.
<b>Unit – III</b>	Lease Accounts, Social Accounting.
<b>Unit – IV</b>	Accounting for Price level changes. Human Resource Accounting.
<b>Unit – V</b>	Insolvency Accounts. (Individual and firm).

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# दुर्ग विश्वविद्यालय, दुर्ग (छ.ग.)



एम.एससी. रसायनशास्त्र  
पाठ्यक्रम

सेमेस्टर परीक्षा— 2017–19

## **SYLLABUS**

**M. Sc. CHEMISTRY**

**SEMESTER EXAMINATION**

**2017-2019**

## EXAMINATION SCHEME

M.Sc. examination will be conducted in four SEMESTERS. Each semester exam shall consist of FOUR THEORY PAPERS AND TWO LAB COURSES.

### SEMESTER –I (20 CREDIT)

#### THEORY (16 CREDIT)

PAPER	COURSE	CREDIT	DURATION	INTERNAL ASSESSMENT	THEORY MARKS	TOTAL MARKS
CH - 1	GROUP THEORY AND CHEMISTRY OF METAL COMPLEXES	4	3 Hrs	20	80	100
CH - 2	CONCEPTS IN ORGANIC CHEMISTRY	4	3 Hrs	20	80	100
CH - 3	QUANTUM CHEMISTRY, THERMODYNAMICS AND CHEMICAL DYNAMICS - I	4	3 Hrs	20	80	100
CH - 4	THEORY AND APPLICATIONS OF SPECTROSCOPY-I	4	3 Hrs	20	80	100

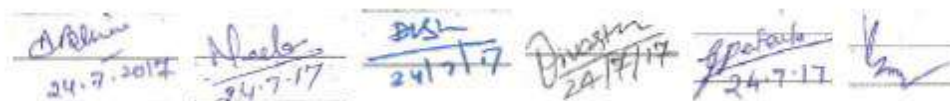
#### PRACTICAL (4 CREDIT)

PAPER	COURSE	CREDIT	DURATION	MARKS
CH - 5	Lab Course – I	2	8 Hrs	100
CH - 6	Lab Course – II	2	8 Hrs	100

### SEMESTER –II (20 CREDIT)

#### THEORY (16 CREDIT)

PAPER	COURSE	CREDIT	DURATION	INTERNAL ASSESSMENT	THEORY MARKS	TOTAL MARKS
CH - 7	TRANSITION METAL COMPLEXES	4	3 Hrs	20	80	100
CH - 8	REACTION MECHANISMS	4	3 Hrs	20	80	100
CH - 9	QUANTUM CHEMISTRY, THERMODYNAMICS AND CHEMICAL DYNAMICS - II	4	3 Hrs	20	80	100
CH - 10	THEORY AND APPLICATIONS OF SPECTROSCOPY-II	4	3 Hrs	20	80	100

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**PRACTICAL (4 CREDIT)**



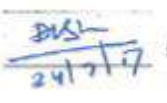



PAPER	COURSE	CREDIT	DURATION	MARKS
CH - 11	Lab Course – III	2	8 Hrs.	100
CH - 12	Lab Course – IV	2	8 Hrs.	100

**SEMESTER –III (20 CREDIT)****THEORY (16 CREDIT)**

PAPER	COURSE	CREDIT	DURATION	INTERNAL ASSESSEME	THEORY MARKS	TOTAL MARKS
CH – 13	RESONANCE SPECTROSCOP PHOTOCHEMISTRY AND ORGANOCATALYSIS	4	3 Hrs	20	80	100
CH – 14	CHEMISTRY OF BIOMOLECULES	4	3 Hrs	20	80	100
CH – 15	CATALYSIS, SOLID STATE AND SURFACE CHEMISTRY	4	3 Hrs	20	80	100
CH – 16	ANALYTICAL TECHNIQUES AND DATA ANALYSIS	4	3 Hrs	20	80	100

**PRACTICAL (4 CREDIT)**

PAPER	COURSE	CREDIT	DURATION	MARKS
CH – 17	Lab Course - V	2	8 Hrs.	100
CH – 18	Lab Course - VI	2	8 Hrs.	100

## SEMESTER –IV (20 CREDIT)

### THEORY (16 CREDIT)

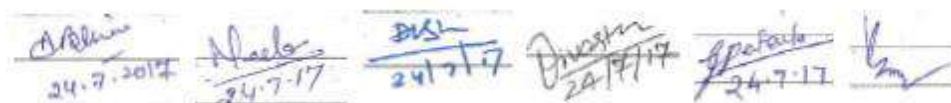
PAPER	COURSE	CREDIT	DURATION	INTERNAL ASSESSMENT	THEORY MARKS	TOTAL MARKS
CH – 19	INSTRUMENTAL METHODS OF ANALYSIS	4	3 Hrs	20	80	100
CH – 20	NATURAL PRODUCT AND MEDICINAL CHEMISTRY	4	3 Hrs	20	80	100
CH – 21	MATERIAL AND CHEMISTRY NUCLEAR	4	3 Hrs	20	80	100
CH - 22	ENVIRONMENTAL & APPLIED CHEMICAL ANALYSIS	4	3 Hrs	20	80	100
<b>OPTIONAL PAPERS</b>						
<b>In place of CH 22 students can opt any optional papers CH 22a to CH 22c</b>						
CH – 22 a	CHEMISTRY OF SURFACTANTS	4	3 HRS	20	80	100
22 b	NANOCHEMISTRY	4				
22 c	POLYMERS	4				

### PRACTICAL (4 CREDIT)

PAPER	COURSE	CREDIT	DURATION	MARKS
CH - 23	Lab Course - VII	2	8 Hrs.	100
CH - 24	Lab Course - VIII	2	8 Hrs.	100

### SCHEME FOR PRACTICAL EXAMINATION

EXPERIMENT	MARKS
Experiment-1	30
Experiment -2	30
Viva-voce	20
Sessional Marks	20
<b>TOTAL MARKS</b>	<b>100</b>





**FIRST SEMESTER**  
**PAPER NO. CH –1**  
**GROUP THEORY AND CHEMISTRY OF METAL COMPLEXES**

**Max. Marks 80**

**UNIT - I**

**SYMMETRY AND GROUP THEORY IN CHEMISTRY:** Symmetry elements and symmetry operation, definitions of group, subgroup, relation between orders of a finite group and its subgroup. Contumacy relation and classes. Point symmetry group. Scion flies' symbols, representations of groups by matrices (representation for the  $C_n$ ,  $C_{nv}$ ,  $C_{nh}$ ,  $D_{nh}$  etc. groups to be worked out explicitly). Character of a representation. The great orthogonality theorem (without proof) and its importance. Character tables of  $C_{2v}$ ,  $C_{2h}$ ,  $C_{3v}$  and their use in spectroscopy.

**UNIT - II**

- A. **METAL-LIGAND BONDING:** Limitation of crystal field theory, molecular orbital theory, octahedral, tetrahedral and square planar complexes.  $\pi$  bonding and molecular orbital theory.
- B. **METAL-COMPLEXES:** Metal carbonyls, structure and bonding, vibrational spectra of metal carbonyls for bonding and structural elucidation, important reactions of metal carbonyls; preparation, bonding, structure and important reactions of transition metal nitrosyl, dinitrogen and dioxygen complexes; tertiary phosphine as ligand.

**UNIT –III**

- A. **METAL-LIGAND EQUILIBRA IN SOLUTION:** Stepwise and overall formation constants and their interaction, trends in stepwise constants, factors affecting the stability of metal complexes with reference to the nature of metal ion and ligand, chelate effect and its thermodynamic origin, determination of binary formation constants by pH- metry and spectrophotometry.
- B. **ISOPOLY ACID AND HETEROPOLYACID:** Isonomy and heterophony acids of Mo and W. Preparation, properties and structure. Classification, Preparation, properties and structures of borides, carbides, nitrides and silicide's.

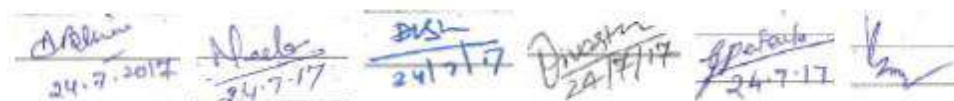
**SILICATES-** Classification and structure, Silicones-preparation, properties and application.

**UNIT – IV**

- A. **METAL CLUSTERS:** Higher boranes, carboranes, metallo boranes and metallocarboranes. Metallocarbonyl and halide cluster, compounds with metal-metal multiple bonds.
- B. **CHAINS:** Catenation, heterocatenation, intercatenation.
- C. **RINGS:** Borazines, phosphazines.

**BOOKS SUGGESTED:**

1. Advanced Inorganic Chemistry, F.A. Cotton and Wilkinson, JohnWiley.
2. Inorganic Chemistry, J.E. Huhey, Harpes and Row.
3. Chemistry of the Elements, N.N. Greenwood and A. Earnshow, Pergamon.
4. Inorganic Electronic Spectroscopy, A.B.P. Lever, Elsevier.
5. Comprehensive Coordination Chemistry, Eds.G. Wilkinson, R.D.Gillars and J.A. McCleverty, Pergamon.



**PAPER NO. CH –2**  
**CONCEPTS IN ORGANIC**  
**CHEMISTRY**

**UNIT - I**

**Max. Marks 80**

- A. NATURE OF BONDING IN ORGANIC MOLECULES:** Localized and delocalized chemical bond, conjugation and cross-conjugation, Bonding in Fullerenes, Bonds weaker than covalent, Addition compounds, Crown ether complexes and cryptands. Inclusion compounds, Cyclodextrins, Catenanes and rotaxanes.
- B. AROMATICITY:** Aromaticity in benzenoid and non-benzenoid compounds, Huckel's rule anti-aromaticity, homo-aromaticity. PMO approach for Aromaticity, Annulenes.

**UNIT - II**

- A. CONFORMATIONAL ANALYSIS:** Conformational analysis of cycloalkanes, decalins, effect of conformation on reactivity, conformation of sugars, steric strain due to unavoidable crowding.
- B. STEREOCHEMISTRY:** Elements of symmetry, chirality, molecules with more than one chiral center, methods of resolution, optical purity, stereospecific and stereoselective synthesis. Asymmetric synthesis. Optical activity in the absence of chiral carbon (Biphenyls, allenes and spiranes), chirality due to helical shape.

**UNIT - III**

- A. REACTION INTERMEDIATES:** Generation, structure, stability and reactivity of carbocations, carbanions, free radicals, carbenes and nitrenes. Sandmeyer reaction, Free radical rearrangement and Hunsdiecker reaction.
- B. ELIMINATION REACTIONS:** The E<sub>2</sub>, E<sub>1</sub> and E<sub>1c</sub> mechanisms. Orientation of the double bond. Reactivity, effects of substrate structures, attacking base, the leaving group and the medium.

**UNIT - IV**

**PERICYCLIC REACTIONS:** Classification of pericyclic reactions. Woodward-Hoffmann correlation diagrams. FMO and PMO approach. Electrocyclic reactions - conrotatory and disrotatory motions, 4n, 4n+2 and allyl systems. Cycloadditions - antarafacial and suprafacial additions, 4n and 4n+2 system, 2+2 addition of ketenes, 1, 3 dipolar cycloadditions and cheletropic reactions. Sigmatropic rearrangements - suprafacial and antarafacial shifts of H, sigmatropic shifts involving carbon moieties, 3, 3- and 5, 5- sigmatropic rearrangements. Claisen, Cope and Aza-Cope rearrangements. Ene reaction.

**BOOKS SUGGESTED:**

1. Advanced Organic Chemistry, F.A. Carey and R.J. Sundberg, Plenum.
2. A Guide Book to Mechanism in Organic Chemistry, Peter Sykes, Longman.
3. Structures and Mechanism in Organic Chemistry, C.K. Ingold, Cornell University Press.
4. Organic Chemistry, R. T. Morrison and R. N. Boyd, Prentice-Hall.
5. Modern Organic Reactions, H. O. House, Benjamin.
6. Principles of Organic Synthesis, R.O.C. Norman and J.M. Coxon, Blackie, Academic and Professional.
7. Pericyclic Reactions, S. M. Mukherji, Macmillan, India.
8. Reaction Mechanism in Organic Chemistry, S.M. Mukherji and S.P. Singh, Macmillan.
9. Stereochemistry of Organic Compounds, D. Nasipuri, New Age International.
10. Some Modern Methods of Organic Synthesis, W. Carruthers, Cambridge Univ. Press.
11. Rodd's Chemistry of Carbon Compounds, Ed. S. Coff
12. Organic Chemistry, Vol 2, I. L. Finar, ELBS.
13. Stereo selective Synthesis: A Practical Approach, M. Nogradi, and VCH.
14. Organic Chemistry, Paula Yurkanis Bruice, Pearson Education.

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**PAPER NO. CH –3**  
**QUANTUM CHEMISTRY, THERMODYNAMICS AND**  
**CHEMICAL DYNAMICS - I**

**Max. Marks 80**

**UNIT - I**

**A. MATHEMATICAL CONCEPT IN QUANTUM CHEMISTRY:**

Vector quantities and their properties Complex numbers and Coordinate transformation. Differential and Integral Calculus, Basis rules of differentiation and Integration Applications.

- B.** The Schrodinger equation and postulates of quantum mechanics. Discussion of solutions of the Schrodinger equation to some model systems viz Particle in a box the harmonic oscillator, the rigid rotator, the hydrogenatom.

**UNIT –II**

**BASICS OF THERMODYNAMICS:** Maxwell's thermodynamic relations isotherm, Vant's Hoff hypothesis. Partial molar volume and partial molar heat content. Chemical potential, Gibbs Duhem equation, variation of chemical potential with temperature and pressure. Chemical potential of ideal gases, pure solids, liquids and mixture of ideal gases. Activity and Fugacity, Determination of Fugacity, Variation of Fugacity with temperature and pressure.

**UNIT –III**


**ELECTROCHEMISTRY–I:** Electrochemistry of solution. Debye-Huckel Onsager treatment and its extension, ion solvent interactions. Debey-Huckel-Limiting Law. Debye-Huckel theory for activity coefficient of electrolytic solutions. Determination of activity and activity coefficient, ionic strength, Thermodynamics of electrified interface equations. Derivation of electro-capillarity, Lippmann equation (surface excess), methods of determination.

**UNIT –IV**

**CHEMICAL DYNAMICS –I:** Methods of determining rate laws, consecutive reactions, collision theory of reaction rates, steric factor, Activated complex theory, kinetic salt effects, steady state kinetics, and thermodynamic and Kinetic control of reactions. Dynamic chain (Hydrogen-bromine and Hydrogen- chlorine reactions) and Oscillatory reactions (Belousov-Zhabotinsky reaction)

**BOOKS SUGGESTED :**

1. Physical Chemistry, P.W. Atkins, ELBS.
2. Coulson's Valence, R. McWeeny, ELBS.
3. Chemical Kinetics, K. J. Laidler, Pearson.
4. Kinetics and Mechanism of Chemical Transformations, J.Rajaraman and J.Kuriacose, McMillan.
5. Modern Electrochemistry Vol.I and Vol.II, J.O.M.Bockris and A.K.N.Reddy, Plenum.
6. Thermodynamics for Chemists, S. Glasstone, EWP.
7. An Introduction to Electrochemistry S. Glasstone, EWP.
8. Organic Chemist's Book of Orbitals, L.Salem and W.L.Jorgensen, Academic Press
9. The Physical Basis of Organic Chemistry, H.Maskill, Oxford University Press

The image shows six handwritten signatures in blue ink, each followed by the date '24.7.17'. The signatures are: 1. A. Balan, 2. A. Balan, 3. A. Balan, 4. A. Balan, 5. A. Balan, 6. A. Balan.

**PAPER NO. CH - 4**  
**THEORY AND APPLICATIONS OF SPECTROSCOPY- I**

**Max. Marks 80**

**UNIT - I**

**UNIFYING PRINCIPLES:**

Electromagnetic radiation, interaction of electromagnetic radiation with matter-absorption, emission, transmission, reflection, dispersion, polarization and scattering, Uncertainty relation and natural line width and natural line broadening, transition probability, selection rules, intensity of spectral lines, Born-Oppenheimer approximation, rotational, vibrational and electronic energy levels.

**UNIT- II**

**MICROWAVE SPECTROSCOPY:**

Classification of molecules in term of their internal rotation mechanism, determination of rotation energy of diatomic and polyatomic molecules, effect of isotopic substitution on diatomic and polyatomic molecules. Intensities of rotational spectral lines and parameters of rotational and the transition frequencies, non-rigid rotors, Linear and symmetric top polyatomic molecules. Application in determination of bond length.

**UNIT- III**

**SCATTERING SPECTROSCOPY:**

- A. **Electron Diffraction Spectroscopy** : Principle, instrumentations and application of Auger spectroscopy and Scanning Electron Microscopy for chemical characterization, electron diffraction of gases and vapours, The Wierl equation and co-related method, application of electron diffraction.
- B. Theory, instrumentation and application of turbidimetry, nephelometry and fluorometry , Fluorescence and phosphorescence and factors affecting them.


**UNIT- IV**

**RAMAN SPECTROSCOPY:**

Classical and quantum theories of Raman effect, pure rotational, vibrational and vibrational-rotational Raman spectra, selection rules, mutual exclusion principle, Resonance Raman spectroscopy, Coherent anti Stokes Raman spectroscopy (CARS), Instrumentation, Application of Raman effect in molecular structures, Raman activity of molecular vibration, structure of CO<sub>2</sub>, N<sub>2</sub>O, SO<sub>2</sub>, NO<sub>2</sub>, ClF<sub>3</sub>.

**BOOKS SUGGESTED**

1. Modern Spectroscopy, J.M. Hollas, JohnWiley.
2. Fundamentals of Molecular Spectroscopy, C.N.Banwell.
3. Spectroscopy, B.K. Sharma, Goel Publication.
4. Organic Spectroscopy: Principles and Applications, JagMohan, Narosa Publication.
5. Spectroscopy Methods in Organic Chemistry, D.H.Williams & I.Fleming, TataMcgraw-Hill Publication.
6. Spectrophotometric Identification of Organic Compounds, R.M. Silversteion & F. X. Webster, John Wiley Publication



**PAPER NO. CH - 5**  
**LABORATORY COURSE-I**

**Max. Marks 100**

**1. QUALITATIVE ANALYSIS OF MIXTURE CONTAINING EIGHT RADICALS INCLUDING TWO LESS COMMON METAL FROM AMONG THE FOLLOWING BY SEMI MICROMETHOD.**

1) *Basic Radicals:*

Ag, Pb, Hg, Bi, Cu, Cd, As, Sb, Sn, Fe, Al, Cr, Zn, Mn, Co, Ni, Ba, Sr, Ca, Mg, Na, K, Ce, Th, Zr, W, Te, Ti, Mo, U, V, Be, Li, Au, Pt.

2) *Acid Radicals:*

Carbonate, Sulphite, Sulphide, Nitrite, Nitrate, Acetate, Flouride. Chloride, Bromide, Iodide, Sulphate, Borate, Oxalate, Phosphate, Silicate, Thiosulphate, Ferrocyanide, Ferricyanide, Sulphocyanide, Chromate, Arsenate and Permanganate.

**2. QUANTITATIVE ANALYSIS:**

Separation and determination of two metal ions in ores, alloys, or mixtures in solution, one by volumetric and the other by gravimetric methods.

**3. ESTIMATION OF:**

- 1) Phosphoric acid in commercial orthophosphoric acid.
- 2) Boric acid in borax.
- 3) Ammonia in ammonium salt.
- 4) Manganese dioxide in pyrolusite.
- 5) Available chlorine in bleaching powder.
- 6) Hydrogen peroxide in a commercial sample.

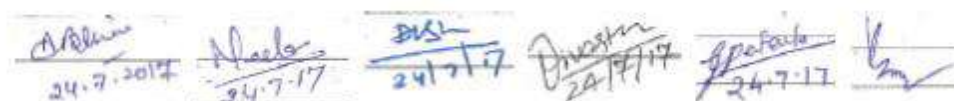
**4. PREPARATIONS:-**

Preparation of selected inorganic compound and their studies by I.R. electronic spectra, Mössbauer, E.S.R. And magnetic susceptibility measurements. Handling of air and moisture sensitive compounds

- (1)  $\text{VO}(\text{acac})_2$
- (2)  $\text{TiO}(\text{C}_9\text{H}_8\text{NO})_2 \cdot 2\text{H}_2\text{O}$
- (3)  $\text{cis-K} [\text{Cr}(\text{C}_2\text{O}_4)_2(\text{H}_2\text{O})_2]$
- (4)  $\text{Na} [\text{Cr} (\text{NH}_3)_2(\text{SCN})_4]$
- (5)  $\text{Mn}(\text{acac})_3$
- (6)  $\text{K}_2[\text{Fe}(\text{C}_2\text{O}_4)_3]$
- (7) Prussian Blue, Turnbull's Blue.
- (8)  $[\text{Co} (\text{NH}_3)_6] [\text{Co}(\text{NO}_2)_6]$
- (9)  $\text{cis-}[\text{Co}(\text{trien}) (\text{NO}_2)_2]\text{Cl} \cdot \text{H}_2\text{O}$
- (10)  $\text{Hg} [\text{Co}(\text{SCN})_4]$
- (11)  $[\text{Co}(\text{Py})_2\text{Cl}_2]$
- (12)  $[\text{Ni} (\text{NH}_3)_6]\text{Cl}_2$
- (13)  $\text{Ni}(\text{DMG})_2$
- (14)  $[\text{Cu} (\text{NH}_3)_4] \text{SO}_4 \cdot \text{H}_2\text{O}$

**BOOKS SUGGESTED**

1. Vogel's Textbook of Quantitative Analysis, Revi Mendham, ELBS.
2. Synthesis and Characterization of Inorganic Compounds, W.L.Jolly, Prentice Hall.

  
A series of handwritten signatures and dates, including '24.7.2017', '24.7.17', '24/7/17', and '24.7.17', likely indicating student completion or verification.

**ADSORPTION/SURFACE CHEMISTRY**

1. To Study Surface tension-Concentration relationship for solutions (Gibbs equation).
2. To Verify the Freundlich and Langmuir Adsorption isotherms using acetic acid/oxalic acid and activated charcoal.
3. Determination of CMC of surfactants

**PHASE EQUILIBRIA**

1. To Construct the Phase diagram for three component system (e.g. chloro form-acetic acid-water).

**CHEMICAL KINETICS**

1. Determination of the effect of (a) Change of temperature (b) Change of concentration of reactants and catalyst and (c) Ionic strength of the media on the velocity constant of hydrolysis of an ester/ionic reactions.
2. Determination of the velocity constant of hydrolysis of an ester/ionic reaction in micellar media.
3. Determination of the rate constant for the decomposition of hydrogen peroxide by  $\text{Fe}^{+++}$  and  $\text{Cu}^{++}$  ions.
4. Determination of the primary salt effect on the kinetics of ionic reactions and testing of the Bronsted relationship (iodide ion is oxidized by persulphate ion).

**SOLUTIONS/MOLECULAR WEIGHTS**

1. Determination of molecular weight of non-volatile substances by Landsberger method.
2. Determination of Molar masses of Naphthalene/acetanilide
3. Molecular weight of polymers by viscosity measurements.

**CONDUCTOMETRY**

1. Determination of the velocity constant, order of the reaction and energy of activation for saponification of ethyl acetate by sodium hydroxide conductometrically.
2. Determination of solubility and solubility product of sparingly soluble salts (e.g.,  $\text{PbSO}_4$ ,  $\text{BaSO}_4$ ) conductometrically.
3. Determination of  $\text{pK}_a$  of Acetic acid and verification of Ostwald dilution law.

**POTENTIOMETRY/pH METRY**

1. Determination of the strength of strong and weak acids in a given mixture using a potentiometer/pH meter.
2. Determination of the dissociation constant of acetic acid in DMSO, DMF, acetone and dioxane by titrating it with KOH.
3. Determination of the dissociation constant of monobasic/dibasic acid by Albert-Serjeant method.
4. Determination of Redox potential of  $\text{F}^{++}$  /  $\text{F}^{+++}$  system.

**POLARIMETRY**

1. Determination of rate constant for hydrolysis/inversion of sugar using a polarimeter.
2. Enzyme kinetics –inversion of sucrose.
3. Determine the specific and molecular rotation of optically active substances.

**BOOKS SUGGESTED**

1. Experiments and Techniques in Organic Chemistry, D. Pasto, C. Johnson and M. Miller, Prentice Hall.
2. Macro scale and Micro scale Organic Experiments. K.L. Williamson, D.C. Heath.
3. Systematic Qualitative Organic Analysis, H. Middleton, Edward Arnold.
4. Handbook of Organic Analysis –Qualitative and Quantitative, H. Clark, Edward Arnold.
5. Vogel's Textbook of Practical Organic Chemistry,
6. Practical Physical Chemistry, A.M. James and F.E. Prichard, Longman.
7. Findley's Practical Physical Chemistry, B.P. Levi
8. Experimental Physical Chemistry, R.C. Das and B. Behera, Tata McGraw Hill.

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**SECOND SEMESTER**  
**PAPER NO. CH - 7**  
**TRANSITION METAL COMPLEXES**

**Max. Marks 80**

**UNIT - I**

**REACTION MECHANISM OF TRANSITION METAL COMPLEXES:** Energy profile of a reaction, reactivity of metal complexes, inert and labile complexes, kinetic application of valence bond and crystal field theories, kinetics of octahedral substitution, anation reactions and reactions without metal ligand bond cleavage. Substitution reactions in square planar complexes, the trans effect. Redox reactions, electron transfer reactions, mechanism of one electron transfer reactions, outer sphere type reactions, cross reactions and Marcus-Hush theory, inner sphere type reactions.

**UNIT - II**

**ELECTRONIC SPECTRA AND MAGNETIC PROPERTIES OF TRANSITION METAL COMPLEXES:**

Spectroscopic ground states, Correlation, Orgel and Tanabe-Sugano diagrams for transition metal complexes ( $d^1$ - $d^9$  states), Selection rules, mechanism for breakdown of the selection rules, intensity of absorption, band width, spectra of d-d metal complexes of the type  $[M(H_2O)]^{n+}$ , spin free and spin paired  $ML_6$  complexes of other geometries, Calculations of  $Dq$ ,  $B$  and parameters, spin forbidden transitions, effect of spin-orbit coupling, Spectrochemical and Nephelouxetic series. Magnetic properties of complexes of various geometries based on crystal field model, spin free-spin paired equilibria in octahedral stereochemistry.

**UNIT - III**

- A. **TRANSITION METAL COMPLEXES:** Transition metal complexes with unsaturated organic molecules, alkanes, allyl, dienedienyl, arene and trienyl complex, preparations, properties, nature of bonding and structure features. Important reaction relating to nucleophilic and electrophilic attack on ligands and organic synthesis.
- B. Transition Metal, Compounds with Bond to hydrogen.

**UNIT-IV**

- A. **ALKYLS AND ARYLS OF TRANSITION METALS:** Types, routes of synthesis, stability and decomposition pathways, organocopper in organic synthesis.
- B. **COMPOUNDS OF TRANSITION METAL - CARBON MULTIPLE BONDS :** Alkylidenes, low valent carbenes, nature of bond and Structural characteristics.
- C. **FLUXIONAL ORGANOMETALLIC COMPOUNDS:** Fluxionality and dynamic equilibria in compounds such as olefin, allyl and dienyl complexes.

**BOOKS SUGGESTED :**

1. Principles and application of organotransition metal chemistry, J.P.Collman, L.S.Hegsdus, J. R. Norton and R.G. Finke, University Science Books.
2. The Organometallic chemistry of the Transition metals, R.H.Crabtree, JohnWiley.
3. Metallo - organic chemistry, A.J. Pearson, Wiley.
4. Organometallic chemistry, R.C.Mehrotra and A.Singh, Newage International.
5. Principles of organometallic chemistry, P.Powel, Springer





**PAPER NO. CH - 8**  
**REACTION MECHANISMS**

**Max. Marks 80**

**UNIT-I**

- A. **ALIPHATIC NUCLEOPHILIC SUBSTITUTION:** The  $S_N2$  and  $S_N1$  mechanisms. The neighboring group mechanism, neighboring group participation by  $\pi$  and  $\sigma$  bonds, anchimeric assistance. Reactivity effects of substrate structure, attacking nucleophile, leaving group and reaction medium, phase transfer catalysis, ambident nucleophile and regioselectivity.
- B. **AROMATIC NUCLEOPHILIC SUBSTITUTION:** The  $S_NAr$ ,  $S_N1$  and benzyne mechanisms. Reactivity -effect of substrate structure, leaving group and attacking nucleophile. The von Richter, Sommelet-Hauser, and Smiles rearrangements.

**UNIT - II**

- A. **ALIPHATIC ELECTROPHILIC SUBSTITUTION:** Mechanisms of  $S_E1$   $S_E2$ , electrophilic substitution accompanied by double bond shifts. Effect of substrates, leaving group and the solvent polarity on the reactivity.
- B. **AROMATIC ELECTROPHILIC SUBSTITUTION:** The arenium ion mechanism, orientation and reactivity. The ortho/para ratio, ipso attack, orientation in other ring systems. Reactivity-Effect of substrates and electrophiles. Vilsmeier reaction and Gattermann-Koch reaction.

**UNIT - III**

**ADDITION TO CARBON-CARBON MULTIPLE BONDS:** Mechanistic and stereochemical aspects of addition reactions involving electrophiles, nucleophiles and free radicals, regio- and chemoselectivity. Addition to cyclopropane ring. Hydrogenation of double and triple bonds, hydrogenation of aromatic rings Hydroboration, Michael reaction. Sharpless asymmetric epoxidation.

**UNIT - IV**

**ADDITION TO CARBON-HETERO MULTIPLE BONDS:** Mechanism of metal hydride reduction of saturated and unsaturated carbonyl compounds, acids esters and nitriles. Addition of Grignard Reagents, Organo-Zinc and Organo-lithium to carbonyls and unsaturated carbonyl compounds, Wittig reaction.

Mechanism of condensation reactions involving enolates—Perkins, aldol, Claisen, benzoin, Mannich, Knoevenagel, Stobbe reactions. Hydrolysis of esters and amides, ammonolysis of esters.

**BOOKS SUGGESTED:**

1. Advanced Organic Chemistry-Reactions, Mechanism and Structure, Jerry March, John Wiley.
2. Modern Organic Reactions, H. O. House, Benjamin.
3. Principles of Organic Synthesis, R.O.C. Norman and J.M. Coxon, Blackie Academic & Professional.
4. A Guide Book to Mechanism in Organic Chemistry, Peter Sykes, Longman.
5. Structures and Mechanism in Organic Chemistry, C.K. Ingold, Cornell University Press.
6. Reaction Mechanism in Organic Chemistry, S.M. Mukherji and S.P. Singh, Macmillan
7. Organic Chemistry Concepts and Application, Jagdamba Singh, Pragati Prakashan
8. Organic reactions and mechanisms, P.S. Kalsi, New Age International.

  
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**PAPER NO. CH –9**  
**QUANTUM CHEMISTRY, THERMODYNAMICS**  
**AND CHEMICAL DYNAMICS - II**

**Max. Marks 80**

**UNIT –I**

- A. APPLICATION OF MATRICES IN QUANTUM CHEMISTRY:** Addition and multiplication, inverse and transpose of matrices. Determinants in quantum Chemistry.
- B. ANGULAR MOMENTUM IN QUANTUM CHEMISTRY:** Angular momentum, angular momentum Operators. Eigen functions and Eigen values Angular momentum, Ladder operators.
- C. APPROXIMATE METHODS:** The variation theorem, linear variation principle. Perturbation theory (first order and non-degenerate). Applications of variation method and perturbation theory to the Helium atom.

**UNIT –II**

**STATISTICAL THERMODYNAMICS:** Probability, permutations and combinations, concepts of probability, Maxwell Boltzmann distribution. Different ensembles and Partition functions- translational, rotational, vibrational and Electronic partition functions. Thermodynamic function using appropriate Partition function. Fermi-Dirac and Bose-Einstein Statistics and statistical basis of entropy. Heat capacity of solids Debye and Einstein Models.

**UNIT –III**

**ELECTROCHEMISTRY –II:** Structure of electrified interfaces. Gouy-Chapman, Stern models. Over potentials and exchange current density, Derivation of Butler –Volmer equation, Tafelplot. Semiconductor interfaces, Theory of double layer at semiconductor, electrolyte solution interfaces, structure of double layer interfaces. Effect of light at semiconductor solution interfaces. Electro catalysis influence of various parameters. Hydrogen electrode.

**UNIT –IV**

**CHEMICAL DYNAMICS –II:** General features of fast reactions by flow method, relaxation method, flash photolysis and the nuclear magnetic resonance method. Dynamics of molecular motions, probing the transition state, dynamics of barrier less chemical reactions in solutions, dynamics of unimolecular reaction. [Lindemann –Hinshel wood , RRK and Rice-Ramsperger-Kassel-Marcus {RRKM}] theories of unimolecular reactions.

**BOOKS SUGGESTED:**

1. The Chemistry Mathematics Book, E. Steiner, Oxford University Press.
2. Mathematics for Chemistry, Doggett and Sutcliffe, Longman.
3. Mathematical Preparation for Physical Chemistry, F.Daniels, McGrawHill.
4. Chemical Mathematics, D.M, Hirst, Longman.
5. Applied Mathematics for Physical Chemistry, J.R.Barrante, PrenticeHall.
6. Basic Mathematics for Chemists, Tebbutt, Wiley.
7. Physical Chemistry, P.W. Atkins, ELBS.
8. Introduction to Quantum Chemistry, A.K.Chandra, Tata McGrawHill.
9. Quantum Chemistry, Ira N. Levine, PrenticeHall.
10. Coulson's Valence, R. McWeeny, ELBS.
11. Chemical Kinetics, K. J. Laidler, Pearson.
12. Kinetics and Mechanism of Chemical Transformations, J.Rajaraman and J.Kuriacose, McMillan.
13. Modern Electro chemistry Vol.I and Vol.II, J.O.M.Bockris and A.K.N.Reddy, Plenum.
14. Thermodynamics for Chemists, S. GlasstoneEWP.
15. An Introduction to Electrochemistry S. GlasstoneEWP.
16. Physical Chemistry, Ira N. Levine McGrawHill.
17. Physical Chemistry, Silbey, Alberty, Bawendi, John-Wiley.

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**PAPER NO. CH - 10**  
**THEORY AND APPLICATIONS OF SPECTROSCOPY –II**

**Max. Marks 80**

**UNIT - I**

**ULTRAVIOLET AND VISIBLE SPECTROSCOPY:**

Introduction, Intensity of vibrational – electronic spectra - Frank-Condon principle, dissociation energy, Rotational fine structure of electronic – vibrational transitions, shape of some molecular orbitals viz.,  $H_2$ ,  $He_2$ ,  $N_2$ ,  $O_2$ . Electronic spectra of organic molecules, chromophores, Applications of electronic spectroscopy and identification of organic molecules. Spectrophotometric studies of complex ions, determination of ligand/metal ratio in a complex, determination of stability constants.

**UNIT - II**

**INFRA RED SPECTROSCOPY:**

Introduction, simple and anharmonic oscillators in vibrational spectroscopy, diatomic-vibrating rotor, Modes of vibration in polyatomic molecules, vibration-coupling, Fourier Transform IR spectroscopy: instrumentation, interferometric spectrophotometer, sample handling, Factors influencing vibrational frequencies, Application of IR spectroscopy: Interpretation of IR spectra of normal alkanes, aromatic hydrocarbons, alcohols and phenols aldehydes and ketones, ethers, esters, carboxylic acids, amines and amides.

**UNIT - III**

**MASS SPECTROMETRY:**

Introduction, basic principles, separation of the ions in the analyzer, resolution, molecular ion peak, mass spectral fragmentation of organic compounds, factors affecting fragmentation, McLafferty rearrangement. Instrumentation, Characteristics of mass spectra of Alkanes, Alkenes, Aromatic hydrocarbons, Alcohols, Amines. Nitrogen rule, ring rule, Molecular weight and formula determination.

Gas chromatography-Mass spectrophotometry: Introduction.

**UNIT - IV**

**NUCLEAR RESONANCE SPECTROPHOTOMETRY:**

Theory of NMR spectroscopy, interaction of nuclear spin (and magnetic moment, chemical shift, precessional motion of nuclear particles in magnetic field, spin-spin splitting, coupling constants, factor affecting the chemical shift, shielding effect, effect of chemical exchange, hydrogen bonding, instrumentation of Fourier transform NMR spectrophotometer, structure determination of organic compounds,

Carbon-13 NMR spectroscopy, Multiplicity-proton ( $^1H$ ) decoupling-noise decoupling, off resonance decoupling, selective proton decoupling. Chemical shift (aliphatic, olefinic, alkyne, aromatic and carbonyl carbon)

**BOOKS SUGGESTED**

1. Modern Spectroscopy, J.M. Hollas, John Wiley.
2. Fundamentals of Molecular Spectroscopy, C.N. Banwell.
3. Spectroscopy, B.K. Sharma, Goel Publication.
4. Organic Spectroscopy: Principles and Application, Jag Mohan, Narosa Publication.
5. Spectroscopic Methods in Organic Chemistry, D.H. Williams & I. Fleming, Tata Mcgraw-Hill Publication.
6. Spectrophotometric Identification of Organic Compounds, R.M. Silverstein & F.X. Webster, John Wiley Publications.

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**PAPER NO. CH - 11**  
**LABORATORY COURSE –III**

**Max. Marks 100**

1. **GENERAL METHODS OF SEPARATION AND PURIFICATION OF ORGANIC COMPOUNDS WITH SPECIAL REFERENCE TO:**  
Solvent Extraction  
Fractional Crystallisation
2. **DISTILLATION TECHNIQUES:**  
Simple distillation, steam distillation, Fractional distillation and distillation under reduced pressure.
3. **ANALYSIS OF ORGANIC BINARY MIXTURE:**  
Separation and Identification of organic binary mixtures containing at least one component with two substituents.  
(A student is expected to analyse at least 10 different binary mixtures.)
4. **PREPARATION OF ORGANIC COMPOUNDS: SINGLE STAGE PREPARATIONS.**
  - 1) **Acetylation:** Synthesis of  $\beta$ -Naphthyl acetate from  $\beta$ -Naphthol / Hydroquinone diacetate from Hydroquinone.
  - 2) **Aldol condensation:** Dibenzal acetone from benzaldehyde.
  - 3) **Bromination:** p-Bromoacetanilide from acetanilide.
  - 4) **Cannizzaro Reaction:** Benzoic acid and Benzyl alcohol from benzaldehyde.
  - 5) **Friedel Crafts Reaction:** O-Benzoyl Benzoic acid from phthalic anhydride.
  - 6) **Grignard Reaction:** Synthesis of triphenyl methanol from benzoic acid,
  - 7) **Oxidation:** Adipic acid by chromic acid oxidation of cyclohexanol.
  - 8) **Perkin's Reaction:** Cinnamic acid from benzaldehyde.
  - 9) **Sandmeyer Reaction:** p-Chlorotoluene from p-toluidine/o-Chlorobenzoic acid from anthranilic acid.
  - 10) **Schotten Baumann Reaction:**  $\beta$ -Naphthyl benzoate from :  $\beta$ -Naphthol / Phenyl benzoate from phenol.
  - 11) **Sulphonation Reaction:** Sulphanilic acid from aniline.

**BOOK SUGGESTED :**

1. Practical Organic chemistry by A. I. Vogel.
2. Practical Organic chemistry by Mann and Saunders.
3. Practical Organic chemistry by Garg and Saluja.
4. The Systematic Identification of Organic compounds, R.L. Shriner and D.Y. Curtin.
5. Semimicro Qualitative Organic Analysis, N.D. Cheronis, J.B. Entrikin and E.M. Hodnett.
6. Practical Physical chemistry by Alexander Findlay.
7. Experimental Physical chemistry, D. P. Shoemaker, G. W. Garland and J. W. Niber, McGraw Hill Interscience.
8. Findlay's Practical Physical chemistry, revised B

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**PAPER NO. CH –12**  
**LABORATORY COURSE –IV**

**Max. Marks 100**

**I. ERROR ANALYSIS AND STATISTICAL DATA ANALYSIS**

1. Linear Regression Analysis
2. Curve Fitting
3. Student "t" Test
4. Data Analysis Using Basic Statistical Parameters
5. Calibration of volumetric Apparatus, Burette, Pipette, Weighing Box etc.

**II. USE OF COMPUTER PROGRAMMES**

The students will learn how to operate a PC and how to run standard programmes and packages. Execution of linear regression, X-Y plot, numerical integration and differentiation as well as differential equation solution programmes. Monte Carlo and Molecular dynamics. Programmes with data preferably from physical chemistry laboratory. Further, the student will operate one or two of the packages such as MICROSOFT EXCEL, WORD, POWERPOINT, SPSS, ORIGIN, MATLAB, EASYPLOT.

**III. A. FLAME PHOTOMETRIC DETERMINATIONS**

1. Sodium and potassium when present together.
2. Sodium/potassium in solid samples.
3. Solid Sodium and Potassium in Liquid Samples.
4. Lithium/calcium/barium/strontium.
5. Cadmium and magnesium in tap water.

**B. NEPHELOMETRIC DETERMINATIONS**

1. Sulphate
2. Phosphate
3. Silver

**IV. ELECTROPHORESIS**

1. To separate cations of inorganic salts by paper electrophoresis.
2. Capillary Electrophoresis of water soluble Vitamins.

**V. SPECTROSCOPY**

1. Verification of Beer's Lambert Law.
2. Determination of stoichiometry and stability constant of inorganic (e.g. ferric-salicylic acid) and organic (e.g. amine-iodine) complexes, thiocyanate.
3. Characterization of the complexes by electronic and IR, UV spectral data.
4. Determination of Indicator constant ( $pK_a$ ) of methyl red.

**BOOKS SUGGESTED:**

1. Computer and Common Sense, R. Hunt and J. Shelley, Prentice Hall.
2. Computational Chemistry, A.C. Norris.
3. Microcomputer Quantum Mechanics, J.P. Killingbeck, Adam Hilger.
4. Computer Programming in FORTRAN IV, V. Rajaraman, Prentice Hall.
5. An Introduction to Digital Computer Design, V. Rajaraman and T. Radhakrishnan, Prentice Hall.
6. Experiments in Chemistry, D.V. Jagirgar.



### THIRD SEMESTER

### PAPER NO. CH - 13

### RESONANCE SPECTROSCOPY, PHOTOCHEMISTRY AND ORGANOCATALYSIS

Max. Marks 80

#### UNIT –I

- A. **ELECTRON SPIN RESONANCE SPECTROSCOPY:** Hyperfine coupling, spin polarization for atoms and transition metal ions, spin-orbit coupling and significance of g-tensors, application to transition metal complexes (having one unpaired electron).
- B. **NUCLEAR QUADRUPOLE RESONANCE SPECTROSCOPY:** Quadrupole nuclei, quadrupole moments, electric field gradient, coupling constant, splittings, applications.

#### UNIT –II

- A. **PHOTOELECTRON SPECTROSCOPY:** Basic principle for atoms and molecules; Photo-electric effect, ionization process, Koopman's theorem, Augerelectron spectroscopy, Determination of Dipole moment. Photoelectron spectra of simple molecules-ESCA.
- B. **PHOTOACOUSTIC SPECTROSCOPY:** Basic principle of Photo acoustic Spectroscopy (PAS), PAS –gases and condensed system. Chemical and Surface applications.

#### UNIT –III

- A. **PHOTOCHEMICAL REACTIONS:** Interaction of electromagnetic radiation with matter, Stern Volmer equation, types of excitations, fate of excited molecule, quantum yield, transfer of excitation energy, Actinometry.
- B. **DETERMINATION OF REACTION MECHANISM:** Classification, rate constants and life times of reactive energy states –determination of rate constants of reactions. Effect of light intensity on the rate of photo chemical reactions.
- C. **MISCELLANEOUS PHOTOCHEMICAL REACTIONS:** Photo-Fries reactions of anilides, Photo-Fries rearrangement. Barton reaction. Singlet molecular oxygen reactions. Photochemical formation of smog. Photo degradation of polymers, Photochemistry of vision.

#### UNIT –IV

##### A. **ORGANOCATALYSIS**

General Principles: Energetic, Catalytic cycles, catalytic efficiency and life time, selectivity. Type of organometallic reaction: Ligand substitution, Oxidative addition, reductive elimination and insertion and de-insertion. Homogeneous catalysis: Hydrogenation of alkenes, Hydroformylation, Monosubstituted acetic acid synthesis, Wacker oxidation of alkenes. Alkenes metathesis, Palladium-Catalysed C-C bond forming reactions, asymmetric oxidation. Heterogeneous catalysis: The nature of heterogeneous catalysts, Fischer-Tropsch synthesis, alkene polymerization

#### BOOK SUGGESTED:

1. Infrared and Raman Spectra: Inorganic and Coordination Compounds, K.Nakamoto, Wiley.
2. Fundamentals of Photochemistry, K.K.Rohtagi-Mukherji, Wiley-Eastern.
3. Essentials of Molecular Photochemistry, A.Gilbert and J. Baggott, Blackwell Scientific Publications.
4. Molecular Photochemistry, N.J. Turro, W.A.Benjamin.
5. Introductory Photochemistry, A. Cox and T. Camp, McGraw-Hill.
6. Photochemistry, R.P. Kundall and A. Gilbert, Thomson Nelson.
7. Application of Spectroscopy of Organic Compounds, J.R.Dyer, Prentice Hall.
8. Photochemistry, R.P. Kundall and A. Gilbert, Thomson Nelson.
9. Organic Photochemistry, J.Coxon and B.Halton, Cambridge University Press.
10. Shriver & Atkins Inorganic Chemistry: P.Atkins, T.Overtone, J.Rourke, M.Weller, F.Armstrong Oxford University Press
11. Inorganic Chemistry: C.E.Housecroft, A.G.Sharpe, Pearson Education Limited.
12. Inorganic Chemistry: Principles of Structure and Reactivity: J.E.Huheey, Keiter, OMedhi, Pearson Education
13. Organometallic Chemistry: A Unified Approach: R.C.Mehrotra, A.Singh, New Age Publishers.

**PAPER NO. CH - 14**  
**CHEMISTRY OF BIOMOLECULES**

**Max. Marks 80**

**UNIT –I**

- A. **BIOENERGETICS:** Standard free energy change in biochemical reactions, exergonic, endergonic. Hydrolysis of ATP, synthesis of ATP from ADP.
- B. **ELECTRON TRANSFER IN BIOLOGY:** Structure and function of metalloproteins in electron transport processes—cytochromes and iron-sulphur proteins, synthetic models.
- C. **TRANSPORT AND STORAGE OF DIOXYGEN:** Heme proteins and oxygen uptake, structure and function of haemoglobin, myoglobin, haemocyanins and haemerythrin, model synthetic complexes of iron, cobalt and copper.

**UNIT –II**


- A. **METALLOENZYMES:** Zinc enzymes –carboxypeptidase and carbonic anhydrase. Iron enzymes – catalase, peroxidase and cytochrome P-450. Copper enzymes- superoxide dismutase. Molybdenum oxotransferase enzymes –xanthineoxidase.
- B. **ENZYME MODELS:** Host-guest chemistry, chiral recognition and catalysis, molecular recognition, molecular asymmetry and prochirality. Biomimetic chemistry, Cyclodextrin-based enzyme models, calixarenes, ionophores, synthetic enzymes or synzymes.

**UNIT –III**

- A. **ENZYMES:** Nomenclature and classification of Enzyme. Induced fit hypothesis, concept and identification of active site by the use of inhibitors.
- B. **CO-ENZYME CHEMISTRY:** Structure and biological functions of coenzyme A, thiamine pyrophosphate, pyridoxal phosphate, NAD<sup>+</sup>, NADP<sup>+</sup>, FMN, FAD, lipoic acid, vitamin B<sub>12</sub>.
- C. **BIOTECHNOLOGICAL APPLICATIONS OF ENZYMES:** Techniques and methods of immobilization of enzymes, effect of immobilization on enzyme activity, application of immobilization enzymes in medicine and industry. Enzymes and Recombinant DNA Technology.

**UNIT –IV**

- A. **BIOPOLYMER INTERACTIONS:** forces involved in biopolymer interaction. Electrostatic charges and molecular expansion, hydrophobic forces, dispersion force interactions. Multiple equilibria and various types of binding processes in biological systems. Hydrogen ion titration curves.
- B. **THERMODYNAMICS OF BIOPOLYMER SOLUTIONS:** Thermodynamics of biopolymer solution, osmotic pressure, membrane equilibrium, muscular contraction and energy generation in mechanochemical system.
- C. **CELL MEMBRANE AND TRANSPORT OF IONS:** Structure and functions of cell membrane, ion transport through cell membrane, irreversible thermodynamic treatment of membrane transport and Nerve conduction.

  
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## BOOKS SUGGESTED:

1. Principles of Bioinorganic Chemistry, S.J.Lippard and J.M.Berg, University Science Books.
2. Bioinorganic Chemistry, I.Bertini, H.B.Gray, S.L.Lippard and J.S.Valentine, University Science Books.
3. Inorganic Biochemistry vols II and I. Ed G.L. Eichhorn, Elsevier.
4. Principles of Bioinorganic Chemistry, S.J.Lippard and J.M.Berg, University Science Books.
5. Bioinorganic Chemistry, I.Bertini, H.B.Gary, S.J.Lippard and J.S.Valentine, University Science.
6. Inorganic Biochemistry vols I and II ed. G.L. Eichhorn, Elsevier.
7. Bioorganic Chemistry: A Chemical Approach to Enzyme Action, Hermann Dugas and C. Penny, Springer-verlag.
8. Understanding Enzymes, Trevor palmer, Prentice Hall.
9. Enzyme Chemistry: Impact and Applications, Ed. Collin J Suckling, Chapman and Hall.
10. Enzyme Mechanisms Ed, M.I. Page and A. Williams, Royal Society of Chemistry.
11. Fundamentals of Enzymology, N.C. Price and L. Stevens, Oxford University Press.
12. Immobilized Enzymes: An Introduction and Applications in Biotechnology, Michael D. Trevan, and John Wiley.
13. Enzymatic Reaction Mechanisms, C. Walsh, W.H. Freeman.
14. Enzyme Structure and Mechanisms, A. Fersht, W.H. Freeman.
15. Biochemistry: The Chemical Reactions of Living Cells, D.E. Metzler, Academic Press.
16. Principles of Biochemistry, A.L. Lehninger, Wroth Publishers.
17. Biochemistry, L. Stryer, W.H. Freeman.
18. Biochemistry, J. David Rawn, Neil Patterson.
19. Biochemistry, Voet and Voet, John Wiley.
20. Outlines of Biochemistry, E.E. Conn and P.K. Stumpf, John Wiley.
21. Bioorganic Chemistry : A Chemistry Approach to Enzyme Action, H. Dugas and C. Penny, Springer- Verlag.
22. Biochemistry and Molecular Biology of Plants, Buchanan, Griseham and Jones, I.K. International Pvt. Ltd.

*Alkhina*  
24.7.2017

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24.7.17

*Dinesh*  
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24.7.17

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**PAPER NO. CH –15**  
**CATALYSIS, SOLID STATE AND SURFACE CHEMISTRY**

**Max. Marks 80**

**UNIT –I**

**ACIDS, BASES, ELECTROPHILES, NUCLEOPHILES AND CATALYSIS :**

Acid-base dissociation, Electronic and structural effects, acidity and basicity. Acidity function and their applications. Hard and soft acids and bases. Nucleophilicity scales. Nucleofugacity. The alpha effect. Ambivalent Nucleophilies. Acid base catalysis-specific and general catalysis. Bronsted catalysis, Enzyme Catalysis.

**UNIT –II**

**MICELLES AND ADSORPTION :**

Micelles : Classification of surface active agents, micellization, hydrophobic interaction, critical micellar concentration (CMC), factors affecting the CMC of Surfactants. Thermodynamics of micellization - phase separation and mass action models. Reverse micells, micro-emulsion. Micellar Catalysis, Surface tension capillary action, pressure difference across curved surface (Laplace equation), vapour pressure of droplets(Kelvinequation), Gibbsadsorptionisotherm.

**UNIT –III**

**SOLID STATE CHEMISTRY - I :**

Crystal defects and Non-stoichiometry - Perfect and imperfect crystals, intrinsic and extrinsic defects - point defect, line and plane defects, vacancies - Schottky defects and Frankel defects. Thermodynamics of Schottky and Frenkel defect, formation of color centres, non-stoichiometry and defects. Electronic properties and Band theory of semiconductors.

**UNIT –IV**

**MACROMOLECULES :**

Polymer - Definition types of polymers, electrically conducting, fire resistant, liquid crystal polymers, kinetics of polymerization, mechanism of polymerization.

Molecular mass, average molecular mass molecular mass determination (Osmometry, Viscometry, diffusion and light scattering methods), Sedimentation, chain configuration of macromolecules calculation of average dimensions of various chain structures.

**BOOKS SUGGESTED :**

1. G.W.Castellan, "Physical Chemistry", Addison-Lesley Publishing Co.
2. E.A. Moelwyn Hughes, "Physical Chemistry", PergamonPress.
3. Denbigh, "Chemical Equilibria", D. VanNostrand.
4. J. Rose, "Dynamic Physical Chemistry" Sir Issac Pitman andSons.
5. Solid state"Chemistry and its Applications, A.R. West, Plenum.
6. Principle of Solid State H.V. Kar, WileyEastern.
7. Solid State Chemists, D.K.Chakrabarty, New Age International(P)Ltd.
8. Micelles, Theoretical and Applied Aspects, V. MoralPlenum.
9. The Chemistry Mathematics Book, E. Steiner, Oxford University Press.
10. Mathematics for Chemistry, Doggett and Sutcliffe, Longman.
11. Mathematical Preparation for Physical Chemistry, F.Daniels, McGrawHill.
12. Chemical Mathematics, D.M. Hirst, Longman.
13. Applied Mathematics for Physical Chemistry, J.R.Barrante, PrenticeHall.
14. Basic Mathematics for Chemists, Tebbutt, Wiley.
15. Quantum Chemistry, Ira N. Levine, Prentice Hall.
16. Introduction to Quantum Chemistry, A.K.Chandra, Tata McGrawHill.

*Handwritten signatures and dates:*  
24.7.2017, 24.7.17, 24.7.17, 24.7.17, 24.7.17, 24.7.17



**PAPER NO. CH –16**  
**ANALYTICAL TECHNIQUES AND DATA ANALYSIS**

**Max. Marks 80**

**UNIT –I**

**SAMPLE PREPARATION, DIGESTION AND STATISTICAL ANALYSIS**

- A. Sampling - Collection, Preservation and preparation of sample, Techniques of sampling solids, liquids and gases, Operation of drying and preparing a solution of the analyte.  
Principle, methodology and application of different types of digestions such as acid digestion, base digestion, enzymatic and microwave digestion for liquid and solid materials.
- B. Evolution and procession of Analytical Data, Precision and Accuracy, Types of Errors, Propagation of errors, Normal Distribution Curve, Standard deviation, Confidence limit, Graphical presentation of result-method of average, Method of Linear least square, Significant figures, Statistical aid to hypothesis testing-t-test, F-test, Correlation coefficient, Rejection of data.

**UNIT –II**

**SEPARATION TECHNIQUES**

- A. Efficiency of extraction, Selectivity of extraction, Extraction system, Method of Extraction, applications.
- B. Principle, classification of chromatographic techniques, Technique and applications of paper chromatographic, Thin-layer chromatographic, HPLC, Column chromatography. Gas Chromatography

**UNIT –III**

**THERMAL AND AUTOMATED METHODS**

- A. Principle, Instrumentation, Application of TGA, DTA and DSC methods.
- B. Automated methods, Principle, instrumentation and application of low injection analysis.

**UNIT –IV**

**ELECTROCHEMISTRY**

- A. Principles and instrumentation of pH potentiometry, coulometry and conductometry.
- B. Basic principles, Diffusion current, polarized electrode, Micro electrode, Dropping Mercury Electrode Ilkovic equation, Polarographic wave, Qualitative analysis Stripping methods, Cyclic Voltammetry, Amperometric titration:- curves, Differential pulse polarography and Squarewave polarography.

**BOOK SUGGESTED :**

1. Fundamental of Analytical Chemistry- Skoog D.A. and West D.M.
2. Saunders, College Publication.
3. Textbook of Quantitative Inorganic Analysis-Vogel A.I.
4. Principles and Practice of Analytical Chemistry-Fifield F. Wand Kealey
5. D. Black well Science
6. Instrumental Analysis R. Braun, McGraw Hill, International Edition.
7. Analytical Chemistry, Christian, G.D., WSE/Wiley.
8. Instrumental Analysis, Willard Meritt Dean, CBS.
9. Chemical Analysis, Brawn, McGraw Hill.
10. Fundamental of Analytical Chemistry-Skoog D.A. and West D.M.
11. Principles of instrumental analysis, Skoog Holler -Niemann.
12. Instrumental analysis, Wizard Dean and Merit.
13. Principle and PRACTICAL analytical chemistry, Fifield and Kealey.

**PAPER NO. CH - 17**  
**LABORATORY COURSE-V**


**Max. Marks 100**

1. Determination of the partition coefficient for iodine between carbontetrachloride & (a) Water, (b) Aqueous potassium iodide.
2. Study of kinetics of exchange between ethyl iodide & the iodide ion.
3. Determination of the solubility product of lead iodide.
4. Determination of the dissociation constant of Barium Nitrate.
5. Determination of the concentration of iodine in a given sample (KI), by isotope dilution technique.
6. To study the effect of temperature, concentration of the reactant and catalyst on the rate of a chemical reaction (Hydrolysis/Nucleophilic Substitution).
7. To study Reaction between Sodium Formate and Iodine by
  - (i) Volumetric Method.
  - (ii) Conductometric Method.
8. Saponification of ethyl acetate
  - (i) Volumetric Method.
  - (ii) Conductometric Method.
9. To study the reaction between Acetone and Iodine.
10. To study the autocatalytic reaction between  $\text{KMnO}_4$  and Oxalic acid.
11. To study the reaction between  $\text{K}_2\text{S}_2\text{O}_8$  and Iodine.
12. Determination of  $\text{pK}_a$  by Kinetic Measurement.
13. Evaluation of Equilibrium constants from kinetic data.
14. Determination of rate constant of the decomposition of benzene diazonium chloride at different temperature.
15. To study the photolysis of uranyl oxalate.
16. To study the effect of substrate catalyst etc (i)  $\text{HCl}$ ,  $\text{K}_2\text{S}_2\text{O}_8$  (ii)  $\text{KOH}$ ,  $\text{NaOH}$ .
17. To study the Activation parameters.
18. To study the solvent effect using some Aprotic & Protic Solvents.
19. To examine the substituent effect (Hammett equation).
20. To study the effect of Electrolyte on the rate hydrolysis ( $\text{KCl}$ ,  $\text{NaCl}$ , )
21. To study some simple enzyme catalyzed reaction.
22. To study the Micellar Catalyzed Reaction.

❖ Some advanced level sophisticated instrument based (FTIR, NMR, GC-MS, AAS, FLUORESCENCE SPECTROPHOTOMETER, TENSIMETER etc.) experiments may be given to the students

**BOOK SUGGESTED:**

1. Practical Physical Chemistry by Alexander Findlay.
2. Experimental Physical Chemistry, D.P. Shoemaker, C.W. Garland and J.W. Niber, McGraw Hill Inter science.
3. Findlay's Physical Chemistry, revised B. Phys. Levitt, Longman.



LABORATORY COURSE –VI

Max. Marks 100

**A. SPECTROPHOTOMETRIC DETERMINATIONS**

- I. Manganese / Chromium, Vanadium in steel sample.
- II. Nickel / Molybdenum / Tungsten / Vanadium / Uranium by extractive spectrophotometric method.
- III. Fluoride / Nitrate / Phosphate.
- IV. Iron – phenanthro line complex; Job's Method for determination of stability constant of complex.
- V. Zirconium –Alizarin Red –S complex: Mole-ratiomethod.
- VI. Copper –Ethylenediamine complex: Slope-ratiomethod.

**B. pHMETRY**

Stepwise proton-ligand and metal-ligand stability constant of complexes by Leving – Rossoti methods.

**C. POLAROGRAPHY**

Composition and stability constant of complexes.

**D. FLAME PHOTOMETRIC DETERMINATIONS.**

- (i) Sodium and potassium when present together
- (ii) Lithium / calcium / barium / strontium.
- (iii) Calcium and magnesium in tapwater.

**E. REFRACTOMETRY**

1. Determination of the specific and molar refraction of a given liquid by Abbe Refractometer.
2. Determine the variation of refractive index.
3. To verify law of refraction of mixture (glycerol + water).

**F. SEPARATION AND QUANTITATIVE ESTIMATION OF BINARY AND TERNARY MIXTURES BY THE USE OF FOLLOWING SEPARATION TECHNIQUES:**

1. Paper chromatography –Cadmium and Zinc, Zinc and Magnesium.
2. Thin-layer chromatography –separation of nickel, manganese, cobalt and zinc.
3. Ion-exchange.
4. Solvent extraction.
5. Electro phoretic separation.

❖ Some advanced level sophisticated instrument based (FTIR, NMR, GC-MS, AAS, FLUORESCENCE SPECTROPHOTOMETER, TENSIO METER etc.) experiments may be given to the students

**BOOK SUGGESTED:**

1. Quantitative Inorganic Analysis, A.I.Vogel.
2. Test book of quantitative chemical analysis, A.I.Vogel.
3. Practical Physical chemistry, A.M. James and F.E. Prichard, Longman.
4. Findley's Practical Physical Chemistry, B.P.Levi
5. Experimental Physical Chemistry, R.C.Das and B.Behera, Tata McGraw Hill.

*[Handwritten signatures and dates: 24.7.2017, 24.7.17, 24.7.17, 24.7.17, 24.7.17]*

**FOURTH SEMESTER**  
**PAPER NO. CH - 19**  
**INSTRUMENTAL METHODS OF ANALYSIS**

**Max. Marks 80**

**UNIT –I**

**ADVANCED CHROMATOGRAPHY :**

- A. Ion chromatography: Ion exchange equilibrium, Ion-exchange packing and Inorganic Applications.
- B. Size exclusion chromatography : Column packing, Theory of size of exclusion chromatography and applications.
- C. Supercritical fluid chromatography : Properties of supercritical fluid SFC-Instrumentation and operating variables, comparison with other types of chromatography, applications.
- D. Capillary Electrophoresis and capillary electrochromatography: overviews and applications

**UNIT –II**

**X-RAY AND PROTON INDUCED SPECTROSCOPY:**

- A. X-Ray fluorescent method: Principles-Characteristics x-ray emission. Instrumentation X-ray tube, radioactive sources. Wave length dispersive instruments. Energy dispersive instruments. Analytical Applications- Qualitative Analysis.
- B. Proton Induced X-Ray Spectroscopy: Theory, instrumentation and application.

**UNIT –III**

**ATOMIC EMISSION SPECTROSCOPY**

- A. Selectivity, sensitivity and interferences of atomic spectroscopy.
- B. Theory, instrumentation and application of flame photometer, AES, ICP-AES and AFS.

**UNIT –IV**

**ATOMIC ABSORPTION SPECTROSCOPY AND HYPHENATED TECHNIQUES**

- A. Theory instrumentation and application of flame and graphite furnace AAS, cold-vapour and hydride generation AAS.
- B. Theory, instrumentation and application of hyphenated techniques i.e. GC/HPLC/-MS, GC/IC/HPLC- ICP-MS.

**BOOKS SUGGESTED:**

- 1. Instrumental methods of analysis, Willard, Meritt and Dean.
- 2. Basic concepts of analytical chemistry, S.M.Khopkar, John Wiley & Sons.
- 3. Metallurgical analysis, S.C.Jain.
- 4. Material Science and Engineering. An Introduction, W.D.Callister, Wiley.
- 5. Material Science, J.C.Anderson, K.D.Leaver, J.M.Alexander and R.D.Rawlings, ELBS.
- 6. Fundamentals of Analytical Chemistry, Skoog, West, Holler and Crouch Thomson Learning Inc.



**PAPER NO. CH - 20**  
**NATURAL PRODUCT AND MEDICINAL CHEMISTRY**

Max. Marks 80

**UNIT-I**

- A. **Terpenoids and Carotenoids:** Classification, nomenclature, occurrence, isolation, general methods of structure determination of Citral, Geraniol,  $\alpha$ -Terpineol, Menthol, Farnesol, Zingiberene, Santonin, Phytol, Abietic acid and  $\beta$ -Carotene.
- B. **Alkaloids:** Definition, nomenclature and physiological action, occurrence, isolation, general methods of structure elucidation, degradation, classification based on Nitrogen heterocyclic ring, role of alkaloids in plant. Synthesis and biosynthesis of the following: Ephedrine, (+)-Conine, Nicotine, Atropine, Quinine and Morphine.

**UNIT-II**

- A. **Steroids:** Isolation, structure determination and synthesis of Cholesterol, Bile acids, Androsterone, Testosterone, Estrone, Progesterone, Aldosterone and Biosynthesis of cholesterol.
- B. **Plant Pigments:** Occurrence, nomenclature and general method of structure determination. Isolation and synthesis of Apigenin, Luteolin, Quercetin, Myricetin, Quercetin-3-glucoside, Vitexin, Diadzein, Butein, Aurotin, Cyanidin, Hirsutin.

**UNIT- III**

**Drug Design**

- A. Development of new drugs procedures followed in drug design, concepts of lead compound and lead modification, concepts of prodrugs and soft drugs, Structure-Activity Relationship (SAR), Factors affecting bioactivity, resonance, inductive effect. Theories of drug activity: occupancy theory, rate theory, induced fit theory. Quantitative Structure Activity Relationship (QSAR)-Hansch approach-free Wilson model, relationship between free Wilson and Hans analysis
- B. Concepts of drug receptors, lipophilicity, pharmacophore, pharmacological activity and typical range of parameters related to drug likeness.
- C. General introduction of pharmacokinetics and pharmacodynamics.


**UNIT – IV**

- A. **Antineoplastic Agents:** Introduction, Alkylating agents, antimetabolites, carcinolytic antibiotics, mitotic inhibitors.
- B. **Antibiotics:** Constitution and synthesis of penicillins, chloramphenicol, tetracycline and streptomycin.
- C. **Antimalarials:** Synthesis and properties of the following Antimalarial: 8-amino quinolone derivatives- Pamaquine, Primaquine, Pentaquine, Isopentaquine, 4-aminoquinolone derivatives-Santoquine, Camaquine, Acridine derivatives- Meprazine, Azacrin, Pyrimidine and Biguanid derivatives-Paludrine Pyrimethamine.

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**Book Suggested:**

1. Natural Products: Chemistry and Biological Significance, J.Mann, R.S.Davidson, J.B.Hobbs.
2. D.V.Banthrope and J.B.Harbrone, Longman, Essex., Organic Chemistry, Vol.2, I.L.Finar, ELBS.
3. Chemistry, Biological and Pharmacological properties of Medicinal Plants from the Americans, Ed.Kurt Hostettmann,  
M. P. Gupta and A. Marston, Harwood Academic Publishers.
4. Introduction to Flavonoids, B.A.Bhom, Harwood Academic Publishers.
5. New Trends in Natural Product Chemistry, Att-ur-Rahman and M.I.Choudhary, Harwood, Academic Publishers.
6. Insecticides of Natural Origin, SukhDev, Harwood Academic Publishers.
7. Introduction to medicinal Chemistry, A Gringuage, Wiley-VCH.
8. Burger's Medicinal Chemistry-1 (Chapter-9 and Ch-14), Drug Ed. M.E. Discovery, Wolff, John Wiley.
9. The Science of Flavanoids, Erich Grotewold, Springer



**UNIT- I****NON EQUILIBRIUM THERMODYNAMICS:**

Fundamental concepts, Forces and Fluxes, Entropy production, Phenomenological Laws and Onsager's theory for biological systems, coupled reactions.

**UNIT- II****MATERIAL CHEMISTRY:**

Preparation and Properties of Nanoparticles, Materials-Metals, Ceramics (Oxide, carbides, sulphides, nitrides).physical and chemical Methods, Size and Shape controlled Synthesis, Sol-gel methods, Optical Properties, Electrical and Magnetic Properties, Application of Nanoparticles.Characterization of Nanoparticles( SEM, TEMetc.)

**UNIT-III****SUPRAMOLECULAR CHEMISTRY:**

Properties of covalent bonds, bond length, inter bond angles, Force constant, bond and molecular dipole moment, molecular and bond polarizability.

Intermolecular Forces, hydrophobic effects, Electro static, induction, dispersion and resonance energy, Hydrogen bond, Magnetic interactions. Principles of molecular association and organization Biological macromolecules, Molecular receptors and design principal, cryptands, Cyclophanes, calixarenes and cyclodextrins.

Supramolecular reactivity and catalysis.

**UNIT-IV****NUCLEAR AND RADIOCHEMISTRY NUCLEAR THEORY:**

Nuclear cross section and nuclear radii, nuclear shells and magic numbers, theory of nuclear shell model, nuclear potentials, square well and simple harmonic oscillator potentials, application, liquid drop model, semi-empirical mass equation, application and limitations.

**NUCLEAR FISSION:**

Mass, energy and charge distribution of fission products, decay chains, prompt and neutrons, liquid drop model of nuclear fission.

**NUCLEAR ENERGY:**

Nuclear fission, chain reaction, multiplication factor, nuclear reactors

**APPLIED RADIOCHEMISTRY:**

Radioactive isotopes, purity and strength of radioisotopes. Radiochemical principle in the use of tracers, Application of Tracers in Chemical investigations, Physico-chemical methods, Analytical applications, Age determinations, Medical applications, Agricultural application.



**BOOKS SUGGESTED:**

1. Nuclear and Radiochemistry by G.Friedlander, J.W.Kennedy & J.M.Miller, John Witteyand Sons, Ine New York.
2. Source Book anatomic Energy–S.Glasstone, AffiliatedEast–West PressPvt.Ltd. New Delhi.
3. Nuclear Physics by I. Kaplan, Addision –Welsly. Publishing companyLondon.
4. Nuclear Chemistry and its applications, M.Haissinsky, Addision–Welsley, Publishing Company, London.
5. Essentials of Nuclear chemistry, H.J.Arnika, WileyEaternLtd, New Delhi.
6. Molecular Mechanics, U. Burkertand N.L. Allinger, ACS Monograph 177, 1982.
7. Mechanism and Theoryin Organic Chemistry, T.H.LowryandK.C.Richrdson, Harper and Row.
8. Introduction to Theoretical OrganicChemistry and Molecular, Modelling, W.B.Smith, VCH, Weinheim.
9. Physical Organic Chemistry, N.S. Isaacs, ELBS./Longman.
10. Supramolecular Chemistry: concept and Perspectives, J.M. Lehn, VCH.
11. The Chemistry Mathematics Book, E.Steiner, Oxford University Press.
12. Chemical Mathematics, D.M, Hirst, Longman.
13. Applied Mathematics for Physical Chemistry, J.R.Barrante, PrenticeHall.
14. Quantum Chemistry, Ira N. Levine, PrenticeHall.
15. Introduction to Quantum Chemistry, A.K. Chandra, Tata McGrawHill.

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**ENVIRONMENTAL & APPLIED CHEMICAL ANALYSIS****Max. Marks 80****UNIT –I****AIR POLLUTION MONITORING AND ANALYSIS**

Classification of air pollution monitoring levels, air quality, standards and index, monitoring and analysis of selected air borne pollutants: SO<sub>2</sub>, NO<sub>x</sub>, SPM, Volatile organic compounds, Pb, CO<sub>2</sub>, Persistent organic compounds, Hg, carbon and ozone air pollution control devices Viz ESP, scrubber technique, baghouse filters etc. Atmospheric chemistry of acid rains, photochemical smog, greenhouse effect, global warming, ozone hole.

**UNIT –II****SOIL AND WATER POLLUTION**

Soil and water quality standards, monitoring and analysis of selected soil water contaminants: COD, pesticides, heavy metals, POP's, fluoride, cyanide, nitrate, phosphate, oil & grease, Geobiochemical impact of municipal solid waste, steel plants effluent, domestic sewage. Control devices of water pollutants.

**UNIT –III****FOOD ANALYSIS**

- A. Introduction to general Constituents of food, Proximate Constituents and their analysis, Additives- Introduction -Types - Study of preservatives colors and Antioxidants and method of estimation, adulteration - Introduction, Types, Test for adulterants.
- B. Introduction standards composition and analysis of following foods : Wheat, Bread, Biscuits, Jam, Jelly, Honey, Milk, Ice Cream, Butter, Cheese, Milk Powder, Oils and Fats, Tea, Coffee, Soft drinks, Alcoholic beverages, Cereal and pulses, Confectionery, Fruits, Vegetables, Egg, Fish, Meat.

**UNIT –IV****COSMETICS, CLINICAL AND DRUG ANALYSIS**

- A. Introduction of Cosmetics, evaluation of cosmetics materials, raw material and additives, Cosmetics colors, Perfumes in cosmetics, Cosmetics formulating, introduction, standards and methods of analysis, Creams, facepowders, Make-up, Shaving preparations, Bath preparations.
- B. Concepts and principles of analytic methods commonly used in the clinical species: i.e. ammonia, blood urea Nitrogen, Ca, Cl, CO<sub>2</sub>, Fe, K, Li, Mg, Na, P, urea, glucose.  
Method for analysis of proteins (i.e. albumin, bilirubin, creatinine, cholesterol, HDL-cholesterol, triglycerides, creatinine) and Enzymes (i.e. Alanine Aminotransferase, acid phosphatase, alkaline phosphatase, amylase, aspartate, aminotransferase, cholinesterase, lactate, and lipase).

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**BOOKS SUGGESTED :**

1. Environmental Chemistry, S.E. Manahan, Lewis Publishers.
2. Environmental chemistry, Sharma and Kaur, Krishna Publishers.
3. Environmental Chemistry, A.K. De, Wiley Eastern.
4. Environmental Chemistry, Analysis, S.M. Khopkar, Wiley Eastern.
5. Standard Method of Chemical Analysis, F.J.Welcher Vol.III, VanNostr and ReinholdCo.
6. Environmental Toxicology, Ed.J.Rose, Gordon and Breach Science Publication.
7. Environmental Chemistry, C. Baird, W.H.Freeman.
8. Analytical chemistry, G.D. Christian, J.Wiley.
9. Fundamentals of Analytical Chemistry, D.A.Skoog, D.m.West and F.J.Holler, W.B.Saunders.
10. Analytical Chemistry - Principles, J.H. Kennedy, W.Saunders.
11. Analytical Chemistry-Principles, and Techniques, L.G.hargis, PrenticeHall.
12. Principles of Instrumental Analysis, D.A.Skoog and J.L.Loary, W.B.Saunders.
13. Principles of Instrumental Analysis, D.A.Skoog, W.B.Saunders.
14. Quantitative Analysis, R.A.Day, Jr.and A.L.Underwood, PrenticeHall.
15. Environmental Solution Analysis, S.M. Khopkar, WileyEastern. Basic Concepts of Analytical Chemistry, S.M. Khopkar, WileyEastern.
16. Handbook of Instrumental Techniques for Analytical Chemistry, F.Settle, Prentice Hall.
17. Environmental Biotechnology, Indushekhhar Thakur, I.K.International Pvt.Ltd.
18. Fundamental of Analytical Chemistry D.A. Skoog, D.m. West, F.J. Holler and S.R. Crouch, Thompson Learning Inc.
19. APHA, 1977, "Methods of air c Health Sampling Association Washington and – Analysis US.

A row of six handwritten signatures and dates. From left to right: 1. Signature 'A. Sharma' with date '24.7.2017'. 2. Signature 'A. Sharma' with date '24.7.17'. 3. Signature 'A. Sharma' with date '24.7.17'. 4. Signature 'A. Sharma' with date '24.7.17'. 5. Signature 'A. Sharma' with date '24.7.17'. 6. Signature 'A. Sharma' with date '24.7.17'.

**OPTIONAL PAPERS** CH-22a  
**CHEMISTRY OF SURFACTANTS**

**UNIT- I**

**OVERVIEW OF SURFACTANTS:** Classification of Surfactants, Physicochemical Properties of Surfactants, Critical Micelle Concentration, Determination, Effect of Additives, Aggregate Shapes , Structure and Morphology, Novel and New Generation Surfactants, Aggregation Behavior.

**UNIT-II**

**PRINCIPLES OF SELF-ASSEMBLY:** Closed and Continuous Association, Surfactant Micellization Pseudo-Phase Model, Mass Action Model, Estimation of Micelle Size, Size Dispersion of Micelles, Concentration Dependence of Micelle Size, Phase Behavior, Aggregation Behavior.

**UNIT-III**

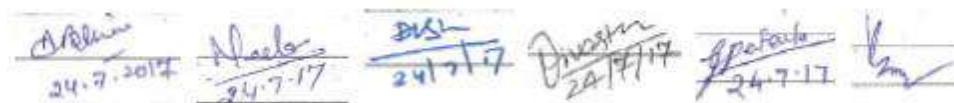
**SURFACTANT MIXTURES:** Ideal and Non-Ideal Mixed Micelles, Regular Solution Model Size and Composition Distribution of Aggregates, Nonionic –ionic Surfactant Mixtures, Ionic -Ionic Surfactant Mixtures, Origin of Ideal and Non-Ideal Mixing Behavior, Polymer Surfactant Interaction.

**UNIT-IV**

**APPLICATIONS OF SURFACTANTS:** Micellar Catalysis, Quantitative Models, Micellar Enzymology, Phenomenon of Solubilization , Solubilization in Mixed Micelles, Drug Surfactant Interaction, Protein Surfactant Interactions, Microemulsions and its applications, Industrial Application of Surfactants.

**BOOKS SUGGESTED:**

1. Surfactants Edited by Th. F. Tadros, Academic Press.
2. Micelles: Theoretical and Applied Aspects by Y.Moroi.
3. Chemistry and Technology of Surfactants by R. J. FarnWiley

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**UNIT I****GENERIC METHODOLOGIES FOR NANOCHEMISTRY AND NANOTECHNOLOGY**

Introduction and classification, What is nanotechnology?, Classification of nanostructures, Nanoscale architecture, Summary of the electronic properties of atoms and solids, The isolated atom, Bonding between atoms, Giant molecular solids, The free electron model and energy bands, Crystalline solids, Periodicity of crystal lattices, Electronic conduction, Effects of the nanometre length scale, Changes to the system total energy, Changes to the system structure, How nanoscale dimensions affect properties

**UNIT -II****MATERIAL CHEMISTRY**

Preparation and Properties of Nanoparticles, Materials-Metals, Ceramics (Oxide, carbides, sulphides, nitrides). physical and chemical Methods, Size and Shape controlled Synthesis, Sol-gel methods, Optical Properties, Electrical and Magnetic Properties, Application of Nanoparticles.

**UNIT-III****CHARACTERIZATION METHODS**

X-ray diffraction, Debye-Scherrer formula, dislocation density, micro strain, Synchrotron Radiation, Principle and Applications, Raman Spectroscopy and its Applications, Dynamic Light Scattering (DLS). Electron microscopes: scanning electron microscope (SEM), transmission electron microscope (TEM), atomic force microscope (AFM), scanning tunneling microscope (STM), XPS, Working Principle, Instrumentation and Applications. Differential scanning calorimeter (DSC), Thermogravimetric/Differential Thermal Analyzer (TG/DTA), UV – Visible Spectrophotometer, FTIR, Principle and Applications, Photoluminescence (PL) Spectroscopy.

**UNIT-IV****APPLICATIONS ON NANOCHEMISTRY**

Nanobiology, Introduction, Bio-inspired nanomaterials, Interaction Between Biomolecules and Nanoparticle Surfaces, Different Types of Inorganic Materials Used for the Synthesis of Hybrid Nano-bio Assemblies, Applications of Nano in Biology, Nanoprobes for Analytical Applications, Current Status of Nanobiotechnology, Future Perspectives of Nanobiology; Nanosensors, Electrochemical, Nanobiosensors, Smart Dust; Nanomedicines, Nanodrug Administration Diagnostic and Therapeutic Applications.

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### **BOOKS SUGGESTED :**

1. Nanoparticles: From Theory to Application Edited by Gu"nterSchmid, @ 2004 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim
2. Nanoparticles and Catalysis Edited by Didier Astruc @ 2008 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim
3. Peter Atkins, Tina Overton, Jonathan Rourke, Mark Weller, Fraser Armstrong, Mike HagermanShriver and Atkin's Inorganic Chemistry, Fifth Edition, Oxford, 2010.
4. Nanoscale Science and Technology, Robert W. Kelsall, Ian W. Hamley and Mark Geoghegan, John Wiley & Sons, Ltd., UK, 2005.
5. Introduction to Nanotechnology, Charles P. Poole Jr and Frank J. Owens, Wiley Interscience, 2003.
6. Nano:The Essentials: Understanding Nanoscience and Nanotecnology, T.Pradeep, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2008.
7. Handbook of nanotechnology , Bharat bhushan, Springer
8. Textbook of Nanoscience and Nanotechnology , B.S.Murty, Baldev Raj, James Murday. Springer

The image shows six handwritten signatures, each followed by the date '24.7.17'. The signatures are written in blue ink on a white background. The first signature is 'A. B. ...', the second is 'A. ...', the third is 'B. S. ...', the fourth is 'D. ...', the fifth is 'P. ...', and the sixth is 'V. ...'.

## CH-22c POLYMERS

Max Marks 80

### UNIT-I

#### I Basics

8Hrs

Importance of polymers. Basic concepts: Monomers, repeat units, degree of polymerization. Linear, branched and network polymers. Classification of polymers. Polymerization: condensation. addition. radical chain-ionic and co-ordination and co-polymerization. Polymerization reactions. Polymerization in homogeneous and heterogeneous system.

#### II Polymer Characterization

14Hrs

Polydispersion-average molecular weight concept. Number, weight and viscosity average molecular weights. Polydispersity and molecular weight distribution. The practical significance of molecular weight. Measurement of molecular weights. End-group, viscosity, light scattering, osmotic and ultracentrifugation methods. Analysis and testing of polymers-chemical analysis of polymers, spectroscopic methods, X-ray diffraction study. Microscopy. Thermal analysis and physical testing-tensile strength. Fatigue, impact. Tear resistance. Hardness and abrasion resistance.

### UNIT-II

#### III Structure and Properties

14Hrs

Morphology and order in crystalline polymers-configurations of polymer chains. Crystal structure of polymers. Morphology of crystalline polymers, strain-induced morphology, crystallization and melting. Polymer structure and physical properties-crystalline melting point  $T_m$ - melting point of homogeneous series, effect of chain flexibility and other steric factors, entropy and heat of fusion. The glass transition temperature,  $T_g$ -Relationship between  $T_m$  and  $T_g$ , effects of molecular weight, diluents, chemical structure, chain topology, branching and cross linking. Property requirements and polymer utilization.

#### IV Polymer Processing

12Hrs

Plastics, elastomers and fibres. Compounding. Processing techniques: Calendering, die casting, rotational casting, film casting, injection moulding, extrusion moulding, thermoforming, foaming, reinforcing and fibre spinning.

### UNIT-IV

#### V Properties of Commercial Polymers

12Hrs

Polyethylene, polyvinyl chloride, polyamides, polyesters, phenolic resins, epoxy resins and silicone polymers. Functional polymers- Fire retarding polymers and electrically conducting polymers. Biomedical polymers-contact lenses, dental polymers, artificial heart, kidney, skin and blood cells.

#### BOOKS SUGGESTED

1. Textbook of Polymer Science, F W . Billmeyer Jr. Wiley
2. Polymer Science, V R Gowarikar, N V Viswanathan and J Sreedhar, Wiley Eastern
3. Contemporary Polymer Chemistry, H R Alcock and F W Lambe, Prentice Hall.
4. Physics and Chemistry of Polymers, JMG Cowie, Blackie Academic and Professional.
5. Polymer Chemistry introduction , Malcom T Stevens, Addison-Wesley Educational Publishers Inc.

*Handwritten signatures and dates:*  
24.7.2017, 24.7.17, 24.7.17, 24.7.17, 24.7.17, 24.7.17

**A. MULTI - STEP SYNTHESIS OF ORGANIC COMPOUNDS**

- (i) Beckmann Rearrangement: Benzanilide from benzene (Benzene Benzophenone Benzo phenoneoxime Benzanilide).
- (ii) Benzilic Acid Rearrangement: Benzilic acid from Benzoin (Benzoin Benzil Benzilic acid)
- (iii) Skraup's synthesis (Synthesis of heterocyclic Quinoline from o – Aminophenol)
- (iv) p –Bromoaniline from Aniline (Aniline Acetanilide p - Bromoacetanilide p - Bromoaniline)
- (v) p –Nitroacetanilide from Acetanilide (Aniline Acetanilide p - Nitroacetanilide p - Nitroaniline)
- (vi) m –Nitroaniline from Benzene (Benzene Nitrobenzene m - dinitrobenzene m - nitroaniline)
- (vii) Acridone from Anthranilic acid (Anthranilic acid o - Chlorobenzoic acid N - Phenylanthranilic acid Acridone)
- (viii) Enzymatic Synthesis  
Enzymatic reduction : Reduction of ethylceenantiomeric excess of S(+) ethyl - 3 - hydroxybutanone and determine its optical purity.

**B. QUANTITATIVE ORGANIC ANALYSIS**

- (i) Estimation of Sulphur by Messenger's Method.
- (ii) Estimation of Nitrogen by Kjeldahl Method.

**C. ESTIMATION OF FUNCTIONAL GROUP**

- (i) Estimation of Aniline.
- (ii) Estimation of Amino Group By Acetylation Method.
- (iii) Estimation of Hydroxyl Group By Acetylation Method.
- (iv) Estimation of Carbonyl Group By Hydrazone Formation Method.
- (v) Estimation of Carboxyl Group By Titration Method.
- (vi) Determination of Equivalent Weight of Carboxylic Acid By Silver Salt Method.
- (vii) Estimation of Glucose By Fehling Solution Method.
- (viii) Estimation of Glycine By Titration Method.

**D. EXTRACTION OF ORGANIC COMPOUNDS FROM NATURAL SOURCES**

- (i) Isolation of caffeine from leaves.
- (ii) Isolation of Casein from milk.
- (iii) Isolation of lactose from milk.
- (iv) Isolation of nicotine dipicrate from tobacco.
- (v) Isolation of Cinchonine from cinchona bark.
- (vi) Isolation of Piperine from black pepper.
- (vii) Isolation of Lycopene from tomatoes.
- (viii) Isolation of  $\beta$ -Carotene from carrots.
- (ix) Isolation of Limonene from citrus rinds.
- (x) Isolation of protein and carbohydrates from seeds –colour test
- (xi) Extraction of Fatty oil from seeds and determination of refractive index of the oil.
- (xii) Isolation of protein and carbohydrate (as reducing sugars) from seed –colour test.

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- E. Some advanced level sophisticated instrument based (FTIR, NMR, GC-MS, AAS, FLUORESCENCE SPECTROPHOTOMETER, TENSIO METER etc.) experiments may be given to the students.

**BOOKS SUGGESTED :**

1. Practical Organic chemistry by A. I. Vogel.
2. Practical Organic chemistry by Mann and Saunders.
3. Practical Organic chemistry by Garg and Saluja.
4. The Systematic Identification of Organic compounds, R. L. Shriner and D. Y. Curtin.
5. Semimicro Qualitative Organic Analysis, N. D. Cheronis, J. B. Entrikin and E. M. Hodnett.
6. Experimental Organic chemistry, M. P. Doyle and W. S. Mungall.
7. Small Scale Organic preparation, P. J. Hill.
8. Experimental Biochemistry, by B. S. Roa and V. Deshpande. I. K. International Pvt. Ltd.
9. Comprehensive Practical Organic Chemistry, Preparation and Qualitative Analysis, V. K. Ahluwalia and Renu Aggarwal, University Press.

The image shows six handwritten signatures and dates, likely representing approvals or verifications. From left to right: 1. Signature 'A. Ahluwalia' with date '24.7.2017'. 2. Signature 'N. Cheronis' with date '24.7.17'. 3. Signature 'B. S. Roa' with date '24.7.17'. 4. Signature 'V. Deshpande' with date '24.7.17'. 5. Signature 'R. L. Shriner' with date '24.7.17'. 6. Signature 'D. Y. Curtin' with date '24.7.17'.



**PAPER NO. CH -24**

## LABORATORY COURSE-VIII

Max. Marks 100

### A. TITRIMETRIC/GRAVIMETRIC DETERMINATIONS

- (i) Manganese in iron/Steel by Bismuthate/Lingane-Karplus/Periodate methods.
- (ii) Manganese in pyrolusite ores.
- (iii) Nickel in steel by dimethylglyoxime method.
- (iv) Lead by dithizone precipitation.

## B. SPECTROPHOTOMETRIC DETERMINATION

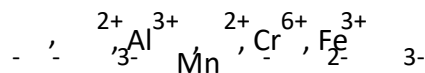
- (i) Maganese/Chromium / Vanadium / Copper / Lead in Steel and Environmental / Industrial effluent samples.
- (ii) Nickel / Molybdenum / Tungsten / Vanadium / Uranium by extractive spectrophotometric methd.
- (iii) Fluoride/Nitrite/Phosphateintap/pond/river industrial waste water.
- (iv) Iron in water samples by thiocyanate and phenanthroline methods.

### C. CHROMATOGRAPHIC SEPARATION

1. Separation and identification of the sugars present in the given mixture of glucose, fructose and sucrose by paper chromatography and determination of  $R_f$  values.
2. Thin layer chromatography – separation of nickel, manganese, cobalt and zinc, Determination of  $R_f$  values.

#### D. FLOW INJECTION ANALYSIS.

Determination of the following anions/cations in synthetic/real/ environmental samples.



- (ii) F, Cl,  $\text{PO}_4$ ,  $\text{NO}_2$ ,  $\text{NO}_3$ ,  $\text{SO}_4$ ,  $\text{BO}_3$  .

### E. ATOMIC ABSORPTIONSPECTROPHOTOMETER

Determination of metal contents (Fe/Pb/As/Zn/Co/Ni etc.) in real and environmental samples.

## F. MISCELLANEOUS

- (i) Nutrient and micronutrient analysis in plant/soil/sediment.
- (ii) Speciation of toxic metals i.e. As, Hg, Se, etc.
- (iii) Analysis of clinical samples i.e. blood, urine, hair, etc.

- ❖ Some advanced level sophisticated instrument based (FTIR, NMR, GC-MS, AAS, FLUORESCENCE SPECTROPHOTOMETER, TENSIMETER etc.) experiments may be given to the students.

**BOOK SUGGESTED :**

1. Quantitative Inorganic Analysis, A.I.Vogel.
2. Standard Methods of Water Analysis.
3. Colorimetric Determination of Traces of Metals, E. B. Sandell.
4. GBC, Manuals on AAS analysis, Austria.

~~Abhinav~~ ~~24.7.2017~~ ~~Abhishek~~ ~~24.7.17~~ ~~Abhishek~~ ~~24.7.17~~ ~~Divyanshu~~ ~~24.7.17~~ ~~Pratik~~ ~~24.7.17~~ ~~h~~

# **DURG VISHWAVIDYALAYA, DURG (C.G.)**

Website - [www.durguniversity.ac.in](http://www.durguniversity.ac.in), Email - [durguniversity@gmail.com](mailto:durguniversity@gmail.com)



## **SCHEME OF EXAMINATION & SYLLABUS of M.Sc. (Physics) Semester Exam UNDER FACULTY OF SCIENCE Session 2017-19**

**(Approved by Board of Studies)  
Effective from July 2017**

# DURG UNIVERSITY

## Syllabus for M.Sc. Physics (Semester System)

### **Semester – I (2017-2018)**

Paper – I	: Mathematical Physics
Paper – II	: Classical Mechanics
Paper – III	: Electrodynamics & Plasma Physics
Paper – IV	: Electronics
Laboratory Course I-A	: General & Optics
Laboratory Course I-B	: Electronics

### **Semester – II (2017-2018)**

Paper – I	: Quantum Mechanics - I
Paper – II	: Statistical Mechanics
Paper – III	: Electronic & Photonic Devices and Optical Modulators
Paper – IV	: Computational Methods & Programming
Laboratory Course I-A	: Numerical Analysis & Computer Programming
Laboratory Course I-B	: Digital Electronics & Microprocessor

### **Semester – III (2017-2018)**

Paper – I	: Quantum Mechanics - II
Paper – II	: Atomic & Molecular Physics
Paper – III	: Solid State Physics - I
Paper – IV	: (A) Astronomy & Astrophysics - I (B) Electronics (Communication) - I (C) Physics of Nano-material - I (D) Space Physics - I
Laboratory Course III-A	: Material Science & General
Laboratory Course III-B	: Astronomy & Astrophysics <b>OR</b> Electronics (Communication) <b>OR</b> Physics of Nano-material <b>OR</b> Space Physics

### **Semester – IV (2017-2018)**

Paper – I	: Nuclear & Particle Physics
Paper – II	: Laser Physics and Applications
Paper – III	: Solid State Physics - II
Paper – IV	: (A) Astronomy & Astrophysics - II (B) Electronics (Communication) - II (C) Physics of Nano-material - II (D) Space Physics - II

Project Work

The Syllabus for M.Sc. Physics (Semester System) is here by  
Approved by the members of the Board of Studies.



## M. Sc. - PHYSICS

M.Sc. in Physics is a full time 2-year (4-semesters course). There will be four theory papers, and two laboratory courses/project in each semester. In each semester, there will be two internal examinations/assessments. Semester-wise course structure along with distribution of marks is given below:

### Semester I

Name of the Paper	Marks					Credits
	Theory		Internal		Total	
	Max	Min	Max	Min		
1. Mathematical Physics	80	16	20	04	100	4
2. Classical Mechanics	80	16	20	04	100	4
3. Electrodynamics & Plasma Physics	80	16	20	04	100	4
4. Electronics	80	16	20	04	100	4
A : General & Optics	-		-		100	2
Laboratory Course I-B : Electronics	-		-		100	2
Total Marks	600					20

**Total Marks for Semester I = 600 & Credit = 20**

### Semester II

Name of the Paper	Marks					Credits
	Theory		Internal		Total	
	Max	Min	Max	Min		
1. Quantum Mechanics-I	80	16	20	04	100	4
2. Statistical Mechanics	80	16	20	04	100	4
3. Electronic & Photonic Devices and Optical Modulators	80	16	20	04	100	4
4. Computational Methods & Programming	80	16	20	04	100	4
Laboratory Course II-A : Numerical Analysis & Computer Programming	-		-		100	2
Laboratory Course II-B : Digital Electronics & Microprocessor	-		-		100	2
Total Marks	600					20

**Total Marks for Semester II = 600 & Credit = 20**



### Semester III

Name of the Paper	Marks				Credits	
	Theory		Internal			Total
	Max	Min	Max	Min		
1. Quantum Mechanics-II	80	16	20	04	100	4
2. Atomic & Molecular Physics	80	16	20	04	100	4
3. Solid State Physics-I	80	16	20	04	100	4
4. (A) Astronomy & Astrophysics-I (B) Electronics (Communication)-I (C) Physics of Nano-material-I (D) Space Physics-I	80	16	20	04	100	4
Laboratory Course III-A Materials Science & General	-		-		100	2
Laboratory Course III-B : Astronomy & Astrophysics <b>OR</b> : Electronics (Communication) <b>OR</b> : Physics of Nano-material <b>OR</b> : Space Physics	-		-		100	2
Total Marks	600					20

**Total Marks for Semester III = 600 & Credit = 20**

### Semester IV

Name of the Paper	Marks					Credits
	Theory		Internal		Total	
	Max	Min	Max	Min		
1. Nuclear & Particle Physics	80	16	20	04	100	4
2. Laser Physics and Applications	80	16	20	04	100	4
3. Solid State Physics -II	80	16	20	04	100	4
4. (A) Astronomy & Astrophysics-II (B) Electronics (Communication)-II (C) Physics of Nano-material-II (D) Space Physics-II	80	16	20	04	100	4
Project Work	-		-		200	4
Total Marks	600					20

**Total Marks for Semester IV = 600 & Credit = 20**



## In Each Semester

MAXIMUM MARKS TOTAL	PASS PER	
	TH.	PR.
600	36	36

In semester IV, Project work in Solid State Physics/ Astronomy & Astrophysics/ Electronics/ Physics of Nano-materials/ Space Physics will lead to specialization in the respective area. It will be primarily based on research oriented topics. On completion of the project, student will submit project report in the form of dissertation which will be examined by an external examiner. The examination of project work shall consist of (a) Presentation and (b) comprehensive viva-voce.

### Marks-distribution for Laboratory Courses and Project Work:

(a) Laboratory courses (Semesters I-III):

Sessional	: 20 Marks
Viva	: 20 Marks
Experiment	: 60 Marks

(b) Project Work (Semester IV) :

Report – Dissertation	: 60 Marks
Presentation	: 100 Marks
Comprehensive viva-voce	: 20 Marks
Internal assessment	: 20 Marks

**Note:** Paper IV of both Semesters III and IV is a major elective course. Student has to opt for any one of the courses: (A) or (B) or (C) or (D). The commencement of any one of the major elective paper is subjected to the availability of basic infrastructural facilities viz. expert faculty, laboratory etc.



## Detailed Course Content

### Semester - I

#### PAPER-I: MATHEMATICAL PHYSICS

**Unit-I:** Vector space and Matrices, Linear independence, Bases, dimensionality, Inner product, Linear transformation, matrices, Inverse, Orthogonal and Unitary matrices, Independent element of a matrix, Eigen values and Eigen Vectors, Diagonalization, Complete orthonormal sets of functions.

**Unit-II:** Complex Variables: Cauchy- Riemann condition, analytic functions, Cauchy's theorem, Cauchy integral formula, Laurent series, singularities, residue theorem, contour integration, evaluation of definite integrals, problems.

**Unit-III:** Differential equations, first order differential equation, second order differential equation with constant coefficients, second order linear ODEs with variable coefficients, Solution by series expansion, nonhomogeneous differential equations and solution by the method of Green's functions.

**Unit-IV:** Special functions, Legendre, Bessel, Hermite and Laguerre functions with their physical applications, generating functions, orthogonality conditions, recursion relations,

**Unit-V:** Integral transforms, Fourier integral and transforms, inversion theorem, Fourier transform of derivatives, convolution theorem, Laplace Transform(LT), LT of Derivatives, Inverse LT, Fourier series; properties and applications, discrete Fourier transform.

#### TEXT AND REFERENCE BOOKS

1. Mathematical Methods for Physics, by G. Arfken.
2. Matrices and Tensors for Physicist, by A. W. Joshi.
3. Advanced Engineering Mathematics, by E. Kroyazig.
4. Special Functions, by E. B. Rainville.
5. Special Functions, by W.W. Bell.
6. Mathematical Method for Physicist and Engineers, by K. F. Relly, M. P. Hobson and S. J. Bence
7. Mathematics for Physicists, By Marry L. Boas.





## Paper - II: CLASSICAL MECHANICS

- Unit-I** Preliminaries, Newtonian mechanics of one and many particle systems, Conservation laws, Constraints & their classification, Principle of virtual work, Generalized coordinates, D'Alembert's principle and Lagrange's equations, Velocity-dependent potentials and dissipation function, Simple applications of the Lagrangian formulation, Hamilton's principle, Lagrange's equations from Hamilton's principle, Conservation theorems and Symmetry properties, Energy function and the conservation of energy.
- Unit-II** The Hamiltonian formulation of mechanics, Legendre transformations and the Hamilton's equations of motion, Cyclic coordinates and Conservation Theorems, Hamilton's equations from Hamilton's principle, The principle of least action, Simple applications of the Hamiltonian formulation.
- Unit-III** Canonical transformations with examples, The harmonic oscillator, Poisson's brackets, Equations of motion and conservation theorems in the Poisson Bracket formulation. Hamilton-Jacobi (HJ) theory: The HJ equation for Hamilton's principal function, Harmonic oscillator as an example of the HJ method, The HJ equation for Hamilton's characteristic function, The action-angle variables
- Unit –IV** The Central force: Two-body central force problem and its reduction to the equivalent one-body problem, The equations of motion and first integrals, The equivalent one-dimensional problem and classification of orbits, The differential equation of the orbit, Closure and stability of orbits, The Kepler problem, Scattering in a central force field: Rutherford scattering.
- Unit – V** Rigid body dynamics, The Euler angles, Euler's theorem on the motion of a rigid body, Rate of change of a vector, The Coriolis force, Angular momentum and Kinetic energy of motion about a point, The Euler equations of motion of rigid bodies. Formulation of the problem of small oscillations, The Eigen-value equation and the principal axis transformation, Frequencies of free vibration and normal coordinates, Free vibration of linear triatomic molecule.

### TEXT AND REFERENCE BOOKS

1. Classical Mechanics, By N.C. Rana and P.S. Joag (Tata McGraw-Hill, 1991)
2. Classical Mechanics, by H.Goldstein (Addison Wesley, 1980)
3. Classical Mechanics, by H.Goldstein, C Poole & J Fafko (Pearson Education, Inc, 2002)
4. Mechanics, by A.Sommerfeld, (Academic press, 1952)
5. Introduction to Dynamics by Perceival and D.Richaeds (Cambridge niversity, press , 1982).

### **Paper-III: ELECTRODYNAMICS & PLASMA PHYSICS**

- Unit-I** Maxwell's equations, vector and scalar potentials and the wave equation, Gauge transformations, Lorenz gauge, Coulomb gauge, Green function for the wave equation, four-vectors, mathematical properties of the space-time in special relativity, matrix representation of Lorentz transformation, covariance of electrodynamics, transformation of electromagnetic fields.
- Unit-II** Radiation by moving charges, Lienard-Wiechert potential and fields for a point charge, total power radiated by an accelerated charge- Larmor's formula and its relativistic generalization, angular distribution of radiation emitted by an accelerated charge, radiation emitted by a charge in arbitrary extremely relativistic motion, distribution in frequency and angle of energy radiated by accelerated charge.
- Unit -III** Bremsstrahlung: emission from single-speed electrons, thermal Bremsstrahlung emission and absorption, Synchrotron radiation: spectrum of synchrotron radiation, spectral index for power law electron distribution, transition from Cyclotron to Synchrotron emission, Cherenkov radiation
- Unit-IV** Plasma: definition, Debye shielding phenomenon and criteria for plasma, motion of charged particles in electromagnetic field; Uniform E & B fields, Electric field drift, Non-uniform magneto static field, Gradient B drift, Parallel acceleration and magnetic mirror effect, Curvature drift, adiabatic invariants.
- Unit-V** Elementary concepts of plasma kinetic theory, the Boltzmann equation, the basic plasma phenomena, plasma oscillations. Fundamental equations of magneto-hydrodynamics (MHD), Hydrodynamics Waves; Magneto sonic and Alfvén waves, Magnetic viscosity and magnetic pressure, plasma confinement schemes.

#### **REFERENCE BOOK:**

1. Jackson, classical electrodynamics.
- 2 Rybicki & Lightman: Radiative Processes in Astrophysics
- 2 Panofsky and Phillips: Classical electricity and magnetism.
- 3 Bittencourt, Plasma physics.
- 4 Chen: Plasma physics.



## Paper - IV: ELECTRONICS

- Unit - I** Operational Amplifier- Basic Op.Amp. Differential amplifier, the emitter coupled Difference Ampl, Transfer characteristics of a Diff. Ampl., an example of an IC Op.-Amp., off set error voltage and currents, measurement of Op.-Amp. Parameters, frequency response of Op-amp.Linear analog systems: Basic Op.-Amp. Applications, Analog integration and differentiation, Electronic analog computation, Non-linear analog systems: Comparators, Waveform generators.
- Unit - II** Combinational Logic –Basic logic gates: OR, AND and NOT gates, NOR and NAND gates, Boolean algebra, DeMorgan's theorems, exclusive OR gate, characteristics of logic families, saturated logic families: RTL, DCTL, non-saturated logic families: TTL and ECL, Unipolar logic families.
- Unit - III** Sequential Logic, Flip-flops: RS Flip-flop, level clocking, Edge triggered Flip Flops, D Flip flops. JK Flip-flops, J.K.master slave Flip-flops, Registers: buffer, shift and control shift registers, counters: ripple synchronous & ring counters, tri-state registers, Buffer: controlled buffer Register, Bus organized structure, Latch, multiplexer, Demultiplexer, decoder, ALU Memories: RAM, ROM, PROM, EPROM, A/D and D/A converters.
- Unit - IV** Microprocessors – Building concept of microprocessors, developing inside of microprocessor , Instruction codes ,Instruction Register ,Introducing RESET Pin, Introducing on chip oscillator, Interfacing I/O devices, Introducing Interrupt lines :Stack, Push, Pop operation ,delay in servicing interrupts, multiply interrupts, location for interrupts .Introducing slow and fast data transfer, Status of microprocessor, interrupt pins, General purpose Register, flag Register, Increment/decrement register. Features of 8085 microprossor. Pin diagram of 8085, block diagram of 8085. CPU of a microprocessor, timing and control, system timings and interrupt timings of 8085, registers in 8085, interfacing memory and I/O devices- a preliminary ideas. Number system, Floating Point notation.
- Unit - V** Instructions set of 8085, types of instructions- Data transfer group, Arithmetic logic, branch group, stack I/O machine control group, addressing mode of Intel 8085, examples of Assembly language programs of 8085, summing of two 8-bit numbers to result a 16-bit number, summing two 16-bit number, multiplying two 8-bit number to result a 16-bit product, block transfer of data from one memory block to other, BCD to hexadecimal data, finding the largest number in a series.



### **Text and reference books**

1. Integrated Electronics: J.Millman R.C.C.Halkias.
2. Electronics devices and circuit theory, by Robert Boylested and Louis Nashdaky PHI, New Delhi-110001, 1991.
3. Operational amplifier linear integrated circuits, by Romakanth A. Gayakwad PHI, second edition 1991.
4. Digital computer electronics- An introduction to microcomputers-A.P.Malvino.
5. Digital finances and applications, by A.P. Malvino and Donald P.Leach, Tata McGraw Hill company, New Delhi 1993.
6. Microprocessor architecture, programming applications with 8085/8086 by Ramesh S.Gaonkar, Willey-Eastern limited 1987.
7. Introduction to microprocessors – A.P.Mathur (Tata McGraw).
8. Microprocessors-Theory and applications- M.Hafiquizzaman (Prentice hall).
9. Microprocessors fundamentals- Schanmi Outling Service Author Pocer L.Tokheim.
10. Integrated circuits : K KBotkar( Khanna publications)
11. Digital Electronics : R P Jain ( Tata McGraw Hill)
12. Microprocesss : B Ram
13. 8-bit microprocessor : V.J.Vibhute & P.B. Borole(Tecn-Max Publication, Pune)



## Laboratory Course

### Lab I-A: General & Optics (Any ten)

1. Determination of band gap of semiconductor by four prob method.
2. Measurement of Hall Coefficient of given semiconductor: identification of type of semiconductor and estimation of charge carrier concentration.
3. Determination of wavelength of mercury light by constant deviation spectrometer using Hartmann formula.
4. Ultrasonic velocity in a liquid as a function of temperature using ultrasonic interferometer.
5. Experiment on transmission line (A) Determination of characteristics impedance, (B) Study of voltage distribution.
6. Determination of the Curie temperature of ferromagnetic material.
7. Determination of forbidden gap of a diode by plotting reverse saturation current as a function of temperature.
8. Determination of operating voltage and study the characteristics of a GM tube.
9. Determination of operating voltage of a GM tube and determine the linear absorption coefficient.
10. Determination of operating voltage of a GM tube and verify inverse-square law.
11. Determination of short half-life of a given source which can be obtained from a mini generator or produced with a neutron source by activation.
12. X-ray diffraction by Telexometer.
13. Determination of ionization potential of Lithium/Mercury.
14. Determination of  $e/m$  of electron by Normal Zeeman Effect using Feby -Perot Etalon.
15. Determination of Dissociation energy of iodine ( $I_2$ ) Molecule by photography, the absorption bands of  $I_2$  in the visible region.
16. Measurement of wavelength of He-Ne Laser light using a ruler and thickness of thin wire by the laser.
17. To study Faraday Effect using He-Ne Laser.

### Lab I-B: Electronics (Any ten)

1. Design & Study of Regulated Power supply.
2. Study of Transistor Amplifiers in CE, CB, and CC modes.
3. Study of Transistor Bias Stability.
4. Study of Astable, Monostable and Bistable Multivibrator.
5. Study of Silicon Controlled Rectifier.
6. Experiment of Uni – Junction Transistor and its application.
7. Experiment of FET and MOSFET characterization and application as an amplifier.
8. Study of Differential. Amplifier.
9. Basic Logic gates and verification of their Truth- Tables.
10. Combinational logic gates and verification of De-Morgan's Theorem.
11. Study of Basic Operational Amplifier (741).
12. Study of Opto- Electronics Devices.



## Semester – II

### PAPER - I: QUANTUM MECHANICS-I

- Unit - I** Inadequacy of classical mechanics, Plank quantum hypothesis and radiation law, Photoelectric effect, De-Broglie's theory. Schrödinger equation, continuity equation, Ehrenfest theorem, admissible wave functions, stationary states, one-dimensional problems; walls and barriers, Schrödinger equation for harmonic oscillator and its solution, uncertainty relations, states with minimum uncertainty product.
- Unit –II** Superposition principle, general formalism of wave mechanics, representation of states and dynamical variables, commutation relationship, completeness and normalization of Eigen functions, Dirac-delta function, Bra & Ket notation, matrix representation of an operator, harmonic oscillator and its solution by matrix method, Heisenberg equation of motion.
- Unit -III** Angular momentum in quantum mechanics, commutation relationships, Eigen values, Spin angular momentum, Pauli's matrices, addition of angular momentum, Clebsch-Gordon coefficients.
- Unit – IV** Central force problem, spherically symmetric potentials in three dimensions, separation of wave equation, parity, three-dimensional square-well potential and energy levels, the hydrogen atom; solution of the radial equation, energy levels and stationary state wave functions, discussion of bound states, degeneracy.
- Unit –V** Time- independent perturbation theory, non-degenerate case, first order and second perturbations with the example of an oscillator, degenerate cases, removal of degeneracy in second order, Zeeman effect without electron spin, first-order Stark effect in hydrogen, perturbed energy levels, correct Eigen function, occurrence of permanent electric dipole moments.

#### TEXT AND REFERENCE BOOKS:

1. L.I. Schiff: quantum mechanics (McGraw-Hill).
2. S.Gasiorowicz, Quantum Physics (Wiley).
3. Landau and Lifshitz : Non-relativistic quantum mechanics.
4. B.Craseman and Z.D.Powell: quantum mechanics (Addison Wesley)
5. A.P. Messiah: Quantum Mechanics.
6. J.J. Sakurai : Modern Quantum Mechanics.
7. Mathews and Venkatesan : Quantum Mechanics.



## PAPER – II: STATISTICAL MECHANICS

- Unit-I** Foundation of statistical mechanics: macroscopic and microscopic states, contact between statistics and thermodynamics, physical significance of  $\Omega(N, V, E)$ , the classical gas, entropy of mixing and Gibbs's paradox, phase space of classical system, Liouville's theorem and its consequences, quantum states and phase space.
- Unit- II** Elements of ensemble theory – A system in micro canonical, canonical, and grand canonical ensembles, partition functions, physical significance of statistical quantities, example of classical system, energy and energy-density fluctuations and mutual correspondence of various ensembles.
- Unit -III** Formulation of quantum statistics – Quantum mechanical ensemble theory, density matrix, statistics of various quantum mechanical ensembles, system composed of indistinguishable particles.  
Theory of simple gases –Ideal gas in various quantum mechanical ensemble, Maxwell-Boltzmann, Bose-Einstein, Fermi-Dirac distributions, statistics of occupation number.
- Unit - IV** Ideal Bose and Fermi gases -Thermodynamic behavior of an ideal Bose gas, Bose-Einstein condensation and, elementary excitations in liquid helium II, Thermodynamic behavior of an ideal Fermi gas, the electron gas, nonrelativistic and relativistic degenerate electron gas, theory of white dwarf stars.
- Unit -V** Statistical Mechanics of interacting systems – the method of cluster expansion for a classical gas, Virial expansion of the equation of state. Theory of phase transition – general remark on the problem of condensation, Fluctuations: thermodynamic fluctuations, Spatial correlation in a fluid Brownian motion: Einstein Smoluchowski theory of Brownian motion.

### TEXT & REFERENCE BOOKS –

1. R. K. Pathria, Statistical Mechanics (Pergamon Press).
2. L. D. Landau & E. M. Lifshitz (Butter worth and Heinemann Press).
3. Federick Reif, Fundamental of statistical and thermal physics (McGraw-Hill publishers).
4. Kerson Huang, Statistical Mechanics (Wiley Eastern).





## **PAPER –III: ELECTRONIC & PHOTONIC DEVICES AND OPTICAL MODULATORS**

- Unit – I** Special Bipolar devices: Thyristors- the four-layer diodes and their basic characteristics, Shockley diode, three terminal thyristor, Diac & Triac, SCR, UJT, Field controlled Thyristors.
- Unit- II** Unipolar Devices : JFET, MESFET and MOSFET, basic structure, working and device I-V characteristics, small signal equivalent circuit for Microwave performance Introduction to MIS and MOS diodes, charge coupled devices (CCDs), basic structure and working principle , MOSFET-basic device characteristics, types of MOSFET.
- Unit-III** Special Microwave Devices: Tunnel diode and backward diode- basic device characteristics, IMPATT diodes and their static and dynamic characteristics, Transfer electron devices- transferred electron effect, Gunn diodes.
- Unit-IV** Photonic Devices: Radiative transitions, LEDs, Visible and infrared SC lasers; Photo detectors; Photo conductor, & Photodiode, Solar cells, Solar radiation and ideal conversion efficiency, p-n junction solar cells, Hetero junction. Interface thin film solar cells.
- Unit -V** Optical Modulators and Display Devices: Modulation of light- Birefringence, Optical activity, Electro-optic, Magneto-optic and Acoustic- optic effects, Materials exhibiting these properties, Non-linear optics. Display devices: Luminescence, Photo-luminescence, Electro-luminescence, Liquid crystal displays, Numeric displays.

### **TEXT & REFERENCE BOOKS-**

1. Semiconductor Devices – Physics and Technology, by S M Sze, Wiley (1985)
2. Introduction to semiconductor device, M.S. Tyasi, John Wiley and sons
3. Measurement, Instrumentation and experimental design in physics and engineering by M.Sayer and A.Mansingh, Prentice Hall India 2000
4. Optical electronics by Ajay Ghatak and K.Thyagarajah, Cam.Univ. Press.
5. Opto electronics – An introduction: J.Wilson and JFB Hawkes (Eastern Economy Edition).
6. Optical Communications: J.H. Franz and V.K. Jain (Narosa).





## **PAPER – IV: COMPUTATIONAL METHODS AND PROGRAMMING**

- Unit –I** Methods for determination of zeroes of linear and nonlinear algebraic equations and transcendental equations, convergence of solutions. Solution of simultaneous linear equations, Gaussian elimination, pivoting, iterative method, matrix inversion.
- Unit –II** Finite differences, interpolation with equally spaced and unevenly spaced points, curve fitting, polynomial least squares and cubic spline fitting. Numerical differentiation and integration, Newton-Cotes formulae, error estimates, Gauss method.
- Unit –III** Numerical solution of ordinary differential equations, Euler and Runge-Kutta methods, predictor-corrector method, elementary ideas of solutions of partial differential equations.
- Unit- IV** Elementary information about digital computer principles, compilers, interpreters and operating systems (Windows/Linux) Fortran programming, flow charts, integers and floating point arithmetic, expressions, built in functions.
- Unit-V** Executable and non-executable statements, assignments, control and input-output statements, subroutines and functions; The statement functions, main features of functions and subroutines, subprogram, function subprogram, overall structure of FORTRAN program, external statement, subroutine subprogram, common statement, equivalence statement, operations with files-open and close statement, Format statements, field specifications.

### **TEXT AND REFERENCE BOOKS**

1. Sastr: Introductory Methods of Numerical Analysis.
2. Rajaraman: Numerical Analysis.
3. Antia: Numerical methods.
4. Raja Raman: FORTRAN programming.



## Laboratory Course

### Lab II-A: Numerical Analysis & Computer Programming (Any ten)

1. To solve simultaneous Linear equation by Gauss Elimination method.
2. To calculate the root of a transcendental equation by Newton – Raphsons method.
3. Solving the system of linear simultaneous equation by Gauss Serdel method.
4. Numerical Integration by Simpson's 1/3 Rule.
5. Solving simultaneous Linear equation by Gauss-Jordon method.
6. Solution of Differential equation by Euler's Method.
7. To invert a given matrix by Gauss-Jordon Method.
8. Solution of Differential equation by Runga Kutte Method.
9. To fit the given data in a straight line by linear regression Method.
  - a) WAP to find the Largest of n number of series.
  - b) To calculate the standard deviation of a given set of data.
10. To write a program to compute the complex roots of a given polynomial of  $N^{\text{th}}$  degree by Grafffe's Method.
11. To write a program to compute the Eigen values of a given matrix.
12. To integrate a given function by: (a) Trapezoidal method or by (b) Gauss Quadrature.
13. To find solutions of Ist order, ordinary differential equation by Taylor method

### Lab II-B: Digital Electronics & Microprocessor (Any ten)

1. Study of R-S, D/T, J-K Flip-Flops.
2. Study of counters: Ripple, Mode 3, Mode 5 counters.
3. Study of Shift Register.
4. Study of R-2R D/A Converter.
5. Study of Random Access Memory (RAM) Read Only Memory. (ROM)
6. Study of A/D Converter.
7. Experiment with Microprocessor:- I
  - (a) Convert BCD in to HEXADECIMPL
  - (b) To transfer group of date blocks from one location to another location.
8. Experiment with microprocessor: - II
  - (a) To write programs for addition of two 1 byte data giving results of 2 bytes.
  - (b) To write programs for multiplication of two 1 byte data giving results of 2 bytes.
9. (a) To add 2 16-BIT numbers stored in locations from x x x x to x x x x + 3 and add them store the results from x x x x + 4 to x x x x + 6 memory location
  - (b) To find the largest of n numbers of a series.
10. To arrange N numbers in an ascending orders.
11. Experiments with Microprocessor.
  - (a) Convert BCD in to binary and vice-versa.
  - (b) To transfer group of data blocks from one location to another location.
  - (c) To write programs for addition of two 1byte data giving result of 2byte data
  - (d) To write programs for multiplication of two 1 byte data giving result of 2byte data.
12. Logic gate study DTL and RTL.
13. Study of adder/Subractor.

## Semester – III

### PAPER –I: QUANTUM MECHANICS -II

- Unit - I** Variational method, expectation value of energy, application to excited states, ground state of He-atom, Zero point energy of one dimensional harmonic oscillator, Vander-waals interaction, the W.K.B. approximation, approximate solutions, asymptotic nature of the solution, solution near turning point, connection formulae, energy levels of a potential well and quantization rule.
- Unit - II** Theory of scattering: differential and total scattering cross section, wave mechanical picture of scattering & the scattering amplitude, Green's functions and formal expression for scattering amplitude, The Born approximation and its validity, Partial wave analysis, asymptotic behavior of partial waves and phase shifts, optical theorem, scattering by a square well potential, scattering by a hard sphere, scattering by a Coulomb potential.
- Unit - III** Time-dependent perturbation theory, first order perturbation, Harmonic perturbation, Fermi's Golden rule, Ionization of a H-atom, absorption and induced emission, Selection rules. Identical particles, symmetric and anti-symmetric wave functions
- Unit - IV** Relativistic quantum mechanics, formulation of relativistic quantum theory, the Klein-Gordon equation; plane wave solutions, charge and current densities, The Dirac equation for a free particle, matrices alpha and beta, Lorentz covariance of the Dirac equation, free particle solutions and the energy spectrum, charge and current densities.
- Unit-V** The spin of the Dirac particle, Dirac particle in electromagnetic fields and the significance of the negative energy state, Dirac equation for a central field: Spin angular momentum, approximate reduction, spin –orbit energy, separation of equation, the hydrogen atom, classification of energy levels and negative energy states.

### TEXT AND REFERENCE BOOKS –

1. L.I. Schiff: Quantum Mechanics (McGraw-Hill).
2. S.Gasiorowicz: Quantum Physics (Wiley).
3. Landau and Lifshitz : Quantum Mechanics.
4. B.Craseman and Z.D.Powell : Quantum Mechanics (Addison Wesley)
5. A.P. Messiah: Quantum Mechanics.
6. J.J. Sakurai: Modern Quantum Mechanics.
7. Mathews and Venkatesan: Quantum Mechanics.
8. Bjorken and Drell : Relativistic Quantum Mechanics.



## PAPER –II: ATOMIC AND MOLECULAR PHYSICS

- Unit - I** Quantum states of one electron atoms-atomic orbitals, Hydrogen spectrum, spin-orbit(l-s) interaction energy, fine structure of hydrogen spectrum including l-s interaction and relativistic correction, spectra of alkali elements, fine structure in alkali spectra, penetrating and non-penetrating orbits, intensity rules.
- Unit - II** Pauli's principle, equivalent and non-equivalent electrons, ground state (basic level of different elements), two electron systems, interaction energy in L-S. and J-J. Coupling, Hyperfine structure, line broadening mechanisms (general ideas).
- Unit - III** Normal and anomalous Zeeman effect, early discoveries and developments, vector models of one electron system in a weak magnetic field, magnetic moment of a bound electron, magnetic interaction energy, selection rules, intensity rules, Paschen - Back(PB) effect – principal series effect, Zeeman and PB effects in hydrogen, Stark effect- discovery, Stark effect in Hydrogen, orbital model, weak and strong effect in Hydrogen.
- Unit - IV** Types of molecules: linear and diatomic molecules, symmetric top, asymmetric top and spherical top molecules. Rotational spectra of diatomic molecules: rigid rotator model, energy levels, Eigen functions, spectrum, comparison with observed spectrum and non-rigid rotator model, Intensities of spectral lines, microwave spectrometer, Raman spectrum; classical and quantum theory of Raman Effect, pure rotational Raman spectrum.
- Unit - V** Vibrational spectra of diatomic molecules: simple harmonic model, energy levels and spectrum, comparison with observed spectrum and anharmonic model, Vibrating rotators, Interaction of rotations and vibrations, fine structures and P-Q-R branches, IR spectrometer, Vibrational Raman spectrum, Vibrational rotational Raman spectrum.

### TEXT AND REFERENCE BOOKS:

1. Introduction to atomic spectra - H.E. White (T).
2. Fundamentals of molecular spectroscopy – C.N. Banwell and E.M McCash (T).
3. Spectroscopy vol. I, II and III – Walker and Straughner.
4. Introduction to Molecular spectroscopy – G.M. Barrow.
5. Spectra of diatomic molecules – Herzberg.
6. Molecular spectroscopy – Jeanne L.Mc-Hale.
7. Molecular spectroscopy – J.M. Brown.
8. Spectra of atoms and molecules –P.F.Bemath.
9. Modern spection copy, J.M. Holias.



## **PAPER – III: SOLID STATE PHYSICS-I**

### **Unit- I: Electrons in Solids and Electronic Properties**

Energy bands: nearly free electron model, origin of energy gap and its magnitude, Bloch function, Kronig-Penny model, Wave equation of electron in periodic potential, restatement of Bloch theorem, crystal moment of an electron, solution of Central equation, Kronig-Penny model in reciprocal space, empty lattice Approximation, approximate solution near zone boundary, Number of orbitals in a band, metals and insulators.

### **Unit -II: Fermi surfaces and metals**

Effect of temperature on F-D distribution, free electron gas in three dimensions. Different zone schemes, reduced and periodic zones, construction of Fermi surfaces, nearly free electrons, electron, hole, open orbits, Calculation of energy bands, Tight binding, Wigner-Seitz, cohesive energy, pseudo potential methods. Experimental methods in Fermi surface studies, quantization of orbits in a magnetic field, de Haas van Alphen Effect, External orbits, Fermi surface of copper.

### **Unit- III: Crystal vibration and thermal properties**

Lattice dynamics in monoatomic and diatomic lattice: two atoms per primitive basis, optical and acoustic modes, quantization of elastic waves, phonon momentum, inelastic neutron scattering by phonons, Anharmonic crystal interactions-thermal expansion, thermal conductivity, thermal resistivity of phonon gas, umklapp processes, imperfections.

### **Unit –IV: Electron-Phonon interaction- superconductivity**

Experimental survey: occurrence of superconductivity, Destruction of superconductivity by magnetic field, Meissner effect, heat capacity, energy gap, MW, and IR properties, isotope effect. Theoretical survey : thermodynamics of superconducting transition, London equation, Coherence length, Cooper pairing due to phonons, BCS theory of superconductivity, BCS ground state, flux quantization of superconducting ring, duration of persistent currents, Type II superconductors, Vortex states, estimation of  $H_{c1}$  and  $H_{c2}$ , single particle and Josephson superconductor tunneling, DC/AC Josephson effect, Macroscopic quantum interference. High temperature superconductors, critical fields and currents, Hall number, fullerenes ring.

### **Unit – V: Semiconductor crystals**

Band gap, equation of motion, physical derivation of equation of motion, holes, effective mass, physical interpretation of effective mass, effective masses of semiconductors Si and Ge, intrinsic carrier concentration, intrinsic mobility, impurity conductivity, donor and acceptor states, thermal ionization of donors and acceptors, thermo-electric effects.



## TEXT AND REFERENCE BOOKS

1. C. Kittel: Introduction to Solid State Physics (Wiley and Sons).
2. J.M.Ziman: Principles of theory of solids (Cambridge Univ.Press).
3. Azaroff: X-ray crystallography.
4. Weertman and weertman : Elementary Dislocation Theory.
5. Verma and Srivastava: Crystallography for Solid State Physics.
6. Azeroff and Buerger: The Power Method.
7. Buerger: Crystal Structure Analysis.
8. Thomas: Transmission Electron Microscopy.
9. Omar: Elementary solid state physics.
- 10.Ashcroft and Mermin: Solid State Physics.
- 11.Chalking and Lubensky: Principles of Condensed Matter Physics.
- 12.Madelung: Introduction to solid state theory.
- 13.Callaway: Quantum theory of solid state physics.
- 14.Huang: Theoretical Solid State Physics.
- 15.Kittel: Quantum theory of solids.



## **PAPER –IV (A): ASTRONOMY AND ASTROPHYSICS-I**

- Unit - I** Stars-apparent magnitudes, Colour index, Spectral classification, Stellar distances, Absolute magnitude, The H-R diagram of stars.  
Stellar interiors: The basic equations of stellar structure, Hydrostatic equilibrium, Thermal equilibrium, Virial Theorem, Energy sources, Energy transport by radiation and convection, Equation of state
- Unit - II** Formation and evolution of stars: Inter stellar dust and gas, Formation of protostars, Pre-main sequence evolution, Post main sequence evolution and Evolution on the main sequence for low and high mass stars, Late stages of evolution, Fate of massive stars, Supernovae and its characteristics.
- Unit – III** End states of stars, degenerate states, White dwarfs, and Chandrasekhar limit, Neutron stars and Pulsars, Black holes.  
Binary stars and their classification, close binaries, Roche Lobes, Evolution of semidetached systems: Algols, Cataclysmic variables and X-ray binaries.
- Unit - IV** Solar Physics: Physical Characteristics of sun, Photosphere: Limb darkening, Granulation, Faculae, Solar Chromosphere and Corona, Prominences, Solar Cycle and Sunspots, Solar Magnetic Fields, Theory of Sunspots, Solar flares, solar wind, Helioseismology.
- Unit - V** Observational and Conceptual foundations of Newtonian gravity and General Theory of Relativity(GR), Principle of Equivalence, Metric tensor, Covariant differentiation, Riemann curvature tensor, Geodesics.  
Stress- Energy tensor, Einstein's field equations, Schwarzschild metric, Particle trajectories in Schwarzschild space- time, Precession of Perihelion, Gravitational red-shift and bending of light.

### **TEXT AND REFERENCE BOOKS:**

1. Astrophysics for Physicists, Arnab Rai Choudhuri, Camb. University Press, 2010.
2. Modern Astrophysics, B.W. Carroll and D.A. Ostlie, Addison-Wealey Pub. Co.
3. Introductory Astronomy and Astrophysics, M.Zeilik and S.A. Gregory, 4<sup>th</sup> edition, Saunders college publishing.
4. Theoretical Astrophysics, vol. – II: Stars and stellar systems, T. Padmanabhan, Cambridge university press.
5. The Physical Universe: An introduction to astronomy, F.Shu, Mill valley : University science books.





## **Paper – IV (B) ELECTRONICS (Communication)-I**

### **Unit I Microwave devices**

Klystron ,magnetron & traveling wave tubes ,velocity modulation ,basic principal of two cavity klystrons & relex klystrons ,principle of operation of magnetrons ,helix traveling wave tubes .

### **Unit II Microwave wave guides & components**

(Wave modes) rectangular wave guides: solution of wave equation in rectangular coordinates, TE modes in rectangular wave guides, TM modes in rectangular wave guides, excitations of modes in rectangular wave guides.

Circular wave guides: solutions of wave equation in Cylindrical coordinates, TE modes in Circular wave guides, TM modes in Circular wave guides, TEM modes in Circular wave guides, excitations of modes in Circular wave guides .

### **Unit-III Microwave cavities:** rectangular cavity resonator, circular –cavity resonator & semi –circular –cavity resonators Q- factor of a cavity resonator.

#### **Transferred Electrons devices (TEDs)**

Gunn effect diodes, principle of operation, modes of operations, read diodes, IMPATT diodes, TRAPATT diodes.

Microwave communications: advantages of microwave transmission, loss in free space, propagation of microwave, components of antennas used in MW communication system.

### **Unit-IV Radar system:**

Radar block diagram & operation, radar frequencies ,pulse consideration, radar range equation ,derivation of radar range equation ,minimum detectable single receiver noise ,signal to noise ratio ,integration of radar pulses ,radar cross sections ,pulse reflections frequency ,antenna ,parameters ,systems losses & propagation losses ,radars transmitters receivers ,antennas displays

### **Unit V Satellite communication**

Orbital Satellite, geostationary satellite, orbital patterns ,look angles ,orbital spacing , satellite system ,link modules.

## **REFERENCE BOOKS**

- 1) “Microwaves” by K.L. Gupta Wiley Estern Ltd. Delhi.
- 2) Advanced Electronic communication system by Wayne Toms Physics education.
- 3) Principle of communication of system-by Toub & Schilling: 2nd ed. TMH 1994
- 4) Communication system: by Siman Haykin, 3rd ed. John wiley & sons inc.1994.
- 5) Microwave devices & circuits by : Samuel, Y. Liau.
- 6) Electronic communication: George kennedy.





## **Paper IV (C) PHYSICS OF NANO MATERIALS - I**

### **Unit I: Nano Materials**

Properties of Nano-Particles: Metal Nano-clusters: Magic Numbers, theoretical modeling of nanoparticles, geometric and electronic structure, Reactivity, Fluctuations, magnetic clusters, Bulk to Nano transition. Semiconducting nanoparticles: optical properties, Photo fragmentation, Columbic Explosion. Rare gas and molecular clusters: Inert-Gas Clusters, Superfluid Clusters, Molecular Clusters. Methods of Synthesis: RF Plasma, Chemical Methods, Thermolysis, Pulsed Laser Methods.

### **UNIT II: Carbon Nanostructures**

Carbon Molecules: Nature of Carbon Bonds, New Carbon Structures. Carbon Clusters: Small Carbon Clusters, Discovery of  $C_{60}$ , Structure of  $C_{60}$  and its Crystal, Alkali-Doped  $C_{60}$ , Superconductivity in  $C_{60}$ , Larger and Smaller Fullerenes, Other Bucky balls. Carbon Nanotubes: Fabrication, structure, Electrical Properties, Vibrational Properties, Mechanical Properties. Applications of Carbon Nanotubes: Field Emission and Shielding, Computers, Fuel Cells, Chemical Sensors, Catalysis, Mechanical Reinforcement.

### **UNIT III: Bulk Nanostructured Materials**

Solid Disordered Nanostructures: Methods of Synthesis, Failure Mechanisms of Conventional Grain-Sized Materials, Mechanical Properties, Nanostructured Multilayers, Electrical Properties, Other Properties, Metal Nano cluster Composite Glasses, Porous Silicon. Nanostructured Crystals: Natural Nano crystals, Computational Prediction of Cluster Lattices, Arrays of Nanoparticles in Zeolites, Crystals of Metal Nanoparticles, Nanoparticle Lattices in Colloidal Suspensions, Photonic Crystals. Nanostructured Ferromagnetism: Basics of Ferromagnetism, Effect of Bulk Nano structuring of Magnetic Properties, Dynamics of Nano magnets, Nano pore Containment of Magnetic Particles, Nano carbon Ferro magnets, Giant and Colossal Magneto resistance, Ferro fluids.

### **UNIT IV: Quantum Wells, Wires, and Dots**

Preparation of Quantum Nanostructures, Size and Dimensionality Effects: Size Effects, Conduction Electrons and Dimensionality, Fermi Gas and Density of States, Potential Wells, Partial Confinement, Properties Dependent on Density of States. Excitons, Single-Electron Tunneling, Applications: Infrared Detectors, Quantum Dot Lasers. Super conductivity.

### **UNIT V: Self-Assembly and Catalysis**

Self-Assembly: Process of Self-Assembly, Semiconductor Islands, Monolayers. Catalysis: Nature of Catalysis, Surface Area of Nanoparticles, Porous Materials, Pillared Clays, Colloids.

Nanomachines and Nanodevices: Microelectromechanical Systems (MEMSs), Nanoelectromechanical Systems (NEMSs): Fabrication, Nanodevices and Nanomachines. Molecular and Superamolecular Switches.



## TEXT AND REFERENCE BOOKS

1. Nanostructures & Nanomaterials: Synthesis, Properties & Applications: Guozhang Cao.
2. Introduction to Nanotechnology: Charles P. Poole Jr and Franks J. Qwens.
3. Handbook of Analytical instruments, R.S. Khandpur
4. Nano materials: Synthesis properties ,characterization and application: A.S Edelstein and R.C Cammaratra
5. Nanotechnology, Kohlr, Michael.
6. X-ray diffraction procedures, H. P. Klung and L.E.Alexander
7. The Powder Method IV. Azaroff and M. J. Buerger
8. Elements of X-ray diffraction, B. D.Cullity
9. Differential Thermal Analysis, R.C.Mackenzie
10. Thermal Methods of Analysis, W.W.Wendlandt
11. Synthesis, Functionalization and Surface treatment of Nanoparticles :Maric Isbella and Buraton
12. Encyclopedia of Nanotechnology, H.S. Nalwa
13. Handbook of Nanotechnology: Bhushan (Ed), Springer Verlag, New York (2004).
14. Nanostructures and Nanomaterials- Synthesis properties and Applications by Guozhong Cao (Empirical College Press World Scientific Pub., 2004).
15. Nanocomposite Science and Technology, Ajayan, Schadler and Braun
16. Fullerene & Carbon nanotubes, Dressel Shaus
17. Carbon Nanotubes, Elizer
18. Physical properties of CNT, Saito
19. Carbon nanotechnology, Liming Dai
20. Nanotubes and nanowires, CNR Rao and Govindaraj RCS Publishing.
21. Nanotechnology in Biology and Medicine: Methods, Devices and Application by Tuan Vo-Dinh, CRC press, 2007.
22. An Introduction to Quantum Computing Phillip Kaye, Raymond Laflamme, Michele Mosca
23. The Physics of Quantum Information: Quantum Cryptography, Quantum Teleportation, Quantum Computation by Dirk Bouwmeester, Artur K. Ekert, Anton Zeilinger
24. Problems And Solutions in Quantum Computing And Quantum Information Yorick Hardy Willi-Hans Steeb



## **PAPER –IV (D): SPACE PHYSICS - I**

### **Unit I: Solar Physics**

Physical Characteristics of sun, Source of solar energy, thermonuclear reaction and building up of higher elements, Description of solar internal and external layers, Photosphere: Limb darkening, Granulation, Faculae, Solar Chromosphere and Corona, Heating of the solar chromosphere and corona, Prominences, Solar Cycle and Sunspots, Solar Magnetic Fields, Theory of Sunspots, Solar flares, Solar wind, Coronal mass ejections, Helioseismology.

### **Unit II: Planetary System**

Solar planetary system, Major characteristics of the Planets, Atmospheric Composition, Planetary magnetism, Magnetic fields, Magnetic dipole, Asteroids, Comets, Extra Solar Planets, Magnetic fields of Extra Solar Planets

### **Unit III: Celestial Mechanics**

Time and Coordinate system: Celestial Sphere, Solar Time, Sidereal Time, Julian Date, Right Ascension and Declination, Azimuth and Elevation, galactic coordinates, WGS 84 coordinate system. GPS – operation, accuracy, time and position information.

### **Unit IV: Space and Observational tools**

Electromagnetic bands of observation: radio, infrared, optical, UV, X-ray and Gamma-ray windows. Ground-based, balloon-borne and satellite-borne telescopes, Resolution of Instruments and Limitations, Optical telescopes, Photometers, Spectrographs, CCDs, Polarimeters. Radio telescopes - interferometry, X-ray and Gamma-ray detectors, Neutrino and Cosmic Ray astronomy, Radar.

### **Unit V: Space Missions**

Planetary Exploration, Early spacecraft visits to the moon, Unmanned Lunar landers; The Apollo program - man on the moon – instruments and experiments, Lunar structures; Exploration of Mercury, Venus, Mars - the Red Planet – Structure of Mars, Martian atmosphere; ice at the poles, Martian landscapes: linear features, volcanoes, and impact craters; exotic terrains; Study of Planetary moons with space missions, The Cassini-Huygens Mission, The Deep Impact Mission. Search for extra-terrestrial life – SETI experiments.



## Text and Reference Books

1. Solar System Astrophysics, J. C. Brandt and P. W. Hodge
2. Introduction to Experimental Physics, W. B. Fretter.
3. The Magnetic Field of the Earth, Roland T. Merrill, Michael W. McElhinny, Phillip L. Mcfadden, Academic Press
4. Physics of Geomagnetic Phenomena, Vol. I and II, S. Matsushita. and W. H. Campbell, Academic Press
5. Earth's Magnetospheric Process, Ed. B. M. McCormac, D. Reidel Publishers
6. Physics of the Magnetosphere, Eds. R. L. Corovillano, J. T. McCauley and H. Radosky, D. Reidel Publishers
7. Solar System Plasma Physics, Vol. I, II and III, Eds. C. F. Kennel, L. J. Lanzenrutti and E. N. Parker
8. Dynamics of the Geomagnetically Trapped Radiation ( Physics and Chemistry in Space, Vol II )
9. Solar Terrestrial Physics, Ed. E. R. Dyer, D. Reidel Publishers
10. Solar Magneto-Hydrodynamics, E.R. Priest; D Reidel, 1982
11. R.C. Smith, Observational Astrophysics; CUP, 1995.
12. C.R. Kitchin, Astrophysical Techniques; Adam Hilger, 1984.
13. Digital Image Processing, R. C. Gonzales and R. E. Woods, 2nd Ed, Pearson India, 2002
14. Satellite Meteorology, S. Q. Kidder and T. H. Von der Haar, Academic Press, 1995
15. Lecture Notes on Satellite Meteorology, Vol 1 and 2, SAC, Ahmedabad
16. Remote Sensing and Image Interpretation, T. M. Lillesand and R. W. Kieffer, John Wiley, 2002
17. Fundamentals of Space Systems, V. L. Pisacane and R. C. Moore, Oxford University Press, 1994
18. Fundamentals of Remote Sensing, George Joseph, 2003
19. Processing Remote Sensing Data, M. C. Girgard and C. Girgard, Oxford-IBH, 1999
20. Quantitative Remote Sensing of Land Surfaces, Shunlin Liang, Wiley Interscience, 2004
21. Scale in Remote Sensing and GIS, D. A. Quattrachi and M. F. Goodchild
22. Theory of Satellite Orbits in an Atmosphere, King-Hele Desmond, Butterworths, 1964
23. Uncertainty in Remote Sensing and GIS, Ed: G. M. Foddy and P. M. Atkinson
24. Remote Sensing by George Joseph
25. Concepts in Space Sciences Edited by R.R. Daniel
26. Mathematical Principles of Remote Sensing by A.. Milman
27. An Introduction to Ionosphere and Magnetosphere, J. A. Raticliffe
28. Solar System Astrophysics, J. C. Brandft and P. W. Hodge
29. Plasma Diagnostic Techniques, R. H. Huddleston and S. L. Leonard
30. Introduction to Experimental Physics, W. B. Fretter
30. High Vacuum Techniques, J. Yarwood
31. Plasma Diagnostics, Vol. I, O. Anciello and D. L. Flamm
32. The Earth's Ionosphere: Plasma Physics and Electrodynamics, Michael C. Kelley, Academic Press
33. Ionospheric Techniques and Phenomena, A. Giraud and M. Petit, D. Reidel Publish.
34. Physics of Geomagnetic Phenomena, Vol. I and II, S. Matsushita and W. H. Campbell, Academic Press
35. Introduction to Ionospheric Physics, H. Risbeth and H. Garriot, Academic Press



36. Space Weather, Physics and Effects by Volker Bothmer and Ioannis.A.Depli  
Springer
37. Aerospace Environment by T Beer
38. Free flight of a rocket By Gantmaker
39. Orbital Mechanics, Ed. Vladimir A, Chobotov, AIAA Edn Series
39. Introduction to Celestial Mechanics, S. W. McCusky, Addison-Wesley
40. Fundamentals of Astrodynamics, R. R. Bates et al, Dover
41. Orbital Motion, A. E. Roy, Adam Hinglar Ltd
42. Orbital Methods in Astrodynamics, P. R. Escobal, John Wiley
43. Fundamentals of Astrodynamics, R. R. Bates et al, Dover
44. Orbital Motion, A. E. Roy, Adam Hinglar Ltd
45. Design of Orbital Flights, J. Johnson et al., McGraw Hill
46. Modern Astrophysics, B. W. Carroll and D. A. Ostlie, Addison -Wesley
47. The Physical Universe, F. Shu, University Science Books
48. The Physics of Astrophysics, Vol. I and II, F. Shu, University Science Books
49. Theoretical Astrophysics, Vol. I, II and III, T. Padmanabhan, Cambridge Uni.Press
50. The Physics of Fluids and Plasmas, Arnab Rai Choudhuri, Cambridge Uni.Press
51. Astrophysical Concepts, M. Harwit, Springer-Verlag
52. Galactic Astronomy, J. Binney and M. Merrifield, Princeton University Press
53. Galactic Dynamics, J. Binney and S. Tremaine, Princeton University Press
54. Quasars and Active Galactic Nuclei, A. K. Kembhavi and J. V. Narlikar,  
Cambridge University Press
55. An Introduction to Active Galactic Nuclei, B. M. Peterson



### Lab III-A: Materials Science & General

At least ten experiments should be performed from the following list of experiments or parallel level experiment depending upon the facilities available.

1. To determine activation energy of ionic/superionic solid by Temperature depended conductivity measurement.
2. To study Electron Spin (ESR) Resonance in DPPH (Diphenyl Pricyl Hydrazy) sample.
3. To study I-V characteristics of photovoltaic solar cell and find the efficiency.
4. To study the decay of photoconductivity of given sample and find out trap depth.
5. Study of decay of photoluminescence of a given sample.
6. Measurement of electrical conductivity using Impedance Spectroscopy technique.
7. To determine drift velocities of  $\text{Ag}^+$  ion in AgI from temperature dependence of ionic transference number study.
8. Electrical conductivity of Ball milled/Mechano-chemical synthesized materials.
9. Determination of strength of a given radioactive source.
10. Study of complete spectra of radioactive sources, and study of photo peak efficiency of NaI (TI) crystal for different energy gamma rays.
11. Structural analysis of powder sample by XRD and particle size determination using Scherrer's formula.
12. FTIR studies of solid samples.
13. Mechanoluminescence of sucrose crystals.
14. Thermoluminescence of irradiated samples.
15. Study of Op-Amp.-IC-741 is inverting/ Non inverting amplifier and draw frequency response curve.
16. Construction of Schmitt triggers using IC-741 and study of its characteristics.
17. Study of As table and monos table Multi Vibrator using IC 555.
18. Digital electronics experiments on bread board using IC-7400.

### Lab III-B: Astronomy & Astrophysics

1. Study of Quasar.
2. Study of the orbit of a visual binary Star.
3. Determine the mass of Saturn & its rotational velocity.
4. Verification of Hubble's law and determination of Hubble's constant.
5. Identification of element from Fraunhofer spectrum of the sun.
6. Study of sun spots.
7. Study of light curves of Cepheid variable stars.
8. Study of Proper motion of stars.
9. Determination of Pulsar period and distance.
10. Photo-electric photometry of Pleiades star cluster.
11. Study of expansion of the universe and calculate the age of the Universe.



**OR III -B: Electronics**

- (1) Experiments with microprocessor. (a) Convert BCD in to binary & vice versa.
- (b) To transfer group of data blocks from one location to another location.
- (c) To write programme for addition & subtraction.
- (d) To write programme for multiplication & division.
- (2) Logic gate study DTL & RTL.
- (3) To study & verify the Demerging's Theorem.
- (4) Study of Adder/ Subtract or.
- (5) Study of Encoder & Decoder.
- (6) Study of Multiplexer & DE multiplexer
- (7) Study of digital to analog converter.
- (8) Study of analog to digital converter.
- (9) Study of 4-bit Counter/ ripple Counter.
- (10) Study of left/right shift register.
- (11) Study of read only memory.
- (12) Study of Random Access Memory.
- (13) Study of Phase locked loop.
- (14) Study of BCD to seven segments Decoder.
- (15) Study of modulation & demodulation.
- (16) Optical fiber based experiment.
- (17) Microwave characterization and measurements.

**OR III -B: Physics of Nano-material**

- (1) Synthesis of II-IV semiconductor nanoparticles by Wet chemical method.
- (2) Synthesis of nanoparticles ( $ZrO_2$ ) by Combustion method.
- (3) Synthesis of nanoparticles by Sol-gel method.
- (4) Synthesis of nanoparticles by Ball milling method.
- (5) Synthesis of Quantum cells structures using vacuum coating unit.
- (6) Synthesis of nanoparticles using Solid state reaction method.
- (7) Measurement of band gap energy and size of the nano particle of II-IV semiconductor using absorption spectrophotometer.
- (8) To make the peak analysis of IR transmission spectra of nanoparticle using FTIR spectrometer.
- (9) Study of effect of capping agent on the size of the nanoparticle during synthesis.
- (10) To determine the average particle size of nano materials by XRD using Sherer's formula.
- (11) To determine the Hall coefficient and carrier type for a semiconducting nanoparticles.
- (12) To determine the Band gap of a given semiconductor using Four probe method from room temperature to 100°C.
- (13) To determine the average size of nanoparticles using Zetasizer.
- (14) To measure the change of dielectric constant and dielectric loss of nanoparticle with the change of signal frequency by impedance analyzer.
- (15) To characterize the mechanical properties by tensile testing.
- (16) To estimate the particle size by SEM.
- (17) To perform electron diffraction analysis from TEM image.
- (18) To do roughness analysis of nanostructured sample using AFM.





### **OR III -B: Space Physics**

1. The flow of energy out of the Sun.
2. Study of Sun-spot.
3. Astrometry of asteroids.
4. Study of expansion of the universe and calculate the age of the Universe.
5. Identification of element from Fraunh offer spectrum of the sun.
7. The transit of Venus and Mercury.
8. Jupiter's Moon and speed of light.
9. Determination of Pulsar period and distance.
10. Photo-electric photometry of Pleiades star cluster.
11. The large scale structure of the Universe.





## Semester – IV

### PAPER – I: NUCLEAR AND PARTICLE PHYSICS

- Unit - I Nuclear Interactions:** Nucleon-nucleon interaction, Two-nucleon system, The ground state of the deuteron, Tensor forces, Nucleon-nucleon scattering at low energy, Scattering length, Effective range theory, Spin dependence of nuclear forces, Charge independence and charge symmetry of nuclear forces, Iso-spin formalism, Exchange forces, Meson theory of nuclear forces and the Yukawa interaction.
- Unit - II Nuclear Reactions:** Reaction energetics: Q-equation and threshold energies, Reactions cross sections, Resonance: Breit-Wigner single-level formula, Direct and compound nuclear reactions, Formal reaction theory: Partial wave approach and phase shifts, Scattering matrix, Reciprocity theorem,
- Unit - III Nuclear Decay:** Beta decay, Femi's theory of beta decay, Shape of the beta spectrum, Total decay rate, Angular momentum and parity selection rules, Comparative half-lives, Allowed and forbidden transitions, Selection rules, Parity violation, Two component theory of neutrino decay, Detection and properties of neutrino  
Gamma decay, multiple transitions in nuclei, Angular momentum and Parity selection rules, internal conversion, nuclear isomerism.
- Unit - IV Nuclear models:** Liquid drop model, Bohr-Wheeler theory of fission, Shell Model, Experimental evidence for shell effects, Single particle shell model, Spin-orbit interaction and magic numbers, Analysis of shell model predictions, Magnetic moments and Schmidt lines, Collective model of Bohr and Mottelson.
- Unit - V Elementary particle Physics:** The fundamental interactions, Classification of elementary particles, Leptons and Hadrons, Symmetries, groups and conservation laws, SU(2) and SU(3) multiples and their properties, Quark model, Properties of Quarks, the standard model.

#### TEXT AND REFERENCE BOOKS:

1. A.Bohr and B.R.Mottelson, Nuclear structure, vol. 1 (1969) and vol.2, Benjamin, Reading, A, 1975.
2. Kenneth S.Kiane, Introductory Nuclear Physics, Wiley, New York,1988.
3. Ghoshal, Atomic and Nuclear Physics vol.2.
4. P.H.Perking, Introduction to high energy physics, Addison-Wesley, London, 1982.
5. Shriokov Yudin, Nuclear Physics vol.1 & 2, Mir Publishers, Moscow, 1982.
6. D.Griffiths, introduction to elementary particles, harper and row, New York, 1987.
7. H.A.Enov, introduction to Nuclear Physics, Addison-Wesley, 1973.
8. G.E.Brown and A.D.Jackson, Nucleon-Nucleon interaction North-holland Amsterdam, 1976.
9. S.D.Benedetti, Nuclear interaction, John Willey and sons, NewYork, 1964.
10. M.K.Pal, theory of Nuclear structure, affiliated East West, Madras, 1982.
11. Y.R.Waghmare,introductory nuclear physics, Oxford, IBH, Bombay, 1981.
12. J.M.Longo, elementary particles, McGraw Hill, New York, 1971.
13. R.R.Roy and B.P.Nigam, Nuclear Physics, Wiley-Eastern Ltd. 1983.



## PAPER – II LASER PHYSICS AND APPLICATIONS

### Unit- I Laser Characteristics –

Spontaneous and stimulated emission, Einstein's quantum theory of radiation, theory of some optical processes, coherence and monochromaticity, kinetics of optical absorption, line broadening mechanism, Basic principle of lasers, population inversion, laser pumping, two & three level laser systems, resonator, Q-factor, losses in cavity, threshold condition, quantum yield.

### Unit – II Laser Systems

Solid state lasers- the ruby laser, Nd:YAG laser, Nd: Glass laser, semiconductor lasers – features of semiconductor lasers, intrinsic semiconductor lasers, Gas laser - neutral atom gas laser, He-Ne laser, molecular gas lasers, CO<sub>2</sub> laser, Liquid lasers, dye lasers and chemical laser.

### Unit-III Advances in laser Physics

Production of giant pulse -Q-switching, giant pulse dynamics, laser amplifiers, mode locking and pulling, Non-linear optics, Harmonic generation, second harmonic generation, Phase matching, third harmonic generation, optical mixing, parametric generation and self-focusing of light.

**Unit – IV** Multi-photon processes; multi-quantum photoelectric effect, Theory of two-photon process, three- photon process, second harmonic generation, parametric generation of light, Laser spectroscopy: Rayleigh and Raman scattering, Stimulated Raman effect, Hyper-Raman effect, Coherent anti-stokes Raman Scattering, Photo-acoustic Raman spectroscopy.

**Unit – V** Laser Applications – ether drift and absolute rotation of the Earth, isotope separation, plasma, thermonuclear fusion, laser applications in chemistry, biology, astronomy, engineering and medicine.  
Communication by lasers: ranging, fiber Optics Communication, Optical fiber, numerical aperture, propagation of light in a medium with variable index, pulse dispersion.

### TEXT AND REFERENCE BOOKS:

1. Laud, B.B.: Lasers and nonlinear optics, (New Age Int.Pub.1996).
2. Thyagarajan, K and Ghatak, A.K.: Lasers theory and applications (Plenum press, 1981).
3. Ghatak, A.K.and Thyagarajan, K : Optical electronics (Cambridge Univ. Press 1999).
4. Seigman, A.E.: Lasers ( Oxford Univ. Press 1986)
5. Maitland, A. and Dunn, M.H. : Laser Physics (N.H.Amsterdam, 1969).
6. Hecht, J.The laser Guide book (McGraw Hill, NY, 1986).
7. Demtroder, W.: Laser Spectroscopy (Springe series in chemical physics vol.5, Springe verlag, Berlin, 1981).
8. Harper, P.G.and Wherrett B.S. (Ed.): Non-linear-optics (Acad.press, 1977).

## **PAPER – III: SOLID STATE PHYSICS- II**

### **Unit- I: Plasmon's, Polaritons**

Dielectric function of the electron gas, Plasma optics, Dispersion relation for EM wave, Transverse optical modes in Plasma, Transparency of Alkali metals in the ultraviolet, Longitudinal Plasma oscillations, Plasmon, electrostatic screening and screened Coulomb potential, Mott metal-insulator transition, screening and phonons in metals, Polaritons, LST relation .

### **Unit –II: Dielectric and ferroelectrics**

Maxwell's equations, polarization, macroscopic electric field, depolarization field,  $E_1$ ; local electric field at an atom, Lorentz field  $E_2$ , fields of dipoles inside cavity  $E_3$ ; dielectric constant and polarizability, electronic polarizability; structural phase transition; ferro-electric crystals, classification; displacive transition, soft optical phonons, Landau theory of phase transitions, first and second order transition, antiferro-electricity, ferro-electric domain, piezoelectricity, ferro-elasticity, optical ceramics.

### **Unit –III: Magnetism**

General ideas of dia- and para- magnetisms, quantum theory of paramagnetism, rare earth ions, Hund rule, iron group ions, crystal field splitting, quenching of orbital angular momentum, spectroscopic splitting factor, van vleck temperature dependent paramagnetism, Cooling by isentropic demagnetization, nuclear demagnetization, paramagnetic Susceptibility of conduction electrons.

### **Unit –IV: Ferromagnetism and anti-ferromagnetism**

Ferromagnetic order, Curie point and exchange integral, temp dependence of saturation magnetization, saturation magnetization at absolute zero; magnons, quantization of spin waves, thermal excitation of magnons; neutron magnetic scattering, Ferrimagnetic order, Curie temp and susceptibility of ferrimagnets, iron garnets. Antiferromagnetic order, susceptibility below neel temp, antiferromagnetic magnons, ferromagnetic domains.

### **Unit – V: Optical Processes & Excitons and defects**

Optical reflectance, excitons, Frenkel and Mott-Wannier excitons, Alkali Halides and Molecular crystals Defects: lattice vacancies, Schottky and Frenkel point effects, colour centers, F and other centers, Line defect. Shear strength of single crystals, dislocations- edge and screw dislocations, Burger vectors, Stress fields of dislocations, low angle grain boundaries, dislocation densities, dislocation multiplication and slip, strength of alloys, dislocations and crystal growth, hardness of materials.

## TEXT AND REFERENCE BOOKS

1. C. Kittel: Introduction to Solid State Physics (Wiley and Sons).
2. J.M.Ziman: Principles of theory of solids (Cambridge univ.press).
3. Azaroff : X-ray crystallography.
4. Weertman and weertman : Elementary Dislocation Theory.
5. Verma and Srivastava: Crystallography for Solid State Physics.
6. Azeroff and Buerger: The Power Method.
7. Buerger: Crystal Structure Analysis.
8. Thomas: Transmission Electron Microscopy.
9. Omar: Elementary solid state physics.
10. Ashcroft and Mermin : Solid State Physics.
11. Chalking and Lubensky: Principles of Condensed Matter Physics.
12. Madelung : Introduction to solid state theory.
13. Callaway: Quantum theory of solid state physics.
14. Huang: Theoretical Solid State Physics.
15. Kittel: Quantum theory of solids.



## **PAPER –IV (A): ASTRONOMY AND ASTROPHYSICS - II**

- Unit– I** The Milky Way Galaxy: Structure of the Milky way, Oort's theory of galactic rotation, Dynamics of the spiral arms, Distribution of Interstellar matter, Central regions of the Milky way. Normal Galaxies: Classification of galaxies, Hubble sequence: Elliptical, Lenticulars and Spiral galaxies, and their properties, Distribution of light and mass in galaxies, Brightness profiles, Distribution of gas and dust in galaxies.
- Unit- II** Active galaxies: Active Galactic Nuclei (AGNs), Seyfert galaxies, BL Lac Objects, Radio galaxies: General properties, Superluminal motion, Quasars: Properties and Energy requirements, Nature of quasar redshifts, Supermassive black hole model and Unified model of AGNs.
- Unit- III** Cosmology: Cosmological principle, Observational support and other arguments to support cosmological principle, Fundamental observers and co-moving frame, Robertson-Walker line element (without derivation), Observational features of Robertson-Walker space time e.g. Red shift etc, Models of the universe, Friedmann models, Quantitative predictions of FRW model, Quantitative solutions, Open and closed universes, Hubble's law, Angular size, Source counts, Models with the cosmological constant, Steady state cosmology.
- Unit- IV** Relics of the big bang, the early universe, Thermodynamics of the early universe, Thermal History, Primordial neutrinos, Helium synthesis and other nuclei, Microwave background, the very early universe, the formation of structures in the Universe, Jeans Mass, Growth Rate, Recombination era, Onset of matter dominated era.
- Unit- V** Observations of the cosmological significance, Measurement of Hubble's constant, Anisotropy of local large - scale velocity fields, Age of the universe, Abundance of light nuclei, Dark matter, the redshift-magnitude relation, Number counts of extragalactic objects, The variation of angular sizes with distance.



### TEXT AND REFERENCE BOOKS:

1. Astrophysics for Physicists, Arnab Rai Choudhuri, Cambridge University Press, 2010.
2. Modern Astrophysics, B.W. Carroll and D.A. Ostlie, Addison-Wesley Pub. Co.
3. Introductory Astronomy and Astrophysics, M.Zeilik and S.A. Gregory, 4th edition, Saunders college publishing.
4. Theoretical Astrophysics, vol. – II: Stars and stellar systems, T. Padmanabhan, Cambridge university press.
5. The Physical universe: An introduction to astronomy, F.Shu, Mill valley: University science books.
6. Textbook of astronomy and astrophysics with elements of cosmology, V.B.Bhatia, Pb -New Delhi, Narosa publishing house.
7. The new cosmos, A.Unsold and B.Baschek, Newyork, Springer Verlag.
8. Quasars and active galactic nuclei, A.K. Kembhavi and J.V. Narlikar, Cambridge university press.
9. Modern Astrophysics, B.W.Carroll and D.A. Ostlie, Addison Wesley publish. co.
10. Introductory astronomy and astrophysics, M.Zeilik and S.A.Gregory, 4th edition, Saunders college publishing.
11. Theoretical Astrophysics, vol. I: Astrophysical processes T.Padmanabhan, Cambridge university press.
12. Introduction to cosmology, J.V. Narlikar, 3rd edition, Cambridge uni. press.
13. Structure formation in the universe, T.Padmanabhan, Cambridge University, press.
14. General relativity and cosmology, J.V. Narlikar-Delhi: Macmillan Comp.of India Ltd.
15. Galactic Astronomy: Binney and Merrifield.



## **Paper – IV (B) Electronics II (Communication)**

### **Unit-I Digital communications**

Pulse modulation systems, Sampling Theorem, Low pass & Band pass signal, PAM- Channel BE for PAM signal, Natural Sampling, Flat-top sampling, Signal through holding, Quantization of signals, quantization error.

### **Unit-II Digital modulation techniques**

PCM, Differential PCM, Delta modulation, Adaptive, delta modulation (CVSD). BPSK, DPSK, QPSK, PSK, QASK, BFSK, FSK, MSK

### **Unit-III Mathematical representation of noise**

Sources of noise, Frequency domain representation of noise, Effect of filtering on the probability density of Gaussian noise, Spectral component of noise, Effect of a filter on the power spectral density of noise, Superposition of noise, Mixing involving noise, linear filtering, Noise bandwidth, Quadrature component of noise, Power spectral density of  $n_c(t)$  &  $n_s(t)$  & their time derivatives.

### **Unit-IV Data Transmission I**

Base band signal receiver, Probability of error optimum filter, White noise: Matched filter & probability of error, Coherent reception correlation, PSK, FSK, Non-Coherence detection on FSK, Differential PSK, QASK, Calculation of error probability for BPSK, BFSK, QPSK.

### **Unit-V Data Transmission II**

Noise in pulse code & delta modulation system, PCM transmission, Calculation of quantization noise output signal power, Effect of thermal noise, output signal to noise ratio in PCM, DM, Quantization noise in DM, output signal power, DM output signal to quantization noise ratio, effect of thermal noise in delta modulation, output signal to noise ratio in DM

### **Text and Reference Books:**

- 1) "Microwaves" by K.L. Gupta Wiley Eastern Ltd. Delhi.
- 2) Advanced Electronic communication system by Wayne Tomasi Physics education.
- 3) Principle of communication of system-by Toub & Schilling: second edition TMH 1994
- 4) Communication system: by Simon Haykin, third edition John Wiley & sons inc. 1994.
- 5) Microwave devices & ckts by: Samuel, Y. Liao.
- 6) Electronic communication: George Kennedy.





## **Paper – IV (C) PHYSICS OF NANO MATERIALS- II**

### **UNIT I: Synthesis of Nano-materials**

Top-down & Bottom-up approaches: Kinetically confined synthesis of nanoparticles: micro emulsion and spray pyrolysis. Template based synthesis: Electrochemical deposition, Physical Vapour deposition, Chemical Vapour deposition, Electron Beam Lithography (EBL), X-ray Lithography (XRL).

Chemical Route synthesis of Nanomaterials: Chemical precipitation and co-precipitation, Chemical Bath Deposition (CBD), Sol-gel, Combustion technique.

### **UNIT II: Characterization of Nano-materials (a)**

X-ray Diffraction (XRD), powder and single crystal Diffraction, X-ray fluorescence (XRF), X ray photoelectron spectroscopy (XPS), Energy Dispersive X-ray analysis (EDAX), Thermo analytic Methods: Thermo Gravimetric Analysis (TGA), Differential Scanning Calorimetry (DSC), Differential Thermal Analysis (DTA).

### **UNIT III: Characterization of Nano-materials (b)**

Scanning Tunneling Microscopy (STM), Contact and non-contact Atomic Force Microscopy (AFM), Conductive AFM. Scanning Electron Microscopy (SEM), Transmission electron microscopy (TEM), High resolution TEM Field emission SEM. Spectrophotometer: UV-Vis spectrophotometers, IR spectrophotometers, Fourier Transform Infrared Radiation (FTIR), Photoluminescence (PL), electroluminescence and thermoluminescence spectroscopy.

### **UNIT IV: Applications of Nano-materials**

Quantum wells, wires and dots. Organic Semiconductors, Organic Light Emitting Diodes (OLEDs), self-assembly of complex organic molecules, molecular switches, thermochromic switches, Motor molecules and bio-mimetic components, charge transfer complexes, molecular connections, contact issues, conducting polymers, light emitting polymers, polymer-polymer heterostructures, plastic FETs, photodiodes & solar cells, Nano Robotics: Nano robots and NEMS, Sensors and actuators, Artificial molecular machines, Biomotors, Other Nano machines, Propulsion, Control, Communication, Programming and coordination.

### **UNIT V: Nano Sensors and Biomedical applications**

**Nanosensors:** Gas sensors, Pollution sensor, Photo sensor, Temperature sensor, IR detector, Biosensor, nanomaterial gas discharge devices, CNT based fluid velocity sensor. Nanoparticle in Drug delivery, Targeting Legends, Cancer Treatment, Mediated Delivery of Sirna, Nanonephrology, Nanosystems in Inflammation, Targeting Macrophages to Control Inflammation, Tissue Regeneration, Growth And Repair, Tissue Bioengineering, Future Understanding for Treatment, nanosurgery, Drug Delivery Technology Significance, Impact and Development.





## References: Books/ Research Monographs

1. Nanostructures & Nanomaterials: Synthesis, Properties & Applications: Guozhang Cao.
2. Introduction to Nanotechnology: Charles P. Poole Jr and Franks J. Qwens.
3. Handbook of Analytical instruments, R.S. Khandpur
4. Nano materials: Synthesis properties ,characterization and application: A.S Edelstein and R.C Cammaratra
5. Nano electronics and Nanosystems , Karl Goser, Peter Glosekotter, Jan Dienstuhl.,
6. Springer, 2004
7. Nanomaterial Systems Properties and Application, A.S.Eldestein and R.C.Cammarata.
8. Handbook of Nanotechnology: Bhushan (Ed), Springer Verlag, New York (2004).
9. Nanocomposite Science and Technology, Ajayan, Schadler and Braun
10. Piezoelectric Sensors: Force, Strain, Pressure, Acceleration and Acoustic Emission
11. Sensors, Materials and Amplifiers, G. Gautschi.
12. Block Copolymers in Nanoscience Massimo Lazzari
13. Supramolecular Chemistry, Jonathan W. Steed, Jerry L. Atwood
14. Nanotechnology: Importance and Application by M.H. Fulekar, IK International, 2010.
15. Nanotechnology in Biology and Medicine: Methods, Devices and Application by Tuan Vo-Dinh, CRC press, 2007.
16. Nano system characterization tools in the life sciences by Challa Kumar. Wiley-VCH,
17. 2006.
18. Nanolithography M.Gentili et al.(edits),Springer.
19. Environanotechnology by Mao Hong fan, Chin-pao Huang, Alan E Bland, Z Honglin
20. Wang, Rachid Sliman, Ian Wright. Elsevier, 2010.
21. Nanotechnologies, Hazards and Resource efficiency by M. Steinfeldt, Avon Gleich, U. Petschow, R. Haum. Springer, 2007.
22. Nanotechnology: Health and Environmental risk by Jo Anne Shatkin. CRC press, 2008.
23. An Introduction to Quantum Computing Phillip Kaye, Raymond Laflamme, Michele
24. Mosca
25. The Physics of Quantum Information: Quantum Cryptography, Quantum
26. Teleportation, Quantum Computation by Dirk Bouwmeester, Artur K. Ekert, Anton
27. Zeilinger
28. Problems and Solutions in Quantum Computing And Quantum Information Yorick Hardy Willi-Hans Steeb



## **PAPER –IV (D): SPACE PHYSICS – II**

### **Unit I: Glimpse of Universe**

Universe - description, origin, its evolution, age and size; Stars–birth, life, death, spectral analysis, stellar composition - element synthesis in stars, Exotic stars- novae, supernovae, pulsars, black holes and gamma ray bursts; Galaxies; Starbursts and Active Galactic Nucleus; Evidence for the Big Bang; Cosmic Background Radiation; Expansion Models; Dark Matter and Energy Recent innovations about the concept of Universe: Dark Energy and an accelerating universe

### **Unit II: Spacecraft & Satellites**

Satellite orbits and attitude: principles of satellite motion, Kepler's laws, orbital elements, satellite attitude and its control, types of orbits, polar and geostationary, earth and Sun-synchronous, orbit optimization, viewing geometry, launch vehicles and spacecraft, rocket propulsion concepts such as solid, hybrid, liquid, nuclear and antimatter. Rocket motors and their design, flight stability and recovery systems, stability and control system.

### **Unit III: Remote Sensing**

Sensors and systems: visible, infrared, water vapour and microwave sensors, sensor characteristics, sensor materials, passive and active sensors, scanning radiometers, spectral signatures.

Satellite data processing: satellite data acquisition, satellite communications, data collection platforms, earth station, image processing, geometric and radiometric corrections, image navigation, registration, image enhancement techniques, noise removal methods, histogram methods, density slicing, image classification.

Applications of remote sensing in earth resources management, agriculture, forestry, water resources and disaster mitigation

### **Unit IV: Solar Wind and Interactions**

The ionospheric layers D, E, F and their formation, effect of radiation on earth's atmosphere, photochemical processes,

Geomagnetic and magnetic coordinates, poles, measurement of geomagnetic field components, micro pulsation indices, variations of geomagnetic field, quiet and disturbed variations, geomagnetic storms, equatorial and auroral phenomena.

Solar wind, model of solar winds, interaction in the interplanetary medium and with the planets. Magnetosphere: interaction of solar wind with the geomagnetic field and formation of the magnetospheric tail, storm and sub-storm phenomena, Van Allen radiation belts

### **Unit V: Space Weather**

Space Weather Effects on Communication, Space Weather Effects on Power Grids, Space Radiation Protection, Effects on Space craft's hardware and Operations, Effects on Satellite Navigation, Forecast of Space Weather.

### **Text and Reference Books**

Same as mentioned in Semester III, Paper IV (D)

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# **HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**

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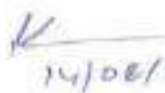
## **SCHEME OF EXAMINATION & SYLLABUS of M.A./M.Sc.(Mathematics) Semester Exam UNDER FACULTY OF SCIENCE Session 2018-19**

**(Approved by Board of Studies)  
Effective from July 2018**

M.A./M.Sc. (MATHEMATICS)  
(Semester-I) 2018-19

There shall be five papers. Each paper shall have 100 marks. **Overall tally of marks will be 500.**

Paper	Description	Theory	Sessional	Practical	Total Marks
I	Advanced Abstract Algebra (I)	80	20	-	100
II	Real Analysis (I)	80	20	--	100
III	Topology	80	20	--	100
IV	Advanced Complex Analysis (I)	80	20	--	100
V	Advanced Discrete Mathematics (I)	80	20	--	100

   
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**M.Sc./M.A. Course (First Semester)**  
**PAPER -I**

**Advanced Abstract Algebra (I)**

Max. Marks 80


- Unit-I** Groups - Normal and Subnormal series. Composition series. Jordan-Holder theorem. Solvable groups. Nilpotent groups.
- Unit-II** Field theory- Extension fields. Algebraic and transcendental extensions. Separable and inseparable extensions. Algebraically closed fields.
- Unit-III** Perfect fields. Finite fields. Primitive elements. Normal extensions, Splitting field.
- Unit-IV** Automorphisms of extensions. Galois extensions. Fundamental theorem of Galois theory.
- Unit-V** Solution of polynomial equations by radicals. Insolvability of the general equation of degree 5 by radicals.

**Books Recommended:**

1. P. B. Bhattacharya, S. K. Jain, S. R. Nagpaul: Basic Abstract Algebra, Cambridge University press
2. I. N. Herstein: Topics in Algebra, Wiley Eastern Ltd.
3. Vivek Sahai and Vikas Bist: Algebra, Narosa Publishing House, 1999.

**References**

1. M. Artin, Algebra, Prentice -Hall of India, 1991.
2. P. M. Cohn, Algebra, Vols. I, II & III, John Wiley & Sons, 1982, 1989, 1991.
3. N. Jacobson, Basic Algebra, Vols. I, W.H. Freeman, 1980 (also published by Hindustan Publishing Company).
4. S. Lang, Algebra, 3rd edition, Addison-Wesley, 1993.
5. I. S. Luther and I. B. S. Passi, Algebra, Vol. I-Groups, Vol. II-Rings, Narosa Publishing House (Vol. I-1996, Vol. II-1999)
6. D. S. Malik, J. N. Mordeson, and M. K. Sen, Fundamentals of Abstract Algebra, Mc Graw-Hill, International Edition, 1997.
7. Qazi Zameeruddin and Surjeet Singh : Modern Algebra
8. I. Stewart, Galois theory, 2nd edition, Chapman and Hall, 1989.
9. J. P. Escofier, Galois theory, GTM Vol.204, Springer, 2001..
10. Fraleigh , A first course in Algebra Algebra, Narosa, 1982.

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**M.Sc./M.A. Course (First Semester)**  
**PAPER-II**  
**Real Analysis (I)**

Max. Marks 80

- Unit-I** Sequences and series of functions, pointwise and uniform convergence, Cauchy criterion for uniform convergence, Weierstrass M-test, Abel's and Dirichlet's tests for uniform convergence, uniform convergence and continuity, definition and simple properties of Riemann-Stieltjes integral, uniform convergence and Riemann-Stieltjes integration, uniform convergence and differentiation, Weierstrass approximation theorem.
- Unit-II** Power series, uniqueness theorem for power series, Abel's and Tauber's theorems. Rearrangements of terms of a series, Riemann's theorem.
- Unit-III** Functions of several variables, linear transformations, Derivatives in an open subset of  $\mathbb{R}^n$ , Chain rule, Partial derivatives, interchange of the order of differentiation, Derivatives of higher orders, Taylor's theorem, Inverse function theorem, Implicit function theorem.
- Unit-IV** Jacobians, extremum problems with constraints, Lagrange's multiplier method, Differentiation of integrals.
- Unit-V** Partitions of unity, Differential forms, Stoke's theorem.

**Recommended Books:**

1. Principle of Mathematical Analysis by Walter Rudin (3rd edition) McGraw-Hill, Kogakusha, 1976, International student edition.
2. Real Analysis by H. L. Roydon, Macmillan Pub. Co. Inc. 4th Edition, New York .1962.

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## References

1. T. M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
2. Gabriel Klambauer, Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975.
3. A. J. White, Real Analysis; an introduction, Addison-Wesley Publishing Co., Inc., 1968.
4. G. de Barra, Measure Theory and Integration, Wiley Eastern Limited, 1981.
5. E. Hewitt and K. Stromberg. Real and Abstract Analysis, Berlin, Springer, 1969.
6. P. K. Jain and V.P. Gupta, Lebesgue Measure and Integration, New Age International (P) Limited Published, New Delhi, 1986 Reprint 2000).
7. I. P. Natanson, Theory of Functions of a Real Variable. Vol. I, Frederick Ungar Publishing Co., 1961.
8. Richard L. Wheeden and Antoni Zygmund, Measure and Integral: An Introduction to Real Analysis, Marcel Dekker Inc. 1977.
9. J. H. Williamson, Lebesgue Integration, Holt Rinehart and Winston, Inc. New York. 1962.
10. A. Friedman, Foundations of Modern Analysis, Holt, Rinehart and Winston, Inc., New York, 1970.
11. P. R. Halmos, Measure Theory, Van Nostrand, Princeton, 1950.
12. T. G. Hawkins, Lebesgue's Theory, of Integration: Its Origins and Development, Chelsea, New York, 1979.
13. K. R. Parthasarathy, Introduction to Probability and Measure, Macmillan Company of India Ltd., Delhi, 1977.
14. R. G. Bartle, The Elements of Integration, John Wiley & Sons, Inc. New York, 1966.
15. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1969.
16. Inder K. Rana, An Introduction to Measure and Integration, Narosa Publishing House, Delhi, 1997.
17. Walter Rudin, Real & Complex Analysis, Tata McGraw-Hill Publishing Co. Ltd. New Delhi, 1966.

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**M.Sc./M.A. Course (First Semester)**  
**PAPER-III**  
**Topology**

Max. Marks 80

- Unit-I** Countable and uncountable sets. Infinite sets and the Axiom of Choice. Cardinal numbers and its arithmetic. Schroeder-Bernstein theorem. Cantor's theorem and the continuum hypothesis. Zorn's lemma, well-ordering theorem. Definition and examples of topological spaces. Closed sets. Closure. Dense subsets. Neighbourhoods. Interior, exterior and boundary. Accumulation points and derived sets. Bases and sub-bases. Subspaces and relative topology.
- Unit-II** Alternate methods of defining a topology in terms of Kuratowski Closure Operator and Neighborhood Systems. Continuous functions and homeomorphism. First and Second Countable spaces. Lindelof's theorems. Separable spaces. Second countability and separability.
- Unit-III** Separation axioms; their Characterizations and basic properties. Urysohn's lemma, Tietze extension theorem.
- Unit-IV** Compactness. Continuous functions and compact sets. Basic properties of Compactness. Compactness and finite intersection property. Sequentially and countably compact sets. Local compactness and one point compactification. Stone-Cech compactification.
- Unit-V** Compactness in metric spaces. Equivalence of compactness, countable compactness and sequential compactness in metric space. Connected spaces. Connectedness on the real line. Components. Locally connected spaces.

**Recommended Books:**

1. James R. Munkres, Topology, A First Course, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
2. K. D. Joshi, Introduction to General Topology, Wiley Eastern Ltd., 1983.

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## References

1. J. Dugundji, Topology, Allyn and Bacon, 1966 (reprinted in India by Prentice Hall of India Pvt. Ltd.).
2. George F. Simmons, Introduction to Topology and modern Analysis, McGraw-Hill Book Company, 1963.
3. J. Hocking and G. Young, Topology, Addison-Wiley Reading, 1961.
4. J. L. Kelley, General Topology, Van Nostrand, Reinhold Co., New York, 1955.
5. L. Steen and J. Seebach, Counter examples in Topology, Holt, Rinehart and Winston, New York, 1970.
6. W. Thron, Topologically Structures, Holt, Rinehart and Winston, New York, 1966.
7. N. Bourbaki, General Topology Part I (Transl.), Addison Wesley, Reading, 1966.
8. R. Engelking, General Topology, Polish Scientific Publishers, Warszawa, 1977.
9. W. J. Pervin, Foundations of General Topology, Academic Press Inc. New York, 1964.
10. E. H. Spanier, Algebraic Topology, McGraw-Hill, New York, 1966.
11. S. Willard, General Topology, Addison-Wesley, Reading, 1970.
12. Crump W. Baker, Introduction to Topology, Wm C. Brown Publisher, 1991.
13. Sze-Tsen Hu, Elements of General Topology, Holden-Day, Inc. 1965.
14. D. Bushaw, Elements of General Topology, John Wiley & Sons, New York, 1963.
15. M. J. Mansfield, Introduction to Topology, D. Van Nostrand Co. Inc. Princeton, N. J., 1963.
16. B. Mendelson, Introduction to Topology, Allyn & Bacon, Inc., Boston, 1962.
17. C. Berge, Topological Spaces, Macmillan Company, New York, 1963.
18. S. S. Coirns, Introductory Topology, Ronald Press, New York, 1961.
19. Z. P. Mamuzic, Introduction to General Topology, P. Noordhoff Ltd., Groningen, 1963.
20. K. K. Jha, Advanced General Topology, Nav Bharat Prakashan, Delhi.

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**M.Sc./M.A. Course (First Semester)**  
**PAPER-IV**

**Complex Analysis (I)**

Max. Marks 80

- Unit-I** Complex integration, Cauchy-Goursat. Theorem. Cauchy's integral formula. Higher order derivatives. Morera's Theorem. Cauchy's inequality and Liouville's theorem. The fundamental theorem of algebra. Taylor's theorem. Laurent's series. Isolated singularities. Meromorphic functions.
- Unit-II** Maximum modulus principle. Schwarz lemma. The argument principle. Rouché's theorem Inverse function theorem.
- Unit-III** Residues. Cauchy's residue theorem. Evaluation of integrals. Branches of many valued functions with special reference to  $\arg z$ ,  $\log z$  and  $z^a$ .
- Unit-IV** Definitions and examples of conformal mapping Bilinear transformations, their properties and classifications.
- Unit-V** Spaces of analytic functions. Hurwitz's theorem. Montel's theorem Riemann mapping theorem.

**Recommended Books:**

1. Complex Analysis by L.V.Ahlfors, McGraw - Hill, 1979.
2. J. B. Conway, Functions of one Complex variable, Springer-Verlag, International student-Edition, Narosa Publishing House, 1980.

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## References

1. H. A. Priestly, Introduction to Complex Analysis, Clarendon Press, Oxford 1990.
2. Complex Function Theory By D.Sarason
3. Liang-shin Hahn & Bernard Epstein, Classical Complex Analysis, Jones and Bartlett Publishers International, London, 1996.
4. S. Lang, Complex Analysis, Addison Wesley, 1977.
5. D. Sarason, Complex Function Theory, Hindustan Book Agency, Delhi, 1994.
6. Mark J. Ablowitz and A.S. Fokas, Complex Variables: Introduction and Applications, Cambridge University press, South Asian Edition, 1998.
7. E. Hille, Analytic Function Theory (2 Vols.) Gonn & Co., 1959.
8. W. H. J. Fuchs, Topics in the Theory of Functions of one Complex Variable, D.Van Nostrand Co., 1967.
9. C. Caratheodory, Theory of Functions (2 Vols.) Chelsea Publishing Company, 1964.
10. M.Heins, Complex Function Theory, Academic Press, 1968.
11. Walter Rudin, Real and Complex Analysis, McGraw-Hill Book Co., 1966.
12. S. Saks and A.Zygmund, Analytic Functions, Monografic Matematyczne, 1952.
13. E. C. Titchmarsh, The Theory of Functions, Oxford University Press, London.
14. W. A. Veech, A Second Course in Complex Analysis, W.A. Benjamin, 1967.
15. S.Ponnusamy, Foundations of Complex Analysis, Narosa Publishing House, 1997.

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**M.Sc./M.A. Course (First Semester)**  
**PAPER-V**  
**Advanced Discrete Mathematics (I)**

Max. Marks 80

- Unit-I** Formal Logic-Statements. Symbolic Representation and Tautologies. Quantifiers, Predicates and Validity. Propositional Logic. Semigroups & Monoids-Definitions and Examples of Semigroups and monoids (including those pertaining to concatenation operation).
- Unit-II** Homomorphism of semigroups and monoids. Congruence relation and Quotient Semigroups. Subsemigroup and submonoids. Direct Products. Basic Homomorphism Theorem.
- Unit-III** Lattices-Lattices as partially ordered sets. Their properties. Lattices as Algebraic Systems. Sublattices, Direct products, and Homomorphisms. Some Special Lattices e.g., Complete, Complemented and Distributive Lattices. Boolean Algebras-Boolean Algebras as Lattices. Various Boolean Identities. The Switching Algebra example. Subalgebras,
- Unit-IV** Direct Products and Homomorphisms. Join-Irreducible elements, Atoms and Minterms. Boolean Forms and Their Equivalence. Minterm Boolean Forms, Sum of Products Canonical Forms. Minimization of Boolean Functions. Applications of Boolean Algebra to Switching Theory (using AND, OR & NOT gates). The Karnaugh Map Method.
- Unit-V** Grammars and Languages-Phrase-Structure Grammars. Rewriting Rules. Derivations. Sentential Forms. Language generated by a Grammar. Regular, Context-Free, and Context Sensitive Grammars and Languages. Regular sets, Regular Expressions and the Pumping Lemma. Kleene's Theorem. Notions of Syntax Analysis, Polish Notations. Conversion of Infix Expressions to Polish Notations. The Reverse Polish Notation.

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**Recommended Books:**

1. Elements of Discrete Mathematics by C. L. Liu, McGraw-Hill Book Co.
2. J. P. Tremblay & R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill Book Co., 1997.

**References**

1. J. L. Gersting, Mathematical Structures for Computer Science, (3<sup>rd</sup> edition), Computer Science Press, New York.
2. Seymour Lipschutz, Finite Mathematics (International) edition (1983), McGraw-Hill Book Company, New York.
3. S. Wiitala, Discrete Mathematics-A Unified Approach, McGraw-Hill Book Co.
4. J. E. Hopcroft and J. D. Ullman, Introduction to Automata Theory, Languages & Computation, Narosa Publishing House.
5. C. L. Liu, Elements of Discrete Mathematics, McGraw-Hill Book Co.
6. N. Deo. Graph Theory with Application to Engineering and Computer Sciences. Prentice Hall of India
7. K. L. P. Mishra and N. Chandrashekar, Theory of Computer Science PHI(2002)

   
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## M.A. /M.Sc. (MATHEMATICS) (Semester-II)

**2018-19 & Onward**

There shall be five theory papers. Each paper shall have 100 marks.

**Overall tally of marks will be 500.**

Paper	Description	Theory	Sessional	Practical	Total Marks
I	Advanced Abstract Algebra (II)	80	20	-	100
II	Real Analysis (II)	80	20	--	100
III	General and Algebraic Topology	80	20	--	100
IV	Advanced Complex Analysis (II)	80	20	--	100
V	Advanced Discrete Mathematics (II)	80	20	--	100

   
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## **M.Sc. /M.A. Course (Second Semester)**

### **PAPER-I**

### **Advanced Abstract Algebra (II)**

Max. Marks 80

**Unit-I** Modules - Cyclic modules. Simple modules. Semi-simple modules. Schuler's Lemma. Free modules. Noetherian and Artinian modules and rings-Hilbert basis theorem. Wedderburn Artin theorem. Uniform modules, primary modules, and Noether-Lasker theorem.

**Unit-II** Linear Transformations - Algebra of linear transformation, Singular and non singular transformation, characteristic roots and vectors, matrices and linear transformations.

**Unit-III** Canonical Forms - Similarity of linear transformations. Invariant subspaces. Reduction to triangular forms. Nilpotent transformations. Index of nilpotency. Invariants of a nilpotent transformation. The primary decomposition theorem. Jordan blocks and Jordan forms.

**Unit-IV** Smith normal form over a principal ideal domain and rank. Fundamental structure theorem for finitely generated modules over a Principal ideal domain and its applications to finitely generated abelian groups.

**Unit-V** Rational canonical form. Generalised Jordan form over any field.

#### **Books Recommended:**

1. P. B. Bhattacharya, S.K.Jain, S.R.Nagpaul : Basic Abstract Algebra, Cambridge University press
2. I. N. Herstein : Topics in Algebra, Wiley Eastern Ltd.
3. Qazi Zameeruddin and Surjeet Singh : Modern Algebra

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## References

1. M. Artin, Algebra, Prentice -Hall of India, 1991.
2. P. M. Cohn, Algebra, Vols. I, II & III, John Wiley & Sons, 1982, 1989, 1991.
3. N. Jacobson, Basic Algebra, Vols. I & II, W. H. Freeman, 1980 (also published by Hindustan Publishing Company).
4. S. Lang, Algebra, 3rd edition, Addison-Wesley, 1993.
5. I. S. Luther and I.B.S. Passi, Algebra, Vol. I-Groups, Vol. II-Rings, Narosa Publishing House (Vol. I-1996, Vol. II-1999)
6. D. S. Malik, J.N. Mordeson, and M.K. Sen, Fundamentals of Abstract Algebra, Mc Graw-Hill, International Edition, 1997.
7. K. B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
8. S. K. Jain, A. Gunawardena and P.B. Bhattacharya, Basic Linear Algebra with MATLAB, Key College Publishing (Springer-Verlag), 2001.
9. S. Kumaresan, Linear Algebra, A Geometric Approach, Prentice-Hall of India, 2000.
10. Vivek Sahai and Vikas Bist, Algebra, Narosa Publishing House, 1999.
11. I. Stewart, Galois Theory, 2nd edition, Chapman and Hall, 1989.
12. J. P. Escofier, Galois Theory, GTM Vol. 204, Springer, 2001.
13. T. Y. Lam, Lectures on Modules and Rings, GTM Vol. 189, Springer-Verlag, 1999.
14. D. S. Passman, A Course in Ring Theory, Wadsworth and Brooks/Cole Advanced Books and Software, Pacific Grove, California, 1991.
15. Fraleigh, A first course in Algebra, Narosa, 1982.

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**M.Sc./M.A. Course (Second Semester)**  
**PAPER-II**

**Real Analysis (II)**

Max. Marks 80

- Unit-I** Definition and existence of Riemann-Stieltjes integral, Properties of the Integral, integration and differentiation, the fundamental theorem of Calculus, integration of vector-valued functions, Rectifiable curves.
- Unit-II** Lebesgue outer measure. Measurable sets. Regularity. Measurable functions. Borel and Lebesgue measurability. Non-measurable sets. Integration of Non-negative functions. The General integral. Integration of Series.
- Unit-III** Measures and outer measures, Extension of a measure. Uniqueness of Extension. Completion of a measure. Measure spaces. Integration with respect to a measure. Riemann and Lebesgue Integrals.
- Unit-IV** The Four derivatives. Lebesgue Differentiation Theorem. Differentiation and Integration.
- Unit-V** Functions of Bounded variation. The  $L^p$ -spaces. Convex functions. Jensen's inequality. Holder and Minkowski inequalities. Completeness of  $L^p$ , Convergence in Measure, Almost uniform convergence.

**Recommended Books:**

1. Principle of Mathematical Analysis by W. Rudin
2. Real Analysis by H. L. Royden

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## References

1. T. M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
2. Gabriel Klambauer, Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975.
3. A. J. White, Real Analysis; an introduction, Addison-Wesley Publishing Co., Inc., 1968.
4. G. de Barra, Measure Theory and Integration, Wiley Eastern Limited, 1981.
5. E. Hewitt and K. Stromberg. Real and Abstract Analysis, Berlin, Springer, 1969.
6. P. K. Jain and V.P. Gupta, Lebesgue Measure and Integration, New Age International (P) Limited Published, New Delhi, 1986 Reprint 2000).
7. I. P. Natanson, Theory of Functions of a Real Variable. Vol. 1, Frederick Ungar Publishing Co., 1961.
9. Richard L. Wheeden and Antoni Zygmund, Measure and Integral: An Introduction to Real Analysis, Marcel Dekker Inc. 1977.
10. J. H. Williamson, Lebesgue Integration, Holt Rinehart and Winston, Inc. New York. 1962.
11. A. Friedman, Foundations of Modern Analysis, Holt, Rinehart and Winston, Inc., New York, 1970.
12. P. R. Halmos, Measure Theory, Van Nostrand, Princeton, 1950.
13. T. G. Hawkins, Lebesgue's Theory, of Integration: Its Origins and Development, Chelsea, New York, 1979.
14. K. R. Parthasarathy, Introduction to Probability and Measure, Macmillan Company of India Ltd., Delhi, 1977.
15. R.G. Bartle, The Elements of Integration, John Wiley & Sons, Inc. New York, 1966.
16. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1969.
17. Inder K. Rana, An Introduction to Measure and Integration, Norosa Publishing House, Delhi, 1997.

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**M.Sc./M.A. Course (Second Semester)**  
**PAPER-III**

**General and Algebraic Topology**

Max. Marks 80

- Unit-I** Tychonoff product topology in terms of standard sub-base and its characterizations. Projection maps.
- Unit-II** Product spaces, separation axioms connectedness (Tychonoff's theorem). Compactness, product spaces Countability in product spaces.
- Unit-III** Embedding and metrization. Embedding lemma and Tychonoff embedding. The Urysohn metrization theorem. Metrization theorems and Paracompactness-Local finiteness. The Nagata-Smirnov metrization theorem. Paracompactness. The Smirnov metrization theorem.
- Unit-IV** Nets and filter. Topology and convergence of nets. Hausdorffness and nets. Compactness and nets. Filters and their convergence. Canonical way of converting nets to filters and vice-versa. Ultra-filters and Compactness.
- Unit-V** The fundamental group and covering spaces-Homotopy of paths. The fundamental group. Covering spaces. The fundamental group of the circle and the fundamental theorem of algebra.

**Recommended Books:**

1. James R. Munkres, Topology, A First Course, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
2. K. D. Joshi, Introduction to General Topology, Wiley Eastern Ltd., 1983.

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## References

1. J. Dugundji, Topology, Allyn and Bacon, 1966 (reprinted in India by Prentice Hall of India Pvt. Ltd.).
2. George F. Simmons, Introduction to Topology and modern Analysis, McGraw-Hill Book Company, 1963.
3. J. Hocking and G Young, Topology, Addison-Wiley Reading, 1961.
4. J. L. Kelley, General Topology, Van Nostrand, Reinhold Co., New York, 1995.
5. L. Steen and J. Seebach, Counter examples in Topology, Holt, Rinehart and Winston, New York, 1970.
6. W. Thron, Topologically Structures, Holt, Rinehart and Winston, New York, 1966.
7. N. Bourbaki, General Topology Part I (Transl.), Addison Wesley, Reading, 1966.
8. R. Engelking, General Topology, Polish Scientific Publishers, Warszawa, 1977.
9. W. J. Pervin, Foundations of General Topology, Academic Press Inc. New York, 1964.
10. E. H. Spanier, Algebraic Topology, McGraw-Hill, New York, 1966.
11. S. Willard, General Topology, Addison-Wesley, Reading, 1970.
12. Crump W. Baker, Introduction to Topology, Wm C. Brown Publisher, 1991.
13. Sze-Tsen Hu, Elements of General Topology, Holden-Day, Inc. 1965.
14. D. Bushaw, Elements of General Topology, John Wiley & Sons, New York, 1963.
15. M. J. Mansfield, Introduction to Topology, D. Van Nostrand Co. Inc. Princeton, N.J., 1963.
16. B. Mendelson, Introduction to Topology, Allyn & Bacon, Inc., Boston, 1962.
17. C. Berge, Topological Spaces, Macmillan Company, New York, 1963.
18. S. S. Coirns, Introductory Topology, Ronald Press, New York, 1961.
19. Z. P. Mamuzic, Introduction to General Topology, P. Noordhoff Ltd., Groningen, 1963.
20. K. K. Jha, Advanced General Topology, Nav Bharat Prakashan, Delhi.

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**M.Sc./M.A. Course (Second Semester)**  
**PAPER-IV**

**Advanced Complex Analysis (II)**

Max. Marks 80

- Unit-I** Weierstrass' factorisation theorem. Gamma function and its properties. Riemann Zeta function. Riemann's functional equation. Runge's theorem. Mittag-Leffler's theorem.
- Unit-II** Analytic Continuation. Uniqueness of direct analytic continuation. Uniqueness of analytic continuation along a curve. Power series method of analytic continuation Schwarz Reflection Principle. Monodromy theorem and its consequences.
- Unit-III** Harmonic functions on a disk. Harnack's inequality and theorem. Dirichlet Problem. Green's function.
- Unit-IV** Canonical products. Jensen's formula. Poisson-Jensen formula. Hadamard's three circles theorem. Order of an entire function. Exponent of Convergence. Borel's theorem. Hadamard's factorization theorem.
- Unit-V** The range of an analytic function. Bloch's theorem. The Little Picard theorem. Schottky's theorem. Montel Caratheodory and The Great Picard theorem. Univalent functions. Bieberbach's conjecture (Statement only) and the "1/4-theorem.

**Recommended Books:**

1. L. V. Ahlfors, Complex Analysis, MCGraw - Hill, 1979.
2. J. B. Conway, Functions of one Complex variable, Springer-Verlag, International student-Edition, Narosa Publishing House, 1980.

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## References

1. H. A. Priestly, Introduction to Complex Analysis, Clarendon Press, Oxford 1990.
2. Liang-shin Hahn & Bernard Epstein, Classical Complex Analysis, Jones and Bartlett Publishers International, London, 1996.
3. S. Lang, Complex Analysis, Addison Wesley, 1977.
4. Mark J. Ablowitz and A.S. Fokas, Complex Variables: Introduction and Applications, Cambridge University press, South Asian Edition, 1998.
5. E. Hille, Analytic Function Theory (2 Vols.) Gonn & Co., 1959.
6. W. H. J. Fuchs, Topics in the Theory of Functions of one Complex Variable, D. Van Nostrand Co., 1967.
7. C. Caratheodory, Theory of Functions (2 Vols.) Chelsea Publishing Company, 1964.
8. M. Heins, Complex Function Theory, Academic Press, 1968.
9. Walter Rudin, Real and Complex Analysis, McGraw-Hill Book Co., 1966.
10. S. Saks and A. Zygmund, Analytic Functions, Monografic Matematyczne, 1952.
11. E.C Titchmarsh, The Theory of Functions, Oxford University Press, London.
12. W. A. Veech, A Second Course in Complex Analysis, W.A. Benjamin, 1967.
13. S. Ponnusamy, Foundations of Complex Analysis, Narosa Publishing House, 1997.
14. D. Sarason, Complex Function Theory, Hindustan Book Agency, Delhi, 1994.

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**M.Sc./M.A. Course (Second Semester)**  
**PAPER-V**  
**Advanced Discrete Mathematics (II)**

Max. Marks 80

- Unit-I** Graph Theory-Definition of (Undirected) Graphs, Paths, Circuits, Cycles, & Subgraphs. Induced Subgraphs. Degree of a vertex. Connectivity. Planar Graphs and their properties. Trees. Euler's Formula for connected planar Graphs. Complete & Complete Bipartite Graphs. Kuratowski's Theorem (statement only) and its use.
- Unit-II** Spanning Trees, Cut-sets, Fundamental Cut -sets, and Cycle. Minimal Spanning Trees and Kruskal's Algorithm. Matrix Representations of Graphs. Euler's Theorem on the Existence of Eulerian Paths and Circuits.
- Unit-III** Directed Graphs. In degree and Out degree of a Vertex. Weighted undirected Graphs. Dijkstra's Algorithm.. strong Connectivity & Warshall's Algorithm. Directed Trees. Search Trees. Tree Traversals.
- Unit-IV** Introductory Computability Theory-Finite State Machines and their Transition Table Diagrams. Equivalence of finite State Machines. Reduced Machines. Homomorphism.
- Unit-V** Finite Automata. Acceptors. Non-deterministic Finite Automata and equivalence of its power to that of Deterministic Finite Automata. Moore and mealy Machines. Turing Machine and Partial Recursive Functions.

**Recommended Books:**

1. Elements of Discrete Mathematics By C. L. Liu
2. Graph Theory and its application By N. Deo
3. Theory of Computer Science By K. L. P. Mishra and N. Chandrashekar

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## References

1. J. P. Tremblay & R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill Book Co., 1997.
2. J. L. Gersting, Mathematical Structures for Computer Science, (3rd edition), Computer Science Press, New York.
3. Seymour Lipschutz, Finite Mathematics (International) edition 1983), McGraw-Hill Book Company, New York.
4. S. Wiitala, Discrete Mathematics-A Unified Approach, McGraw-Hill Book Co.
5. J. E. Hopcroft and J. D. Ullman, Introduction to Automata Theory, Languages & Computation, Narosa Publishing House.
6. C.L Liu, Elements of Discrete Mathematics, McGraw-Hill Book Co.
7. N. Deo. Graph Theory with Application to Engineering and Computer Sciences. Prentice Hall of India.

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**M.A./M.Sc. (MATHEMATICS) (Semester-III)**  
**2019-20 & Onward**

There shall be five theory papers. Two compulsory and three optionals. Each paper shall have 100 marks. Out of these five papers, the paper which has theory and practical both, the theory part shall have 70 marks and practical part shall have 30 marks. **Overall tally of marks in theory and practical will be 500.**

Paper	Description	Theory	Sessional	Practical	Remark
<b>Compulsory Papers</b>					
I	Integration Theory and Functional Analysis (I)	80	20	--	--
II	Partial Differential Equations & Mechanics (I)	80	20	--	--
<b>Optional Papers</b>					
III	A Fundamentals of Computer Science ( Object Oriented Programming and Data Structure)	70	--	30	For regular students only
	B General Relativity and Cosmology (I)	80	20	--	--
	C Fuzzy Set Theory & Its Applications (I)	80	20	--	--
	D Mathematical Biology (I)	80	20	--	--
IV	A Operations Research (I)	80	20	--	--
	B Wavelets (I)	80	20	--	--
V	A Programming in C (with ANSI Features) (I)	70	--	30	For regular students only
	B Graph Theory (I)	80	20	--	--
	C Algebraic Number Theory (I)	80	20	--	--

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**M.Sc./M.A. Course (Third Semester)**  
**PAPER -I**  
**Integration Theory and Functional Analysis (I)**

Max. Marks 80

**Integration Theory:**

**Unit-I** Signed measure. Hahn decomposition theorem, mutually singular measures. Radon-Nikodym theorem. Lebesgue decomposition. Riesz representation theorem. Extension theorem (Caratheodory).

**Unit-II** Lebesgue-Stieltjes integral, product measures, Fubini's theorem. Differentiation and Integration. Decomposition into absolutely continuous and singular parts.

**Unit-III** Baire sets. Baire measure, continuous functions with compact support. Regularity of measures on locally compact spaces. Integration of continuous functions with compact support, Riesz-Markoff theorem.

**Functional Analysis :**

**Unit-IV** Normed linear spaces. Banach spaces and examples. Quotient space of normed linear spaces and its completeness, equivalent norms. Riesz Lemma, basic properties of finite dimensional normed linear spaces and compactness.

**Unit-V** Weak convergence and bounded linear transformations, normed linear spaces of bounded linear transformations, dual spaces with examples.

**Books Recommended :**

1. P. R. Halmos, Measure Theory, Van Nostrand, Princeton, 1950.
2. B. Choudhary and S.Nanda, Functional Analysis with Applications. Wiley Eastern Ltd. 1989.
3. H. L. Royden, Real Analysis, Macmillan Publishing Co. Inc., New York, 4<sup>th</sup> Edition, 1993.

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## References

1. S. K. Berberian, Measure and integration, Chelsea Publishing Company, New York, 1965.
2. G. de Barra, Measure Theory and Integration, Wiley Eastern Limited, 1981.
3. P. K. Jain and V.P. Gupta, Lebesgue Measure and Integration, New Age International (P) Limited, New Delhi, 2000.
4. Richard L. Wheeden and Antoni Zygmund, Measure and Integral : An Introduction to Real Analysis, Marcel Dekker Inc. 1977.
5. J. H. Williamson, Lebesgue Integration, Holt Rinehart and Winston, Inc. New York. 1962.
6. T. G. Hawkins, Lebesgue's Theory of Integration: Its Origins and Development, Chelsea, New York, 1979.
7. K. R. Parthasarathy, Introduction to Probability and Measure, Macmillan Company of India Ltd., Delhi, 1977.
8. R. G. Bartle, The Elements of Integration, John Wiley & Sons, Inc. New York, 1966.
9. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1967.
10. Inder K. Rana, An Introduction to Measure and Integration, Narosa Publishing House, Delhi, 1997.
11. Walter Rudin, Real & Complex Analysis, Tata McGraw-Hill Publishing.
12. Edwin Hewitt and Karl Stromberg, Real and Abstract Analysis, Springer-Verlag, New York.
13. Edwin Hewitt and Kenneth A. Ross, Abstract Harmonic Analysis, Vol. 1, Springer-Verlag, 1993.
14. G. Bachman and L. Narici, Functional Analysis, Academic Press, 1966.
15. N. Dunford and J.T. Schwartz, Linear Operators, Part I, Interscience, New York, 1958.
16. R. E. Edwards, Functional Analysis, Holt Rinehart and Winston, New York, 1965.
17. C. Goffman and G. Pedrick, First Course in Functional Analysis, Prentice Hall of India, New Delhi, 1987.
18. P. K. Jain, O.P. Ahuja and Khalil Ahmad, Functional Analysis, New Age International (P) Ltd. & Wiley Eastern Ltd., New Delhi, 1997.
19. R. B. Holmes, Geometric Functional Analysis and its Applications, Springer-Verlag, 1975.
20. K.K. Jha, Functional Analysis, Students' Friends, 1986.
21. L. V. Kantorovich and G.P. Akilov, Functional Analysis, Pergamon Press, 1982.
22. E. Kreyszig, Introductory Functional Analysis with Applications, John Wiley & Sons, New York, 1978.
23. B. K. Lahiri, Elements of Functional Analysis, The World Press Pvt. Ltd., Calcutta, 1994.
24. A. H. Siddiqui, Functional Analysis with Applications, Tata McGraw-Hill Publishing Company Ltd. New Delhi

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25. B. V. Limaye, Functional Analysis, Wiley Eastern Ltd.
26. L. A. Lustenik and V.J. Sobolev, Elements of Functional Analysis, Hindustan Publishing Corporation, New Delhi, 1971.
27. G. F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill Book Company, New York, 1963.
28. A. E. Taylor, Introduction to Functional Analysis, John Wiley and Sons, New York, 1958.
29. K. Yosida, Functional Analysis, 3<sup>rd</sup> edition Springer-Verlag, New York, 1971.
30. J. B. Conway, A Course in Functional Analysis, Springer-Verlag, New York, 1990.
31. Walter Rudin, Functional Analysis, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1973.
32. A. Wilansky, Functional Analysis, Blaisdell Publishing Co., 1964.
33. J. Tinsley Oden & Leszek F. Dernkowicz, Applied Functional Analysis, CRC Press Inc., 1996.

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**M.Sc./M.A. Course (Third Semester)**  
**PAPER -II**  
**Partial Differential Equations and Mechanics (I)**

Max. Marks 80

**Partial Differential Equations**

**Unit-I** Examples of PDE. Classification. Transport Equation-Initial value Problem. Non-homogeneous Equation, Laplace's Equation-Fundamental Solution, Mean Value Formulas, Properties of Harmonic Functions, Green's Function, Energy Methods.

**Unit-II** Heat Equation-Fundamental Solution, Mean Value Formula, Properties of Solutions, Energy Methods. Wave Equation-Solution by Spherical Means, Non-homogeneous Equations, Energy Methods.

**Analytical Dynamics:**

**Unit-III** Generalized coordinates. Holonomic and Non-holonomic systems. Scleronomic and Rheonomic systems. Generalized potential. Lagrange's equations of first kind. Lagrange's equations of second kind. Uniqueness of solution. Energy equation for conservative fields. Hamilton's variables. Donkin's theorem. Hamilton canonical equations. Cyclic coordinates. Routh's equations.

**Unit-IV** Poisson's Bracket. Poisson's Identity. Jacobi-Poisson Theorem. Motivating problems of calculus of variations, Shortest distance. Minimum surface of revolution. Brachistochrone problem. Isoperimetric problem. Geodesic. Fundamental lemma of calculus of variations. Euler's equation for one dependent function and its generalization to (i) 'n' dependent functions, (ii) higher order derivatives. Conditional extremum under geometric constraints and under integral constraints.

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## Gravitation:

**Unit-V** Attraction and potential of rod, disc, spherical shells and sphere.  
Surface integral of normal attraction (application & Gauss' theorem).  
Laplace and Poisson equations. Work done by self attracting systems. Distributions for a given potential. Equipotential surfaces.  
Surface and solid harmonics. Surface density in terms of surface harmonics.

## Books Recommended:

1. L. C. Evans, Partial Differential Equations, Graduate Studies in Mathematics, Volume 19, AMS, 1998.
2. F. Gantmacher, Lectures in Analytic Mechanics, MIR Publishers, Moscow, 1975.
3. R. C. Mondal, Classical Mechanics, Prentice Hall of India
4. S. L. Loney, An Elementary Treatise on Statics, Kalyani Publishers, New Delhi, 1979.

## References

1. Books on Partial differential equation by I.N. Sneddon, F. John, P. Prasad and R. Ravindran, Amarnath etc.
2. A. S. Ramsey, Dynamics Part II, The English Language Book Society and Cambridge University Press, 1972.
3. H. Goldstein, Classical Mechanics (2nd edition), Narosa Publishing House, New Delhi.
4. I. M. Gelfand and S.V. Fomin, Calculus of Variations, Prentice Hall.
5. Narayan Chandra Rana & Pramod Sharad Chandra Joag, Classical Mechanics, Tata McGraw Hill, 1991.
6. Louis N. Hand and Janet D. Finch, Analytical Mechanics, Cambridge University Press, 1998.
7. A. S. Ramsey, Newtonian Gravitation, The English Language Book Society and the Cambridge University Press.

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**M.Sc./M.A. Course (Third Semester)**  
**PAPER-III (A)**  
**Fundamentals of Computer Science-Theory and Practical**  
**(Object Oriented Programming and Data Structure)**

Max. Marks. 100  
(Theory-70 +Practical-30)

- Unit-I** Object Oriented Programming-Classes and Scope, nested classes, pointer class members; Class initialization, assignment and destruction.
- Unit-II** Overloaded functions and operators; Templates including class templates; class inheritance and virtual functions.
- Unit-III** Data Structures-Analysis of algorithms, q, W, O, o, w notations ; Sequential and linked representations, Lists, Stacks, and queues;
- Unit-IV** Trees: Binary tree- search tree implementation, B-tree (concept only);
- Unit-V** Sorting: Insertion sort, shell sort, quick-sort, heap sort and their analysis; Hashing-open and closed.

**Books Recommended :**

1. S. B. Lipman, J. Lajoi: C++ Primer, Addison Wesley.
2. B. Stroustrup; The C++ Programming Language, Addison Wesley.
3. C. J. Date : Introduction to Database Systems, Addison Wesley.
4. C. Ritchie: Operating Systems-Incorporating UNIX and Windows, BPB Publications.
5. M. A. Weiss, Data Structures and Algorithm Analysis in C++, Addison Wesley.

**Practical Examination Scheme**

Max. Marks – 30	Time Duration – 3 Hrs.
Practical (two)	20 Marks( 10 marks each)
Viva	05 Marks
Sessional	05 Marks

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**M.Sc./M.A. Course (Third Semester)**  
**PAPER-III (B)**  
**General Relativity & Cosmology (I)**

Max Marks – 80

- Unit-I** General Relativity-Transformation of coordinates. Tensors. Algebra of Tensors. Symmetric and skew symmetric Tensors. Contraction of tensors and quotient law. Riemannian metric. Parallel transport. Christoffel Symbols. Covariant derivatives, intrinsic derivatives and geodesics.
- Unit-II** Riemann Christoffel curvature tensor and its symmetry properties. Bianchi identities and Einstein tensor. Review of the special theory of relativity and the Newtonian Theory of gravitation.
- Unit-III** Principle of equivalence and general covariance, geodesic principle, Newtonian approximation of relativistic equations of motion. Einstein's field equations and its Newtonian approximation.
- Unit-IV** Schwarzschild external solution and its isotropic form. Planetary orbits and analogues of Kepler's Laws in general relativity. Advance of perihelion of a planet. Bending of light rays in a gravitational field, gravitational redshift of spectral lines. Radar echo delay.
- Unit-V** Energy-momentum tensor of a perfect fluid. Schwarzschild internal solution. Boundary conditions. Energy momentum tensor of an electromagnetic field. Einstein-Maxwell equations. Reissner-Nordström solution.

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## REFERENCES:

1. C. E. Weatherbum, An Introduction to Riemannian Geometry and the tensor Calculus, Cambridge University Press, 1950.
2. H. Stephani, General Relativity: An Introduction to the theory of the gravitational field, Cambridge University Press, 1982.
3. A. S. Eddington, The Mathematical Theory of Relativity, Cambridge University Press, 1965.
4. J. V. Narlikar, General Relativity and Cosmology, The Macmillan Company of India Limited, 1978.
5. R. Adiev, M. Bazin, M. Schiffer, Introduction to general relativity, McGraw Hill Inc., 1975.
6. B. F. Schutz, A first course in general relativity, Cambridge University Press, 1990.
7. S. Weinberg, Gravitation and Cosmology: Principles and applications of the general theory of relativity, John Wiley & Sons, Inc. 1972.
8. R. K. Sachs and H. Wu., General Relativity for Mathematician, Springer Verlag, 1977.
9. J. L. Synge, Relativity: The general theory. North Holland Publishing Company, 1976.

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**M.Sc./M.A. Course (Third Semester)**  
**PAPER-III (C)**  
**Fuzzy Set Theory and Its Applications (I)**

Max Marks – 80

- UNIT-I** Fuzzy sets-Basic definitions,  $\alpha$ -level sets. Convex fuzzy sets. Basic operations on fuzzy sets. Types of fuzzy sets. Cartesian products, Algebraic products. Bounded sum and difference, t-norms and t-conorms.
- UNIT-II** The Extension Principle- The Zadeh's extension principle. Image and inverse image of fuzzy sets. Fuzzy numbers. Elements of fuzzy arithmetic.
- UNIT-III** Fuzzy Relations on Fuzzy sets, Composition of Fuzzy relations. Min-Max composition and its properties.
- UNIT-IV** Fuzzy equivalence relations. Fuzzy compatibility relations. Fuzzy relation equations. Fuzzy graphs, Similarity relation.
- UNIT-V** Possibility Theory-Fuzzy measures. Evidence theory. Necessity measure. Possibility measure. Possibility distribution. Possibility theory and fuzzy sets. Possibility theory versus probability theory.

**REFERENCES :**

1. H. J. Zmmemann, Fuzzy set theory and its Applications, Allied Publishers Ltd. New Delhi, 1991.
2. G. J. Klir and B. Yuan- Fuzzy sets and fuzzy logic, Prentice-Hall ol India, New Delhi, 1995.

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**M.Sc./M.A. Course (Third Semester)**  
**PAPER-III (D)**  
**Mathematical Biology (I)**

Max. Marks - 80

**UNIT-I**

**Population Dynamics**

Malthusian growth model, Logistic equation, model of species competition, Linear and Nonlinear First Order Discrete Time Models, Biology of Insect Population Dynamics, Model for Insect Population Dynamics with Competition, Differential Equation Models.

**UNIT-II**

**Age Structured Population Dynamics**

Evolutionary Aspects, Harvesting and Fisheries, Metapopulations, Delay Effects, Fibonacci's Rabbits, golden ratio, Age-structured Population's in Discrete Time, continuous age-structured populations, Euler-Lotka Equations.

**UNIT-III**

**Population Dynamics of Interacting Species**

Host-parasitoid Interactions, Lotka-Volterra Prey-predator Equations, Modelling the Predator Functional Response, Ecosystems Modelling, Interacting Metapopulations, Competition, Predation, Predator-mediated Coexistence of Competitors, Effects of Habitat Destruction.

**UNIT-IV**

**Population Genetics and Evolution**

Mendelian Genetics in Populations with Non-overlapping Generations, Haploid genetics, Spread of a favored allele, Mutation-selection balance, Diploid genetics, Sexual reproduction, Spread of a favored allele, Mutation-selection balance, Heterosis, Frequency-dependent selection, Linkage equilibrium, Random genetic drift, Evolution of the Genetic System.

**UNIT-V**

**Infectious Disease**

Simple Epidemic and SIS Diseases, SIR Epidemics, SIR epidemic disease model, SIR Endemics, SIR endemic disease model, No Disease-related Death, Including Disease-related Death, Vaccination, Evolution of virulence, Vector -borne Diseases, Basic Model for Macroparasitic Diseases.

**Recommended Books**

1. Jeffrey R. Chasnov, Mathematical Biology, Lecture Notes for MATH(365), The Hong Kong University of Science and Technology (2010)
2. Nicholas F. Britton, Essential Mathematical Biology, Springer-Verlag(2003)
3. J.D.Murray, Mathematical Biology I. An Introduction, Springer-Verlag (2002) 3<sup>rd</sup> Edition.
4. J. D. Murray, Mathematical Biology II. Spatial Models and Biomedical Application, Springer-Verlag (2003) 3<sup>rd</sup> Edition.

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**M.Sc./M.A. Course (Third Semester)**  
**PAPER -IV (A)**  
**Operations Research (I)**

Max. Marks 80

- Unit-I** Operations Research and its Scope. Necessity of Operations Research in Industry. Linear Programming-Simplex Method. Theory of the Simplex Method. Duality and Sensitivity Analysis.
- Unit-II** Other Algorithms for Linear Programming-Dual Simplex Method.
- Unit-III** Parametric Linear Programming. Upper Bound Technique. Interior Point Algorithm. Linear Goal Programming.
- Unit-IV** Transportation and Assignment Problems.
- Unit-V** Network Analysis-Shortest Path Problem. Minimum Spanning Tree Problem. Maximum Flow Problem. Minimum Cost Flow Problem. Network Simplex Method. Project Planning and Control I with PERT-CPM.

**Books Recommended :**

1. F. S. Hillier and G.J. Ueberman. Introduction to Operations Research (Sixth Edition), McGraw Hill International Edition, Industrial Engineering Series, 1995. (This book comes with a CD containing tutorial software).
2. G. Hadley, Linear Programming, Narosa Publishing House, 1995.
3. G. Hadley, Nonlinear and Dynamic Programming, Addison-Wesley, Reading Mass.
4. H. A. Taha, Operations Research -An introduction, Macmillan Publishing Co., Inc., New York.
5. Kanti Swarup, P.K. Gupta and Man Mohan, Operations Research, Sultan Chand & Sons, New Delhi
6. Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali, Linear Programming and Network flows, John Wiley & Sons, New York, 1990.

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## References

1. S. S. Rao, Optimization Theory and Applications, Wiley Eastern Ltd., New Delhi.
2. Prem Kumar Gupta and D.S. Hira, Operations Research-An Introduction. S. Chandra & Company Ltd., New Delhi.
3. N. S. Kambo, Mathematical Programming Techniques, Affiliated East-West Press Pvt. Ltd., New Delhi, Madras
4. R. K. Rathy, An Introduction to Fluid Dynamics, Oxford and IBH Publishing Company, New Delhi, 1976.
5. A. D. Young, Boundary Layers, AIAA Education Series, Washington DC, 1989.
6. S. W. Yuan, Foundations of Fluid Mechanics, Prentice Hall of India Private Limited, New Delhi, 1976.
7. LINGO Systems Products (Visit website <http://www.Hndo.com/productsf.html>)
  - (i) LINGO (the linear programming solver)
  - (ii) LINGO Callable Library (the premier optimisation engine)
  - (iii) LINGO (the linear, non-linear, and integer programming solver with mathematical modelling language)
  - (i) What's Best I (the spreadsheet add-in that solves linear, non-linear, and integer problems).

All the above four products are bundled into one package to form the Solver Suite. For more details about any of the four products one has to click on its name.

- (i) Optimisation Modelling with LINGO (8" edition) by Linus Schrage.
- (ii) Optimisation Modelling with LINGO by Unus Schrage.

More details available on the Related Book page York, 1979.

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**M.Sc./M.A. Course (Third Semester)**  
**PAPER-IV (B)**  
**Wavelets (I)**

Max Marks – 80

- Unit-I.** Preliminaries-Different ways of constructing wavelets- Orthonormal bases generated by a single function: the Balian-Low theorem. Smooth projections on  $L^2(\mathbb{R})$ .
- Unit-II.** Local sine and cosine bases and the construction of some wavelets. The unitary folding operators and the smooth projections.
- Unit-III.** Multiresolution analysis and construction of wavelets. Construction of compactly supported wavelets and estimates for its smoothness. Band limited wavelets.
- Unit-IV.** Orthonormality. Completeness. Characterization of Lemarie-Meyer wavelets and some other characterizations. Franklin wavelets and Spline wavelets on the real line.
- Unit-V.** Orthonormal bases of piecewise linear continuous functions for  $L^2(\mathbb{T})$ . Orthonormal bases of periodic splines. Periodization of wavelets defined on the real line.

**REFERENCES:**

1. Eugenic Hernandez and Guido Weiss, A First Course on Wavelets, CRC Press, New York, 1996.
2. C. K. Chui, An Introduction to Wavelets, Academic Press, 1992.
3. I. Daubechies, Ten Lectures on Wavelets, CBS-NSF Regional Conferences in Applied Mathematics, 61, SIAM, I 1992.
4. Y. Meyer, Wavelets, algorithms and applications (Tran.by R.D. Rayan, SIAM, 1993.
5. M. V. Wickerhauser, Adapted wavelet analysis from theory to software, Wellesley, MA, A.K. Peters, 1994.

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**M.Sc./M.A. Course (Third Semester)**  
**PAPER –V (A)**  
**Programming in C (with ANSI features) Theory and Practical (I)**

Max. Marks. 100  
(Theory-70 +Practical-30)

- Unit-I** An overview of programming. Programming language, Classification. C Essentials-Program Development. Functions. Anatomy of a C Function. Variables and Constants. Expressions. Assignment Statements. Formatting Source Files. Continuation Character. The Preprocessor.
- Unit-II** Scalar Data Types-Declarations, Different Types of Integers. Different kinds of Integer Constants. Floating-Point Types. Initialization. Mixing Types. Explicit Conversions-Casts. Enumeration Types. The Void Data Type. Typedefs. Finding the Address of an object. Pointers.
- Unit-III** Control Flow-Conditional Branching. The Switch Statement. Looping. Nested Loops. The break and continue Statements. The goto statement. Infinite Loops.
- Unit-IV** Operators and Expressions-Precedence and Associativity. Unary Plus and Minus operators. Binary Arithmetic Operators. Arithmetic Assignment Operators. Increment and Decrement Operators. Comma Operator. Relational Operators. Logical Operators. Bit - Manipulation Operators. Bitwise Assignment Operators. Cast Operator. Size of Operators. Conditional Operator. Memory Operators.
- Unit-V** Arrays -Declaring an Array. Arrays and Memory. Initializing Arrays. Encryption and Decryption.

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## Books Recommended :

1. Peter A. Darnell and Philip E. Margolis, C: A Software Engineering Approach, Narosa Publishing House (Springer International Student Edition) 1993.
2. Samuel P. Harkison and Gly L. Steele Jr., C : A Reference Manual, 2nd Edition, Prentice Hall, 1984.
3. Brian W. Kernighan & Dennis M. Ritchie, The C Programme Language, 2nd Edition (ANSI Features), Prentice Hall 1989.

## Practical Examination Scheme

Max. Marks – 30

Time Duration – 3 Hrs.

Practical (two)

20 Marks( 10 marks each)

Viva

05 Marks

Sessional

05 Marks

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**M.Sc./M.A. Course (Third Semester)**  
**PAPER-V (B)**  
**Graph theory (I)**

Max. Marks - 80

Unit-I: Operations on graphs, matrices and vector spaces: Topological operations, Homeomorphism, homomorphism, contractions, derived graphs, Binary operations.

Unit-II: Matrices and vector spaces: Matrices and vector spaces : The adjacency matrix, The determinant and the spectrum, Spectrum properties, The incidence matrix, cycle space and Bond space, Cycle bases and cycle graphs.

Unit-III: Colouring packing and covering: Vertex coverings, critical graphs, Girth and chromatic number, uniquely colourable graphs, edge-colourings, Face colourings and Beyond, The achromatic and the Adjoint Numbers.

Unit-IV: Combinational formulations: Setting up of combinational formulations, the classic pair of duals, Gallai, Norman-Rabin Theorems, Clique parameters, The Rosenfeld Numbers.

Unit-V: Perfect Graphs: Introduction to the "SPGC", Triangulated (Chordal) graphs, Comparability graphs, Interval graphs, permutation graphs, circular arc graphs, split graphs, weakly triangulated graphs.

**REFERENCES :**

1. K. R. Parthasarathy, Basic graph theory, Tata Mc graw Hill publishing company limited , 1994.
2. R. J. Wilson, Introduction to graph theory, Longman Harlow, 1985.
3. John Clark, Derek Allon Holton, A first look at graph Theory, World Scientific Singapore, 1991.
4. Frank Hararary, Graph Theory Narosa, New Delhi, 1995.
5. Ronald Gould and Benjamin Cummins, Graph Theory, California.
6. Narsingh Deo, Graph Theory with applications to Engineering and Computer Science, Prentice-Hall of India Private Limited, New Delhi, 2002.

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**M.Sc./M.A. Course (Third Semester)**  
**PAPER-V (C)**  
**Algebraic Number Theory (I)**

Max Marks – 80

**UNIT-I**

**Elementary Number Theory:** Primes and factorization, Division Algorithm, Congruence, Congruence and Modular Arithmetic, Euler phi function, Primitive roots of Unity, Quadratic law of Reciprocity, Arithmetical functions, Mobius Inversion Formula, The Diophantine Equations, Farey Sequences.

**UNIT-II**

**Algebraic Numbers:** Algebraic Numbers, Conjugates and Discriminants, Algebraic Integers, Integral Bases, Rings of Integers.

**UNIT-III**

**Special Fields:** Calculations for Quadratic fields, cubic fields, biquadratic fields and sextic fields.

**UNIT-IV**

**Localization:** Localization, Integral closure, Prime ideals, Chinese remainder theorem, Galois extensions. **Rings:** Dedekind rings, Discrete valuation rings, Explicit factorization of a prime.

**UNIT-V**

**Completions:** Definitions and completions, Polynomials in complete fields, Structure of complete discrete valuation ring, extension of complete fields.

**References:**

1. Serge Lange: Algebraic Number Theory, Springer-Verlag, 1986.
2. Jean-Pierre Serre: Local Fields, Springer-Verlag, 1979
3. M. Ram Murty, Jody Esmonde: Problems in Algebraic Number Theory (2<sup>nd</sup> ed.), Springer, 2005.
4. H. P. F. Swinnerton-Dyer: A Brief Guide to Algebraic Number Theory, Cambridge University Press, 2001
5. A. Frohlich, M.J. Taylor: Algebraic Number Theory, Cambridge University Press, 1991.
6. Ian Stewart, David Tall : Algebraic Number Theory and Fermat's Last Theorem (3<sup>rd</sup> ed.), A K Peters, Natick, Massachusetts, 2002.
7. Ethan D. Bolker: Elementary Number Theory, An Algebraic Approach, W. A. Benjamin, Inc., New York, 1970
8. Jurgen Neukirch: Algebraic Number Theory, Springer-Verlag, 1999
9. William Stein: Algebraic Number Theory, a Computational Approach, Cambridge University Press, 1991.
10. G. A. Jones and J. M. Jones, Elementary Number Theory, Springer, 1998.

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**Scheme of Examination**  
**M.A./M.Sc. (MATHEMATICS) (Semester-IV)**  
**2019-20 & Onward**

There shall be five papers. Two compulsory and three optional papers. Each paper shall have 100 marks. The paper which has theory and practical both, the theory part shall have 70 marks and practical part shall have 30 marks. **Overall tally of marks in theory and practical will be 500.**

Paper	Description		Theory	Sessional	Practical	Remark
Compulsory Papers						
I	Functional Analysis (II)		80	20	--	--
II	Partial Differential Equations & Mechanics		80	20	--	--
Optional Papers						
III	A	Operating System and Database Management System	70	--	30	For regular students
	B	Cosmology (II)	80	20	--	--
	C	Fuzzy Set Theory & Its Applications	80	20	--	--
	D	Mathematical Biology(II)	80	20	--	--
IV	A	Operations Research (II)	80	20	--	--
	B	Wavelets (II)	80	20	--	--
V	A	Programming in C (with ANSI Features) (II)	70	--	30	For regular students
	B	Graph Theory (II)	80	20	--	
	C	Algebraic Number Theory	80	20	--	

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## **M.Sc./M.A. Course (Fourth Semester)**

### **PAPER -I**

### **Functional Analysis (II)**

Max. Marks 80

**Unit-I** Uniform boundedness theorem and some its consequences. Open mapping and closed graph theorems.

**Unit-II** Hahn-Banach theorem for real linear spaces, complex linear spaces and normed linear spaces. Reflexive spaces. Weak Sequential Compactness. Compact Operators. Solvability of linear equations in Banach spaces. The closed Range Theorem.

**Unit-III** Inner product spaces. Hilbert spaces. Orthonormal Sets. Bessel's inequality. Complete orthonormal sets and Parseval's identity.

**Unit-IV** Structure of Hilbert spaces. Projection theorem. Riesz representation theorem. Adjoint of an operator on a Hilbert space. Reflexivity of Hilbert spaces.

**Unit-V** Self-adjoint operators, Positive, projection, normal and unitary operators. Abstract variational boundary-value problem. The generalized Lax-Milgram theorem.

### **Books Recommended :**

1. B. Choudhary and S. Nanda, Functional Analysis with Applications. Wiley Eastern Ltd. 1989.
2. H. L. Royden, Real Analysis, Macmillan Publishing Co. Inc., New York, 4th Edition, 1993.

### **References**

1. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1967.
2. Walter Rudin, Real & Complex Analysis, Tata McGraw-Hill Publishing.
3. Edwin Hewitt and Karl Stromberg, Real and Abstract Analysis, Springer-Verlag, New York.
4. Edwin Hewitt and Kenneth A. Ross, Abstract Harmonic Analysis, Vol. 1, Springer-Verlag, 1993.

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5. G. Bachman and L. Narici, Functional Analysis, Academic Press, 1966.
6. N. Dunford and J.T. Schwartz, Linear Operators, Part I, Interscience, New York, 1958.
7. R. E. Edwards, Functional Analysis, Holt Rinehart and Winston, New York, 1965.
8. C. Goffman and G. Pedrick, First Course in Functional Analysis, Prentice Hall of India, New Delhi, 1987.
9. P. K. Jain, O.P. Ahuja and Khalil Ahmad, Functional Analysis, New Age International (P) Ltd. & Wiley Eastern Ltd., New Delhi, 1997.
10. R. B. Holmes, Geometric Functional Analysis and its Applications, Springer-Verlag, 1975.
11. K. K. Jha, Functional Analysis, Students' Friends, 1986.
12. L. V. Kantorovich and G.P. Akilov, Functional Analysis, Pergamon Press, 1982.
13. E. Kreyszig, Introductory Functional Analysis with Applications, John Wiley & Sons, New York, 1978.
14. B. K. Lahiri, Elements of Functional Analysis, The World Press Pvt. Ltd., Calcutta, 1994.
15. A. H. Siddiqui, Functional Analysis with Applications, Tata McGraw-Hill Publishing Company Ltd. New Delhi
16. B.V. Limaye, Functional Analysis, Wiley Eastern Ltd.
17. L.A. Lustenik and V.J. Sobolev, Elements of Functional Analysis, Hindustan Publishing Corporation, New Delhi, 1971.
18. G. F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill Book Company, New York, 1963.
19. A. E. Taylor, Introduction to Functional Analysis, John Wiley and Sons, New York, 1958.
20. K.Yosida, Functional Analysis, 3<sup>rd</sup> edition Springer-Verlag, New York, 1971.
21. J.B. Conway, A Course in Functional Analysis, Springer-Verlag, New York, 1990.
22. Walter Rudin, Functional Analysis, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1973.
23. A. Wilansky, Functional Analysis, Blaisdell Publishing Co., 1964.
24. J. Tinsley Oden & Leszek F. Demkowicz, Applied Functional Analysis, CRC Press Inc., 1996.







**M.Sc./M.A. Course (Fourth Semester)**  
**PAPER -II**  
**Partial Differential Equations and Mechanics (II)**

**Max. Marks 80**

**Partial Differential Equations**

**Unit-I** Non-linear First Order PDE-Complete Integrals, Envelopes, Characteristics, Hamilton Jacobi Equations (Calculus of Variations, Hamilton's ODE, Legendre Transform, Hopf-Lax Formula, Weak Solutions, Uniqueness), Conservation Laws (Shocks, Entropy Condition, Lax Oleinik formula, Weak Solutions, Uniqueness, Riemann's Problem, Long Time Behaviour)

**Unit-II** Representation of Solutions-Separation of Variables, Similarity Solutions (Plane and Travelling Waves, Solitons, Similarity under Scaling), Fourier and Laplace Transform, Hopf-Cole Transform, Hodograph and Legendre Transforms, Potential Functions.

**Unit-III** Asymptotics (Singular Perturbations, Laplace's Method, Geometric Optics, Stationary Phase, Homogenization), Power Series (Non-characteristic Surfaces, Real Analytic Functions, Cauchy-Kovalevskaya Theorem).

**Analytical Dynamics:**

**Unit-IV** Hamilton's Principle. Principle of least action. Poincare Cartan Integral invariant. Whittaker's equations. Jacobi's equations. Lee Hwa Chung's theorem, canonical transformations and properties of generating functions.

**Unit-V** Hamilton-Jacobi equation. Jacobi theorem. Method of separation of variables. Lagrange Brackets. Condition of canonical character of a transformation in terms of Lagrange brackets and Poisson brackets, invariance of Lagrange brackets and Poisson brackets under canonical transformations.

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### **Books Recommended :**

1. L. C. Evans, Partial Differential Equations, Graduate Studies in Mathematics, Volume 19, AMS, 1998.
2. F. Gantmacher, Lectures in Analytic Mechanics, MIR Publishers, Moscow, 1975.
3. R. C. Mondal, Classical Mechanics, Prentice Hall of India

### **References**

1. Books on Partial differential equation by IN. Sneddon, F. John, P. Prasad and R. Ravindran, Amarnath etc.
2. A. S. Ramsey, Dynamics Part II, The English Language Book Society and Cambridge University Press, 1972.
3. H. Goldstein, Classical Mechanics (2nd edition), Narosa Publishing House, New Delhi.
4. I. M. Gelfand and S.V. Fomin, Calculus of Variations, Prentice Hall.
5. Narayan Chandra Rana & Pramod Sharad Chandra Joag, Classical Mechanics, Tata McGraw Hill, 1991.
6. Louis N. Hand and Janet D. Finch, Analytical Mechanics, Cambridge University Press, 1998.

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**M.Sc./M.A. Course (Fourth Semester)**  
**PAPER-III (A)**  
**Operating System and Database Management System**  
**- Theory and Practical**

Max. Marks. 100

(Theory-70 +Practical-30)

**Unit-I** Database Systems-Role of database systems, database system architecture and data modeling.

**Unit-II** Introduction to relational algebra and relational calculus.

**Unit-III** Introduction to SQL: Basic features including views; Integrity constraints; Database design-normalization up to BCNF.

**Unit-IV** Operating Systems- Overview of operating system, user interface, processor management, memory management.

**Unit-V** I/O management, concurrency and Security, network and distributed systems.

**Books Recommended :**

1. S. B. Lipman, J. Lajoi: C++ Primer, Addison Wesley.
2. B. Stroustrup; The C++ Programming Language, Addison Wesley.
3. C. J. Date : Introduction to Database Systems, Addison Wesley.
4. C. Ritchie: Operating Systems-Incorporating UNIX and Windows, BPB Publications.
5. M. A. Weiss, Data Structures and Algorithm Analysis in C++, Addison Wesley.

**Practical Examination Scheme**

Max. Marks – 30

Time Duration – 3 Hrs.

Practical (two)

20 Marks( 10 marks each)

Viva

05 Marks

Sessional

05 Marks

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## M.Sc./M.A. Course (Fourth Semester)

### PAPER-III (B) Cosmology (II)

Max Marks – 80

- Unit-I:** Cosmology-physical universe, Mach's principle, Einstein modified field equations with cosmological term.
- Unit-II:** Static Cosmological models of Einstein and De-Sitter, their derivation, properties and comparison with the actual universe.
- Unit-III:** Hubble's law. Cosmological principles. Weyl's postulate. Derivation of Robertson-Walker metric. Hubble and deceleration parameters. Redshift. Redshift versus distance relation. Angular size versus redshift relation and source counts in Robertson-Walker space-time.
- Unit-IV:** Friedmann models. Fundamental equations of dynamical cosmology. Critical density. Closed and open Universes. Age of the Universe. Matter dominated era of the Universe.
- Unit-V:** Einstein-deSitter model. Particle and event horizons. Eddington-Lemaître models with  $\Lambda$ -term. Perfect cosmological principle. Steady state cosmology.

### REFERENCES:

1. J. V. Narlikar, General Relativity and Cosmology, The Macmillan Company of India, 1978.
2. S. Weinberg, Gravitation and Cosmology: Principles and applications of the general theory of relativity, John Wiley & Sons, Inc. 1972.
3. J. V. Narlikar, Introduction to Cosmology, Cambridge University Press, 1993.
4. L. D. Landau and E.M. Lifshitz, The classical theory of Fields, Pergamon Press, 1980.

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**M.Sc./M.A. Course (Fourth Semester)**  
**PAPER-III (C)**  
**Fuzzy Set Theory & Its Applications (II)**

Max Marks – 80

- Unit-I** Fuzzy Logic-An overview of classical logic, Multivalued logics, Fuzzy propositions. Fuzzy quantifiers. Linguistic variables and hedges. Inference from conditional fuzzy propositions, the compositional rule of inference.
- Unit-II** Approximate Reasoning-An overview of Fuzzy expert system. Fuzzy implications and their selection. Multiconditional approximate reasoning. The role of fuzzy relation equation.
- Unit-III** An introduction to Fuzzy Control-Fuzzy controllers. Fuzzy rule base. Fuzzy inference engine. Fuzzification.
- Unit-IV** Defuzzification and the various defuzzitication methods (the centre of area, the centre of maxima, and the mean of maxima methods).
- Unit-V** Decision Making in Fuzzy Environment-Individual decision making. Multiperson decision making. Multicriteria decision making. Multistage decision making. Fuzzy ranking methods. Fuzzy linear programming.

**REFERENCES :**

1. H. J. Zimmemann, Fuzzy set theory and its Applications, Allied Publishers Ltd. New Delhi, 1991.
2. G. J. Klir and B. Yuan- Fuzzy sets and fuzzy logic, Prentice-Hall ol India, New Delhi, 1995.

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# M.Sc./M.A. Course (Fourth Semester)

## PAPER-III (D)

### Mathematical Biology (II)

Max. Marks - 80

#### UNIT-I

**Tumor Modelling:** Phenomenological Models, Nutrients: the Diffusion-limited Stage, Moving Boundary Problems, Growth Promoters and Inhibitors, Vascularisation, Metastasis, Immune System Response.

#### UNIT-II

**Growth and Control of Brain Tumours:** Basic Mathematical Model of Glioma Growth and Invasion, Tumour Spread *In Vitro*: Parameter Estimation, Tumour Invasion in the Rat Brain, Tumour Invasion in the Human Brain, Modelling Tumour Resection in Homogeneous Tissue, Analytical Solution for Tumour Recurrence After Resection, Modelling Surgical Resection with Brain Tissue Heterogeneity, Modelling the Effect of Chemotherapy on Tumour Growth, Modelling Tumour Polyclonality and Cell Mutation.

#### UNIT-III

**Dynamics of Infectious Diseases:** Historical Aside on Epidemics, Simple Epidemic Models and Practical Applications, Modelling Venereal Diseases, Multi-Group Model for Gonorrhea and Its Control, Bovine Tuberculosis Infection in Badgers and Cattle, Modelling Control Strategies for Bovine Tuberculosis in Badgers and Cattle.

#### UNIT-IV

**Modelling of Immunodeficiency Virus:** AIDS: Modelling the Transmission Dynamics of the Human Immunodeficiency Virus (HIV), HIV: Modelling Combination Drug Therapy, Delay Model for HIV Infection with Drug Therapy, Modelling the Population Dynamics of Acquired Immunity to Parasite Infection, Age- Dependent Epidemic Model and Threshold Criterion, Simple Drug Use Epidemic Model and Threshold Analysis.

#### UNIT-V

**Geographic Spread and Control of Epidemics:** Simple Model for the Spatial Spread of an Epidemic, Spread of the Black Death in Europe, Brief History of Rabies, Spatial Spread of Rabies Among Foxes: Background and Simple Model, Three- Species (*SIR*) Model. Control Strategy Based on Wave Propagation into a Non-epidemic Region: Estimate of Width of a Rabies Barrier, Analytic Approximation for the Width of the Rabies, Effect of Fox Immunity on the Spatial Spread of Rabies.

#### Recommended Books

1. Jeffrey R. Chasnov, Mathematical Biology, Lecture Notes for MATH(365), The Hong Kong University of Science and Technology (2010)
2. Nicholas F. Britton, Essential Mathematical Biology, Springer-Verlag (2003)
3. J. D. Murray, Mathematical Biology I. An Introduction, Springer-Verlag (2002) 3<sup>rd</sup> Edition.
4. J. D. Murray, Mathematical Biology II. Spatial Models and Biomedical Application, Springer-Verlag (2003) 3<sup>rd</sup> Edition.

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**M.Sc./M.A. Course (Fourth Semester)**  
**PAPER –IV (A)**  
**Operations Research (II)**

Max. Marks 80

**Unit-I** Dynamic Programming-Deterministic and Probabilistic Dynamic programming.

**Unit-II** Game Theory-Two-Person, Zero-Sum Games. Games with Mixed Strategies. Graphical . Solution. Solution by Linear Programming.

**Unit-III** Integer Programming-Branch and Bound Technique.

**Unit-IV** Applications to Industrial Problems-Optimal product mix and activity levels. Petroleum, Refinery operations, Blending problems, Economic interpretation of dual linear programming. Problems, Input-output analysis. Leontief system. Indecomposable and Decomposable economies.

**Unit-V** Nonlinear Programming-One/and Multi-Variable Unconstrained Optimization., Kuhn-Tucker Conditions for Constrained Optimization. Quadratic Programming. Separable Programming. I Convex Programming. Non-convex Programming.

**Books Recommended :**

1. F. S. Hillier and G. J. Lieberman. Introduction to Operations Research (Sixth Edition), McGraw Hill International Edition, Industrial Engineering Series, 1995. (This book comes with a CD containing tutorial software).
2. G. Hadley, Linear Programming, Narosa Publishing House, 1995.
3. G. Hadley, Nonlinear and Dynamic Programming, Addison-Wesley, Reading Mass.
4. H. A. Taha, Operations Research -An introduction, Macmillan Publishing Co., Inc., New York.
5. Kanti Swarup, P.K. Gupta and Man Mohan, Operations Research, Sultan Chand & Sons, New Delhi
6. Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali, Linear Programming and Network flows, John Wiley & Sons, New York, 1990.


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## References

1. S. S. Rao, Optimization Theory and Applications, Wiley Eastern Ltd., New Delhi.
2. Prem Kumar Gupta and D.S. Hira, Operations Research-An Introduction. S. Cliand & Company Ltd., New Delhi.
3. N. S. Kambo, Mathematical Programming Techniques, Affiliated East-West Press Pvt. Ltd., New Delhi, Madras
4. R. K. Rathy, An Introduction to Fluid Dynamics, Oxford and IBH Publishing Company, New Delhi, 1976.
5. A. D. Young, Boundary Layers, AIAA Education Series, Washington DC, 1989.
6. S. W. Yuan, Foundations of Fluid Mechanics, Prentice Hall of India Private Limited, New Delhi, 1976.
7. LINDO Systems Products (Visit websHe <http://www.Hndo.com/productsf.html>)
  - (i) LINDO (the linear programming solver)
  - (ii) LINDO Callable Library (the premier optimisation engine)
  - (iii) LINGO (the linear, non-linear, and integer programming solver with mathematical modelling language)
  - (i) What's Best ! (the spreadssheet add-in that solves linear, non- linear, and integer problems).

All the above four products are bundled into one package to form the Solver Suite. For more details about any of the four products one has to click on its name.

- (i) Optimisation Modelling with LINDO (8" edition) by Linus Schrage.
- (ii) Optimisation Modelling with LINGO by Linus Schrage. More details available on the Related Book page York, 1979.

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**M.Sc./M.A. Course (Fourth Semester)**  
**PAPER-IV (B)**  
**Wavelets (II)**

Max Marks – 80

**Unit-I** Characterizations in the theory of wavelets-The basic equations and some of its applications.

**Unit-II** Characterizations of MRA wavelets, low-pass filters and scaling functions. Non-existence of smooth wavelets in  $H^2(\mathbb{R})$ .

**Unit-III Frames** - The reconstruction formula and the Balian-Low theorem for frames. Frames from translations and dilations. Smooth frames for  $H^2(\mathbb{R})$ .

**Unit-IV Discrete** transforms and algorithms-The discrete and the fast Fourier transforms. The discrete and the fast cosine transforms.

**Unit-IV** The discrete version of the local sine and cosine bases. Decomposition and reconstruction algorithms for wavelets.

**REFERENCES:**

1. Eugenio Hernández and Guido Weiss, A First Course on Wavelets, CRC Press, New York, 1996.
2. C. K. Chui, An Introduction to Wavelets, Academic Press, 1992.
3. I. Daubechies, Ten Lectures on Wavelets, CBS-NSF Regional Conferences in Applied Mathematics, 61, SIAM, I 1992.
4. Y. Meyer, Wavelets, algorithms and applications (Tran. by R.D. Rayan, SIAM, 1993.
5. M. V. Wickerhauser, Adapted wavelet analysis from theory to software, Wellesley, MA, A.K. Peters, 1994.

  
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**M.Sc./M.A. Course (Fourth Semester)**

**PAPER –V (A)**

**Programming in C (with ANSI features)**

**(II) Theory and Practical**

**Max. Marks. 100**

(Theory-70 +Practical-30)

**Unit-I** Storage Classes-Fixed vs. Automatic Duration. Scope. Global variables. The register Specifier. ANSI rules for the syntax and Semantics of the storage-class keywords.

**Unit-II** Pointers Pointer Arithmetic. Passing Pointers as Function Arguments. Accessing Array Elements through Pointers. Passing Arrays as Function Arguments. Sorting Algorithms. Strings. Multidimensional Arrays. Arrays of Pointers. Pointers to Pointers.

**Unit-III** Functions-Passing Arguments. Declarations and Calls. Pointers to Functions. Recursion. The main Function. Complex Declarations.The C Preprocessor-Macro Substitution. Conditional Compilation. Include Facility. Line Control.

**Unit-IV** Structures and Unions-Structures. Dynamic Memory Allocation. Linked Lists. Unions, enum Declarations.

**Unit-V** Input and Output-Streams, Buffering. The <Stdio.h> Header File. Error Handling. Opening and Closing a File. Reading and Writing Data. Selecting an I/O Method. Unbuffered I/O Random Access. The standard library for Input/Output.

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**Books Recommended:**

1. Peter A. Darnell and Philip E. Margolis, C: A Software Engineering Approach, Narosa Publishing House (Springer International Student Edition) 1993.
2. Samuel P. Harkison and Gly L. Steele Jr., C : A Reference Manual, 2nd Edition, Prentice Hall, 1984.
3. Brian W. Kernighan & Dennis M. Ritchie, The C Programme Language, 2nd Edition (ANSI Features), Prentice Hall 1989.

**Practical Examination Scheme**

Max. Marks – 30

Time Duration – 3 Hrs.

Practical (two)

20 Marks( 10 marks each)

Viva

05 Marks

Sessional

05 Marks

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## **M.Sc./M.A. Course (Fourth Semester)**

### **PAPER-V (B)**

#### **Graph theory-II**

Max. Marks - 80

Unit-I: Ramsey Theory: Perfectness-preserving operations, Forbidden Subgraph orientations, Ramsey numbers and Ramsey graphs.

Unit-II: Groups: Permutation groups, The automorphism group, graphs with given group, symmetry concepts, pseudo-similarity and stability, spectral studies of the Automorphism group.

Unit-III: Polynomials and Graph Enumeration: The colour polynomials, The chromatic polynomial, The bivariate colouring polynomials.

Unit-IV: Graph Enumeration: Co-chromatic (co-dichromatic) graphs and chromatically unique graphs, Graph Enumeration.

Unit-V: Digraphs & Networks: Digraphs, Types of connectedness, Flows in Networks, Menger's and Konig's Theorem, Degree sequences.

#### **REFERENCES:**

1. K. R. Parthasarathy, Basic graph theory, Tata Mc graw Hill publishing company limited, 1994.
2. R. J. Wilson, Introduction to graph theory, Longman Harlow, 1985.
3. John Clark, Derek Allon Holton, A first look at graph Theory, World Scientific Singapore, 1991.
4. Frank Harary, Graph Theory Narosa, New Delhi, 1995.
5. Ronald Gould and Benjamin Cummins, Graph Theory, California.
6. Narsingh Deo, Graph Theory with applications to Engineering and Computer Science, Prentice-Hall of India Private Limited, New Delhi, 2002.

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**M.Sc./M.A. Course (Fourth Semester)**  
**PAPER-V (C)**  
**Algebraic Number Theory (II)**

Max Marks – 80

**UNIT-I**

**Extensions:** Decomposition and ramification, Unramified extensions, Tamely ramified extensions.

**UNIT-II**

**The Different and Discriminant:** Complementary modules, The different and ramification, The discriminant.

**UNIT-III**

**Cyclotomic Fields):** Roots of unity, Quadratic fields, Gauss sums, Relations in ideal classes, Fermat's last theorem.

**UNIT-IV**

**The Structure of Units:** Dirichlet's Unit Theorem, Units in Real Quadratic Fields, Pell's equation.

**UNIT-V**

**Zeta Functions:** The Riemann Zeta Function, Dedekind Zeta Function

**References:**

1. Serge Lang: Algebraic Number Theory, Springer-Verlag, 1986.
2. Jean-Pierre Serre: Local Fields, Springer-Verlag, 1979
3. M. Ram Murty, Jody Esmonde: Problems in Algebraic Number Theory (2<sup>nd</sup> ed.), Springer, 2005.
4. H. P. F. Swinnerton-Dyer: A Brief Guide to Algebraic Number Theory, Cambridge University Press, 2001
5. A. Frohlich, M.J. Taylor: Algebraic Number Theory, Cambridge University Press, 1991.
6. Ian Stewart, David Tall: Algebraic Number Theory and Fermat's Last Theorem (3<sup>rd</sup> ed.), A K Peters, Natick, Massachusetts, 2002.
7. Ethan D. Bolker: Elementary Number Theory, An Algebraic Approach, W. A. Benjamin, Inc., New York, 1970
8. Jurgen Neukirch: Algebraic Number Theory, Springer-Verlag, 1999
9. William Stein: Algebraic Number Theory, a Computational Approach, Cambridge University Press, 1991.

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# **DURG VISHWAVIDYALAYA, DURG (C.G.)**

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## **SCHEME OF EXAMINATION & SYLLABUS of M.Sc. (Botany) Semester Exam UNDER FACULTY OF SCIENCE Session 2017-19**

**(Approved by Board of Studies)  
Effective from July 2017**

**SCHEME OF EXAMINATION, 2017-2018****M.Sc. I SEMESTER, BOTANY****THEORY**

<b>PAPER</b>	<b>TITLE</b>	<b>MAX. MARKS</b>	<b>Internal Assessment/ seminar</b>	<b>Total marks</b>
I	CYTOLOGY	80	20	100
II	GENETICS	80	20	100
III	MICROBIOLOGY, PHYCOLOGY AND MYCOLOGY	80	20	100
IV	BRYOPHYTA, PTERIDOPHYTA AND GYMNOSPERM	80	20	100

**PRACTICAL**

LAB COURSE-I	BASED ON PAPER I & III	80	20	100
LAB COURSE-II	BASED ON PAPER II & IV	80	20	100
	<b>TOTAL MARKS (Theory and Practical)</b>			<b>600</b>

**M.Sc. II SEMESTER, BOTANY****THEORY**

<b>PAPER</b>	<b>TITLE</b>	<b>MAX. MARKS</b>	<b>Internal Assessment /Seminar</b>	<b>Total marks</b>
I	TAXONOMY AND DIVERSITY OF PLANTS	80	20	100
II	MOLECULAR BIOLOGY	80	20	100
III	PLANT PHYSIOLOGY	80	20	100
IV	PLANT METABOLISM	80	20	100

**Choice Based Credit System: Semester II Course Forestry seed Technology.**

**Marks 100 , Credit Points -03, Total Hours -50**

**PRACTICAL**

LAB COURSE-I	BASED ON PAPER I & II	80	20	100
LAB COURSE-II	BASED ON PAPER III & IV	80	20	100
	<b>TOTAL MARKS (Theory and Practical )</b>			<b>600</b>

**TOTAL MARKS OF SEMESTER I & II - 1200**

NOTE : Botanical excursion (within or outside Chhattisgarh) is compulsory for the Students of M.Sc.

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**PRACTICAL SCHEME, LAB COURSE- I**  
**M.Sc. I SEMESTER (BOTANY)**

**Time-5 Hours**

**Maximum Marks 100**

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1.	Exercise based on Cytology	20 Marks
2.	Exercise based on Phycology	20 Marks
3.	Exercise based on Mycology	15 Marks
4.	Spotting	15 Marks
5.	Viva-voce	10 Marks
6.	Sessional (Internal Assessment)	20 Marks

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**Total- 100 Marks**

**PRACTICAL SCHEME, LAB COURSE-II**  
**M.Sc. I SEMESTER (BOTANY)**

**Time-5 Hours**

**Maximum Marks 100**

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1.	Exercise based on Genetics	10 Marks
2.	Exercise based on Bryophyte	15 Marks
3.	Exercise based on Pteridophyta	15 Marks
4.	Exercise based on Gymnosperm	15 Marks
5.	Spotting	15 Marks
6.	Viva-voce	10 Marks
7.	Sessional (Internal Assessment)	20 Marks

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**Total- 100 Marks**



**PRACTICAL SCHEME, LAB COURSE- I**  
**M.Sc. II SEMESTER (BOTANY)**

**Time-5 Hours**

**Maximum Marks 100**

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- |    |  |          |
|----|--|----------|
| 1. | Exercise based on Molecular biology            | 20 Marks |
| 2. | Exercise based on plant description (2 plants) | 35 Marks |
| 3. | Spotting                                       | 15 Marks |
| 4. | Viva-voce                                      | 10 Marks |
| 5. | Sessional (Internal Assessment)                | 20 Marks |
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**Total- 100 Marks**

**PRACTICAL SCHEME, LAB COURSE-II**  
**M.Sc. II SEMESTER (BOTANY)**

**Time-5 Hours**

**Maximum Marks 100**

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- |    |                                 |          |
|----|---------------------------------|----------|
| 1. | Exercise based on Paper-III     | 30 Marks |
| 2. | Exercise based on Paper-IV      | 25 Marks |
| 3. | Spotting                        | 15 Marks |
| 4. | Viva-voce                       | 10 Marks |
| 5. | Sessional (Internal Assessment) | 20 Marks |
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**Total- 100 Marks**



**M.Sc. SEMESTER - I**

**PAPER - I  
CYTOLOGY**

**MAX.MARKS-80**

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**UNIT-I**

- The dynamic cells, Structural organization of the plant cell, specialized plant cell type chemical foundation, biochemical energetics.
- Cell wall - Structure and functions, biogenesis growth.
- Plasma membrane; structure, models and functions, site for ATPase, ion carriers channels and pumps, receptors.

**UNIT-II**

- Chloroplast-structure, genome organization, gene expression, RNA editing.
- Mitochondria; structure, genome organization, biogenesis.
- Plant Vacuole – Tonop last membrane, AT Pases transporters as a storage organelle.

**UNIT-III**

- Nucleus: Structure, nuclear pore, Nucleosome organization.
- Ribosome- Structure and functional significance.
- Cell cycle and Apoptosis; Control mechanisms, role of cyclin dependent kinases.
- Retinoblastoma and E2F proteins, cytokinesis and cell plate formation, mechanisms of programmed cell death.

**UNIT-IV**

- Other cell organelles: Structure and functions of microbodies, microtubules, microfilaments, Golgi apparatus, lysosome, endoplasmic reticulum.
- Techniques in cell biology: Immune techniques, in situ hybridization to locate transcripts in cell types FISH, GISH, Confocal microscopy.

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## LIST OF PRACTICALS

- Identification of different stages of mitosis from suitable plant material. (onion root tips, garlic root tips ).
- Identification of meiosis from suitable plant material. (Onion floral buds).
- Isolation of cell organelles: Mitochondria, Chloroplast, Nucleus, Lysosomes and there assay by succinate dehydrogenase activity (Mitochondria), acid phosphatase activity (Lysosome), acetocarmine staining (Nucleus) and microscopic observation (Chloroplast).
- Study of mitotic index from suitable plant material.
- Study of cyclists in cells of suitable plant material.

### Suggested Reading:-

1. De Robertis and De Robertis 2005 (Eight edition) (Indian) Cell and Molecular Biology, Lippincott Williams, Philadelphia. [B.I Publications Pvt. Ltd. New Delhi].
2. Sad ova David – 2004 (First Indian Edition). Cell Biology, New Delhi.
3. Albert Etal 2002 (Fourth Edition). Molecular Biology of the cell, Garland Science (Iaylar and Francis) New York Group (wt.)
4. Lodish Etal 2004 (Fifth Edition). Molecular Cell Biology, W H Freeman and company, New York.
5. Giese Arthur 1979 (Fifth Edition). Cell Physiology, Toppan company Ltd., Tokyo, Japan.
6. Cooper G.M and Hausman R.E 2007 (Fourth Edition). The Cell molecular approach Sinauer associate, Inc, Suderland (USA).
7. Powar C.B 2005 (Third Edition). Cell Biology, Himalaya Publishing, Mumbai.
8. Roy S.C and KKDe 2005 (Second Edition). Cell Biology, New central Book Agency Private Ltd., Kolkata.
9. Krishnamurthy, K.V 2000. Methods in Cell Wall Cytochemistry. CRC Press, Boca Raton, Florida.
10. Buchanan B.B, Gruissm W. and Jones R.L 2000. Biochemistry and Molecular Biology of Plant. American Society of Plant Physiologist, Maryland, USA.
- 11.. De D.N 2000. Plant Cell Vacuoles : An Introduction. CISRO Publication, Collingwood, Australia.
12. Kleinsmith L.J and Kish V.M 1995. Principles of Cell and Molecular Biology (Second Edition). Happer Collins College Publishers, New York, USA.
13. Lodish H., Berk A., Zipursky, S.L Matsudaira P., Baltimore D. and Darnell J. 2000. Molecular Cell Biology (Fourth Edition). W.H. Freeman and Company, New USA.
14. David Freifelder 1996. Essentials of Molecular Biology, Panima Publishing Company
15. Gerald Karp 1999 Cell and Molecular Biology- Concept and Expts. John Wiley and Scene Ine., USA

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## **PAPER - II**

### **GENETICS**

**MAX.MARKS-80**

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#### **UNIT-I**

- Chromatin Organization : Chromosome structure and packaging of DNA, molecular organization of centromere and telomere, nucleolus and ribosomal RNA genes, chromatin and heterochromatin, Karyotype, banding pattern specialized types of chromosomes, polytene, lamp brush, B chromosomes and sex chromosomes.
- Molecular basis of chromosome pairing chromosomal aberration and polyploidy.

#### **UNIT-II**

- Mapping of Bacteriophage genome, Phage phenotype, recombination in phage, genetic transformation and transduction in bacteria.

#### **UNIT-III**

- Genetic recombination & genetic mapping; Mechanism of crossing over, molecular mechanism of recombination, role of Rec-A, Rec-B, Rec-C and Rec-D enzymes, site specific recombination, linkage, linkage group, genetic marker.

#### **UNIT-IV**

- Alien gene transfer through chromosome manipulation; Transfer of whole genome examples from wheat, a rachis & brassica. Transfer of individual chromosomes & chromosome segment, methods for detecting alien chromatin, production.

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### LIST OF PRACTICALS-

- Staining of salivary gland chromosomes of Chironomas larva or Drosophila.
- Isolation of DNA and its quantification by UV- spectrophotometric method.
- Isolation of RNA and its quantification by UV- spectrophotometric method.
- Isolation of DNA by Agarose gel electrophoresis.
- Transformation in Bacteria
- Transduction in Bacteria.

### Suggested Readings:

1. Albert B. Bray, D Lewis, J Raff, M. Robert, K. and Walter 1989, Molecular Biology of the Cell (Second Edition) Garland Publishing Inc, New York.
2. Atherly, A.G., Girton, J.R. and McDonald, J.F 1999. The Science of Genetics Saunders College Publishing, Frot Worth, USA.
3. Burnham, C.R 1962. Discussions in Cytogenetics. Burgess Publishing Co. Minnesota.
4. Busch, H. and Rothblum. L 1982. Volume X. The Cell Nucleus rDNA part A. Academic Press.
5. Hartk D.L and Jones, E.W 1998 Genetics: Principles and Analysis (Fourth Edition). Jones and Bartlett Publishers, Massachusetts, USA.
6. Khush, G.S 1973. Cytogenetics of Aneuploids. Academic Press, New York, London.
7. Karp, G. 1999. Cell and Molecular Biology : Concept and Experiments. John Wiley and Sons, Inc., USA.
8. Lewin, B. 2000. Gene VII. Oxford University Press, New York, USA.
9. Lewis, R. 1997. Human Genetics : Concepts and Application (Second Edition). WCB McGraw Hill, USA.
10. Malacinski, G.M and Freifelder, D. 1998 : Essentials of Molecular Biology (Third Edition). Jones and B. Artlet Publisher, Inc., London.
11. Russel, P.J. 1998. Genetics (Fifth Edition). The Benjamin/Cummings Publishing Company IND., USA.
12. Snustad, D.P and Simmons, M.J 2000. Principles of Genetics (Second Edition). John Wiley and Sons Inc., USA.
13. Gardner and Simmons Snustad 2005 (Eighth Edition). Principles of Genetics, John Wiley and Sons, Singapore.
14. Sariu C 2004 (Sixth Edition) Genetics. TATA McGraw-Hill Publishing Company Ltd., New Delhi.
15. Ahluwalia K.B 2005 (First Edition). Genetics. New Age International Private Ltd. Publishers, New Delhi.
16. Burus and Bottino 1989. (Sixth Edition). The Science of Genetics. Macmillan Publishing Company, New York (USA).
17. Pawar C.B 2003 (First Edition). Genetics Vol. I and II. Himalaya Publishing House, Mumbai.
18. Strickberger 2005. (Third Edition). Genetics. Prentice Hall of India Pvt. Ltd., New Delhi.
19. Verma and Agarwal, Genetics, S. Chand Co, New Delhi..
20. Singh B.D 2004. Genetics. Kalyani Publication, Ludhiana.
21. Gupta P.K Genetics and Cytogenetics, Rastogi Publications.

## PAPER – III

### MICROBIOLOGY, PHYCOLOGY AND MYCOLOGY

MAX.MARKS-80

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#### UNIT-I

- **Archaeobacteria and Eubacteria** : General account, ultra structure, nutrition and reproduction, biology and economic importance.
- **Cyanobacteria** : Salient feature and biological importance.

#### UNIT-II

- **Viruses** : Characteristics and ultra-structure of virons, isolation and purification of viruses, chemical nature, replication, transmission of viruses, economic importance.
- **Phytoplasma** : General characteristic and role in causing plant diseases.

#### UNIT-III

- **Phycology** : Algae in diversified habitats (terrestrial, freshwater, marine), thallus organization, cell ultra-structure, reproduction ( vegetative, asexual, sexual).
- Criteria for classification of Chlorophyta, Xanthophyta, Bacillariophyta, Phaeophyta and Rhodophyta.
- Economic importance of algae.

#### UNIT-IV

- **Mycology** : General characters of fungi, substrate relationship in fungi, cell structure unicellular and multicellular organization, cell wall composition, nutrition (saprobic biotrophic, symbiotic) reproduction, (vegetative, asexual, sexual) heterothallism, heterokaryosis, Para sexuality, recent account of Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina, Deuteromycotina, Mycorrhiza, fungi as biocontrol agent.

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## LIST OF PRACTICALS

### ALGAE: -

- a. Cyanophyta: - Range of thallus organization and reproductive structures, types showing unicellular, gonical, conical, filamentous, branched (pseudo and true branched).
- b. Chlorophyta: - Chlamydomonas, Gonium, Pandorina, Eudorina, Volvox, Chlorella, Pediastrum, Hydrodictyon, Scenedesmus, Ulothrix, Cladophora, Draparnaldia, Draparnaldiopsis, Fristschiella, Chara, Nitella, Coleochaete, Ulva., Caulerpa, Oedogonium, Zygnema, Spirogyra, .
- c. Phaeophyta: -Ectocarpus, , Dictyota, Padina, Sargassum.
- d. Rhodophyta: -Porphyra, Batrachospermum, Gelidium, Gracillaria, Champia, Polysiphonia.

### FUNGI: -

Thallus organization, Spore producing organs, Tissue differentiation and accessory structures of following –

- a. Mastigomycotina: - Synchronium, Saprolegnia, Achlya, Peronospora, Plasmopora, Albugo, Sclerospora.
- b. Zygomycotina: -Mucor, Rhizopus, Pilobolus.
- c. Ascomycotina: - Taphrina, Protomyces, Erotium, Trichoglossum, Erysiphe, Phyllactinia, Uncinula.
- d. Basidiomycotina: -Uromyces, Ravenelia, Monosporidium, Melampsora, Ustilago, Agaricus, Pleurotus, Ganoderma, Polyporus, Cyathus, Lycoperdon, Phallus, Geaster.
- e. Deuteromycotina: - Aspergillus, Penicillium, Fusarium, Cercospora, Colletotrichum, Alternaria.

### Suggested Readings : -

1. Alexopoulos C.J, Mims C.W. and Blackwell M.I 1996. Introductory Mycology. John Wiley and Sons Inc.
2. Kumar H.D. 1988. Introductory Phycology. Affiliated East-West Press Ltd., New Delhi.
3. Mehrotra R.S and Aneja R.S 1998. An introduction to Mycology. New Age Intermediate Press.
4. Rangaswamy G. and Mahadevan A. 1999. Diseases of crop plants in India (Fourth Edition) Prentice Hall of India Pvt. Ltd. New Delhi.
5. Webster J. 1985. Introduction to Fungi. Cambridge University Press.
6. Hawker L.E. 1967. An Introduction to Fungi Cambridge.
7. Kamat M.N 1959. Hand Book of Mycology, Prakash Publication.
8. Vashista B.R & A.K Sinha 2005. Botany for degree students – Fungi, S.Chands Publication.
9. Vashista B.R & A.K Sinha 2005. Botany for degree students – Bryophyta, S.Chands Publication.
10. Ainsworth G.C 1973. The Fungi Vol IV A, IV B Academic Press.
11. Bessey 1950. Morphology and Taxonomy of fungi. The Blakistan Co.
12. Burnett J.H. 1968. Fundamentals of Mycology. Edwards Arnold Publication.
13. Morris I 1986. An Introduction to the Algae. Cambridge University Press, U.K.

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14. Round F.E. 1986. The Biology of Algae. Cambridge University Press, Cambridge
15. Vashista B.R & A.K Sinha 2005. Botany for degree students – Algae, S.Chands Publication
15. Vijayraghavan M.R and Bela Bhatia (1997), Red Algae : Structure, ultrastructure and Reproduction, APH publishing Corporations, New Delhi.
16. Vijayraghavan M.R and Bela Bhatia (1997), Brown Algae : Structure, ultrastructure and Reproduction, APH publishing Corporations, New Delhi.
17. Fritsch F.E (1945). The structure and reproduction of the algae Volume I and II, Cambridge University Press.
18. Chapman V.J and Chapman D.J (1973). The Algae Macmillon and company, New York.
19. Bold H.C and Wynne M.J (1975). Introduction to the Algae structure and reproduction prentice hall Biological Science Series.
20. Pandey S.N. A Text-book of Botany Volume I, Vikas Publications.

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## PAPER - IV

### BRYOPHYTA, PTERIDOPHYTA AND GYMNOSPERM

MAX.MARKS-80

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#### UNIT-I

- **Bryophyta** : morphology, structure, reproduction, life history, distribution, classification.
- General account of Marchantiales, Jungermanniales, Anthocerotales, Sphagnales, Funariales and Polytrichales. Economic and ecological importance.

#### UNIT-II

- **Pteridophyta** : morphology, anatomy and reproduction, classification, evolution of stele.
- Heterospory and origin of seed habit, general account of fossil pteridophyta .
- Introduction to Psilopsida, Lycopsidea, Sphenopsida and Pteropsida.

#### UNIT-III

- Gymnosperm : General characters of gymnosperm mentioning diversity.
- Classification of gymnosperm.
- Resemblances and difference amongst gymnosperm, pteridophyta and angiosperm.
- Gymnosperm distribution in India.
- Gymnosperm Biotechnology.
- Economic importance of gymnosperm.
- Origin and evolution of gymnosperm stele.
- Structure and theories regarding origin of Paleozoic ovule.

#### UNIT-IV

- Extinct gymnosperm : general account of pteridospermales, Glossopteridales, Caytoniales, Pentoxylales.
- Extant gymnosperm : Cycadales, Ginkgoales, Coniferales, Ephedrales Gnetales, and Welwitschiales.

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## LIST OF PRACTICALS

### **Bryophyta: -**

- a. Hepaticopsida: - Riccia, Marchantia, Targionia, Astrella, Porella, Cyathodium, Plagiochasma,
- b. Anthocerotopsida: -Anthoceros, Notothyllus.
- c. Bryopsida: -Sphagnum, Funaria, Polytrichum,

### **Pteridophyta :-**

- a. Study of the following members to observe arrangement of Sori on a receptacle : - Isoetes, Osmunda, Angiopteris, Ceratopteris, Achrostichum, Gleichenia
- b. Morphology, Anatomy and reproductive structures of : - Psilotum, Selaginella, Lycopodium, Equisetum, Ophioglossum, Lygodium, Pteris, Pteridium, Salvinia, Adiantum, Azolla.

### **Gymnosperms: -**

Morphology, Anatomy and reproductive structures of –Cycas, Zamia, Ginkgo, Pinus, Cryptomeria, Juniperous, Araucaria, Taxus, Cedrus Thuja, Podocarpus, Gnetum, Ephedra.

### **Suggested readings:**

1. Sporne K.R. 1991. The Morphology of Pteridophytes. B.I Publishing Pvt. Ltd. Bombay.
2. Stewart W.N. and Rathwell G.W. 1993. Paleobotany and the Evolution of plants. Cambridge University Press.
3. Bhatnagar S.P and Moitra Alok 1996. Gymnosperms. New Age International Pvt. Ltd. Publishers, New Delhi, 470 pp.
4. Biswas C and Johari B.M 2004. The Gymnosperms Narosa Publishing House, New Delhi. 497 pp.
5. Sporne K.R 1965. The Morphology of Gymnosperms London, pp. 216.
6. Bierhorst D.W. 1971. Morphology of Vascular Plants. New York and London.
7. Chamberlain C.J 1934. Gymnosperms-Structure and Evolution, Chicago.(Page 19)
8. Coulter J.M. and Chamberlain C.J. 1917. Morphology of Gymnosperms, Chicago.
9. Foster A.S and Gifford E.M 1959. Comparative Morphology of Vascular Plants. San Francisco.
10. Maheshwari P. and Vasil, Vimla 1961. Gnetum, Delhi.
11. Vashishta P.C., A.R. Sinha, Anil Kumar. 2006. Gymnosperms. S.Chand. Publication
12. Vashishta P.C. 2006. Pteridophytes. S. Chand.
13. Parihar N.S. 1996. Biology and Morphology of Pteridophytes. Central Book Depot, Allahabad
14. Parihar N.S. 1991. Bryophyta. Central Book Depot, Allahabad.
15. Puri P. 1980. Bryophytes. Atma Ram and Sons, Delhi.
16. Vashista B.R & A.K Sinha 2005. Botany for degree students – Bryophyta, S.Chands Publication
17. Sporne. Morphology of Bryophytes, Oxford Publishing House
18. Rashid A (1998). An introduction to Bryophyta. First edition, Vikas Publishing House Pvt. Ltd, New Delhi.

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## **SEMESTER II**

### **PAPER - I**

#### **TAXONOMY AND DIVERSITY OF PLANTS**

**MAX.MARKS-80**

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##### **UNIT-I**

- Plant nomenclature : Binomial Nomenclature, International code of Botanical nomenclature.
- Plant identification : Herbaria, Botanical gardens, Taxonomic literature, Taxonomic-keys.
- Taxonomic hierarchy - Major categories, minor categories ,species concept.
- Taxonomic evidences - Morphology, Anatomy, Palynology, Embryology, Cytology, Photochemistry, Genome analysis and Nucleic acid hybridization.
- Geographical information system (GIS).

##### **UNIT-II**

- Pre Darwinian Classification Based on form relationship (Bentham and Hooker )
- Post Darwinian classification Engler and Prantl, Bessey's, Hutchinson, Takhtajan and Cronquist.
- Recent modifications : Dahlgren's system of classification.
- Fossil angiosperm.

##### **UNIT-III**

- Study of following families with particular reference to systematic position, phylogeny, evolutionary trends and economic importance. Dicot families; Ranunculaceae, Magnoliaceae, Nymphaeaceae, Sterculiaceae, Meliaceae, Fabaceae, Cucurbitaceae, Umbelliferae, Asteraceae, Sapotaceae. Bignoniaceae, Labiatae, Verbenaceae, Euphorbiaceae, Moraceae.

##### **UNIT-IV**

- Study of following families with particular reference to systematic position, phylogeny, Evolutionary trends and economic importance, Monocot families-Orchidaceae, Zingiberaceae, Commelinaceae, Cyperaceae, Poaceae study of local available families.

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## **LIST OF PRACTICALS:-**

### **Angiosperms: -**

1. Methods of non-destructive field collection and documentation.
2. Techniques of herbaria preparation.
3. Morphological characterization of selected families of dicots and monocots and identification upto families.
4. Preparation of artificial key based on appropriate character combination.
5. Identification of genus and species from Monocots and Dicots
6. Identification of given plant up to species with the help of modern flora keys.

### **Suggested readings: -**

1. Blatter E and W.S Millard. 1929. Some Beautiful Indian Trees J.Bom. Nat Hist Soc. 33:624-635.
2. Bor N.L 1943. Manual of Indian Forest Botany. London.
3. Clifford H.T and W. Stephenson. 1975. An Introduction to Numerical Taxonomy. Academic Press, N.Y.
4. Cole A.J (Ed.) 1969. Numerical Taxonomy. Academic Press,N.Y.
5. Cronquist, A. 1968. The Evolution and Classification of Flowering Plants. Thomas Nel and Sons, Ltd. London.
6. Davis P.H and V.H Heywood 1963. Principles of Angiosperm Taxonomy. Oliver and Boyd London.
7. Heywood V.H 1967. Plant Taxonomy, London.
8. Lawrence, G.H.M 1951. Taxonomy of Vascular Plants. N.Y.
9. Lawrence G.H.M 1955. An Introduction to Plant Taxonomy N.Y.
10. Rendle A.B. 1925. The Classification of flowering plants. 2 Vols. London.
11. Santapau H. 1953. The Flora of Khandala on the Western Ghats of India.
12. Singh V. and D.K Jain, 1981 Taxonomy of Angiosperms. Rastogi Publication, Meerut.
13. Swingle D.B. 1946. A Text book of Systematic Botany. Mc Graw Hill Book Co. New York.
14. Pande B.P 1997. Taxonomy of Angiosperms. S.Chand Publication.
15. Takhtajan A. 1969. Flowering Plants; Origin and Disposal.

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## PAPER – II

### MOLECULAR BIOLOGY

MAX.MARKS-80

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#### UNIT-I

- RNA and DNA Structure. A, B and Z Forms, replication, damage and repair, transcription, translation.

#### UNIT-II

- Molecular Cytogenetics : Nuclear DNA content, C-value paradox, Cot curve and its Significance, restriction mapping - concept and techniques, multigene families and their evolution, *in situ* hybridization and techniques, chromosomes micro dissection and micro cloning, flow cytometry and confocal microscopy and karyotype analysis.

#### UNIT-III

- Gene structure and expression : fine structure of gene, Cis-trans test, fine structure analysis of eukaryotes, introns and their significance. RNA splicing, regulation of gene expression in prokaryotes and eukaryotes.
- Protein sorting: Targeting proteins to organelles.

#### UNIT-IV

- Mutation: Spontaneous and induced mutation, physical and chemical mutagens molecular basis of gene, transposable elements in prokaryotes and eukaryotes, mutation induced by transposones, site directed mutagenesis, inherited human diseases and defects in DNA repair, translocation, intersect Robertsonian translocation, B-A translocation.

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## Suggested readings: -

1. Albert B. Bray, D Lewis, J Raff, M. Robert, K. and Walter 1989, Molecular Biology of the Cell (Second Edition) Garland Publishing Inc, New York.
2. Atherly, A.G., Girton, J.R. and McDonald, J.F 1999. The Science of Genetics Saunders College Publishing, Frot Worth, USA.
3. Burnham, C.R 1962. Discussions in Cytogenetics. Burgess Publishing Co. Minnesota.
4. Busch, H. and Rothblum. L 1982. Volume X. The Cell Nucleus rDNA part A. Academic Press.
5. Hartk D.L and Jones, E.W 1998 Genetics: Principles and Analysis (Fourth Edition). Jones and Bartlett Publishers, Massachusetts, USA.
6. Khush, G.S 1973. Cytogenetics of Aneuploids. Academic Press, New York, London.
7. Karp, G. 1999. Cell and Molecular Biology : Concept and Experiments. John Wiley and Sons, Inc., USA.
8. Lewin, B. 2000. Gene VII. Oxford University Press, New York, USA.
9. Lewis, R. 1997. Human Genetics : Concepts and Application (Second Edition). WCB McGraw Hill, USA.
10. Malacinski, G.M and Freifelder, D. 1998 : Essentials of Molecular Biology (Third Edition). Jones and B. Artlet Publisher, Inc., London.
11. Russel, P.J. 1998. Genetics (Fifth Edition). The Benjamin/Cummings Publishing Company IND., USA.
12. Snustad, D.P and Simmons, M.J 2000. Principles of Genetics (Second Edition). John Wiley and Sons Inc., USA.
13. Gardner and Simmons Snustad 2005 (Eighth Edition). Principles of Genetics, John Wiley and Sons, Singapore.
14. Sariu C 2004 (Sixth Edition) Genetics. TATA McGraw-Hill Publishing Company Ltd., New Delhi.
15. Ahluwalia K.B 2005 (First Edition). Genetics. New Age International Private Ltd. Publishers, New Delhi.(Page 12)
16. Burus and Bottino 1989. (Sixth Edition). The Science of Genetics. Macmillan Publishing Company, New York (USA).
17. Pawar C.B 2003 (First Edition). Genetics Vol. I and II. Himalaya Publishing House, Mumbai.
18. Strickberger 2005. (Third Edition). Genetics. Prentice Hall of India Pvt. Ltd., New Delhi.
19. Verma and Agarwal, Genetics, S. Chand Co, New Delhi..
20. Singh B.D 2004. Genetics. Kalyani Publication, Ludhiana.
21. Gupta P.K Genetics and Cytogenetics, Rastogi Publications.

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**PAPER - III**  
**PLANT PHYSIOLOGY**

**MAX.MARKS-80**

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**UNIT-I**

- **Membrane transport and translocation of water and solutes:** Plant-water relation, mechanism of water transport through Xylem, root microbe interaction in facilitating nutrient uptake. Comparison of xylem and phloem transport, phloem loading and unloading, passive and active solute transport, membrane transport system.

**UNIT-II**

- **Signal Transduction :** Overview, receptors and G proteins, Phospholipids signaling, role of cyclic nucleotides, calcium-calmodulin cascade, diversity in protein kinases and phosphatases, specific signaling mechanism- two component sensor regulatory system in bacteria.

**UNIT-III**

- **Stress physiology :** Plant responses to biotic and abiotic stress, mechanism of biotic and abiotic stress tolerance, HR Fundamental and SAR, water deficit and drought resistance salinity stress, metal toxicity, freezing and heat stress, oxidative stress.

**UNIT-IV**

- **Fundamentals of enzymology :** General aspects of allosteric mechanism, regulatory & active sites, isozymes, kinetics of enzymatic catalysis, Michaelis-Menton equation and its significance.
- Sensory photobiology, History of discovery of phytochromes and cryptochroms and their photo chemical and biochemical properties, photophysiology of light under responses ,cellular localization, and molecular mechanism of action of enzyme.

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### **Suggested Reading :-**

1. Moore T.C. 1989. Biochemistry and Physiology of Plant Hormones Springer – Verlag, New York, USA.
2. Nobel P.S 1999. Physiochemical and Environmental Plant Physiology (Second Edition) Academic Press, San Diego, USA.
3. Salisbury F.B and Ross C.W 1992. Plant physiology (Fourth Edition) Wadsworth Publishing Company, California, USA.
4. Singhal G.S., Renger G., Sopory, S.K. Irrgang K.D and Govindjee 1999. Concept in Photobiology; Photosynthesis and Photomorphogenesis. Narosa Publishing House, New Delhi.
5. Taiz L. and Zeiger E. 1998. Plant Physiology (Second Edition). Sinauer Associates, Inc. Publishes, Massachusetts, USA.
6. Thomas B. and Vince-Prue D. 1997. Photoperiodism in Plants (Second Edition) Academic Press, San Diego, USA.
7. Verma S.K. and Verma Mohit 2007. A.T.B of Plant Physiology, Biochemistry and Biotechnology, S.Chand Publications.
8. Lehninger A.C 1987. Principles of Biochemistry, CBS Publishers and Distributors (Indian Reprint)

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## PAPER - IV

### PLANT METABOLISM

MAX.MARKS-80

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#### UNIT-I

- **Photosynthesis** : General concepts and historical background, evolution of photosynthetic apparatus, photosynthetic pigments and light harvesting complexes, photo oxidation of water, mechanism of electron and proton transport, Carbon assimilation ,the Calvin cycle, photorespiration and its significance, the C<sub>4</sub> cycle, the CAM pathway, biosynthesis of starch and sucrose, physiological and ecological considerations.

#### UNIT-II

- **Respiration and lipid metabolism** : Overview of plant respiration, glycolysis, Krebs cycle (TCA cycle), electron transport and ATP synthesis, Pentose phosphate pathway, alternative oxidase system, structure and function of lipids, fatty acid biosynthesis, synthesis of membrane lipids ,structural lipids and storage lipids and their catabolism Glyoxylate cycle.

#### UNIT-III

- **Nitrogen and Sulphur metabolism** : Overview, biological nitrogen fixation, nodule formation and nod factors, mechanism of nitrate uptake and reduction ,ammonium assimilation, sulphur uptake, transport and assimilation.

#### UNIT-IV

- **Plant growth regulators and elicitors** : Physiological effects and mechanism of action of auxins, gibberellins, cytokinins, ethylenes, abscisic acid, brassinosteroid, polyamines ,jasmonic acid and salicylic acid, hormone receptors.
- The flowering process:- Photoperiodism and its significance, endogeneous clock and its regulation, floral induction and development, Genetic molecular analysis, role of vernalization.

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### **LIST OF PRACTICALS:- (Paper III and IV )**

1. Determination of osmotic pressure of cell sap by plasmolytic method.
2. Determination of Diffusion pressure deficit in potato tuber.
3. Determination of 25imbibitions pressure of seeds of different categories ( protein, lipid, carbohydrate containing seeds).
4. To compare the rate of imbibition of fatty and starchy seeds.
5. Determination of osmotic pressure of cell sap by plasmolytic method.
6. Determination of effect of temperature on the permeability of plasma membrane of beet root.
7. Determination of effect of different organic solvents ( alcohol, formaline, benzene) on the permeability of plasma membrane of beet root.
8. Determination of effect of different concentration of organic solvents (alcohol, formaline, benzene) on the permeability of plasma membrane of beet root.
9. Determination of effect of different Phytohormones on the germination of seeds.
10. Determination of effect of different concentration of auxins on the germination of Seeds.
11. Determination of the rate of respiration by Ganong's Respirometer.
12. Determination of the rate of respiration by Pipette manometer.
13. Determination of R.Q. of carbohydrates by Ganong's Respirometer.
14. Determination of R.Q. of lipids by Ganong's Respirometer.
15. Determination of R.Q. of proteins by Ganong's Respirometer.
16. Separation of chlorophyll pigments by paper chromatography.
17. Separation of chlorophyll pigments by circular paper chromatography.
18. Qualitative analysis of Organic acids by paper chromatography.
19. Qualitative analysis of amino acids by paper chromatography.
20. Qualitative analysis of sugars by paper chromatography.
21. Separation of A.A by thin layer chromatography method.
22. Separation of chlorophyll by thin layer chromatography.
23. Determination of the effect of CO<sub>2</sub> concentration on the rate of photosynthesis by inverted funnel method.
24. Determination of the effect of CO<sub>2</sub> concentration on the rate of photosynthesis by wilmot's bubbler.
25. Determination of the effect of intensity of light on the rate of photosynthesis by wilmot's bubbler.
26. Determination of the effect of intensity of light on the rate of photosynthesis by inverted funnel method.
27. Determination of the effect of quality of light on the rate of photosynthesis by inverted funnel method.
28. Determination of the effect of quality of light on the rate of photosynthesis by wilmot's bubbler.

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### **MINOR EXPERIMENTS**

1. Preparation of molar and molal solutions .
2. Preparation of percentage solution.
3. Preparation of normal solution of solute.
4. Preparation of normal solution of acid and base.
5. Demonstration of Brownian movement in the latex of Calotropis.
6. Demonstration of tyndall effect.
7. Demonstration of plasmolysis and deplasmolysis in plant cell.
8. Demonstration of exosmosis and endosmosis in grapes and resins.
9. Demonstration of the rate of respiration of flower buds by pipette mano-meter.
10. Demonstration of evolution of  $O_2$  during photosynthesis by inverted funnel method.
11. Demonstration of the rate of photosynthesis by inverted funnel method.
12. Demonstration of the rate of photosynthesis by wilnot's bubbler.
13. Determination of the effect of temperature on the rate of photosynthesis by inverted funnel method.
14. Demonstration of the rise of temperature during seed germination
15. Demonstration of evolution of  $CO_2$  during respiration.
16. Demonstration of fermentation by Kuhns tube.
17. Demonstration of Determination of R.Q. of organic acids by Ganong's Respirometer.
18. Effect of phytohormones on the growth of seedling.

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### **BIOCHEMISTRY PRACTICALS**

1. Qualitative estimation of amylase enzyme activity in the germinating seeds of wheat.
2. Qualitative estimation of amylase enzyme activity in potato tuber.
3. Qualitative estimation of catalase enzyme activity in the germinating seeds of wheat.
4. Qualitative estimation of catalase enzyme activity in potato tuber.
5. Effect of enzyme concentration on the rate of catalase enzyme activity in potato tuber.
6. Effect of enzyme concentration on the rate of catalase enzyme activity in the germinating seeds of wheat.
7. Effect of enzyme concentration on the rate of amylase enzyme activity in potato tuber.
8. Effect of enzyme concentration on the rate of amylase enzyme activity in the germinating seeds of wheat.
9. Effect of substrate concentration on the rate of catalase enzyme activity in the germinating seeds of wheat.
10. Effect of substrate concentration on the rate of catalase enzyme activity in potato tuber.
11. Effect of substrate concentration on the rate of amylase enzyme activity in the germinating seeds of wheat.

### **Suggested readings**

1. Moore T.C. 1989. Biochemistry and Physiology of Plant Hormones Springer – Verlag, New York, USA.
2. Nobel P.S 1999. Physiochemical and Environmental Plant Physiology (Second Edition) Academic Press, San Diego, USA.
3. Salisbury F.B and Ross C.W 1992. Plant physiology (Fourth Edition) Wadsworth Publishing Company, California, USA.
4. Singhal G.S., Renger G., Sopory, S.K. Irrgang K.D and Govindjee 1999.  
Concept in Photobiology; Photosynthesis and Photomorphogenesis. Narosa Publishing House, New Delhi.
5. Taiz L. and Zeiger E. 1998. Plant Physiology (Second Edition). Sinauer Associates, Inc. Publishes, Massachusetts, USA.
6. Thomas B. and Vince-Prue D. 1997. Photoperiodism in Plants (Second Edition) Academic Press, San Diego, USA.
7. Verma S.K. and Verma Mohit 2007. A.T.B of Plant Physiology, Biochemistry and Biotechnology, S.Chand Publications.
8. Leninger A.C 1987. Principles of Biochemistry, CBS Publishers and Distributors (Indian Reprint)

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# SEMESTER EXAMINATION

## SCHEME OF EXAMINATION, M.Sc. III SEMESTER, BOTANY THEORY

PAPER	TITLE	External Marks	Internal Assessment/ Seminar	Total marks
I	PLANT DEVELOPMENT & PLANT RESOURCES	80	20	100
II	PLANT ECOLOGY – I (Ecosystem and vegetation ecology)	80	20	100
III	BIOTECHNOLOGY-I (Biotechnology and genetic engineering of plants and microbes)	80	20	100
IV	ELECTIVE- I Molecular plant pathology-I	80	20	100
	ELECTIVE-2 Limnology - I	80	20	100
	ELECTIVE-3 Ethno botany – I	80	20	100

## PRACTICAL

LAB COURSE-I	BASED ON PAPER I & II	80	20	100
LAB COURSE-II	BASED ON PAPER III & IV	80	20	100
	GRAND TOTAL OF MARKS			600

**Choice Based Credit System: Semester III Course Environmental Science. Marks 100 , Credit Points -03, Total Hours -50**

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**SCHEME OF EXAMINATION**  
**M.Sc. IV SEMESTER, BOTANY**  
**THEORY**

<b>PAPER</b>	<b>TITLE</b>	<b>External</b>	<b>/ Internal</b>	<b>Total</b>
		<b>Marks</b>	<b>Assessment Seminar</b>	<b>marks</b>
I	PLANT REPRODUCTION AND UTILIZATION OF RESOURCES	80	20	100
II	PLANT ECOLOGY-II (Pollution and biodiversity conservation)	80	20	100
III	BIOTECHNOLOGY-II (Plant cell, tissue culture and organ culture)	80	20	100
IV	ELECTIVE- I Molecular plant pathology-II	80	20	100
	ELECTIVE-2 Limnology -I I	80	20	100
	ELECTIVE-3 Ethnobotany - II	80	20	100

**PRACTICAL**

LAB COURSE-I	BASED ON PAPER I & II	80	20	100
LAB COURSE-II	BASED ON PAPER III & IV	80	20	100
	GRAND TOTAL OF MARKS			600

**NOTE:**

- Botanical excursion (within or outside Chhattisgarh) is compulsory for the Students of M.Sc.
- In each semester, each theory paper there will be five questions of equal marks. First question will be based on complete syllabus with no internal choice whereas rest question will be unit wise.

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**PRACTICAL  
SCHEME, LAB  
COURSE-I  
M.Sc. III SEMESTER (BOTANY)**

**Time-5 Hours**

**Maximum Marks 100**

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1.	Practical based on Paper-I	30 Marks
2.	Practical based on Paper II	25 Marks
3.	Spotting	15 Marks
4.	Viva-voce	10 Marks
5.	Sessional (Internal Assessment)	20 Marks

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Total- 100 Marks

**PRACTICAL SCHEME, LAB COURSE-II  
M.Sc. III SEMESTER (BOTANY)**

**Time-5 Hours**

**Maximum Marks 100**

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1.	Practical based on Paper-III	25 Marks
2.	Practical based on Paper-IV	30 Marks
3.	Spotting	15 Marks
4.	Viva-voce	10 Marks
5.	Sessional (Internal Assessment)	20 Marks

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Total- 100 Marks



**PRACTICAL SCHEME,  
LAB COURSE-I  
M.Sc. IV SEMESTER (BOTANY)**

**Time-5 Hours**

**Maximum Marks 100**

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1.	Exercise based on Paper-I	25 Marks
2.	Exercise based on Paper-II	25 Marks
3.	Spotting	20 Marks
4.	Viva-voce	10 Marks
5.	Sessional (Internal Assessment)	20 Marks

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**Total- 100 Marks**

**PRACTICAL  
SCHEME, LAB  
COURSE-II  
M.Sc. IV SEMESTER (BOTANY)**

**Time-5 Hours**

**Maximum Marks 100**

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1.	Exercise based on Paper-III	25 Marks
2.	Exercise based on Paper-IV	25 Marks
3.	Spotting	20 Marks
4.	Viva-voce	10 Marks
5.	Sessional (Internal Assessment)	20 Marks

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**Total- 100 Marks**



**M.Sc. SEMESTER - III**  
**PAPER - I**  
**PLANT DEVELOPMENT AND PLANT RESOURCES**  
**MAX.MARKS-80**

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**UNIT-I**

**Introduction:** Unique features of plant development. Metabolism of nucleic acids, proteins and mobilization of food reserves, tropisms; control of cell division, Programmed cell death in the life cycle of plants, Seed germination, Hormonal control of Seedling growth. Seed dormancy, Over coming of seed dormancy, Bud dormancy.

**Root development :** Organization of root apical meristem (RAM), Cell fates and lineages, Vascular tissue differentiation of root, Lateral roots, Root hairs, Root microbe interaction.

**UNIT-II**

**Shoot development :** Organization of shoot apical meristem (SAM), Cytological and molecular analysis of SAM. Control of tissue differentiation; especially Xylem and Phloem, Vascular cambium. Secretory ducts and laticifers, Wood development in relation to environmental factors.

**UNIT-III**

**Leaf development :** Development, Phyllotaxy, Control of leaf form, Differentiation of epidermis (with special reference to Stomata and Trichome) and Mesophyll cell. Senescence, Influences of hormones and environmental factors on senescence.

**Flower development :** Floral characteristics, Flower development, Genetics of floral organ differentiation: Homeotic mutant in *Arabidopsis* and *Antirrhinum*, Sex determination.

**UNIT-IV**

**Plant resources :** Origin, Evolution, Cultivation and Uses of (i) Food, Forage and Fodder crops, (ii) Fiber crops, (iii) Medicinal and Aromatic plants, (iv) Vegetable Oil-yielding crops (v) fruits.  
Important fire-wood, Timber-yielding plants and Non-wood forest products (NFPs) such as bamboos, gums, tannins, dyes and resins.

**SUGGESTED LABORATORY / FIELD EXERCISES**

- Effect of gravity, unilateral light and plant growth regulators on the growth of young seedling.
- Role of dark and red light / far-red light on the expansion of cotyledons and epicotylar hook opening in pea.
- Study of living shoot apices by dissections using aquatic plants such as *Ceratophyllum* and *Hydrilla*.
- Study of monocot and dicot stem.



- Study of cytohistological zonation in the shoot apical meristem (SAM) in sectioned and double-stained permanent slides of a suitable plant such *Coleus*, *Kalanchoe*, and *Tobacco*. Examinations of shoot apices in monocotyledons in both T.S. and L.S. to show the origin and arrangement of leaf primordia.
- Study of alternate and distichous, alternate and superposed, opposite and superposed, opposite and decussate leaf arrangement. Examination of rosette plants (*Launaea*, *Mollugo*, *Raphanus*, *Hyoscyamus* etc.) and induction of bolting under natural conditions as well as by GA treatment.
- Microscopic examination of vertical section of leaves such as *Cannabis*, *Tobacco*, *Nerium*, *Maize* and *wheat* to understand the internal structure of leaf tissues and trichomes, glands etc.
- Study the C3 and C4 leaf anatomy of plants.
- Study of epidermal peels of leaves such as *Coccinia*, *Gailardia*, *tradescantia*, *Notonea*, etc. To study the development and final structure of stomata and stomatal index. Demonstration of the effect of ABA on stomatal closure.
- Study of whole roots in monocots and dicots.
- Examination of L.S. of root from a permanent preparation to understand the organization of root apical meristem and its derivatives. (Use *Maize*, Aerial roots of *Banyan*, *Pistia*, *Jussiaea* etc.).
- Origin of lateral roots.
- Study of leguminous roots with different types of nodules.
- Food crops: Wheat, Rice, Maize, Chickpea, Potato, Tapioca, Sweet Potato, Sugar cane, Morphology, Anatomy, Micro chemical tests for stored food material.
- Forage/Fodder crops: Study of any five important crops of the locality (For example fodder sorghum, Bajra, Berseem, Clove, Guar bean, Gram, *Ficus* sp.)
- Plant fibers: (i) Textile fibers: Cotton, Jute, Linen, Sunn hemp, *Cannabis*. (ii) Cordage fibers; Coir (iii) Fibers for stuffing: Silk and Cotton.

### SUGGESTED READINGS :

- Bewley, J.D. and Black. M. 1994 Seeds : Physiology of development and germination. Plenum Press, New York.
- Bendre, A. and Kumar, 2004 A. Rastogi pub. Meerut, India.
- Crocker, W. and Barton V. 1953 Physiology of seeds. Waltham, Mass, U.S.A
- Santra, S.C., Chatterjee. T.P. and Das, 2005. A.P. College Botany Practical Vol. I New Central pub. India.
- Parihar, NS. 1964, Hormonal control of plant growth. Asia pub. House, London.
- Wareing P.F. and Phillips I.D.J. 1973, Pergamon press. Oxford.

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**M.Sc. SEMESTER - III  
PAPER - II  
PLANT ECOLOGY- I**

**(ECOSYSTEM AND VEGETATION ECOLOGY)**

**MAX.MARKS-80**

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**UNIT-I**

**ECOSYSTEM ORGANISATION:-** Structure and functions, primary production (Methods of measurement, global pattern, controlling factors), Energy dynamics (trophic organization, energy flow pathways, ecological efficiencies), Litter fall and decomposition, (mechanism, substrate quality, and climatic factors), global biogeochemical cycles of C, N, P, and S, mineral cycles (pathways, processes and budgets) in terrestrial and aquatic ecosystems.

**UNIT-II**

**ECOSYSTEM STABILITY AND MANAGEMENT**

Concept (resistance and resilience), Ecological perturbations (natural and anthropogenic) and their impact on plants and ecosystems, ecology of plant invasion, environment impact assessment, ecosystem restorations. Concept of Sustainable development, sustainability indicators.

**UNIT-III**

**VEGETATION ORGANISATION:-**

Concepts of community and continuum, analysis of communities (analytical and synthetic characters), Community coefficients, inter specific associations, ordination, and concept of ecological niche.

**UNIT-IV**

**VEGETATION DEVELOPMENT :-**

Temporal changes (cyclic and non cyclic), mechanism of ecological succession (relay floristic and initial floristic composition, facilitation, tolerance and inhibition models), change in ecosystem properties during succession.

**REFERENCE BOOKS :**

- Smith, R.L. 1996. Ecology and field biology, Harper Collins, New York.  
Odum, E.P. 1971. Fundamentals of Ecology, Saunders, Philadelphia.  
Odum, E.P. 1983. Basic ecology, Saunders, Philadelphia.  
Kormondy, E.J. 1996. Concepts of Ecology, Prentice Hall of India Pvt.Ltd. New Delhi.  
Moldan, B. and Billharz, S. 1997 Sustainability indicators, John Wiley and Sons, New York.





Muller-Dombois, D and Ellenberg, H 1974 Aims and methods of vegetation ecology, Wiley, New York.

Begon M, Harper, J.L. Townsend, C.R.1996. Ecology, Blackwell science, Cambridge, USA.

Ludwig, J. and Reynolds, J.F, 1988 Statistical ecology, John Wiley and Sons. Barbour, M.G.

Burk, J.H. and Pitts, W.D.1987. Terrestrial plant ecology, Benjamin Cummings Publication Company, California.

Chapman, J.L. and Reiss, M.J.1988 Ecology principles and applications, Cambridge University press, Cambridge, U.K.

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## LIST OF PRACTICALS

1. To determine minimum size and number of quadrat required for reliable estimate of biomass in grassland.
2. To compare protected and unprotected grassland stands using community coefficients (similarity indices).
3. To analyze plant communities Bra Curtis ordination method.
4. To estimate IVI of the species in a woodland using point centered quarter method.
5. To calculate mean, variance, standard deviation, standard error, coefficient of variations and to use t test for comparing two means related to ecological data.
6. To find out the relationship between two ecological variables using correlation and regression analysis.
7. To find out important grassland species using chi square test.
8. Scientific visits to a protected area, a wet land, a mangrove, NBPGR, BSI, CSIR, ICAR labs and a recognized botanical gardens or a museum.

## REFERENCE BOOKS :

Ludwig, J.A. and Reynolds, J.F. 1988, Stastical Ecology, Willey New York.

Krebs, C.J. Ecological methodology, Herper and Row, New York, USA

Pielou, E.C.1984. The interpretation of ecological data, Wiley, New York.

Moore, P.W. and Chapman, S.B.1986. Methods inplant Ecology, Blackwell scientific publications.

Misra, R. 1968. Ecology work book, Oxford & IBH, New Delhi.

Smith, R.L. 1996. Ecology and Field Biology, Harpercollins, New York.

Muller-Dombois, D and Ellenberg, H. 1974. Aims and methods of vegetation ecology, Wiley, New York.

Sokal, R.R. and Rohlf, F.J. 1995. Biometry, W.H. Freeman & Co. San Francisco.

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**M.Sc. SEMESTER - III**  
**PAPER – III**  
**BIOTECHNOLOGY AND GENETIC ENGINEERING OF PLANTS AND MICROBES**  
**MAX.MARKS-80**

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**UNIT-I**

**BIOTECHNOLOGY** - Basic concepts, principles and scope.

**RECOMBINANT D.N.A. TECHNOLOGY** : Gene cloning principles, Tools - Restriction Endonucleases, DNA modifying enzymes, Choice of Vectors, Plasmid, Cosmid, Bacteriophage vectors, phagmids, Artificial chromosomes. Shuttle vectors, Yeast vectors, Expression vectors and techniques, construction of genomic / cDNA libraries.

**UNIT-II**

**MICROBIAL GENETIC MANIPULATION:** Bacterial transformation, selection of recombinants and transformants, genetic improvement of industrial microbes and nitrogen fixers, fermentation technology.

**GENETIC ENGINEERING OF PLANTS** : Aims, strategies for development of transgenies (with suitable examples), Gene transfer methods - Vector mediated gene transfer-Agrobacterium the natural genetic engineer. t-DNA mediated DNA transformation. Virus mediated gene transfer, Vectorless or direct DNA transfer.

**UNIT-III**

**DNA SYNTHESIS AND SEQUENCING** : Chemical synthesis of gene, Polymerase chain reaction, its variation, application, advantages and limitations, DNA sequencing - Sanger and Coulson method, Maxam Gillbert method, High throughput DNA sequencing, DNA finger printing.

**UNIT-IV**

**GENOMICS AND PROTEOMICS** : Genetic and physical mapping of genes, molecular markers for introgression of useful traits, Transposon mediated gene tagging, genome projects, bioinformatics, functional genomics, microarrays, protein profiling and its significance.

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### **Suggested Reading :**

1. Brown, T.A. 1999. Genomes, John Wiley and Sons (Asia) Pvt.Ltd., Singapore.
2. Callow, J.A., Fort-Lloyd, B.V. and Newbury, H.J. 1997.
3. Biotechnology and Plant Genetic Resources : Conservation and Use, CAB International, Oxon, UK.
4. Chrispeels, M.J. and Sadava, 1994, Plants, Genes and Agriculture, Jones & Barlloy Publishers, Boston, USA.
5. Glazer, A.N. and Nikaido, 11, 1995 Microbial Biotechnology. W.H. Freeman & Company, New York, USA.
6. Gustafson, J.P. 2000, Genomes Kluwer Academic Plenum Publishers, New York, USA.
7. Henry, R.J. 1997, Practical Applications of Plant Molecular Biology, Chapman & Hall London, UK/
8. Jolles, O. and Jornvall, H. (eds) 2000. Proteomics in Functional Genomics. Birkhauser Verlag, Bsel, Switzerland.
9. Old, R.W. and Primrose, S.B. 1989, Principal of Gene Manipulation, Blackwell Scientific Publication, Oxford, UK, Primrose, S.B. 1995, Principles of Genome Analysis, Blackwell Science Ltd., Oxford, UK.
10. Raghavan, V. 1997, Molecular Biology of Flowering Plants, Cambridge University Press, New York, USA.
11. Shantharam, S. and Montgomery, J.F. 1999, Biosafety, and Biodiversity, Oxford and IBH Publishing Co. Pvt.Ltd., New Delhi.

### **Suggested Laboratory Exercises :**

1. Growth characteristics of E. coli using plating and turbidimetric methods.
2. Isolation of plasmid from E. coli by alkaline lysis method and its quantitation spectrophotometrically.
3. Restriction digestion of the plasmid and estimation of the size of various DNA fragment.
4. Cloning of DNA fragment in a plasmid vector, transformation of the given bacteria population and selection of recombinants.  
Demonstration of DNA sequencing by Sanger's dideoxy method.

### **Suggested Reading (for laboratory exercise)**

1. Plant molecular biology Manual, 2<sup>nd</sup> edition, Kluwer Academic Publishers, Dordrecht, The Netherland.
2. Glick, B.R. and Thompson, J.E. 1993. Methods in Plant Molecular Biology and Biotechnology, CRS press, Boca Raton, Florida.
3. Glover, D.M. and Hames, B.D. (Eds), 1995, DNA Cloning 1: A Practical Approach; Core Techniques, 2<sup>nd</sup> edition, PAS, IRL Press at Oxford University Press, Oxford.
4. Hackett, P.B., Fuchs, J.W. 1988. An introduction to Recombinant DNA Techniques; Basic Experiments in Gene manipulation. The Benjamin Cummings/ Publishing Co.; Inc Menlo, Calio Park, Callifornin.
5. Shaw, C.H. (Ed.) 1988, Plant Molecule Biology: A Practical Approach, IRL Press, Oxford.



**M.Sc. SEMESTER**

**- III PAPER - IV**

**ELECTIVE COURSE-- MOLECULAR PLANT PATHOLOGY-I**

**MAX.MARKS-80**

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**UNIT-I**

1. Introduction and history of plant pathology.
2. General Principles of plant pathology and classification of plant diseases.
3. **Diseases inciting organisms** - Animate Pathogens- fungi, Bacteria, Mycoplasma, Viruses, Nematodes, their general characteristics, heterotrophic behaviour with emphasis on parasitism ability and virulence.

**UNIT-II**

1. **Disease Syndrome and General Symptoms of plant diseases** : Pathogenic and nonpathogenic; Symptoms caused by fungi, Bacteria, Viruses, Mycoplasma and Nematodes.
2. **Sources of Infection** : Seeds, soil, water and airborne diseases of plants; Significance of phyllosphere and rhizosphere studies.
3. **Pathogenesis** - Dissemination of plant pathogens; Mode of infection; Inoculum potential.

**UNIT-III**


1. **Effect of environment on disease development**- Predisposing factors; Survival of fungi; Germination of spores; Disease initiation and Epidemics.
2. **Host Parasites relationship** - Mechanism and physiology of infection, Path of infection, Role of enzymes, growth regulators and toxins in pathogenesis.
3. **Physiological specialization** : General account; Physiological specialization with special reference to smuts and rusts.

**UNIT-IV**

1. **Recurrence of disease** with special reference of recurrence of rust disease in India.
2. **Methods of Studying Plant Diseases**: General account, Macroscopic study, Microscopic study, Koch postulates, Culture technique, Preparation of culture tubes, media preparation, Inoculation, Isolation, Pure culture, Parasitism of obligate parasites, Methods in bacteriology, Techniques required in introductory bacteriology

**Suggested Laboratory Exercises:**

Experiment based on theory syllabus.



### **SUGGESTED READINGS :**

1. Plant Pathology - J.C. Walkar
2. Fungi and plant diseases - B.B. Mundkar
3. Plant Pathology – G.N. Agrios
4. Plant Pathology - Wheeler
5. Plant Pathology (Vol.1-3) – Horsfall & Dimon
6. A text book of Modern Plant Pathology – K.S. Bilgrami and H. S.Dubey
7. Plant Pathology – R.S.singh
8. An introduction to Principles of Plant pathology - R.S.singh
9. Plant Disease of Crop plants in India – N.G. Rangaswamy.
10. Plant Pathology problems and progress- Horsfall
11. Essentials of Plant Pathology- V.N. Pathak
12. Plant Pathology – Butter and Jones.
13. Plant Pathology- R.S. Malhotra
14. Crop plant Disease Colender- IARI-India.
15. Physiology of Fungus- – K.S. Bilgrami and H. S.Dubey
16. Micro-organisms in laboratory – G.P. Agarwal and S.K. Hasija.
17. Physiology of fungi – V.G.Lily and H.L.. Barnet.
18. Illustrated Genera of Imperfecti fungi- H.L.. Barnet and B.B. Hunter.
19. Microbiology and Plant Pathology- P.D.Sharma
20. Plant Pathology- P.D.Sharma
21. Microbiology – P.D.Sharma
22. The Fungi – G. Sumbali
23. Fungicides and crop protection- H.G.Mewitt
24. Fungal diseases of plants- B.M. Duggar
25. Plant Pathology – P.C. Trivedi
26. Plant Pathology – G.P. Gupta
27. Virus and Plant diseases S.R.Mishra
28. Bacterial Diseases- V. Kumar
29. Biotechnology and Plant Pathology- V.K.Jain
30. Laboratory manual of Plant Pathology- D.K.Jha.
31. Modern technology of Plant Pathology- V.Suri.

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**M.Sc. SEMESTER – III (Botany)**  
**PAPER – IV**  
**ELECTIVE COURSE-- LIMNOLOGY-I**  
**MAX. MARKS-80**

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**UNIT-1**

- 1.Limnology–Definition, historical development and scope of Limnology.
- 2.The characteristics of water, Hydrological cycle, Global water balance.
- 3.Types of fresh water habitats and their ecosystem-  
(a) Ponds, Streams and rivers. (b) Lakes– General characteristics of lakes and classification of lakes. Definition depth of lakes. Retention and replacement of water in lakes, origin of lakes.

**UNIT-II**

- 1.Morphometry–Use of various morphometric parameters and Zonation. Food Chains, Food webs, Trophic levels and Energy flow in freshwater ecosystems. Eutrophication: Causes, mechanism and significance, Management of freshwater bodies.

**UNIT-III**

Physical Characteristics of Lake water and their role.

1. Light and Temperature-  
(a) Transmission and absorption of Light, Colour and Transparency of light  
(b) Distribution of heat in lakes, Temperature Radiation, Stratification and Heat Budget.  
Comparative analysis of river, reservoir and lakes.
2. Water movements: Flow of water, surface and internal water movements. Turbidity, Salinity and Total Dissolved Solids.

**UNIT-IV**

3. Chemical characteristics of fresh water with special reference to different parameters-Dissolved gases (Oxygen, Carbon di oxide, Hydrogen Sulphide), Seasonal changes in dissolved gases and pH, Hardness, Alkalinity, Sulphates, Nitrogen, Phosphorus, Iron, Sulphur and Silica cycle, Arsenic, and Fluoride.



**Suggested Readings:**

1. Anathakrishnan : Bioresources Ecology
2. Goldman : Limnology
3. Odum : Ecology
4. Pawlosuske : Physico-chemical methods for water Limnology Wetzel : Chemical and biological methods for water pollution studies
5. Trivedi & Goyal : Chemical and biological methods for water pollution studies
6. Welch : Limnology Vols.I-II
7. Perkins : Ecology
8. Arora : Fundamentals of environmental biology
9. Ghoshe : Toxicology
10. Sood : Toxicology

**Suggested Laboratory Exercises**

1. Construction of morphometric maps of aquatic systems.
2. Measurement of transparency and temperature.
3. Analysis of different dissolved gases: Dissolved oxygen and Carbon dioxide.
4. Analysis of lake water for bicarbonates, carbonates, total alkalinity, chlorides etc.

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## M.Sc.(Botany) III SEMESTER

### PAPER –IV

#### Elective Course –Ethno botany

MAX. MARKS: 80

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#### Unit I

- **Ethno botany** : History, general account and its sub disciplines.
- Interdisciplinary approaches & aim of ethno botany.
- Main world centers of Ethno botanical studies, workers & literature of Ethno botany
- Ethno botany with special reference to Chhattisgarh.
- Ethno botanical Research done in India:
- Ethno botany in relation to national priorities and health care programme.
- Practical application of ethno botany for tribal development programme.

#### Unit II

- Methods and techniques in ethno botany.
- General account of major and minor tribes of Chhattisgarh with special reference to Gond, Kamar, Baiga, Abujhmara.
- Ethno botanical aspect of Art & literature.
- Abstract ethno botany with special reference to folklore, Taboos, Majico-religious beliefs.

#### Unit –III

- Ethno botanical importance of Bacteria, Algae, Fungi, Bryophyte, Pteridophyta and Gymnosperm.
- Ethnoveterinary medicines from plants.
- Major & Minor Forest Products (NWFPs) of Chhattisgarh.
- Ethno botany in relation to livelihood security reference to tribes.

#### Unit- IV

- Ethnobotanical study of following plants with special reference to their medicinal importance  
1. *Azadirachta indica* (Neem) 2. *Emblica officinalis* (Amla) 3. *Ricinus communis* (Andi) 4. *Madhuca indica* (Mahua) 5. *Cassia fistula* (Amaltash) 6. *Ficus religiosa* (Pipal) 7. *Oscimumsanctum* (Tulsi) 8. *Asparagus racemosus* (Satavar) 9. *Aloe vera* (Ghrith kumari) 10. *Andrographis paniculata* (Bhui neem).

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### **Suggested Readings:-**

- Baker, H.G. 1978. Plants and Civilization (3<sup>rd</sup> edition). C.A. Wadsworth, Belmont.
- Chandel, K.P.S., Shukla, G. & Sharma, N. 1996. Biodiversity in medicinal and Aromatic Plants in India: Conservation & Utilization. National Bureau of Plant Genetic Resources, New Delhi.
- Chrispeels, M.J. & Sadava, D. 1977. Plants, Food & People. W.H Freeman and Co., San Francisco.
- Ambasta S.P. (ed.) (1986). The Useful Plants of India. Publications & Information Directorate, CSIR, New Delhi India.
- Anon. (1978). The tribes of Madhya Pradesh. Dept. of Tribal Welfare, Govt. of M.P. Bhopal.
- Arnold. J. E. M. & Ruiz Perez, M, (1998). The role of non-timber forest products in conservation and development. In: Wallenberg, Eva. & Andrew Ingles (Eds.) Income from the Forest, CIFOR 1998, Indonesia, pp-17 to 41.
- Asolkar, L.V. (1992). Second Supplement to Glossary of Medicinal Plants, (CSIR) NISCOM, New Delhi, India.
- Bal, S.N. (1984). Catalogue of Medicinal Plant Exhibits. BSI. Bishne Singh Mahendra Pal Singh, Cannaught Place, Dehra Dun, India.
- Buch, M.N. (1991). Forest of Madhya Pradesh, Madhya Pradesh Madhyam Bhopal.
- Chopra, R.N.; Badhwar, R.L. & Ghosh, S. (1965). Poisonous Plants of India. Vol. I. 2nd Ed. ICAR, New Delhi, India.
- Cotton C.M, (1996). Ethnobotany: Principals and Applications, John Willey & Sons, Chichester. New York.
- Faulks. P.J. (1958) An Introduction to Ethnobotany: Moredale Publications Ltd. London, England.
- Harshberger, J.W. (1896). Purposes of Ethnobotany Bot. Gaz. 21: 146-154.
- Jain S.K. and Phuipps, R.D. (1991). Medicinal Plants of India Rec. Pub. Algonac USA 2 Vols. 1-849.
- Jain, S. K. (1991). Dictionary of India folk medicine and Ethnobotany. Deep publications. NEW DELHI, pp. 1-311.
- Jain, S. K. (1995). In Manual of Ethnobotany (edt. S.K. Jain,) Scientific Pubisher, Jodhpur. 128-134.
- Jain, S.K. & Rao, R.R. (1977). A handbook off field and herbarium methods. New Delhi: Today & Tomorrow's Printers and Publishers.
- Jain, S.K. (1981). Glimpses of Indian Ethnobotany. Oxford & IBH New Delhi, India.
- Jain, S.K. (1989). Methods and Approaches in Ethnobotany. Society of Ethnobotanist. Lucknow.
- Jain, S.K. and Mudgal, Hand Book of Ethanobotany. Bisen pal Singhm Mahendra Pal Singh Publication.
- Vaishnaw T.K. (2004). Chhattisgarh ki Anusuchit Janjatiyan, Adim Jati Anusandhan Avam Prshikshan Sansthan Raipur. Prakashan kramank 2, pp. 1-120

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- Varghese, E. S. V D. (1996). Applied Ethnobotany - A case study among the Kharias of Central India. New Delhi. Deep Publications
- Jajoria, E, V.K. (1998); "The Kamar [A way of life.] Vanya Prakashan., Tribal Research and Development Institute. 35, Shamla Hills, Bhopal., ethnobot. Res.2:303-3 15.
- Joshi, S.G. (2000). Medicinal Plants, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi, India.
- Kirtikar, K. R. & Basu, B.D. (1933-1935). Indian Medicinal plants. Vol.I to VIII (4 Vols. text & 4 vols. plates) Reprint 1994, Dehradun U.P.
- Maheshwari, J.K. Ed. (2000). Ethnobotany and Medicinal Plants of Indian Subcontinent. Scientific Publishers, Jodhpur
- Martin, G.J. (1995). Ethnobotany. Chapman and Hall, London.

### **Suggested Laboratory Exercises:-**

1. Description and identification of medicinal plants and its medical properties.
2. Preparation of medicinal plants herbarium and photographs.
3. Herbal preparation:-
  - a. Extract of Tulsi leaves.
  - b. Ointment from Neem Leaves.
  - c. Ayurvedic tooth powder.
  - d. Face pack preparation from various herbs.
  - e. Preparation of Triphla.
  - f. Kwath of Triphla.
  - g. Preparation of diabetes controlled powder.
  - h. Preparation of herbal shampoo.
4. To cultivate at least two medicinal plant in earthen pot.
5. Field Study of Forest area or Tribal area.
6. Documentation technique of Ethnobotanical knowledge.
7. To separate active principles from the extract of Medicinal plant.

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## M.Sc. SEMESTER - IV

### PAPER - I PLANT REPRODUCTION AND UTILIZATION OF RESOURCES MAX.MARKS-80

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#### UNIT-I

**Reproduction** :Vegetative reparation, Methods of propagation. Pollination, Pollination-mechanism and vector, Structure of pistil, Pollen stigma interaction, Sporophytic and gametophytic Self-incompatibility (Cytological, biochemical and molecular aspects), Fertilization, double fertilization, *in-vitro* fertilization.

#### UNIT-II

**Male gametophyte** : Structure of anther, Microsporogenesis, Role of tapetum, pollen development, male sterility, sperm dimorphism and hybrid seed production, Pollen germination, Pollen tube growth and guidance, Pollen storage, Pollen allergy, Pollen embryo sac.

**Female gametophyte** : Ovule development, Organization of embryo sac and Structure of embryo sac cells.

#### UNIT-III

**Seed and Fruit development:** Endosperm development during early, maturation and desiccation stages. Embryo genesis, Storage proteins of endosperm, Ultra structure and nuclear cytology, Cell lineage during late embryo development, Polyembryony, Apomixes, Embryo culture, Endospermic and non-endospermic seeds, Dynamics of fruit growth, biochemistry and biology of fruit maturation.

#### UNIT-IV

**Utilization of resources:** Plant used as avenue trees for shade, Pollution control and aesthetics, Innovation for meeting world food demands Origin of Agriculture. Green revolution; benefits and adverse consequences. Ethanobotanically important plants of Chhattisgarh. World centers of primary diversity of domesticated plants.

#### SUGGESTED READINGS :

- Bhojwani, SS. and Bhatnagar, S.P. 2000. The Embryology of Angiosperms (4 revised and enlarged edition) Vikas publication House, New Delhi.
- Fageri, K. and Vander Pijl, L. 1979. The Principles of Pollination Ecology Pergamon Press, Oxford.
- Proctor, And Yeo, P. 1973. The Pollination of Flowers. William Collins, London.
- Raghavan. V. 1997. Molecular Embryology of Flowering Plants. Cambridge University, Press, Cambridge.

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- Raghavan, V. 1999 Developmental Biology of Flowering Plants. Springer-Verlag, New York.
- Raven, P.H. Evert, R.F. and Eichhorn, and S.E. 1992. Biology of plants (5 edition), Worth, New York.
- Sedgely, M. and Griffin, A.R. 1989. Sexual Reproduction of Tree Crops. Academic Press, London.
- Shivanna, K.R. and Sawhney, V.K. 1997. Pollen Biotechnology for crop Production and Improvement.
- Shivanna, K.R. and Rangaswamy, N.S. 1992. Pollen Biology : A Laboratory Manual. Springer-Verlag, Berlin.
- Shivanna, K.R. and Johri, B.M. 1985. The Angiosperm Pollen : Structure and Function. Wiley Eastern Ltd., New York.
- Chandel, K.P.S., Shukla, G. and Sharma N. 1996. Biodiversity in Medicinal and Aromatic Plants in India; Conservation and Utilization. National Bureau of Plant Genetic Resources, New Delhi.
- Chrispeels, M.J. and Sdava, D. 1977. Plants, Food and People. W.H. Freeman and CO., San Francisco.
- Council of Scientific and Industrial Research 1986. The Useful Plants of India. Publications and directorate, CSIR, New Delhi.
- Kochhar, S.L. 1998. Economic botany of the Tropics, 2<sup>nd</sup> edition. Macmillan India Ltd., Delhi.
- Thakur, R.S., Puri, H.S. and Hussain, A., 1989. Major Medicinal Plants of India. Central Institute of Medicinal and Aromatic Plants, CSIR, Lucknow.
- Swaminathan, M.S. and Kocchar, S.L. 1989. Plants and Society. Macmillan Pub. London.

### **SUGGESTED LABORATORY / FIELD EXERCISES**

- Study of microsporogenesis and gametogenesis in sections of anthers.
- Examination of modes of anther dehiscence and collection of pollen grains for microscopic examination (*Maize, Grasses, Cannabis Sativa, Croton, Tradescantia, Brassica, Petunia, Solanum melongena* etc.)
- Tests for pollen viability and *in vitro* germination. Pollen germination using hanging drop and sitting drop cultures, suspension culture and surface culture.
- Estimating percentage and average pollen tube length *in vitro*.
- Role of transcription translation inhibitors on pollen germination and pollen tube growth.
- Pollen storage, Pollen-pistil interaction, self-incompatibility *in vitro* pollination.
- Study of ovule in cleared preparations, study of monosporic, bisporic and tetrasporic types of embryo sac development through examination of permanent, stained serial sections.
- Field study of several types of flower with different pollination mechanisms (wind pollination, thrips pollination, bee/butterfly pollination, bird pollination).
- Emasculation, bagging and hand pollination to study of pollen germination, seed set and fruit development using self compatible and obligate out crossing system. Study of cleistogamous flowers and. Their adaptations.
- Study of nuclear and cellular endosperm through dissections and staining.

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- Isolation of zygotic, globular, heart shaped, torpedo stage and nature embryo from suitable seeds and polyembryony in citrus, jamun (*Syzygium cumini*) etc. by dissections.
- Study of endospermic and non-endospermic seed.
- Study of seed dormancy and methods to break dormancy.
- Medicinal and Aromatic plants; Depending on the geographical location College/University select five medicinal and aromatic plants each from a garden, crop field or from the wild only if they are abundantly available. *Papaver somniferum*, *Atropa belladonna*, *Catharanthus roseus*, *Adhatoda ceylanica*, *Allium sativum*, *Rauvolfia serpentina*, *Withania somnifera*, *Phyllanthus amarus*, *Andrographis paniculata*, *Aloe barbadense*, *Mentha arvensis*, *Rosa* sp. *Pogostemon cablin*, *Origanum vulgare*, *Vetivera zizanioides*, *Jasminum grandiflorum*, *Cymbopogon* sp., *Pandanus odoratissimus*.
- Study of live or herbarium specimens or other visual materials to become familiar with these resources.
- Vegetable oils; Mustard, Groundnut, Soya bean, Coconut, Sunflower and Castor.
- Gums, Resins, Tannins and Dyes; Perform simple tests for gums and resins. Prepare a water extract of vegetable tannins (*Acacia*, *Terminalia*, Mangroves, Tea, *Cassia* sp. *Myrobalans*) and dyes (*Turmeric*, *Bixa orellana*, *Indigo*, *Butea monosperma*, *Lawsonia intermis*) and perform tests to understand their chemical nature.

#### **SUGGESTED READINGS FOR LABORATORY EXERCISE:**

- Adriance, W. and Brison, R. Propagation of horticultural plants. Tata McGraw Hill pub. New Delhi.
- Sen. N. David, 1977. Environmental and seed germination of Indian plants. The chronica botanica co. New Delhi.
- Shivanna, K.R. and Rangaswamy, N.S. 1992 Pollen Biology : A Laboratory Manual. Springer-Verlag, Berlin.
- Shivanna, K.R., Johr, B.M. And Sastri, D.C. 1979. Development and physiology of angiosperm pollen. Today and tomorrows printers and pub. New Delhi.
- Vargheese, T.M. Experimental and applied embryology of angiosperms. Oxford & IBS pub. Co. New Delhi.

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**M.Sc. SEMESTER - IV**

**PAPER - II  
POLLUTION AND BIODIVERSITY CONSERVATION**

**MAX.MARKS-80**

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**UNIT-I**

**CLIMATE, SOIL AND VEGETATION PATTERNS OF THE WORLD :**

Life zones, major biomes, major vegetation types and soil types of the world, barren land.

**UNIT-II**

**POLLUTION, CLIMATE CHANGE AND ECOSYSTEMS :**

Air, water and soil pollution:- kinds, sources, quality parameters, effects on plants and ecosystem. Green house gases (Carbon dioxide, methane, nitrous oxide, Chlorofluorocarbons: sources, trends and role), ozone layer, ozone hole, consequences of climate change) Carbon dioxide fertilization, global warming, sea level rise, UV radiation).

**UNIT-III**

**BIOLOGICAL DIVERSITY :-** Concepts and levels, status in India, Utilization and concerns, role of biodiversity in ecosystem functions and stability, speciation and extinction, IUCN categories of threat, distribution and global patterns, terrestrial biodiversity hot spots, inventory.

World centers of primary diversity of domesticated plants; The Indo Burmese center, plant introductions and secondary centers.

**UNIT-IV**

**CONSERVATION STRATEGIES**

Principles of conservation, extinctions, environmental status of plants based on International union for conservation of Nature.

In situ conservation, International efforts and Indian initiatives, protected areas in India- sanctuaries, national parks, biosphere reserves, Wetlands, Mangroves and coral reefs for conservation of wild biodiversity.

Ex situ conservation : Principles and practices, botanical gardens, field gene bank, seed banks, in vitro repositories, cryo banks, general account of the activities of Botanical survey of India (BSI), National Bureau of plant genetic resources (NBPGR), Indian council of Agriculture research (ICAR), Council of scientific and Industrial research (CSIR), and the department of Biotechnology (DBT) for conservation and non formal conservation efforts.

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## REFERENCE BOOKS :

- Threshow, M1985. Air pollution and plant life, Wiley interscience.
- Mason C.F. 1991. Biology of fresh water pollution, Longman.
- Hill, M.K. 1997. Understanding Environmental pollution, Cambridge University press.
- Anonymous, 1987. National gene bank, Indian heritage on plant genetic resources, National bureau of plant genetic resources.
- Directory of Indian wet lands, 1993 WWF India and AWB, Kualalumpur.
- Frankel, O.H., Brown, A.H.D. and Burdon, J.J. 1995. The conservation of Plant biodiversity, Cambridge University press, Cambridge, U.K.
- Kothari, A. 1997. Understanding Biodiversity: Life sustainability and Equity, Orient Longman.
- Nair, M.N.B. 1998. Sustainable management of non wood forest products, Faculty of forestry, University Putra Malaysia.
- Paroda, R.S. and Arora R.K. 1991. Plant resources conservation and management, IPGRIP USA Campus, New Delhi.
- Heywood, V.H. and Watson, R.T.1995. Global biodiversity assessment, Cambridge University press Cambridge, U.K.
- Brady, N.C. 1990. The nature and properties of soils, MacMilan.
- Chandel, K.P.S., Shukla, G. and Sharma, N., 1996. biodiversity in medicinal and aromatic plants in India, conservation and utilization. National bureau of plant genetic resources, New Delhi.
- Falk, D.A. Olwell, M Millan, C. 1996. Restoring biodiversity, Island press, Columbia, USA.
- Gaston, K.J. Biodiversity: a biology of numbers and differences, Blackwell science Ltd. Oxford, U.K.
- Heywood, V. 1995 Global biodiversity assessment. United nations environment programme, Cambridge University Press, Cambridge, U.K.
- Heywood, V.H. and Wyse Jakon, P.S. 1991. Tropical botanical gardens, their role in conservation and development, Academic press San. Diego.
- Walter, K.S. and Gillett H.J. 1998. 1997 IUCN Red list of threatened plants.
- IUCN The World conservation union, IUCN, Gland, Switzerland and Cambridge, U.K.

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### **LIST OF PRACTICALS :**

1. To prepare ombrothermic diagram for different sites on the basis of given data set and to comment on climate.
2. To determine soil moisture content, porosity and bulk density of soil collected from varying depths at different locations.
3. To determine the water holding capacity of soils collected from different locations.
4. To determine percent organic carbon and organic matter in the soils of cropland, grassland and forests.
5. To estimate rate of carbon dioxide evolution from different soils using soda lime or alkali absorption method.
6. To determine gross and net phytoplankton productivity by light and dark bottle method.
7. To estimate the dissolved oxygen content in eutrophic and oligotrophic water samples by azide modification method.
8. To estimate chlorophyll content in sulphur dioxide fumigated and unfumigated plant leaves.
9. To study environmental impact of a given developmental activity using checklist as a EIA method.
10. To determine diversity indices (Shannon Wiener, concentration of dominance, species richness, equability and B diversity).
11. Field survey of a part of town or city to make the students aware of the diversity of plants in urban ecosystems.

### **REFERENCE BOOKS FOR LABORATORY EXERCISE:**

Magurran, A.E. 1988. Ecological diversity and its measurement, Chapman and Hall. London.  
APHA-AWWA-WPCF Standard methods for the examination of water and waste water, American public health association, Washington, D.C.  
Krebs, C.J. Ecological methodology, Harper and Row, New York, USA.  
Pielou, E.C. 1984. The interpretation of ecological data, Wiley, New York.  
Moore, P.W. and Chapman, S.B. 1986. Methods in plant Ecology. Blackwell scientific publications.

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**M.Sc. SEMESTER - IV**  
**PAPER – III**  
**BIOTECHNOLOGY-II**  
**PLANT CELL, TISSUE CULTURE AND ORGAN CULTURE**

**MAX.MARKS-80**

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**UNIT-I**

**PLANTS CELLS AND TISSUE CULTURE:** General introduction, history, scope, concept of cellular differentiation, cellular totipotency.

**TISSUE CULTURE MEDIA:** Introduction, Media constituents, Media selection, Media preparation.

**CELL CULTURE:** Introduction isolation of single cells. Suspension cultures, Culture of Single cell, Plant cell reactors, Applications of cell culture.

**CLONAL PROPAGATION** - Auxiliary bud proliferation, Meristem and shoot tip culture, bud culture.

**ORGANOGENESIS AND ADVENTIVE EMBRYOGENESIS :** Fundamental aspects of morphogenesis; organogenesis via callus formation, direct adventitious organ formation.

**UNIT-II**

**SOMATIC EMBRYOGENESIS AND ANDROGENESIS :** Mechanisms, techniques and utility.

**SOMATIC HYBRIDIZATION :** Methods of Protoplast isolation, Spontaneous and induced methods of protoplasm fusion, identification and selection of hybrid cells. Regeneration of hybrid plants. Verification and Characterization of somatic hybrids, Cybrids, possibilities, achievements and limitations of protoplast research.

**UNIT-III**

**CRYOPRESERVATION AND GERMPLASM STORAGE :** Raising sterile tissue cultures, Addition of cryoprotectants and pretreatment, freezing, storage, thawing, determination of survival viability. Plant growth and generation, verification, encapsulation and dehydration. Slow growth method, Applications.


**INTELLECTUAL PROPERTY RIGHTS :** Possible ecological risks and ethical concerns.

**UNIT-IV**

**APPLICATION OF PLANT TISSUE CULTURE :** Artificial seeds, Production of hybrids and soma clones.

**PRODUCTION OF SECONDARY METABOLITES / NATURAL PRODUCTS :** Morphological and chemical differentiations, Medium composition for secondary product formation. Growth production patterns, Environmental factors. Selection of cell lines producing high amounts of a useful metabolite, Problems associated with secondary metabolite production Immobilized cell system.

**TRANSGENICS IN CROP IMPROVEMENT:** Transgenic for Resistance to biotic and abiotic stresses, Transgenes for quality modification, Terminator seed technology. Chloroplast transformation and its utility.



**Suggested Reading:**

1. Bhojwani, S.S. and Razdan, M.K. 1996. Plant Tissue Culture: Theory and Practice (revised edition). Elsevier Science Publishers, New York, U.S.A.
2. Bhojwani, S.S. 1990, Plant Tissue Culture; Application and Limitations. Elsevier Science Publishers, New York, USA.
3. Collins, H.A. and Edwards, S., 1998. Plants cell Culture Bio Scientific Publishers, Oxford UK.
4. Jain, S.M. Sopory, S.K. and Veilleux, R.E. 1996. In Vitro Haplod Productin in Higher Plants, Vois. Fundamental Aspects and Methods Kluwer Academic Publishers. Dordrecht. The Netherlands.
5. Kartha, K.K. 1985. Cryopreservation of Plants Cells and Organs. CRC Press, Boca Raton, Florida, USA.
6. Raghavan, V. 1986. Embryogenesis, in Angiosperms: A Development an Experimental Study Cambridge University Press, New York, USA.
7. Vasil, Iksshorpe, T.A. 1994. Plant Cell and Tissue Culture, Kluwer ACADEMIC publishers, The Netherlands.

**Suggested Laboratory Exercise:**

1. Isolation protoplast from various plant tissues and testing their viability.
2. Effect of physical (e.g. temperature) and chemical (e.g. osmoticum) factors on protoplast yield.
3. Demonstration of protoplast fusion employing PEG.
4. Organogenesis and somatic embryogenesis using appropriates explants and preparations of artificial seed.
5. Demonstration of and oogenesis in Datura.
6. Electroporation of protoplasts and checking of transient expression of the reporter gene.
7. Co-cultivation of the plant material (e.g. leaf discs) with Agrobacterium and study GUS activity histochemically.

**Suggested Reading (for laboratory exercise) :**

1. Butenko, R.G. 2000. Plant Cell Culture, University Press of pacific.
2. Ckollin, H.A. and Edwards, S. 1998. Plant Cell Culture. Bios Scientific Published, Oxford, UK.
3. Dixon, R.A. (Ed.) 1987. Plant Cell Culture: A Practical Approach. IRL Press, Oxford.
4. George, F.F., 1993, plant propagation by tissue Culture. Part 2. The Technology, 2<sup>nd</sup> Exegetics Ltd. Edington, UK.
5. Hall, R.D.; (E.D.) 1999. Plant Cell Culture Protocols, Humana Press, Inc., New Jersey, USA.
6. Smith, R.H. 2000, Plant Tissue Culture: Technique and Experiments. Academic Press, New York.



**M.Sc. SEMESTER - IV**  
**PAPER - IV**  
**ELECTIVE PAPER-- MOLECULAR PLANT PATHOLOGY**  
**MAX.MARKS-80**

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**UNIT-I**

1. **Epidemiology and disease forecasting:** form of epidemics, factors responsible for the establishment of an epidemic, disease forecasting.
2. **General principles of plant disease control :** General account; Prophylactic. Chemical (including fungicides, systemic fungicides, fumigants, antibiotics, growth regulators etc.) and biological control; Breeding for disease resistance varieties of host plants, Plant quarantine.

**UNIT-II**

1. **Defense Mechanism-** Defense of host against pathogen, Structural defense; Physiological defense, Biochemical defense-role of phenolic compounds; Phytoalexins Defense through hyper-sensitive reactions.
2. **Resistance and susceptibility:** General account, types of resistance, vertical and horizontal resistance; breeding for disease resistance.

**UNIT-III**

1. **Wilt diseases:** General account, systems of diseases, Mechanism of wilting.
2. **Diseases due to fungi:** Rusts, smuts, Downy mildews powdery mildew diseases, Wilts, Leaf blight, Ergots, Tikka, necrosis, Rots-red rot of sugarcane, Damping off and warts diseases of economically important plants.
3. **Diseases due to Bacteria:** Bacterial blight of Rice, Tundu disease, citrus canker, Crown galls of stone fruits, Angular leaf spots.

**UNIT-IV**

1. **Diseases due to Viruses:** Mosaic of tobacco, Potato and tomato, Leaf curl of tomato & papaya, Yellow vein mosaic of Bhindi, Bunchy top of banana, Grassy shoot disease of sugarcane.
2. **Diseases due to Mycoplasma :** Sandal spike, Little leaf of Brinjal, Grassy shoot disease, Sesamum, phyllody, Citrus greening.
3. **Diseases due to Nematodes:** General characteristics of plants nematodes, Root knot, Malaya disease of Barley, wheat, Citrus nematodes, Ear cockle of wheat.

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### **SUGGEST READINGS:**

1. Plant Pathology - J.C. Walkar
2. Fungi and plant diseases - B.B. Mundkar
3. Plant Pathology – G.N. Agrios
4. Plant Pathology - Wheeler
5. Plant Pathology (Vol.1-3) – Horsfall & Dimon
6. A text book of Modern Plant Pathology – K.S. Bilgrami and H. S.Dubey
7. Plant Pathology – R.S.singh
8. An introduction to Principles of Plant pathology - R.S.singh
9. Plant Disease of Crop plants in India – N.G. Rangaswamy.
10. Plant Pathology problems and progress- Horsfall
11. Essentials of Plant Pathology- V.N. Pathak
12. Plant Pathology – Butter and Jones.
13. Plant Pathology- R.S. Malhotra
14. Crop plant Disease Colender- IARI-India.
15. Physiology of Fungus- – K.S. Bilgrami and H. S.Dubey
16. Micro-organisms in laboratory – G.P. Agarwal and S.K. Hasija.
17. Physiology of fungi – V.G.Lily and H.L.. Barnet.
18. Illustrated Genera of Imperfecti fungi- H.L.. Barnet and.B.B. Hunter.
19. Microbiology and Plant Pathology- P.D.Sharma
20. Plant Pathology- P.D.Sharma
21. Microbiology – P.D.Sharma
22. The Fungi – G. Sumbali
23. Fungicides and crop protection- H.G.Mewitt
24. Fungal diseases of plants- B.M. Duggar
25. Plant Pathology – P.C. Trivedi
26. Plant Pathology – G.P. Gupta
27. Virus and Plant diseases S.R.Mishra
28. Bacterial Diseases- V. Kumar
29. Biotechnology and Plant Pathology- V.K.Jain
30. Laboratory manual of Plant Pathology- D.K.Jha.
31. Modern technology of Plant Pathology- V.Suri.

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**M.Sc. SEMESTER – IV (Botany)**

**PAPER – IV**

**ELECTIVE PAPER-- LIMNOLOGY-II**

**MAX.MARKS-80**

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**UNIT-1**

1.Study of Biota

- (a) Phytoplankton flora-classification of phytoplankton, special distribution of phytoplankton, seasonal distribution and species composition of phytoplankton. Algal blooms effects of salinity and climatic stresses on the distribution of phytoplankton, Phytobenthos-classification.
- (b) Phytoplankton and their inter-relationship with Zooplanktons.
- (c) Aquatic insects, birds and their environmental significance.

**UNIT-II**

- 1. Lake Flora-Higher Plants. Categories of aquatic higher plants, zonation of rooted higher plants, some peculiarities of aquatic higher plants.
- 2. Lake Bacteria-occurrence, characteristics and importance.
- 3. Ecological classification of aquatic higher aquatic plants and their significance.
- 4. Biotic relationship and interaction among organisms. Symbiosis, competition among algae, Parasitism of algae, predation of algae, impact of human being on algae.

**UNIT-III**

- 1. Concept of Productivity: Seasonal variation, Primary productivity in freshwater lakes, Estimation of Primary Productivity.
- 2. Bio indicators-Aquatic flora and fauna in relation to water quality in an aquatic environment.
- 3. Use and misuse of inland waters.
- 4. Methods of water quality testing BOD and COD.

**UNIT-IV**

- 1. Sewage-Definition, composition and its treatment.
- 2. Pollution by Domestic and Agriculture sewage, Industrial effluent.
- 3. Causes of pollution of Aquatic Resources, their management and conservation.
- 4. Resource Conservation-Aquatic pollution, control, legislation, regulation on discharge of industrial effluents and domestic wastes in rivers and reservoirs.

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**Suggested Readings:**

Anathakrishnan : Bioresources Ecology Goldman: Limnology  
Odum: Ecology  
Pawlosuske : Physico-chemical methods for water Limnology Wetzel :  
Chemical and biological methods for water pollution studies  
Trivedi&Goyal : Chemical and biological methods for water pollution  
studies Welch: Limnology Vols.I-II  
Perkins: Ecology  
Arora : Fundamentals of environmental biology Ghoshe : Toxicology  
Sood : Toxicology

**Suggested laboratory Exercise**

1. Sampling of phytoplankton and their qualitative and quantitative analysis.
2. Sampling of periphytes and macrophytes, and their qualitative and quantitative analysis.
3. Sampling of Zooplankton and their qualitative and quantitative analysis.
4. Primary production: Experiment-in-situ by light and dark bottle method.
5. Short-term productivity experiments for the understanding of diel variation in aquatic ecosystems.
6. Analysis of sediments for benthic fauna and flora.

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### **Suggested Reading:**

1. Adoni, A.D. et al. 1985. Workbook on Limnology. Pratibha Pub. Sagar 216 p.
2. APHA 1981. Standard Methods for the Examination of Water and Waste water. American Public Health Association, Washington.
3. Arber, A. 1920. Water Plants. Cambridge University Press.
4. Barnes, A.K. and K.H. Mann, 1980. Fundamentals of Aquatic Ecosystems. Blackwell Scientific Publication, Oxford.
5. Brown, A.L. 1971. Ecology of Fresh Water. Heinemann, London, 129 p. nd
6. Cole G.A., 1979. Text book of Limnology. 2
7. De, A.K., 1989. Environmental Chemistry. Wiley Eastern Limited, New Delhi.
8. Goldman, C.R. and A.J. Horne, 1983. Limnology. McGraw Hill Inc. Tokyo, 464 p.
9. Golterman H.L., 1975. Physiological Limnology. Elsevier Scientific Publishing Co., Amsterdam, The Netherlands, 489 p.
10. Hutchinson G.E. 1957. A Treatise on Limnology. Vol. I,II,III, John Wiley & Sons, NY.
11. Mackereth, F.J.H., 1963. Some methods of water Analysis for Limnologists. Fresh Water Biological Association. Scientific Publication, No. 21, Ambleside England.
12. Mackereth, F.J.H., J. Heron and J.F. Talling. 1978. Water Analysis : Some Revised Methods for Limnologists. Freshwater Biological Association, Sci. Pub. No. 36.
13. Moss, B., 1980. Ecology of fresh waters. Blackwell Scientific Publications, Oxford, 417 p. rd
14. Odum, E.P. 1971. Fundamentals of Ecology. 3
15. Ruttner, F., 1963. Fundamentals of Limnology, 3 p.
16. Schwoerbel, I. 1987. Handbook of Limnology. Gustav fisher, Verlag.
17. Strickland J.D.H. and T.R. Parson. 1972. A Practical Handbook of Sea Water Analysis. Fisheries Research Board of Canada, Ottawa.
18. Subramanyam, K. 1962. Aquatic Angiosperms C.S.I.R., New Delhi.
19. Welch, P.S. 1935. Limnology. McGraw Hill Co. N.Y., 472 p.
20. Welch, P.S. 1948. Limnological methods. Philadelphia, Blakiston Co. 381p.
21. Wetzel, R.G. 1975. Limnology0. W.B. Saunders Co., Phildalelphia, 743 p.

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**M.Sc. IV SEMESTER**

**PAPER –IV**

**ELECTIVE COURSE – ETHNO BOTANY**

**MAXIMUM MARKS : 80**

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**Unit - I**

- Plant Conservation by Tribes & role of Joint Forest Management Programme in Plant Conservation specially People's Protected Area
- Ethnobotany and its role in domestication and conservation of native plant and genetic resources.
- The protection of plant varieties and Intellectual Properties Rights.
- General account of conservation of medicinal plants.
- General role of Aromatic plants.

**Unit-II**

- General ideas of various system of medicine using plants.
- Basic knowledge of Ayurvedic, Homeopathic, Allopathic system of medicine.
- General idea of active principles of Plants.
- Herbal Cosmetics.
- General account of toxic plants and Harmful effect of plants on human society with special reference to allergic plants of Chhattisgarh.

**Unit –III**

- Endemic plants of Chhattisgarh.
- Endangered plants of Chhattisgarh.
- Techniques of cultivation and marketing of Aromatic plants –Podina, Lemon grass Kasturibhindi, Palmarosa.
- Techniques of cultivation ,marketing and importance of mushroom
- Techniques of cultivation, extraction of juice and importance of wheat grass.

**Unit-IV**

- Ethnobotanical study of the following plants with special reference to their medicinal importance-

1. *Allium sativum* (Lahsun) 2. *Aegle marmelos* (Bel) 3. *Terminallia arjuna* (Arjun) 4. *T. bellerica* (Bahera) 5. *T. chebula* (Harra) 6. *Calendula officianallis* (Calendula) 7. *Thuja occidentalis* (Vidhya) 8 *Dhatura alba* (Dhatura) 9. *Argemone maxicana* (Pili kateli) 10. *Ephedra* sps. ( Ephedra).



### Suggested Readings :-

- Baker, H.G. 1978. Plants and Civilization (3<sup>rd</sup> edition). C.A. Wadsworth, Belmont.
- Chandel, K.P.S., Shukla, G. & Sharma, N. 1996. Biodiversity in medicinal and Aromatic Plants in India: Conservation & Utilization. National Bureau of Plant Genetic Resources, New Delhi.
- Chrispeels, M.J. & Sadava, D. 1977. Plants, Food & People. W.H Freeman and Co., San Francisco.
- Ambasta S.P. (ed.) (1986). The Useful Plants of India. Publications & Information Directorate, CSIR, New Delhi India.
- Anon. (1978). The tribes of Madhya Pradesh. Dept. of Tribal Welfare, Govt. of M.P. Bhopal.
- Arnold. J. E. M. & Ruiz Perez, M, (1998). The role of non-timber forest products in conservation and development. In: Wallenberg, Eva. & Andrew Ingles (Eds.) Income from the Forest, CIFOR 1998, Indonesia, pp-17 to 41.
- Asolkar, L.V. (1992). Second Supplement to Glossary of Medicinal Plants, (CSIR) NISCOM, New Delhi, India.
- Bal, S.N. (1984). Catalogue of Medicinal Plant Exhibits. BSI. Bishne Singh Mahendra Pal Singh, Cannaught Place, Dehra Dun, India.
- Buch, M.N. (1991). Forest of Madhya Pradesh, Madhya Pradesh Madhyam Bhopal.
- Chopra, R.N.; Badhwar, R.L. & Ghosh, S. (1965). Poisonous Plants of India. Vol. I. 2nd Ed. ICAR, New Delhi, India.
- Cotton C.M, (1996). Ethnobotany: Principals and Applications, John Willey & Sons, Chichester. New York.
- Faulks. P.J. (1958) An Introduction to Ethnobotany: Moredale Publications Ltd. London, England.
- Harshberger, J.W. (1896). Purposes of Ethnobotany Bot. Gaz. 21: 146-154.
- Jain S.K. and Phuipps, R.D. (1991). Medicinal Plants of India Rec. Pub. Algonac USA 2 Vols. 1-849.
- Jain, S. K. (1991). Dictionary of India folk medicine and Ethnobotany. Deep publications. NEW DELHI, pp. 1-311.
- Jain, S. K. (1995). In Manual of Ethnobotany (edt. S.K. Jain,) Scientific Pubisher, Jodhpur. 128-134.
- Jain, S.K. & Rao, R.R. (1977). A handbook off field and herbarium methods. New Delhi: Today & Tomorrow's Printers and Publishers.
- Jain, S.K. (1981). Glimpses of Indian Ethnobotany. Oxford & IBH New Delhi, India.
- Jain, S.K. (1989). Methods and Approaches in Ethnobotany. Society of Ethnobotanist. Lucknow.
- Jain, S.K. and Mudgal, Hand Book of Ethanobotany. Bisen pal Singhm Mahendra Pal Singh Publication.
- Vaishnaw T.K. (2004). Chhattisgarh ki Anusuchit Janjatiyan, Adim Jati Anusandhan Avam Prshikshan Sansthan Raipur. Prakashan kramank 2, pp. 1-120
- Varghese, E. S. V D. (1996). Applied Ethnobotany - A case study among the Kharias of Central India. New Delhi. Deep Publications

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- Jajoria, E. V.K. (1998); “The Kamar [A way of life.] Vanya Prakashan., Tribal Research and Development Institute. 35, Shamlia Hills, Bhopal., ethnobot. Res.2:303-315.
- Joshi, S.G. (2000). Medicinal Plants, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi, India.
- Kirtikar, K. R. & Basu, B.D. (1933-1935). Indian Medicinal plants. Vol.I to VIII (4 Vols. text & 4 vols. plates) Reprint 1994, Dehradun U.P.
- Maheshwari, J.K. Ed. (2000). Ethnobotany and Medicinal Plants of Indian Subcontinent. Scientific Publishers, Jodhpur
- Martin, G.J. (1995). Ethnobotany. Chapman and Hall, London.

#### **Suggested Laboratory Exercises:-**

##### **Ethnobotany**

1. Description and identification of medicinal plants and its medical properties.
2. Extraction of phytochemicals from various medicinal plants.
3. Preparation medicinal plants herbarium and photographs.
4. Herbal preparation –
  - a. Preparation of digestive powder.
  - b. Mouth freshener of Ajwain.
  - c. Beverage of Tulsi,Bel,Tikhur,Mango.
  - d. Ayurvedic tea preparation.
  - e. Tablet of amla vati.
  - f. Murabba of Awla/Bel.
  - g. Herbal dye
  - h. Shitopladi powder.
5. Identification and study of Ethnobotanical importance of some plants of Raipur.
6. To cultivate at least two medicinal plant in earthen pot.

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## SYLLABUS M.Sc. BOTANY

Semester	Paper	Title	External marks	Internal marks	Credit
First	I	Cytology	80	20	4
	II	Genetics	80	20	4
	III	Microbiology, Phycology and Micology	80	20	4
	IV	Bryophyte, Pteridophyta and gymnosperm	80	20	4
	LC - I	Lab Course-I (Based on paper I & III)	80	20	4
	LC - II	Lab Course-II (Based on paper I & IV)	80	20	4
Second	I	Taxonomy and diversity of plants	80	20	4
	II	Molecular Biology	80	20	4
	III	Plant physiology	80	20	4
	IV	Plant metabolism	80	20	4
	LC- I	Lab Course-I (Based on paper I & II)	80	20	4
	LC-II	Lab Course-I (Based on paper II & IV)	80	20	4
Third	I	Plant development and plant resources	80	20	4
	II	Plant Ecology– I (Ecosystem and vegetation ecology)	80	20	4
	III	Biotechnology I (Genetic engineering of plants & microbes)	80	20	4
	IV	<b>Elective paper-1</b> Molecular plant pathology-I <b>OR</b> <b>Elective paper-II</b> Limnology-I <b>OR</b> <b>Elective paper-III</b> Ethno botany I	80	20	4
	LC-I	Lab Course-I (Based on paper I & II)	80	20	4
	LC-II	Lab Course-II (Based on paper III & IV)	80	20	4

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Fourth	I	Plant reproduction and plant resources utilization	80	20	4
	II	Plant Ecology II (Pollution and biodiversity conservation)	80	20	4
	III	Biotechnology II ( Plant cell, tissue culture & organ culture)	80	20	4
	IV	<b>Elective paper-I</b> Molecular plant pathology-II <b>OR Elective paper-II</b> Limnology-II <b>OR Elective paper-III</b> Ethno botany II	80	20	4
	LC-I	Lab Course-I (Based on paper I &II)	80	20	4
	LC-II	Lab Course-II (Based on paper III &IV)	80	20	4

**Choice Based Credit System: Semester II Course Forestry seed Technology. Marks 100, Credit Points -03, Total Hours -50**

**Choice Based Credit System: Semester III Course Environmental Science. Marks 100, Credit Points -03, Total Hours -50**

- Each theory paper will have 5 questions of equal marks. First question will encompass all the five units without internal choice, whereas rest questions will be unit wise with internal choice.
- The respective teachers on each paper will ensure the internal evaluation by a class test and a seminar / poster presentation of 20 marks each and submit the foil and counter foil to the HOD by the end of the activity.

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# **DURG VISHWAVIDYALAYA, DURG (C.G.)**

Website - [www.durguniversity.ac.in](http://www.durguniversity.ac.in), Email - [durguniversity@gmail.com](mailto:durguniversity@gmail.com)



## **SCHEME OF EXAMINATION & SYLLABUS of M.Sc. (Zoology) Semester Exam UNDER FACULTY OF SCIENCE Session 2017-19**

**(Approved by Board of Studies)  
Effective from July 2017**

**DURG UNIVERSITY DURG**  
**CHHATTISGARH**  
**SYLLABUS FOR 2017-19**  
**M. Sc. ZOOLOGY**

Semester	Paper	Title	External marks	Internal marks	Credit
<b>First DEC, 2017</b>	I	Biosystematics, Taxonomy and Biodiversity	80	20	4
	II	Structure and Function of Invertebrates	80	20	4
	III	Population Genetics and Evolution	80	20	4
	IV	Tools & Techniques in Biology	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
<b>Second MAY-JUNE, 2018</b>	I	Molecular Cell Biology and Biotechnology	80	20	4
	II	General Physiology and Endocrinology	80	20	4
	III	Development Biology	80	20	4
	IV	Quantitative Biology and Computer Application	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
<b>Third DEC, 2018</b>	I	Comparative Anatomy of Vertebrates	80	20	4
	II	Animal Behavior	80	20	4
	III	Environment Physiology and Population Ecology	80	20	4
	IV	Immunology and Parasitism	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2

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	<b>Compulsory</b>				
<b>Fourth MAY-JUNE, 2019</b>	I	Biochemistry	<b>80</b>	<b>20</b>	<b>4</b>
	II	Neurophysiology	<b>80</b>	<b>20</b>	<b>4</b>
<b>Optional papers (Group I)*</b>					
	I	Fish (ichthyology) structure and function	<b>80</b>	<b>20</b>	<b>4</b>
	II	Cell biology	<b>80</b>	<b>20</b>	<b>4</b>
	III	Entomology	<b>80</b>	<b>20</b>	<b>4</b>
	IV	Wild life conservation	<b>80</b>	<b>20</b>	<b>4</b>
	V	Biology of Vertebrate immune system	<b>80</b>	<b>20</b>	<b>4</b>
<b>Optional paper (Group II)*</b>					
	I	Pisciculture and economic importance of fishes (Ichthyology)	<b>80</b>	<b>20</b>	<b>4</b>
	II	Cellular organization and molecular organization	<b>80</b>	<b>20</b>	<b>4</b>
	III	Applied entomology	<b>80</b>	<b>20</b>	<b>4</b>
	IV	Environment and Biodiversity conservation	<b>80</b>	<b>20</b>	<b>4</b>
	V	Molecular endocrinology and reproductive technology	<b>80</b>	<b>20</b>	<b>4</b>
	LC-I	Lab Course I (Based on paper I & II)	<b>80</b>	<b>20</b>	<b>2</b>
	LC-II	Lab Course I (Based on paper III & IV)	<b>80</b>	<b>20</b>	<b>2</b>
<b>Total</b>			<b>1920</b>	<b>480</b>	<b>80</b>

\* Student has choice to opt. for one paper each (special paper) from group I & group II.

\* Each theory paper will have 5 questions of equal marks. First question will encompass all the four units without any internal choice, whereas rest questions will be unit wise with internal choice.

UGC guideline should be strictly followed for animal dissections. Animal dissections can be performed by using alternate methods like clay modeling.

\*\*The respective teachers on each paper will ensure the internal evaluation by a class test and a seminar/ poster presentation of 10 marks each and submit the foil and counter foil to the HOD by the end the activity.

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**M. Sc. ZOOLOGY FIRST SEMESTER**  
**PAPER – I**  
**BIOSYSTEMATICS, TAXONOMY AND BIODIVERSITY**

(There will be 5 questions of equal marks. First question will encompass all the four units without any internal choice, whereas rest questions will be unit wise with internal choice).

**UNIT-I**

- Definition and basic concepts of biosystematics and taxonomy.
  - Historical resume of systematics.
  - Importance and applications of biosystematics in biology
- Trends in biosystematics concepts of different conventional and newer aspects
  - Chemotaxonomy
  - Cytotaxonomy
  - Molecular taxonomy

**UNIT-II**

- Dimensions of speciation and taxonomic characters
  - Mechanisms of speciation in panmictic and apomictic species
  - Species concepts and species category.
  - Theories of biological classification.
  - Taxonomic characters and different kinds.

**UNIT-III**

- Procedure keys in taxonomy.
  - Taxonomic procedures-taxonomic collections, preservation, curation
  - Taxonomic keys-different kinds of taxonomic keys, their merits and demerits.
  - Process of typification and different Zoological types.
  - International code of Zoological Nomenclature (ICZN)
  -

**UNIT-IV**

- Biodiversity
  - Types of Biodiversity
  - Hot spots of Biodiversity
  - Threats to Biodiversity
  - Conservation of Biodiversity
- Evaluation of biodiversity indices
  - Shannon-Weiner index.

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## **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **Biosystematics & Taxonomy**  
**Dr. R. C. Tripathi**, University Book House Jaipur
- **Theory & Practice of Animal Taxonomy**  
**V.C. Kapoor**, 5th Edition Oxford & IBH Publishing Co.
- **Principle of Animal Taxonomy**  
**G.G. Simpson**, Oxford & IBH Publishing Co.
- **Elements of axonomy**  
**Earnst Mayer**
- **Biodiversity**  
**E.O. Vilson**, Academic Press Washington
- **The Biology of Biodiversity** **M. Kato**, Springer
- **Molecular Markers - Natural History & Evolution** **J.C. Avise**

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# **M.Sc. ZOOLOGY FIRST SEMESTER**

## **PAPER-II: STRUCTURE & FUNCTION OF INVERTEBRATES**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

### **UNIT-I**

- Organization of coelom
  - Acoelomates and Pseudocoelomates
  - Coelomates: Protostomia and Deuterostomia.
- Locomotion
- Flagellar and ciliary movement in Protozoa.
  - Hydrostatic movement in Coelenterata, Annelida and Echinodermata.

### **UNIT-II**

- Nutrition and Digestion
  - Patterns of feeding and digestion in Protozoa
  - Filter feeding in polychaeta.
- Respiration
  - Organs of respiration Gills, lungs and trachea.
  - Respiratory pigments.

### **UNIT-III**

- Excretion
  - Organs of excretion.
  - Excretion and osmoregulation
- Nervous System
  - Primitive nervous system: Coelenterata and Echinodermata.
  - Advanced Nervous system: Annelida, Arthropoda (Crustacea and insecta) and Mollusca (Cephalopoda)
- 

### **UNIT-IV**

- Invertebrate larvae
- Larval forms of free-living and parasitic invertebrates
- Minor Phyla
  - Organization and general characters of (Ctenophore, Rotifera, Ectoprocta, Endoprocta)

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### **SUGGESTED READING MATERIALS (ALL LATEST EDITION)**

- **Invertebrate Structure and function:-**

E.J.W. Barrington English language Book society UK.

- **Invertebrate Zoology:**

Robert Barnes IV Edition Holt Saunders International Edition japan.

- **The Cambrige Natural History Vol 1 - 9.**

S F Harmer, A.E. Shipley.

Todays & Tomorrows Book agency, New Delhi India.

- **A Text book of Zoology Invertebrate:**

Parker Hasvell, Marshall & Williams.

AITBS Publishing & Distributers, Delhi

- **The Invertebrates Vol. 1 - 9**

Libbic Henrietta Hyman, McGraw Hill Book Company

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# **M. Sc. ZOOLOGY FIRST SEMESTER**

## **PAPER-III: POPULATION GENETICS & EVOLUTION**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

### **UNIT-I**

- Concepts of evolution and theories of organic evolution: Lamarckism, Darwinism and Synthetic theory of evolution
- Evidences of evolution: anatomical, embryological, palaeontological, physiological and Bio-chemical

### **Unit-II**

- Hardy-Weinberg law of genetic equilibrium
- Detailed account of destabilizing forces.
- Natural selection
  - Mutation
  - Genetic drift
  - Meiotic drive
- Phenotypic variation

### **UNIT-III**

- Patterns and mechanisms of reproductive isolation
- Phylogenetic and biological concepts of species
- Gene Evolution, Evolution of gene families
- Factors affecting human disease frequency

### **UNIT-IV**

- Origin of higher categories
- Micro-and Macro-evolution
- Evolution of horse, elephant, camel, man

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## **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **Gene & Evolution**  
Jha A.P. John Publication, New Delhi
- **Evolution & Genetics**  
Merrel D.J. Holt rinchert & Wiston INC.
- **The Genetics & Origin of Species**  
Dobzhansky, Columbia University Press.
- **Evolution**  
Dobzhansky, Ayala F.J., Stebbins G.L. & Valentine J.M. Surjeet Publication  
New Delhi.
- **Species Evolution - The Role of Chromosomal Change**  
King M. Cambridge University Press. Cambridge
- **A Primer of Population Genetics**  
Hartl D.L. Suinaer Associates INC, Massachusetts
- **Evolutionary Genetics**  
Smith J.M. Oxford University Press, New York
- **Evolutionary Biology**  
Futuyama D.J. Suinaer Associates INC publishers, Dunderland
- **Evolution**  
Strikberger M.W. Johns & Bartett Publishers, Boston London

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**M. Sc. ZOOLOGY FIRST  
SEMESTER PAPER-IV:  
TOOLS & TECHNIQUES IN BIOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

**UNIT-I**

- Principles and application of
  - Ultracentrifugation
  - Electrophoresis
  - Chromatography (various types)
  - Lambert-Beers Law and colorimetry and spectrophotometry
  - Flow cytometry.

**UNIT-II**

- Principles and Application of
  - Light Microscopy and micrometry
  - Phase Contrast microscopy
  - Interference microscopy
  - Fluorescence microscopy
  - Transmission Electron microscopy.
  - Scanning Electron microscopy.

**UNIT-III**

- Assay
- Chemical assays
- Biological assays-in vivo and in vitro
- Principles of cytological and cytochemical techniques
  - Fixation: chemical basis of fixation by formaldehyde, glutaraldehyde, chromium salts, mercury salts, osmium salts, alcohol and acetone
  - Chemical basis of staining of carbohydrate, protein lipids and nucleic acids.

**UNIT-IV**

- Principle and techniques of
  - Nucleic acid hybridization and cot curve
  - Sequencing of proteins and nucleic acids
- Freeze techniques
- Media preparation and sterilization
- Inoculation and growth monitoring

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## **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **Introduction to Instrumental Analysis**
- **Robert Braun**, McGraw Hill International Edition
- **A biologist guide to principles and techniques of practical biochemistry**
- **K Wilson and K. H. Goulding** ELBs Edition
- **Instrumentation**
- **Upadhyay and Nath**, Meerut Publications
- **Instrumentation and Techniques**
- **R.C. Bajpayee**, Himalayan Publications

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## M. Sc. ZOOLOGY FIRST SEMESTER

### LAB COUSE-I: (PRACTICAL BASED ON PAPER I & II)

- **Biosystematics and Taxonomy**

- Study of biodiversity among various invertebrates and vertebrates (Listing of all the animals found in and around your house and also try to find out their Zoological names).
- Collection of various insect species.
- Visits to a local animal park or zoo to identify and study the captive fauna and preparation of report.
- Study of adaptive characteristics of various invertebrates and vertebrates in different climate.
- Taxonomic key formation and conversion.
- Study of biodiversity in grassland and pond water by using Shannon -Weiner index
- Other exercise related to theory paper

- **Structure and function of invertebrates**

- Identification, classification and study of distinguishing features of important representatives from various groups (Protozoa to Hemichordata).
- Study of permanent prepared slides (from Protozoa to Hemichordata).
- Dissection by using alternate methods like clay modeling : Reproductive, Excretory, nervous and haemocoelomic systems of leech.
- Dissection by using alternate methods like clay modeling: Reproductive system of cockroach; general anatomy, nervous and reproductive systems of grasshopper; nervous system of crab; nervous and reproductive systems of scorpion.
- Dissection by using alternate methods like clay modeling: Nervous system of Mytilus, Sepia and Aplysia, general anatomy of Aplysia.
- Study of sections of the arm of a starfish; general anatomy of a Holothurian; Aristotle's lantern of a sea urchin complete as well as disarticulated parts of the Aristotle's lantern.
- Permanent preparations of different materials to be provided for study.
- Wonder invertebrates
- Other exercise related to theory paper.
- UGC guideline should be followed.

#### EXAMINATION SCHEME

Based on paper I	35 marks
Based on paper II	35 marks
Viva	10 marks
Sessional (Internal)	20 mark
<b>Total</b>	<b>80+20 (100)</b>

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**M. Sc. ZOOLOGY FIRST SEMESTER**  
**LAB COUSE-II: (PRACTICAL BASED ON PAPER III & IV)**

**Population genetics and evolution**

- Problems on genetics (complete and incomplete linkage; dominance, sex-linked inheritance) Demonstration of Hardy-Weinberg law
- Preparation of human chromosomes map, demonstration of chromosomal deficiencies.
- Experiments based on population genetics, pedigree analysis.
- Study of evolution of horse by way of models.
- Study of evolution through homologous and analogous organs.
- Other exercises related to theory paper.

**Tools and techniques in biology**

- Parts study, principles and use of following instruments for different techniques:
- pH meter: Determination of pH of different soil and water samples.
- Spectrophotometer: Preparation of absorption spectrum.
- Chromatography: Paper and thin layer chromatography.
- Centrifuge: Extraction proteins and carbohydrates from tissues.
- Electrophoresis: Paper and gel electrophoresis.
- Microscope: Parts study and principles of various microscopes.
- Demonstration of cryostat.
- Other exercise related to theory paper.

**EXAMINATION SCHEME**

Based on paper III	35 marks
Based on paper IV	35 marks
Viva	10 marks
Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

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## **M. Sc. ZOOLOGY SECOND SEMESTER**

### **PAPER – I: MOLECULAR CELL BIOLOGY AND BIOTECHNOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### **UNIT-I**

- Biomembranes
  - Molecular composition and arrangement Transport across membrane
  - Structure and function Mitochondria
  - Golgi complex Lysosome Ribosome

#### **UNIT-II**

- DNA replication
- Transcription
- Translation
  - Genetic code
  - Mechanisms of initiation, elongation and termination
  - Regulation of translation

#### **UNIT-III**

- Genome organization
  - Chromosomal organization: morphological and structural types.
  - Non-coding DNA
- Molecular mapping of genome
  - Genetic and physical maps
  - Polymerase Chain Reaction (PCR) and blotting techniques
  - Molecular markers in genome analysis.

#### **UNIT-IV**

- Transgenic animals and knock-outs
  - Production and applications
  - Embryonic stem cells
- Application of genetic engineering
  - Medicine
  - Agriculture
  - Industry

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## **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **MOLECULAR CELL BIOLOGY**  
**Lodish**, W.H. Freeman & Co. New York
- **Lehninger PRINCIPLES OF BIOCHEMISTRY**,  
Fourth Edition - David L [1]. Nelson, Michael M. Cox
- **MOLECULAR CELL BIOLOGY**  
Lodish M. Baltimore, Scientific American books
- **ESSENTIALS OF CELL & MOLECULAR BIOLOGY**  
**Roberties & Roberties**, Halt Saunders International Edition.
- **CELL & MOLECULAR CELL BIOLOGY**  
**Gerald Karp**, Willey & Sons Co.
- **MEDICAL CELL BIOLOGY**  
**Flickinger E.J. Brown J.C.** Halt Saunders International Edition.
- **CELL BIOLOGY**  
**Powar C.B.** Himalaya Publishing House

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## **M. Sc. ZOOLOGY SEMESTER - II**

### **PAPER – II: GENERAL PHYSIOLOGY AND ENDOCRINOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### **UNIT-I**

- Digestion and Metabolism
  - General organization of alimentary canal
  - Mechanism of digestion
  - Mechanism of absorption
- Gas Exchange and Acid-base Balance
  - Oxygen and Carbon dioxide transport in blood
  - The role of hemoglobin
  - Regulation of body pH

#### **UNIT-II**

- Muscle Function and Movement
  - Anatomy of muscle
  - Mechanism of muscle contraction
  - Regulation of muscle contraction
- Nervous System
  - Neurons and membrane excitation
  - Action potentials
  - Synapses and neurotransmitters

#### **UNIT III**

- Sensory Transduction
  - Auditory receptors
  - Chemoreceptor: taste and smell
  - Vision and Photoreception – Photo Chemistry of vision
- Thermoregulation and Cold Tolerance
  - Heat balance and exchange
  - Endotherms Vs Ectotherms
  - Torpor, hibernation and aestivation

#### **UNIT-IV**

- Endocrinology
  - Structure and functions of endocrine glands (Pituitary, pineal, pancreas, adrenal, thyroid etc.)
  - Ghrelin, Amglin, Leptin, Orsxin
  - Biosynthesis of hormones (thyroid and gonadal)
  - Hormones and Reproduction -Pregnancy, Parturition, Lactation
  - Oeshans menstrual cycle Menarche Menopause

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## **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- Comparative vertebrate Endocrinology – by **Gorbman & Bern**
- Medical Physiology by Guyton and Hall
- Physiology by **Antonio Lucanio**
- Human Physiology – by **Dr. C. C. Chatterjee**
- Comparative Endocrinology – by **Barrington**
- Applied Animal Endocrinology – by **Squires**
- **Endocrinology** – Basic & Clinical principles - by **Melmed & Cohn**

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## M. Sc. ZOOLOGY SEMESTER - II PAPER – III: **DEVELOPMENT BIOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

### **UNIT-I**

- Oogenesis
- Differentiation and growth of oocytes.
- Organization of egg cytoplasm and egg cortex.
- Vitellogenesis
- Spermatogenesis
- Differentiation and ultra-structure of sperm
- Spermatocytogenesis Spermiation

### **UNIT-II**

- Fertilization
  - Biological role of fertilization.
  - Basic requirements of fertilization.
  - Activation of egg metabolism
  - Capacitation
  - Biochemistry of fertilization
- Cleavage
  - Characteristics and mechanisms of cleavages, Egg types

### **UNIT-III**

- Formative movements
- Fate maps
  - Utility and comparative topographical relationship of the Presumptive areas in early embryos of
  - Amphioxus
  - Fishes
  - Amphibian
  - Birds
- Differentiation

### **UNIT-IV**

- Cell and tissue interactions in development
  - Primary embryonic induction
  - Competence
  - Concept of organizer
- Metamorphosis
- Teratology

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## **SUGGESTED READINGS MATERIALS**

- **Animal Gametes –**

Vishmanath, Asia Publishing House

- **Foundation Of Embrology –**

Bradley M.Patten, McGraw Publication

- **Fertilization In Animals –**

Brain Dale, Arlond Heiniman, Gulab Vazerani Publication

- **Development Biology -**

N.J. Berril, Tata McGraw Hill Publication N. Delhi

- **Embryology Of Vertebrates -**

Nelson

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## **M. Sc. ZOOLOGY SEMESTER - II**

### **PAPER – IV: QUANTITATIVE BIOLOGY AND COMPUTER APPLICATION**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### **UNIT-I**

- Introduction to digital computer and application
  - Basic knowledge of hardware and software
  - CPU (Central Processing Unit)
  - Input and Output devices
  - Auxiliary storage system
  - Operating system and Binary number system

#### **UNIT-II**

- Computer application
  - Introduction to MSoffice
    - Word
    - Excel
    - Power point
- Computer application in biostatistics
- Simple computation and elementary knowledge of flow chart

#### **UNIT-III**

- Types of biological data
- Representation of data
- Sample and sampling
- Measures of central tendency
- Measures of dispersion
- Hypothesis testing: Null and alternate hypothesis

#### **UNIT-IV**

- Tests of significance
  - Chi-square test
  - Student's t-test
- Analysis of Variance
- Simple linear regression
- Correlation
- Probability distribution: normal and binomial

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## **SUGGESTED READING MATERIALS**

Bataschelet. E. Introduction to mathematics for site scientist springer-verlag, berling

Lenderen D. Modelling in behavioral ecology. Chapman & Hall London U.K.

Snedecor, G.W. and W.G. cochrane, statistical methods, Affiliated East,

West Press New Delhi (Indian ed.)

Murray, J.D. Mathematical Biology, Springer Verlag Berlin

Pielou, E.C. The interpretation of ecological data :

A primer on classification and ordination.

A. Lewis . Biostatistics

B.K. Mahajan Methods in Biostatistics

J.D. Murray Mathematical Biology

Georgs & Wilians Statistical method

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**M. Sc. ZOOLOGY SEMESTER – II**  
**LAB COURSE – I: (PRACTICAL BASED ON PAPER I & II)**

• **Molecular biology and Biotechnology**

- Isolation of DNA/RNA
- Study of mitochondria from buccal epithelium by staining with supravital stains.
- Culture of amoeba, paramecium, euglena.
- Study of cell division mitosis/meiosis by squash and smear preparation of root tip and cockroach/grasshopper testis.
- Study of giant chromosome in the salivary gland of Chironomous larvae or Drosophila.
- Study of Barr body and human chromosome.
- Culture and study of drosophila.
- Preparation of culture media and culture of bacteria.
- Other exercise related to theory paper.

**General physiology and endocrinology**

- Estimation of RBC, hemoglobin, hematocrit/PVC, blood group and Rh factor blood clotting time.
- Determine the blood pressure of man.
- Determination of urea, glucose and ketone bodies in urine.
- Demonstration of osmosis.
- Dissection by using alternate methods like clay modeling and exposure of major endocrine glands in an experimental animals.
- Study of histology of endocrine glands in different animal types through permanent slides and microtomy.
- Other exercise related to theory paper.

EXAMINATION SCHEME

Exercise based on paper I	35 marks
Exercise based on paper II	35 marks
Viva	10 marks

Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

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**M. Sc. ZOOLOGY SEMESTER – II**  
**LAB COURSE-II: (PRACTICAL BASED ON PAPER III & IV)**

**Development biology**

- Study of slides of development of frog.
- Study of development of Hen's egg, by cover glass window method, staining and mounting of blastodisc.
- Study of caudal regeneration in Teleost (Meal time effect).
- Study of embryological slides: spermatogenesis, oogenesis, histology of gonads.
- Study of effect of NaF/urea on growth of fish fingerlings.
- Study of effect of thyroid hormone on metamorphosis of tadpole
- Other exercises related to theory paper

**Quantitative biology and computer application**

- Preparation of frequency tables and graphs.
- Calculation of standard deviation, variance and standard error of mean.
- Calculation of probability and significance between means using t-test, Chi-square test, ANOVA
- Calculation of correlation, regression and probability distribution.
- Computer software use for computational tasks, data presentation, design task and communication
- Other exercises related to theory paper.

**EXAMINATION SCHEME**

Exercise based on paper III	35 mark
Exercise based on paper IV	35 mark
Viva	10 mark
Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

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## **M. Sc. ZOOLOGY SEMESTER - III**

### **PAPER-I: COMPARATIVE ANATOMY OF VERTEBRATES**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise) with internal choice.

#### **UNIT-I**

- Origin of Chordates
- Amphibians, Reptiles, Birds and Mammals.
  - Classification of Vertebrates and specialty of respective classes
- Amphibians, Gymnophiona Neoteny, Parental care
- Reptiles – Extinct reptiles
- Birds – Palate in Birds
- Mammals. – New world and old world Mankeys

#### **UNIT-II**

- Vertebrate integument and its derivatives.
- General structure and functions of Integument.
- Structure and functions of glands, scales, horns, claws, nails, hoof, feather and hair.
- Skeletal system in vertebrates.
- Comparative account of (i) Jaw suspensorium, (ii) Limbs and Girdles.

#### **UNIT-III**

- Respiration in Vertebrates.
- Comparative account of respiratory organs (structure and functions).
- Circulation in Vertebrates.
- Structure and function of blood.
- Evolution of heart.
- Evolution of aortic arches.

#### **UNIT-IV**

- Nervous System – Central, Peripheral and Autonomic.
- Sense organs.
- Comparative account of Sensory Receptors.
- Evolution of Urinogenital system in vertebrates.

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### **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **Vertebrate life** :– William N. Ferland, F. Harvey pough, Tom J Gode, John B. Heiser
- Collier MacNille International edition
- **Chordate morphology** :–Malcom Jollie
- Reinhold Publishing Corporation New York
- **Chordate –Structure & Function** :- Arnold G. Khage, B.E. Fry Johanson
- Mc Millan Publishing Co. INC. New York
- **Comparative Animal Physiology** :- Orosser
- Satish Book Enterprises, Agra
- **The Vertebrate Body** :- Alfred Sherwood Romer
- Vakils, Feffer & Simons Publications Ltd.

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## **M. Sc. ZOOLOGY SEMESTER – III PAPER-II: ANIMAL BEHAVIOUR**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise) with internal choice.

### **UNIT- I**

- Historical perspectives- Ethology
- Behavioural patterns
- Innate behaviour
- Biological rhythms
  - Types of biological rhythm
  - Biological clock

### **UNIT- II**

- Communications
  - Auditory
  - Visual
  - Chemical
- Learning and Memory
  - Conditioning
  - Habituation
- Reasoning
- Reproductive behaviour.

### **UNIT-III**

- Orientation
  - Echolocation in bats
  - Bird migration and navigation.
  - Fish migration.
  - Neural and hormonal control of behaviour

### **UNIT-IV**

- Hormonal effect on behavioural patterns.
  - Social behaviour
  - Social organization in insects and primates
  - Schooling in fishes and Flocking in birds
  - Homing, territoriality, dispersal
  - Altruism
  - Host–parasite relation

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### **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **ANIMAL BEHAVIOR – Mc Farland** (English Language Book Society)
- **ANIMAL BEHAVIOR – Arora M.P.** (Himalaya Publishing House, Mumbai)
- **ANIMAL BEHAVIOR - Reena Mathur** (Rastogi Publications, Meerut)

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**M. Sc. ZOOLOGY SEMESTER – III**  
**PAPER – III: ENVIRONMENT PHYSIOLOGY AND**  
**POPULATION ECOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

**UNIT – I**

Population dynamics:

- Demography, life table, reproductive rates, reproductive values
- Population growth, exponential, non overlapping
- Stochastic and time lag models of population growth
- Population density
- Population evolution
- Community dynamics: Characteristics, development and classification

**UNIT-II**

- Adaptations
  - Levels of adaptation.
  - Mechanisms of adaptation.
- Adaptations to different environments.
  - Marine, shores and estuaries.
  - Freshwater.
- Terrestrial Life.

**UNIT-III**

- Stress Physiology
  - Basic concepts of environmental stress and strain, Concept of elastic and plastic strain.
  - Stress avoidance, stress tolerance and stress resistance.
  - Acclimatization, acclimation and adaptation.
  - Endothermic and physiological mechanism of regulation of body temperature.

**UNIT -IV**

- Stress physiology in different conditions
  - Osmoregulation in aqueous and terrestrial habitats.
  - Physiological response to oxygen deficient stress.
  - Physiological response to body exercise.
  - Effect of meditation and yoga

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**SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

**ECOLOGY** with special reference to animal & man

**S. Charles, Kendeigh** Prentice hall of India Pvt. Ltd. New Delhi

- **ELEMENTS OF TROPICAL ECOLOGY**
  - **Yanney Ewusie** (English language Book Society, Heinemann educational book publication)
- **FUNDAMENTALS OF ECOLOGY**
- **Odum P.**
  - **ANIMAL PHYSIOLOGY, MECHANISM AND ADAPTATION -**

**Eckert, R., W, H, Freeman and Co.**

- **BIOCHEMICAL ADAPTATION -**

**Hochachka, P.W, and Somero S.N,** Princeton, New Jersey

- **ANIMAL PHYSIOLOGY: ADAPTATION AND ENVIRONMENT.-**

**Schiemidt Nielsen,** Cambridge

- **GENERAL & COMPARATIVE ANIMAL PHYSIOLOGY**

**Hoar W.S.** Princeton Hall of India

- **ENVIRONMENTAL PHYSIOLOGY**

**Willmer, P.G. Stone & Johanson I,** Blackwell Science Oxford

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## **M. Sc. ZOOLOGY SEMESTER – III PAPER – IV: IMMUNOLOGY AND PARASITISM**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

### **UNIT-I**

- Cells of immune system
- B-Lymphocytes, T-lymphocytes ( N K Cells, Helper Cells, Killer Cells)
- Mononuclear cells
- Granulocytic cells (Neutrophils, Eosinophils and Basophils)
- Mast cells
- Dendritic cells
- Organs of immune system
- Primary lymphoid organs (Thymus, bone marrow)
- Secondary lymphoid organs (Lymph nodes, spleen, mucosal associated lymphoid tissue, cutaneous associated lymphoid tissue)

### **UNIT-II**

- Immunoglobulin structure and function
- Molecular structure of Ig, Light chain and Heavy chain
- Immunoglobulin classes
- IgG
- IgM
- IgE
- IgD
- Monoclonal antibodies

### **UNIT-III**

- Antigens Immunogenicity
- Contribution of the immunogens.
- Contribution of Biological system.
- Antigen - Antibody Interaction
- Antibody affinity and activity
- Cross reactivity
- Agglutination reactions
- Precipitation Reaction
- Vaccine
- Active and passive immunization
- Whole organism vaccine
- Recombinant vector vaccines
- DNA vaccines

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#### UNIT-IV

- Immune system in Health disease
- Immune response to infectious disease
- Immune response in cancer
  - Pathophysiology of parasitic infection
  - Viral infections
  - Bacterial infection
  - Helminths infection
- AIDS

#### SUGGESTED READING MATERIALS

- **Immunology**
- **Kuby, W.H. Froeman USA**
- **Fundamental of Immunology**
- **W. Paul,**
- **Essential Immunology**
- **I.M. Roitt, ELBs Edition**
- **Immunology**
- **Richard M. Hyde, Robert A. Patnode, A Wiley Medical Publications**
- **Reproductive Physiology**
- **Gayton,**

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## M. Sc. ZOOLOGY SEMESTER – III

### LAB COURSE-I: (PRACTICAL BASED ON PAPER I & II)

- **Comparative anatomy of Vertebrates**
- Identification, classification and study of distinguishing features of important representatives, museum specimens and slides (Protochordates and Chordates)
- Comparative studies of integumentary, skeleton and reproductive system of major vertebrate classes.
- Dissections by using alternate methods like clay modeling: fowl/snake cranial nerves
- Wonder vertebrates
- Other exercise related to theory paper.

#### Animal Behavior

- To study the phototactic response in earthworm or grain/pulse pest.
- To study the geotaxis behavior of earthworm.
- To study the food preference and cleaning behavior of housefly.
- To study the food preference in tribolium or grain/pulse pests.
- To study the web construction and habituation in spider.
- Estimation of body temperature and pulse rate on daily time scale.
- Estimate the time perception among various individuals at two different time points on daily time scale.
- Determination of effect of time on schooling behavior in fish.
- Toxicological response of fish opercular and surfacing activity.

#### EXAMINATION SCHEME

Based on paper I	35 mark
Based on paper II	35 mark
Viva	10 mark
Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

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## M. Sc. ZOOLOGY SEMESTER – III

### LAB COURSE-II: (PRACTICAL BASED ON PAPER III & IV)

#### Immunology and Parasitism

- Dissection of primary and secondary immune organs from fish/fowl- Preparation and study of cell suspension from spleen (spleenocytes) of fish / fowl.
- Total and differential counting of leucocytes.
- Protein estimation by Lowry's method in normal and infected blood sample.
- Determination of Blood group.
- Study of permanent slides (for spotting); thymus, lymph nodes, spleen, bone marrow, types of cells squamous, cuboidal, columnar, epithelial cells, blood cells, nerve cells, muscles cells, connective tissue of various types, adipose tissue, mitotic and meiotic chromosomes and their different phases cancer cells of various types etc.
- Study of parasites in fish
- Study of various parasites through slides and specimen.
- Other exercises related to theory paper.
- **Environmental Biology, Population ecology**
- Study of biotic community in a pond/grassland ecosystem.
- Study of population growth rate (curve) in protozoan culture.
- Population dynamics of *Tribolium* sp.
- Study of biogeochemical cycles by way of models.
- Visit to some natural habitats and man made habitats to study the human impact on environment.
- Water analysis for fresh and waste water (Dissolve oxygen and chloride).
- Other exercises related to theory paper.

#### EXAMINATION SCHEME

Based on paper III	35 mark
Based on paper IV	35 mark
Viva	10 mark
Sessional (Internal)	20 Mark
Total	80+20 (100)

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**M. Sc. ZOOLOGY SEMESTER – IV**  
**PAPER– I (Compulsory)**  
**BIOCHEMISTRY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise) with internal choice.

**UNIT-I**

- Properties of Proteins
  - Structure and properties of amino acids.
  - Classification of proteins.
  - Structure of proteins.
  - Biological Functions of Proteins.
  - Protein Metabolism.

**UNIT-II**

- Carbohydrates
  - Classification of carbohydrates.
  - Structure and Functions of Carbohydrates.
  - Carbohydrate metabolism.
- Lipid
  - Lipid structure and functions
  - Lipid metabolism.

**UNIT-III**

- Vitamins
  - Water and Fat soluble vitamins,
  - Chemistry, occurrence and physiological role.
- Enzymes
  - Classification and nomenclature.
  - Mechanism of action
  - Regulation of enzyme activity and functions of Co-enzymes.

**UNIT-IV**

- Nucleic acid
  - Chemistry of DNA.
  - Chemistry of RNA.
  - Biological importance of nucleic acids.
  - Nucleoproteins.
  - Metabolism of nucleic acids.

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### **Suggested Reading**

#### **Lehninger Principles of Biochemistry, Fourth Edition**

David L. Nelson, Michael M. Cox

Publisher: W. H. Freeman

- **Biochemistry**

Donald Voet, Hardcover: 1616 pages,

Publisher: Wiley; 3 edition

- **Principles of Biochemistry With a Human Focus**

Reginald H. Garrett, Charles M.

Grisham Publisher: Brooks Cole

- **The Molecular Basis of Cell Cycle and Growth Control**

Gary S. Stein (Editor), Renato Baserga, Antonio Giordano, David T.

Denhardt, Publisher: Wiley-Liss

- **Experiments in Biochemistry: A Hands-On Approach**

Shawn O. Farrell, Ryan T. Ranallo,

Publisher: Brooks Cole

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**M. Sc. ZOOLOGY SEMESTER – IV**  
**PAPER II (Compulsory)**  
**NEUROPHYSIOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise) with internal choice.

**UNIT - I**

- Physiological role of neurosecretory cells
- Histological structure of neurons and neuroglial cells
- Physiological properties of neural fibres
- Synapsis and synaptical transmission
- Myoneural junction and neuromuscular transmission
- Degeneration and regeneration of nerve fibre

**UNIT - II**

- Nerve fibre, peripheral nerves, receptors and effector endings, dermatomes and muscle activity
- The spinal cord and the ascending and descending tracts
- The cranial and spinal nerves

**UNIT - III**

- The fore brain, brain stem, the cerebellum
- The meninges and cerebrospinal fluid
- Peripheral nervous system

**UNIT - IV**

- Autonomic nervous system; sympathetic and para-sympathetic nervous system with special comparison to hormonal mechanism of transmission through autonomic nervous system
- Reflex action; varieties, characteristics, unconditional reflex, electrophysiology of spinal reflexes
- Sensation
- Electro encephalography and its physiological basis.

**Suggested Reading**

- The Brain: Our Nervous System by Seymour Simon
- Mass Action in the Nervous System by Walter J. Freeman
- Human Anatomy and Physiology with Interactive Physiology 10-System Suite, 8th Edition by Elaine N. Marieb and Katja N. Hoehn (Jan 10, 2010)
- Neuroanatomy by H.G. Snell
- Clinical Neurophysiology-Guide for Authors - Elsevier
- Foundations of Cellular Neurophysiology (Bradford Books): Daniel Johnston,  
Optional papers

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## M.Sc. ZOOLOGY SEMESTER – IV

- The following optional papers are being suggested as below
- OPTIONAL (SPECIAL PAPER) GROUP 1
  - Fish (ichthyology) structure and function
  - Or
  - Cell Biology Or
  - Entomology Or
  - Wild life conservation Or
  - Biology of vertebrates immune system
- OPTIONAL (SPECIAL PAPER) GROUP 2
  - Pisci culture and economic importance of fishes (Ichthyology) Or
  - Cellular organization and molecular organization Or
  - Applied entomology Or
  - Environment and Biodiversity conservation Or
  - Molecular endocrinology and reproductive technology
- \*\* Student has choice to opt for one paper each (special paper) from group 1 and group 2

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## M. Sc Zoology Semester-IV

Paper- III A (optional paper)

Ichthyology (Fish) Structure and Function

### Unit-1

- Origin and evolution of fishes
- Classification of fishes as proposed by Berg
- Fish integument
- Locomotion
- Alimentary canal and digestion

### Unit-2

- Accessory respiratory organs
- Air bladder and its functions
- Weberian ossicles their homologies and functions
- Excretion and osmoregulation
- Acoustico-lateral line system

### Unit-3

- Luminous organs
- Colouration in fishes
- Sound producing organs
- Deep sea adaptations
- Hill stream adaptations

### Unit-4

- migration in fishes
- Sexual cycle and fecundity
- parental care in fishes
- Early development and hatching
- Poisonous and venomous fishes.

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## M.Sc Zoology Semester-IV

Paper- III B (Optional) Cell Biology

### Unit-1

- Molecular organization of eukaryotic chromosomes : structure of nucleosome particles and higher order compaction of mitotic chromosomes, chromatin remodeling
- specialized chromosomes: structural organization and functional significance of polytene chromosomes
- DNA methylation and DNA Aase-1 Hypersensitivity in relation to gene activity and chromatin organization.
- specialized chromosomes II : structural organization and functional significance of lampbrush chromosome.
- Organisation and significance of heterochromatin.

### Unit-2

- Structural organization of Eukaryotic genes, interrupted genes and overlapping genes and their evolution
- Gene families: organization, evolution and significance
- Transposable genetic elements of prokaryotes and eukaryotes Gene imitation and molecular mechanism of occurrence of mutation repair mechanism
- Organisation of eukaryotic transcriptional machinery promoter enhancers transcription factors polymerase activators and repressors.
- DNA binding domains of transcription apparatus zinc finger steroid receptors hemeo domains HILIX-loop, Helix and Leucine Zipper.

### Unit-3

- Eukaryotic transcription of Eukaryotic transcriptional control.
- Environmental modulation of gene activity (stress response) stress genes and stress proteins
- Molecular basis of thalasemias muscular dystrophy cystic fibrosis
- DNA rearrangement
- Amplification during development with special response to
- Ciliates
- Chlorine gene
- 58 RNA genes

### Unit-4

- Drosophila development
- Cleavage
- Gastrulation
- Origin of Anterior –Posterior (Maternal effect genes and segmentation genes)
- Drosophila development II origin of dorsal ventral polarity
- Basic idea of homeotic selector genes and homeotic mutation
- Basic idea of organization of homeoboxes
- Evolutionary significance of homeoboxes

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**Suggested Reading Materials:**

- Robertis, De and Robertis Cell and molecular biology Lea and Febiger.
- Watson Hopkis Roberts Steitz Weiner, Molecular Biology of the Gene the Benjamin, Cummings Publishin Company inc.
- Bruce A; berts Bray ewis Raff Roberts Watson Molecular Biology of the Cell, Garland Publishing inc.
- Watson Gilman Witkowski Zoller Recombinant DNA Scientific American Books.
- Karp Gerald Cell Biology.
- Lewin B., Genes VII.
- King Cell Biology.
- Kaniel L. Hartl, Elizabeth W. Jones. Genetics Principals and Analysis, Jones and Bartlett Publishers.
- Kuby, Immunology, W.H. Freeman and Company.
- Roitt Male Snustad Immunology.

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**M.Sc. Zoology Semester-IV**  
**Paper- III**  
**C (Optional) Entomology**

Unit-1

- Insect head types and modification as per their habit and habitat
- Modification of mouth parts and feeding behaviour
- Structure types and function of antennae
- Hypothetical wing venation
- Structure of cuticle and pigment

Unit-2

- Sclerotisation and tanning of the cuticle
- Structure of alimentary canal and Physiology of digestion
- Malpighian tubules – anatomical organization , Transport mechanism
- Structure of circulatory system
- Cellular elements in the haemolymph

Unit-3

- Cell mediated and humoral immunity
- Structure of compound eye and Physiology of Vision
- Sound Production in insect
- Structure and function of endocrine glands
- Pheromones

Unit-4

- Embryonic membranous up to the formation of blastoderm
- Metamorphosis
- Insecticide effects on CNS
- Important pest of Soybean Modern concept of pest management

Suggested Reading Materials:

- The Insect: Structure and function by R.F. Chapman
- Comparative Insect physiology, Biochemistry and Pharmacology .Vol :1-13. Edited by G.A. Kerkut and L.I. Gilbert.
- Entomophagous Insect by Clausen
- Entomology bu Gilbert
- Principles of Insect Physiology by Wigglesworth.
- Fundamentals of Entomology by Elzinga
- Hand book of economic Entomology for South India by Ayyar.
- Insect cytogenetics by R.E.F.Symposium.
- Insects and plants by Sting, Lawton and southwood.
- Insect and hygiene by Busvine.
- Insect Physiology by Wigglesworth.
- Insect morphology by Mat Calf and Flint
- Applied Agricultural Entomology by Dr. Lalit Kumar Jha

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## **M.Sc Zoology Semester-IV**

### **Paper- III D (Optional) Wild Life Conservation**

#### **Unit-1**

- Wild life -
- Values of wild life - positive and negative.
- Our conservation ethics.
- Importance of conservation.
- Causes of depletion.
- World conservation strategies.
- Habitat analysis, Evaluation and management of wild life.
- Physical parameters - Topography, Geology, Soil and water.
- Biological Parameters - food, cover, forage, browse and cover estimation.
- Standard evaluation procedures - remote sensing and GIS.
- Management of habitats -
- Setting back succession.
- Grazing logging.
- Mechanical treatment.
- Advancing the successional process.
- Cover construction.
- Preservation of general genetic diversity.

#### **Unit-2**

- Population estimation.
- Population density, Natality, Birth rate, Mortality, fertility schedules and sex ratio computation.
- Faecal analysis of ungulates and carnivores - Faecal samples, slide preparation, Hair identification, Pug marks and census method.
- National Organization.
- Indian board of wild life.
- Bombay Natural History Society.
- Voluntary organization involved in wild life conservation.
- Wild life Legislation - Wild Protection act - 1972, its amendments and implementation.
- Management planning of wild life in protected areas.
- Estimation of carrying capacity

#### **Unit-3**

- Eco tourism / wild life tourism in forests.
- Concept of climax persistence.
- Ecology of perturbation.
- Management of excess population & translocation.
- Bio-telemetry.
- Care of injured and diseased animal.

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#### Unit-4

- Quarantine.
- Common diseases of wild animal.
- Protected areas National parks & sanctuaries, Community reserve.
- Important features of protected areas in India.
- Tiger conservation - Tiger reserve in M.P, in India.
- Management challenges in Tiger reserve.

#### Suggested Reading Materials:

- Gopal Rajesh : Fundamentals of wild life management
- Agrawal K.C : Wild life India
- Dwivedi A.P (2008) : Management wild life in India
- Asthana D.K : Environment problem and solution
- Rodgers N.A & Panwar H.S : Planning of wild life / Protected area Network in India vol. the report, wild life Institute of India Dehradun.
- Odum E.P : Fundamentals of Ecology
- Saharia V.B : Wild life in India
- Tiwari S.K : Wild life in Central India
- E.P Gee : Wild life of India
- Negi S.S : Wild life conservation (Natraj Publishers)

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**M. Sc Zoology Semester-IV**  
**Paper- III E (Optional)**  
**Biology of vertebrate immune system**

**Unit-1**

- Tissues of Immune system- Primary lymphoid organs, structure and functions
- (Thymus and Bursa of Fabricius)
- tissues of Immune system- Secondary lymphoid organs, structure and functions
- (Spleen, lymphnode and Payers patches)
- Antigen processing
- Antigen presentation

**Unit-2**

- **T-cell** lineage and receptors
- T-cell activation
- B-cell lineage and receptors
- B-cell activation
- Immunoglobulin structure, Biological and physical properties of immunoglobulin
- Gene model for Immunoglobulin gene structure

**Unit-3**

- Generation of antibody diversity ( Light and heavy chain)
- Immunization
- Immediate type of hypersensitivity reaction of Anaphylectic type-1.
- Antibody dependent cytotoxic type II reaction.
- . Complex mediated type III reaction

**Unit-4**

- Delayed type cell mediated hypersensitivity type IV reaction.
- Enzyme linked immunosorbent assay (ELISA) technique and its applications.
- Immunofluorescence technique (Direct & Indirect and Sandwich antibody labelling techniques.
- Immunodiffusion techniques (Mancini and Ouchterlony immunodiffusion techniques)
- Monoclonal antibody technology (Hybridoma technology)

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## M. Sc Zoology Semester-IV

### Paper- IV A (Optional)

#### Pisci Culture and Economic Importance of Fishes (Ichthyology)

##### Unit-1

- Collection of fish seed from natural resources and transportation of fish seed.
- Breeding in fish, Bundh breeding and Induced breeding.
- Types of ponds required for fresh water fish culture farms.
- Management of fish farm.
- Physiochemical factors of freshwater for fish farming.

##### Unit-2

- Composite fish culture
- Prawn culture and pearl industries in India.
- Fisheries resources of C.G.
- Riverine fisheries.

##### Unit-3

- Costal fishries in India
- Offshore and deep sea fishery's in India
- Role of fishries in rural development
- Sewage fed fishries

##### Unit-4

- Methods of fish preservation
- Marketing of fish in India.
- Economic importance and by product of fishes
- Fish disease.

##### Suggested Reading Materials: Paper III A & IV A

- JR. Norman - The History of fishes.
- Nagaraja Rao - An introduction to fisheries.
- Lagler Ichthyology.
- Herclen Jones Fishmigration.
- Marshal The life of fishes.
- Thomas - Diseases of fish.
- Greenwood - Inter relationship of fishes.
- Gopalji, Srivastava - Freshwater fishes of U.P. and Bihar.
- Brown -Physiology of fishes Vol. I & II.
- Hoar and Randall -Fish physiology of fishes Vol. 1 & IX.
- Gunther Sterba C.N.H.-Freshwater fishes of the world
- W. Lanham -The Fishes.
- G.V. Nikolsky -The ecology of Fishes,
- Borgstram -Fish as food Vol. I & II.
- Nilsson -Fish physiology -Recent Advances.
- P.B. Myle and J.J. Cech Fishes An Introduction to Ichthyology.
- Carl E. Bond -Biology of fishes.
- M. Jobling -Environmental Biology of fishes.
- Santosh Kumar & Manju Ternbhre -Fish and Fisheries.
- S.K. Gupta-Fish and Fisheries
- K.P. Vishwas -Fish and Fishries.
- Jhingan -Fish and Fishries.

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**M.Sc Zoology Semester-IV**  
**Paper- IV B (Optional)**  
**Cellular Organization and Molecular Organization.**

**Unit-1**

- General organization and characterizes of viruses (Examples SV 40 and HIV).
- Yeast : Structure, reproduction and chromosome organization: Basic ideas of its applications as vectors for gene cloning.
- Molecular organization of respiratory chain assemblies, ATP / ADP
- Translocase and FOF1 ATPase.
- Cell cycle: Cell cycle control in mammalian cells and xenopus.
- Cytochemistry of Golgin complex and its role in cell secretion.,

**Unit-2**

- Peroxisomes and training of peroxysmal proteins.
- Nucleolus: Structure and Biogenesis and functions of lysosomes.
- Intracellular digestion : Ultra structure and function of lysosomes.
- Synthesis and targeting of mitochondrial proteins.
- Secretory pathways and translocation of secretory proteins across the EPR membrane.

**Unit-3**

- Genome complexity: C- value [paradox and cot value].
- DNA sequences of different complexity.
- Difference between normal cells and cancer cells.
- Biochemical changes.
- Cytoskeleton changes.
- Cell surface changes.
- Genetic basis of human cancer

**Unit-4**

- Chromosomal abnormalities in human cancer.
- General idea of oncogenes and proto oncogenes.
- Oncogenesis and cancer.
- Transforming Agents.
- Tumor Suppressor genes.
- Receptor – Ligand interaction and signal transduction. Cross – talk among various signaling pathways.

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### **Suggested Reading Materials:**

- DeRobertis and De Robertis Cell and Molecular Biology. Lea and Febiger.
- We Watson Hopking reberts steits, Weiner molecular biology of the gene, the Benjamin / Cummings Publishin Company Inc.
- Bruce alberts, Bray, Lewis, Raff, Roberts, Watson molecular Biology of the cell garland publishing inc.
- P.K. Gupta, Molecular Cell Biology Rastogi Publication.
- Watson Gilman Witkowski, Zoller Recomdinant D.N.A. scientific American Books.
- Gerald Karp. Cell Biology.
- Lewin B. Genes VII.
- King Cell Biology.
- Baniel L. HArtl Elizabeth W. Jones, Genetics Principles and analysis. Jones and Bartlett Publisher.
- Lodish, Berk Zipursky, Matsudaira Baltimore Dernell Molecular Cell Biology W.H.Freeman and company.
- J. Travers Immunology current Biology limited.
- Kubey Immunology W.H. Freeman and Company.
- Riott, Male snustad Principles of genetics john weley and sons Inc.

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**M. Sc Zoology Semester-IV**  
**Paper- IV C (Optional)**  
**Applied Entomology**

**Unit-1**

Classification according to imms

- Classification of apterygota upto families.
- Classification of following insect orders  
(a) orthoptera (b) hemiptera (c) diptera.
- Classification of following insect order  
(a) hymenoptera (b) lepidoptera (c) coleoptera
- Collection and preservation of insects.

**Unit-2**

- Insect pest-Management strategies and tools
- Biological control, Genetic control, Chemical control
- Pests of Cotton
- Pests of sugarcane
- Pests of paddy
- Pests of stored food grains
- Pests of citrus fruits and mango
- Pests of pulses
- House hold insect pests

**Unit-3**

- Insects in relation to forensic science
- Insects migration, population fluctuation and factors
- Insects of medical and veterinary importance
- Ecological factors affecting the population and development of Insects

**Unit-4**

- Mulberry and non mulberry sericulture
- Apiculture
- Lac culture
- Insects as human food for future.

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**M. Sc. Zoology Semester-IV**  
**Paper- IV D (Optional)**  
**Environment & Biodiversity Conservation**

**Unit I**

- Basic concept of Environmental Biology  
Scope and Environmental Science
- Biosphere and Biogeochemical cycles.
- Environmental monitoring and impact assessment.
- Environmental and sustainable development.
- Water conservation, rain water harvesting, water shed management.

**Unit II**

- Cause, effects and remedial measure of Air pollution, Water pollution.
- Noise, radioactive and thermal pollution.
- Agriculture pollution
- Basic concepts of Bioaccumulation.
- Solid waste management.

**Unit III**

Global warming and disaster management

- Cause of global warming
- Impact of global warming – acid rains and ozone depletion, green house effect.
- Control measures of global warming
- Afforestation (b) reduction in the use of CFCs
- Disaster management - floods, earthquake, Cyclones landslides.
- Environmental legislation.

**Unit IV**

Natural Resources:- Forest-

- Use and over exploitation of forests.
- Timber extraction. Land
- Land degradation. Landslides.
- Soil-erosion and desertification. Water
- Use and over utilization of surface and ground water
- Floods. Drought dams- benefits and problems Mineral
- Use and exploitation ,
- Environmental effect of extracting and using mineral resources Food
- World food problem
- Effects of modern agriculture and overgrazing Energy
- Conventional and nonconventional energy resources.
- Using of alternate energy sources
- Role of an individual in conservation of natural resources Equitable use of resources for sustainable life
- Biodiversity crisis – habitat degradation poaching of wild life.
- Socio economic and political causes of loss of biodiversity.
- In situ and exsitu conservation of biodiversity
- Value of biodiversity.

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### **Suggested Reading Materials: Paper III D & IV D**

- Arora : Fundamentals of environmental biology
- Anathakrishnan : Bioresources ecology
- Bottain : Environmental studies
- Bouhey : Ecology of populations
- Clark : Elements of ecology
- Dowdoswell : An introduction to animal ecology
- Goldman : Limnology
- Kormondy : Concepts of ecology
- May : Model ecosystems
- Odum : Ecology
- Perkins : Ecology
- Simmons : Ecology of estuaries and coastal water
- Pawlosuske : Physico-chemical methods for water
- South Woods : Ecological methods
- Trivedi and Goel : Chemical and biological methods for water pollution studies
- Willington : Fresh water biology
- Wetzel : Limnology
- Welch : Limnology Vols. I-II

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**M.S c Zoology Semester-IV**  
**Paper- IV E (Optional)**  
**Molecular Endocrinology and Reproductive Technology**

**UNIT-1**

- Definition and scope of molecular endocrinology.
- Chemical nature of Hormones-
- Protein & polypeptides.
- Amino acid derivative
- Steroids
- Phospholipids derivative
- (tissue hormones)
- Purification and characterization of Hormones.

**UNIT-2**

- Receptor.
- Membrane Receptor.
- Nuclear Receptor.
- Orphan Receptor
- G-Protein
- Nuclear Receptor

**UNIT-3**

- Hormone – Transduction
- G-Protein & Cyclic Nucleosides.
- Calcium calmoduline & phospholipids.
- Miscellaneous Second Messengers.
- Phosphorylation & other non transcriptional effect of Hormones.
- Genetic control of formation of Hormone.
- Transcription.
- Post transcription.
- Translation.
- Post translation
- Secretion of Hormone.

**UNIT-4**

- Multiple ovulation and embryo transfer Technology.
- Study of estrous cycle by vaginal smear technology
- Surgical technique-
- Castration
- Ovariectomy
- Vasectomy
- Tuetomy
- Laprotomy.

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### **Suggested Reading Materials:**

- Benjamin Lewin – Genes VII/ VIII, Oxford University Press.
- Lodish et al- Molecular Cell Biology.
- Zarrow, M.X., Yochim J.M. and Machrthy, J.L. – Experimental Endocrinology.
- Chatterji C.C.- Human Physiology (Vol- II).
- Bentley, P.J. – Comparative Vertebrate endocrinology.
- Hadley Mac. E.- Endocrinology.
- Chinoy, N.J. Rao, M.V., Desai, K.J. and High land, H.N. – Essential techniques in reproductively
- physiology and Endocrinology.
- Norris, D.O. – Vertebrate Endocrinology.

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**M.Sc. ZOOLOGY – IV SEMESTER  
LAB COURSE-I (COMPULSARY)**

**PAPER- I BIOCHEMISTRY**

1. Estimation of antioxidant enzymes.
2. Estimation of amylase.
3. Estimation of protein by Lowry method.
4. Estimation of Oil in seeds.
5. Estimation of Carbohydrate by anthrone reagent.
6. Other exercise related to theory paper.

**PAPER- II NEUROPHYSIOLOGY**

1. Study of slides of nervous system.
2. Neck nerve of squirrel by using alternate methods like clay modeling.
3. Study of Brain through MODAL.
4. Study of Cranial nerve of Bird, Amphibian, Reptile and Mammals by using alternate methods like clay modeling.
5. Other exercise related to theory paper.

**EXAMINATION SCHEME**

Based on paper I	35 marks
Based on paper II	35 marks
Viva	10 marks
Sessional (Internal)	20 mark
<b>Total</b>	<b>80+20 (100)</b>

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**M.Sc. SEMESTER-IV**  
**LAB COURSE-II**  
**OPTIONAL (SPECIAL PAPER) GROUP 1**

**PAPER-III(A) FISH (ICHTHYOLOGY) STRCTURE AND FUNCTION**

1. Anatomy of various organ systems and mounting of fish materials
2. Cranial nerves of teleost fishes: *Wallago*, *Mystus*, *Labeo* and other fishes by using alternate methods like clay modeling
3. Osteology of fish: *Scoliodon*, carps, catfishes, murels etc.
4. Accessory respiratory organs of air breathing fish by using alternate methods like clay modeling
5. Study of histological (permanent) slides
6. Study of museum specimens of the concerned group
7. Other exercise related to theory paper.

**PAPER –III(B) CELL BIOLOGY**

1. Study of mitosis from onion root tip.
2. Study of meiosis in grasshopper testis.
3. Study of polytene chromosome in Dipteran Larvae.
4. Demonstration of Barr-Body in Human Cheek cell.
5. Estimation of DNA.
6. Estimation of RNA.
7. Other exercise related to theory paper.

**PAPER –III(C) ENTOMOLOGY**

1. Anatomy of common grasshopper, cockroach, honey bee, wasp and dysdercus, mylabris, belestoma (Giant water Bugs) by using alternate methods like clay modeling.
2. Dissection by using alternate methods like clay modeling and exposure of:
  - (i) Sting apparatus of honey bee and wasp.
  - (ii) Tympanal organs of grasshoppers.
  - (iii) Testes of cockroach
  - (iv) Aristae of house fly.
  - (v) Different types of mouthparts of insects.
  - (vi) Different types of wings and antennae of insects.
  - (vii) Tentorium of grasshoppers.
3. Identification and comment on insects of different orders and families.
4. Identification with the help of keys of common insects from different orders and families.
5. Other exercise related to theory paper.

**PAPER-III(D) WILD LIFE CONSERVATION**

1. Anatomy of (by using alternate methods like clay modeling):
  - (a) Toad / Frog.
  - (b) Lizard / Snake / Turtle.
  - (c) Pigeon / Parrot.
  - (d) Rat / Squirrel.
2. Ecological survey of National Parks and Sanctuaries.
3. Mounting: Permanent preparation of parts of internal organs.
4. Study of slides of different microscopic structure.
5. Identification of wild animal species as objects of museum and zoo and specimens of photographs.
6. Osteology of wild animals.
7. Ecological comments on wild species of different niche and habits. Candidates would be required to keep records of exercise in laboratory, field types, sanctuaries and parks of importance and collections.
8. Other exercise related to theory paper.

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### **PAPER-III(E) BIOLOGY OF VERTEBRATE IMMUNE SYSTEM**

1. Dissection by using alternate methods like clay modeling of primary and secondary immune organs from mice:
  - a. Preparation of single cell suspension from bone marrow and spleen (spleenocytes) of mice.
  - b. Cell counting and viability testing of the spleenocytes prepared.
2. Preparation and study of phagocytosis by splenic/peritoneal macrophages.
3. Raising polyclonal antibody in mice, serum collection and estimating antibody titre in serum by following methods:
  - a. Ouchterlony (double diffusion) assay for Antigen -antibody specificity and titre.
  - b. ELISA
4. Antibody purification from the serum collected from immunized mice: affinity purification/chromatography.
5. Immunoelectrophoresis.
6. Demonstration of Western blotting:
  - a. Protein estimation by Lowry's method /Bradford's method
  - b. SDS-PAGE.
  - c. Immunoblot analysis.
7. Other exercise related to theory paper

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## OPTIONAL (SPECIAL PAPER) GROUP 2

### PAPER –IV(A) PISCI CULTURE AND ECONOMIC IMPORTANCE OF FISH (ICTHYOLOGY)

1. Systematic identification of freshwater fishes with particular reference to C.G.
2. Age determination with the help of scales / otolith
3. Pigmentary behaviour in fish
4. Qualitative zooplankton analysis
5. Nutrient analysis of water
6. Analysis of gut contents
7. Microtomy of fish materials
8. Other exercise related to theory paper

### PAPER-IV(B) CELLULAR ORGANIZATION AND MOLECULAR ORGANIZATION

1. Histochemical demonstration of Mitochondria
2. Histochemical demonstration of Golgi complex
3. Histochemical demonstration of Lactate dehydrogenase
4. Histochemical demonstration of Succinate dehydrogenase
5. Isolation and characterization of Nuclei from liver
6. Isolation and characterization of Mitochondria
7. Isolation of DNA from any tissue
8. Separation of lipids using thin layer chromatography
9. Separation of various proteins using column chromatography
10. Study of metaphase chromosomes from rat bone marrow
11. G banding of metaphase chromosomes
12. C- banding of metaphase chromosomes
13. Estimation of Mitotic Index
14. Measurement of cell size using oculometer.
15. Other exercise related to theory paper

### PAPER- IV(C) APPLIED ENTOMOLOGY

1. Insect collection and preservation for systematic studies
2. Identification of different insects upto orders
3. Identification of insects upto families of economically important insect orders
4. Identification of insects upto species: Mosquitoes, honeybees, stored grain beetles, aquatic insects, important crop and household pests
5. Analysis of honey and its quality control
6. Field studies of insects to understand their habit, habitat environmental impact, beneficial and harmful activities etc.
7. Study of beneficial insects, benefits derived from them and useful products
8. Study of destructive insects, damage caused by them and damaged products
9. Study of insecticidal formulations and insect control appliances
10. Experiments on insect control like LC-50 /LD-50, knock down and recovery effect, repellency/antifeedance tests, percentage damage tests for leaf eating insects, and stored grain pests
11. Other exercise related to theory paper

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**PAPER- IV(D) ENVIRONMENT AND BIODIVERSITY CONSERVATION**

- (i) Environmental hazards, destruction of habitat and extrication of species causes and preventive measures.
- (ii) Environmental planning of rural and urban development.
- (iii) Management of soil resources.
- (iv) UNESCO's role in ecology, earth summit, SARC, ED trust fund.
- (v) Biodiversity, its significance and conservation measures.
- (vi) Role of biodiversity in species development.
- (vii) Other exercise related to theory paper

**PAPER- VI(E) MOLECULAR ENDOCRINOLOGY AND REPRODUCTIVE TECHNOLOGY**

- 1. Chromatography method (separation of Androgen & Progesterone).
- 2. Bioassay of  $\alpha$ -Ketosteroids.
- 3. Bioassay of Gonadotropins.
- 4. Study of slide related to endocrine glands.
- 5. Estimation of cholesterol.
- 6. Estimation of catecholamine.
- 7. Dissection by using alternate methods like clay modeling of endocrine glands.
- 8. Other exercise related to theory paper.

**EXAMINATION SCHEME**

Based on paper III	35 marks
Based on paper IV	35 marks
Viva	10 marks
Sessional (Internal)	20 mark
<b>Total</b>	<b>80+20 (100)</b>

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**HEMCHAND YADAV VISHWAVIDYALAYA,  
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**SCHEME OF EXAMINATION  
&  
SYLLABUS  
of  
M.Sc. (Home Science) Semester Exam  
UNDER  
FACULTY OF HOME SCIENCE  
Session 2019-21  
(Approved by Board of Studies)  
Effective from June 2019**

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# Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

M.SC. (HOME SCIENCE)

SYLLABUS 2019-20

SYLLABUS OF SEMESTER SYSTEM

FOOD SCIENCE AND NUTRITION

1<sup>st</sup> SEMESTER

Marking Scheme:

PART I – THEORY

No.	Title	Marks			
		Theory	Test	Seminar	Total
Paper I	Research methodology	80	10	10	100
Paper II	Physiology	80	10	10	100
Paper III	Food Microbiology	80	10	10	100
Paper IV	Problems in Human Nutrition	80	10	10	100

PART II – PRACTICAL

No.	Practical	Marks
Practical I	Nutrition & Food Microbiology	100

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**PAPER - I**  
**RESEARCH METHODOLOGY**

Max. Marks: 80

**Objectives:**

To understand the significance of research methodology in Home Science research. To understand the types, tools and methods of research and develop the ability to construct data gathering instruments appropriate to the research design.

**UNIT-I      1. Science, scientific methods, scientific approach.**

Role of research in Home science discipline. Objectives of research: Explanation, control and prediction. Types of research: Historical, Descriptive, Experimental, case study, Social research and survey: Meaning, definition, nature, scope, objects, types. distinction between social survey & research. Pre-testing and pilot survey.

**UNIT-II      7. Definition and identification of research problem.**

Selection of research problem.

Justification.

**Fact, Theory and concept.**

**Hypothesis** : Definition, sources, characteristics, importance, main difficulties in formation of hypothesis, disadvantages, Limitations and Delimitations of the problems.

**Types of variables.**

**UNIT-III    11. Basic principles of research design:**

Purposes of research design: fundamental, applied and action, exploratory, and descriptive, experimental, ex-post facto. Longitudinal and cross sectional, co-relational.

**Data gathering instrument.**

Observation,

Questionnaire,

Interview,

Scaling method,

Case study,

Home visits,

Reliability and validity of measuring instruments.

**UNIT-IV    13. Theory of probability: Non-probability sampling: purposive,**

Quota and volunteer sampling/snow ball sampling

**Sampling** : Population and sample, Meaning, Characteristics, advantages and disadvantages.

**Types :**

Probability sampling

Random sampling (Simple random, systematic random sampling,)

Purposive sampling

Stratified sampling

Other sampling methods (two stages and multistage sampling, cluster sampling.

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## **UNIT-V 15. Classification and tabulation of data.**

Analysis and interpretation of data

Preparation of report

Diagrammatic presentation of data

### **References:**

Edwards: experimental design in psychological research.

Kerlinger: Foundation of educational research.

Bhandarkar P.L. and Wilkinson T.S. (2000) methodology and techniques of social research, Himalaya publishing house, Mumbai.

Bhatnagar G.L.(1990) research methods and measurements in behavioral and social science Agri Cole publishing agency, New Delhi.

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**PAPER - II**  
**PHYSIOLOGY**

Max. Marks 80

**Objectives :**

This course will enable students to:

Advance their understanding of some of the relevant issues and topics of human physiology.

Enable the students to understand the integrated function of all systems and the grounding of nutritional science in Physiology. Understand alterations of structure and function in various organs and systems in disease conditions.

**UNIT-I      1. Cell structure and functions**

Levels of cellular organization and function - organelles, tissues, organs and systems brief review. Cell membrane, transport across cell membrane and intercellular communication. Regulation of cell multiplication. Nervous system Review of structure and function of neuron, conduction of nerve impulse synapses, role of neurotransmitters Organization of central nervous system structure and function of Brain and spinal cord, Afferent and efferent nerves, Hypothalamus and its role in various body function, obesity, sleep, memory.

**UNIT-II      3. Endocrine system**

Endocrine glands- structure, function, role of hormones, regulation of hormonal secretion, Disorders of endocrine gland. Emphasis on physiology of diabetes and stress hormones. Sense Organs Review of structure and function, Role of skin, eye, ear, nose and tongue in perception of stimuli.

**UNIT-III      5. Digestive system**

Review of structure and function. Secretary, Digestive and Absorptive function. Role of liver, pancreas and gall bladder and their dysfunction. Respiratory system Review of structure and function. Role of lungs in the exchange of gases, Transport of oxygen and  $\text{CO}_2$ . Role of Hemoglobin and buffer systems. Respiratory quotient, hypoxia, and asthma

**UNIT-IV      7. The circulatory system**

Structure and function of heart and blood vessels. Regulation of cardiac output and blood pressure, heart failure, hypertension. Blood formation, composition, blood clotting and homeostasis: Formation and function of plasma proteins, Erythropoiesis, Blood groups and his to compatibility. Blood indices. Use of blood for investigation and diagnosis of specific disorders Anemia. The Musculo skeletal system Structure and function of bone, cartilage and connective tissue, Disorders of the skeletal system. Types of muscles structure and function

**UNIT-V      10. The excretory system:**

Structure and function of nephron. Urine formation. Role of kidney in maintaining pH of blood. Water, electrolyte and acid base balance, diuretics. Immunity system Cell mediated and hormonal immunity. Activation of WBC and production of antibodies. Role in inflammation and defense Physiological changes in pregnancy.

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## References :

- Ganong W.F. 1985: Review of Medical Physiology 2nd Edition, Lange Medical Publication.
- Moan Camcell E.J. Dickinson C.J.... Edwares C.R.N. and Sikora K. (1984): Clinical Physiiology, 5th Edition .... Publication. Guyton A.C. (1985):
- Guyton, A.C. and Hall, J.B. (1996) Text Book of Medical Physiology, 9th Edition, W.B. Saneers Company... Books Pvt. Ltd. Banglore.
- Wilson KTW and Waugh A (1998): Ress and Wilson Antony and Physiology in Health and .... 4th Edition
- Mc. W.D. Karen F.J. and Katch, V.L. (1996): Excericise Physiology, Energy ,.....perfor-mance, 4th Edition, Williams and Wilkons Batimere Jain A.K. Text Book of Physiiology, Vol I and II Avichal Publishing Co. New Delhi.

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**PAPER - III**  
**FOOD MICROBIOLOGY**

Max. Marks: 80

- UNIT-I**     1. Bacterial morphology, structure, staining, culture media, culture method and identification of bacteria.  
Growth and Nutrition of Bacteria : Intrinsic and extrinsic parameters that affect microbial growth.
- UNIT-II**     3. Microorganism important in food microbiology - Mold, yeast, bacteria.  
4. **Spoilage of different groups of foods:**  
Cereals and cereal products  
Vegetables and fruits  
Fish and meat products  
Meat and meat products  
Eggs and poultry  
Milk and milk products  
Canned foods
- UNIT- III**   5. **Contamination of foods.**  
**Food Preservation :**  
General principles of food preservation: Asepsis, removal of micro-organism, maintenance of anaerobic conditions.  
Preservation by use of high temperature.  
Preservation by use of low temperature  
Preservation by drying.  
Preservation by food additives  
Preservation by radiation.
- UNIT-IV**   7. **Foods in relation to disease :**  
Food borne illness: Bacterial and viral food borne disorders. Food borne important animal parasites, mycotoxins.  
**Fermented Foods :**  
Role of microbes in fermented foods –  
Fermented dairy products  
Fermented vegetables  
Fermented meat  
Fermented fish  
Beverage and distilled products.
- UNIT-V**     9. **Indices of Food Sanitary Quality:**  
Microbial criteria of food.  
Microbial standards and food safety  
Controlling the microbial quality of foods -  
Quality control using microbial criteria.  
The HACCP (Hazard Analysis and Critical Control Point) system  
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**PAPER - IV**  
**PROBLEMS IN HUMAN NUTRITION**

**Max. Marks: 80**

- UNIT-I**     1. Nutritional screening and assessment of nutritional status of hospitalized and outdoor patients. Identification of high risk patients. Assessment of patient needs based on interpretation of patient data (Clinical, biochemical, biophysical, personal etc.)  
**Nutritional support:** Recent advances in techniques and feeding substrates.  
**Stress and trauma :** Diet in surgery, burns, fracture.
- UNIT-II**     4. **Diet and drug interaction:** Effect of drugs on ingestion, digestion and metabolism of nutrients.  
5. **Neurological disorders:**  
Neuritis - Etiology, nutritional care.  
Migraine - Diet management  
Anorexia Nervosa - Etiology, treatment.  
Childhood problems : Inborn errors of metabolism and their nutritional management.  
Maple syrup urine disease - Tyrosinemia, Galactosemia, Phenylketonuria.
- UNIT- III**     7. **Musculoskeletal disorders:**  
Arthritis's - Nutritional care  
Gout - Characteristics, nutritional care  
**Cancer :** Types of cancer, Nutritional effect of cancer, Nutritional disorders related to treatment, diet in cancer.
- UNIT-IV**     9. Historical background, prevalence, etiology, biochemical and clinical manifestation, preventive and therapeutic measures for the following –  
I.        P E M  
            Nutritional anaemia  
II.       Vitamin A deficiency  
III.      IDD
- UNIT-V**     10. Osteomalacia and osteoporosis Etiology, symptoms and nutritional care,  
Rickets  
Dental caries: Etiology, nursing bottle caries.  
Nutrition in AIDS.

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## References:

1. Atlas, M. Ronald (1995) principles of Microbiology, 1th Edition Mosby-year Book, Inc., Missouri, U.S.A.
2. Topley and Wission's (1983) Principles of Bacteriology, Virology and Immunity, Edited by S.G. Wilson, A. Miles and M.T. Parkar, Vol.I
3. General Microbiology and Immunity, II: Systematic Bacteriology, 7<sup>th</sup> Edition, Edward Arnold Publish.
4. Block, J.G. (1999) Microbiology Principles and Exportations, 4th Edition John Wiley and Sone Inc. Jay, James, M. (2000) Modern Food Microbiology, 6<sup>th</sup> Edition, Aspen publishers, Inc., Maryland. Bansart, G. (1989) Basic Food Microbiology, 2th Edition, CBS Publisher.
5. Garbutt, J (1977) Essentials of Food Microbiology, 1<sup>st</sup> Edition, Arnold International Students Edition.
6. Doyle, P. Benehat, L.R. and Mantville, T.J. (1977): Food Microbiology, Fundamentals and Forntiers, ASM Press, Washington DC.
7. Bensaon, H.J. (1990) Microbiological applications, C. Brown Publishers U.S.A.
8. Roday, S. (1999) Food Hygiene and sanitation, 1st Edition, Tata Mcgraw Hilll, New Delhi. Venderzant, C and D.F. splitts Toesser (1992): Compendium of Methods for the Microbiological Examination of Foods 3<sup>rd</sup> Edition. American Public Health Association, Washington D.C.
9. Frazier, W.C. and Westhoff, D.C. (1998) : Food Microbiology. Tata McGraw Hill Book Company, New Delhi, 4th Edition.
10. James, M.J. (1987) : Modern Food Microbiology, CBS Publishers, New Delhi, 3rd edition.
11. Pelezar, M.I. and Reid, RD. (1993) : Microbiology, McGraw Hill Book Company, New York, 5th edition.
12. Adams, M.R., Moss, M.O. (1995): Food Microbiology, New Age International (P.) Ltd., Delhi.
16. Banwart G.J. (1987) : Basic Food Microbiology, CBS Publishers and Distributors, Delhi.

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**PRACTICAL - I**  
**NUTRITION & FOOD MICROBIOLOGY**

**Max. Marks: 100**

**Objectives:**

The aim of the course is to:

Familiarize students with basic techniques used in Studies and Research in Nutritional Sciences. Acquaint students with the methods of estimating nutrient requirements. Orient students towards planning of metabolic studies.

**Note: Any 10 practicals from 'Part I' and any 5 practicals from 'Part II'.**

**PART-I**

Estimation of protein quality using different methods PER, B.V., N.P.U., NDP-Cal% Estimation of energy value of food stuffs using bomb calorimeter. Estimation of Energy Requirements.

B M R

Energy expenditure on physical activities.

Factorial approach

Balance studies – Nitrogen balance

Assessment of micronutrient status

Iron

Vitamin 'C'

Vitamin 'A'

Vitamin from 'B' Complex group.

Bioavailability of selected nutrients

Assessment of nutritional status including Body composition.

Physiological parameters like heart rate and blood pressure

Assessment of coronary risk profile- RISK factor

Assessment of bone health

Planning diets and formulating dietary guide lines

Fitness and health

Prevention of chronic degenerative disorders

Obesity management

Management of diabetes mellitus and CVD

Review of existing alternative diet related systems for physical fitness and health. Planning and preparation of diets for the elderly in health and sickness.

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## Part II

Preparation of common laboratory media and special media for cultivation of bacteria, yeast and moulds.

Staining of bacteria- grams staining, spore, capsule, motility of bacteria, staining of yeast and moulds.

Identification of important moulds and yeasts (slides).

Study of environment around us as source of transmission of micro organisms in food. Assessment of surface Sanitation of food preparation units.

Bacteriological analysis of milk.

Demonstration of available rapid methods, diagnostic kits used in identification of microorganisms or their products.

Visits to food processing units or any other organization dealing with advance methods in food microbiology.

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# Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

M.SC. (HOME SCIENCE)

SYLLABUS 2019-20

FOOD SCIENCE AND NUTRITION

M.SC. PREVIOUS - 2ND SEMESTER

MARKING SCHEME:

PART I - THEORY

No.	Title	Marks			
		Theory	Test	Seminar	Total
Paper V	Statistics and Computer Application	80	10	10	100
Paper VI	Food Science	80	10	10	100
Paper VII	Food chemistry	80	10	10	100
Paper VIII	Therapeutic Nutrition	80	10	10	100

## PART II - PRACTICAL

No.	Practical	Marks
Practical II	Food Science and Therapeutic Nutrition	100

## PART III - INTERNSHIP / FIELD PLACEMENT

The student will be required to undergo an internship/field placement for a total duration of six to eight weeks in their chosen area of interest after II<sup>nd</sup> semester which will facilitate their pursuing a professional career in same field.

This programme could be taken up either as a single block or in two different blocks. It is mandatory that the organization / institution (public/private) participating in the field.

Placement programme will be of good professional standing. The list may include Hospitals, state run NGO, Food industry, etc.. The student will be required to submit and present a report of the internship/field placement project after its completion. It is also envisaged that participating organization/institution will give their performance appraisal of the student work. Grade A (60% and above), Grade B (48% to 59%), Grade C (40% to 47%) should be given to the student after evaluation of field placement/ internship report by the department. The grade will be mentioned in the mark sheet of the IV<sup>th</sup> semester of the student.

Excursion trip/field visits should be arranged regularly by the department for the up liftment of the knowledge of the students. This programme is designed with the following objectives:

I. To enable the students to acquire an in-depth understanding of the practical aspects of knowledge and skills acquired during the course in the relevant subject/subjects.

I. To gain hands on experience for higher proficiency in their selected area of expertise To help the students to develop and have their analytical abilities for situation and analysis and bringing about improvements.

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**PAPER - V**  
**STATISTICS AND COMPUTER APPLICATION**

Max. Marks: 80

To understand the significance of statistics and research methodology in Home Science research.

To understand the types, tools and methods of research and develop the ability to construct data gathering instruments appropriate to the research design. To understand and apply the appropriate statistical technique to the measurement scale and design. To understand the role of statistics and computer application in research. To apply statistical techniques to research data for analysis and interpreting data meaningfully

- UNIT-I**      1. Conceptual understanding of statistical measures – meaning, definition, scope, importance, characteristics, distrust of statistics.  
Classification and tabulation of data.  
Measurement of central tendency  
Mean  
Median  
Mode
- UNIT-II**      4. Graphic presentation of data  
Frequency distribution  
Histogram  
Frequency polygons  
Frequency curve  
Ogive  
Binomial distribution  
Parametric and non-parametric tests
- UNIT- III**    5. Methods of Dispersion and variation  
Mean deviation  
Standard deviation  
Quartile deviation  
Independence of attributes  $2 \times 2$  and  $r \times c$  contingency tables  
Analysis of variance – one way method Direct and short cut. What is computers characteristics components of computer system, block diagram of computer, CPU, I/O devices and memory ( RAM and ROM) second storage devices (hard disk Floppy disk ,Magnetic tape etc.)
- UNIT-IV**    7. Computer generations – Classification of computers; Analog digital hybrid general and special  
Types of computers- Micro Mini Mainframe and super computer  
Chi square test Goodness of it  
Application of student 't' test for small samples

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- UNIT-V**
9. Correlation-definition, meaning and types.
  10. Methods of determining coefficient of correlation
    - Product moment correlation
    - Rank correlation.
    - Working with MS Word
    - Getting started with word, formatting text and paragraph.
    - Applying text and language tools, designing pages, with columns and tables, using graphics.

## References:

Garrett, Henry E. 1971: statistics in psychology and education, David and co.

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**PAPER - VI**  
**FOOD SCIENCE**

**Max. Marks 80**

**OBJECTIVES:**

This course is designed to: Provide an understanding of composition of various foodstuffs. Familiarize students with changes occurring in various foodstuffs as a result of processing and cooking. Enable students to use the theoretical knowledge in various applications and food preparations.

**UNIT-I**      1. Introduction to Food Science:

**Water:** Physical properties of water and Ice, chemical, nature, structure of the water molecule.

Absorption phenomena, types of water solutions and collidative properties.

Free and bound water. Water activity and Food spoilage.

Freezing and Ice structure.

Food Dispersions-Colloidal solutions, stabilization of Colloidal systems, Rheology of food dispersions.

Gels: Structure, formation, strength, types and permanence. Emulsions: Formation, stability, surfactants and emulsifiers. Foams: Structure, formation and stabilization.

**UNIT-II**      4. Polysaccharides, Sugars and Sweeteners

**Starch:** Structure, gelatinization, methods for following gelatinization changes. Characteristic of some food starches. gelatinization. Modified food starches. Non-starch Polysaccharides: Cellulose, hemicelluloses, pectins, gums, animal polysaccharides. Sugar and Sweeteners: Sugar, Syrups, potent sweeteners, and sugar products. Sweetener chemistry related to usage in food products: Structural relationships to sweetness perceptions, hydrolytic reactions, solubility and crystallization, hygroscopicity, fermentation, non- enzymatic browning.

**UNIT- III**      5. Cereals and Cereal Products

**Cereal grains:** Structural and composition.

Cereal products. Flours and flour quality. Extruded foods, breakfast cereals, wheat germ burger, puffed and flaked cereals.

Fats, Oils and Related Products Sources, composition , effects of composition on fat properties. Functional properties of fat and uses in food preparations. Fat substitutes. Fat deterioration and antioxidants..

**UNIT-IV**      7. Proteins: Classification, composition, denaturation, non- enzymatic browning and other chemical changes.

Enzymes: Nature of enzymes: stability and action. Proteolytic enzymes oxidizes, lipases, enzymes decomposing carbohydrates and application. Immobilized enzymes.

**UNIT-V**      9. Milk and Milk Products: Composition. Physical and functional properties De-naturation. Effects of processing and storage. Dairy products, Cultured milk, yoghurt, butter, whey cheese, concentrated and used products, frozen desserts, dairy product substitutes.

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## Journals:

Journal of Food Science Published by the Institute of Food Technologist, Chicago lu  
U.S.A.

Journal of Food Science and Technology published by Association of Food  
Sciencetists and Technologist (India) CFTRI- MYSORE.

Food Technology Published by the Institute of Food Technologist, Chicago lu, U.S.A.

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**PAPER - VII**  
**FOOD CHEMISTRY**

Max. Marks: 80

- UNIT-I**    1. **Meat and Poultry:** Muscle composition, characteristics and structure. Post mortem changes processing, preservation and their effects. Heat induced changes in meat variables in meat preparation, Tenderizing treatments, meat products.

**Eggs :** Structure and composition, changes during storage. Functional properties of eggs, use in cookery. Egg processing, low cholesterol egg substitutes.

- UNIT-II**    3. **Fish and sea foods :** Types and composition, storage and changes during storage, changes during processing, by-product and newer products.

**Pulses and Legumes:** Structure, composition, processing, toxic constituents.

**Nut ad oil seeds:** Composition, oil extraction and by-products.

**Protein concentrates :** Hydrolysates and textured vegetable proteins, milk substitutes.

- UNIT- III**    7. **Fruits and vegetables :** Plant, anatomy, composition , Enzymes in fruits and vegetables. Flavor constituents, plant phenolics, pigments, post harvest changes. Texture of fruits and vegetables. Effects of storage, processing and preservation.

8. **Spices and condiments :** Composition, flavoring extracts - Natural and synthetic

- UNIT-IV**    9. Processed foods : Jams, jellies, squashes, pickles, dehydrated products.

**Beverages :** Synthetic and natural, alcoholic and non-alcoholic, carbonated and non-carbonated, coffee, tea, cocoa, malted drinks

- UNIT-V** 11. **Traditional processed products :** Fermented food - Cereal based, pulse based, fruit/vegetables based like vinegar, pickle

**Leavened products :** Leavening agents, biologically leavened and chemically leavened products. Batters and dough, bakery products.

**Salt and substitutes.**

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## References:

Charley, H. (1982) Food Science (2nd edition), John Wiley and Sons, New York.

Potter, N. and Hotchkiss, J.H. (1996) Food Science, Fifth edition, CBS Publishers and Distributors, New Delhi. Belitz, H.D. and Grosch, W. (1999) Food Chemistry (2nd edition), Springer, New York.

Abers, RI, (Ed) (1976) Foam, Academic Press, New York.

Cherry, R.J.Ed) : Protein Functionality in Food. American Chemical Society, Washington D.C.

## Journals:

1. Journal of Food Science
2. Advances in Food Research
3. Journal of Food Science and Technology
4. Journal of Agricultural and Food Chemistry
5. Cereal Science
6. Journal of Dairy Science
7. Journal of the Oil Chemist's Society.

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**PAPER - VIII**  
**THERAPEUTIC NUTRITION**

**Max. Marks: 80**

- UNIT-I    1. Etiopatho physiology, metabolism and clinical aberration:** complications, prevention and recent advances in nutritional management of GIT Disorders  
Gastritis \_ Types, dietary modification  
Peptic ulcer, etiology, symptoms, dietary modification  
Intervals of feeding, bland diet, four stage diet Therapy, prevention of recurrence.  
Diarrhea – Classification, dietary consideration  
Constipation, classification, dietary consideration  
Ulcerative colitis symptom, dietary treatment  
Sprue types, dietary consideration.
- UNIT-II    2. Disease of liver and gall bladder.**  
Diseases of liver and gall bladder  
Jaundice – classification and dietary treatment  
Hepatitis – types and dietary management.  
Hepatic coma – causes and dietary management  
Cirrhosis- Type and dietary management  
Cholecystitis- Types and dietary management  
Cholelithiasis- etiology and dietary management  
Pancreatic disorders: etiology, pathogenesis and nutritional care.
- UNIT- III    4. Renal diseases**  
Basal renal functions, classification of renal disease.  
Glomerulonephritis- Acute and chronic- symptoms and dietetic treatment  
Nephrosis symptoms and principles of nutritional care.  
Renal failure- Acute and chronic renal failure, dialysis.  
Renal calculi- Etiology, types of stones and nutritional care acid and alkaline ash diet.  
Fevers and infections-Types of fever, Tuberculosis, typhoid and malaria dietetic management
- UNIT-IV    5. Cardiovascular diseases:** Classification.  
Hyperlipidemia \_ Classification and nutritional care.  
Atherosclerosis – Etiological factors, pathogenesis dietetic management.  
Hypertension – Classification, etiology, nutritional care.  
**Weight Imbalance:** Regulation of energy in take  
obesity – Types, etiology, treatment, diet and other measures, complication of obesity  
Under weight ness – causes, dietetics management.
- UNIT-V    7. Historical background, prevalence, etiology biochemical and clinical manifestation, preventive and therapeutic measures for metabolic disorders.**  
Diabetic Mellitus.  
Incidence and predisposing factors  
Symptoms , types and diagnoses  
metabolism in diabetes  
dietary management and meal management  
Hypoglycemic agents and insulin  
complications of diabetes  
Disorders of thyroid gland: normal thyroid function  
Hyperthyroidism \_ symptoms and treatment

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**PRACTICAL - II**  
**FOOD SCIENCE AND THERAPEUTIC NUTRITION**

Max. Marks 100

**Distribution of Marks:**

Sessional	-	20
Viva	-	20
Practical	-	60 (Exercises two of 30 each)

**PART- A**

Collection and storage of biological samples for clinical investigation.

Market survey of commercial nutritional supplements and nutritional support substrates.

Commonly used test for diagnosis of various - system — wise.

Interpretation of patient data and diagnostic tests and drawing up of patient diet prescription, using a case study approach.

Follow up- acceptability of diet prescription, compliance, discharge diet plan.

Preparation of diet counseling aids for common disorders.

Planning and preparation of diets for patients with common multiple disorders and complications and discharge diet plans.

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## PART-B

Effect of solutes on boiling point and freezing point of water.

Effect of types of water on characteristic of cooked vegetables, Pulses and cereals.

**Sugar and Jaggery Cookery:** Relative sweetness, solubility and sizes of sugars, stages. of sugar cookery, caramelization, crystallization, factors affecting crystal formation.

**Starches Vegetables Gums and Cereals:** Dextrinization, gelatinization, retro gradation, thickening power, Factors affecting gels. Gluten formation and factors affecting gluten formation.

**Jams and Jellies:** Pectin content of fruits, role of acid pectin and sugar in jam and jelly formation, Use of gums as emulsifiers / stabilizers.

**Fat and Oils:** Flash point, melting point and smoking point, Role of fast and oils in cookery as: Shortening agent, frying medium, Factors affecting fat absorption. Fat crystals. Plasticity of fats Permanent and semi- permanent emulsions.

**Milk & Milk Products:** Scalding denaturation ration. Effect of acid, salt, alkali, sugar, heat) enzymes, polyphenols on milk Khoa, curd, paneer. Cheese (ripened and unripened).

**Egg:** structure assessing egg in quality. Use of egg in cookery: Emulsions air incorporation, thickening, binding, and gelling. Method of egg cookery and effect of heat white foams and factors affecting foams:

**Pulses:** Effect of various cooking and processing methods on various functional properties of pulses and their products.

**Gelatin:** Gelatin gel strength and factors affecting gelatin.

**Fruits and Vegetables:** Pigments: Effects of cooking metal ions, ph, effect of various cooking processes on different characteristics of vegetables. Prevention of enzymatic browning.

**Leavened Products:** Fermentation- Use of microorganisms ((lactic acid yeast). Steam as an agent, Egg as a chemical agent.

**Frozen Desserts:** Factors affecting ice crystal formation. Quality characteristics of frozen desserts.

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# Hemchand Yadav Vishwavidyalaya, Durg (C.G)

FOOD SCIENCE AND NUTRITION

M.SC. (HOME SCIENCE) FINAL

SYLLABUS 2019-20

3<sup>rd</sup> SEMESTER

Marking Scheme:

PART I – THEORY

No.	Title	Marks			
		Theory	Test	Seminar	Total
Paper IX	Advanced Nutrition	80	10	10	100
Paper X	Nutritional Biochemistry	80	10	10	100
Paper XI	Nutrition for Health of Women and Children	80	10	10	100
Paper XII	Methods of Investigation	80	10	10	100

PART II – PRACTICAL

No.	Practical	Marks
Practical III	Nutritional Biochemistry	100

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**PAPER - IX**  
**ADVANCED NUTRITION**

Max. Marks: 80

**Objectives :**

**This Course is designed to:**

Provide in depth knowledge of the physiological and metabolic role of various nutrients and their interactions in human nutrition.

Enable students to understand the basis of human nutritional requirement and recommendations through the life cycle.

Enable students to understand the pharmacological actions of nutrients and their implications. Familiarize students with the recent advances in nutrition.

- UNIT-I**     **1. Energy:** Energy content of foods. Physiological fuel value- review. Measurement of Energy Expenditure: BMR, RM rthermic effect of feeding and physical activity, methods of measurement of basal metabolism. Estimating energy requirements of individuals. Regulation of energy metabolism: control of food intake, digestion, absorption and body weight.
- UNIT-II**     **2. Carbohydrates:** Types, classification, digestion and transport- review, dietary fibre, fructo, oligosaccharides, resistant starch- chemical composition and physiological effects Glycemic index of foods. Sweeteners nutritive and non-nutritive.
- UNIT- III**     **3. Proteins:** Classification, digestion, absorption and transport- review. Metabolism of proteins: Role of muscle, liver and gastro intestinal tract. in protein metabolism. Protein quality, methods of evaluating protein quality. Protein and amino acid requirements. Therapeutic applications of specific amino acid.  
**Lipids:** Classification digestion, absorption, transport- review – Functions of fat E.F.A. Role of n-3 n-6 fatty acids in health and disease. Requirements of total fat and fatty acids. Trans fatty acids, prostaglandins, phospholipids, cholesterol.
- UNIT-IV**     **5. Water:** Regulation of intra and extra cellular volume – Osmolality, water balance and its regulation.  
**Minerals:** (Note: For each nutrient sources, bio-availability, metabolism, function, requirements, RDA, deficiency and toxicity, interactions with other nutrients are to be discussed)  
Macro minerals: calcium, phosphorus, magnesium, sodium, potassium and chloride.  
**Micro minerals:** Iron, copper, zinc, manganese, iodine, fluoride. Trace minerals: Selenium cobalt, chromium, Cadmium, silicon ,boron, nickel.
- UNIT-V**     **10. Vitamins:** Historical background, structure, food sources, absorption and transport metabolism biochemical function, and assessment of status. Interac-tions with other nutrients. Physiological, pharmacological and therapeutic effects, toxicity and deficiency with respect to the following. Fat soluble Vitamins A,D,E, & K  
**Water Soluble:** thiamine riboflavin, niacin, biotin, pyridoxine, folic acid, pantothenic acid, ascorbic acid, cyanocobalamin, choline, inositol, ascorbic acid.

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Cameron, M.E. and van Staveren, W.A. (1988): Manual on Methodology for Food consumption Studies, Oxford University Press Oxford. Quandt, S.A. and Ritenbaugh, S. (1986): Training Manual in Nutritional Anthropology American Association of Anthropology, Washington, D.C.

*Handwritten signatures and dates:*  
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## PAPER - X

### NUTRITIONAL BIOCHEMISTRY

Max. Marks: 80

- UNIT-I**    1. Hetero polysaccharides- Definition classification structure and properties of glycoprotein, and proteoglycans.  
Inter mediatory metabolism- Reactions, standard for energy changes, and regulating, carbohydrates- glycolysis, gluconeogenesis, citric acid cycle, hexose-mono-phosphate pathway.
- UNIT-II**    3. **Lipids-** Beta oxidation synthesis of fatty acids. Synthesis and breakdown of unsaturated fatty acids, cholesterol, phospholipids. And triacylglycerol. Purines and pyrimidines- Synthesis and break down source of various atoms of the purine base. salvage reaction, Biosynthesis of purines and pyrimidines.
- UNIT- III**    5. Plasma proteins- Nature Properties and functions  
Nucleic acids- DNA replication and transcription method of replication fork, okazaki segment, rule of sigma factor and core enzyme, DNA recombinant-Bio medical importance, restriction enzyme cloning, libraries & libraries construction. Protein bio synthesis, initiation, formation of UOS, complex formation of complex, elongation.
- UNIT-IV**    8. Hormones, general characteristic of hormones classification of hormones, mechanism of action. Assay of hormone, functions of Hormones, Thyroxine,TSH.LH. ACTH and insulin.  
Minerals, trace elements, their physiological function sources, absorption, excretions & deficiency of iron, copper, iodine zinc and selenium
- UNIT-V**    10. Detoxification in the body- Metabolism of foreign compounds oxidation conjugation, reduction hydrolyses.  
Major alteration in CHO protein and fat metabolism in chronic nutrition, related generative diseases diabetes, heart diseases.

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## PAPER - XI

### NUTRITION FOR HEALTH OF WOMEN AND CHILDREN

Max. Marks - 80

- UNIT-I**     1. Role of women in national development.  
Women in family and community: Demographic changes menarche, marriage, fertility, morbidity, mortality, life expectancy, sex ratio, aging, widowhood. Women in society: Women's role, their resources, and contribution to family, and effect of nutritional status.
- UNIT-II**     4. Women and health: Health facilities. Disease pattern and reproductive health. Policies and programs for promoting maternal and child nutrition and health. Concept of small family. Methods of family planning-Merits and demerits.
- UNIT- III**     7. Importance of nutrition prior to and during pregnancy- Prerequisites for successful outcome. Effect of under nutrition on mother and child including pregnancy outcome and maternal and child health- Short term and long term effect. Physiology and endocrinology of pregnancy, embryonic and foetal growth and development. Nutritional requirements during pregnancy: Adolescent pregnancy, pregnancy and T.B., TUGR, gestational diabetes.
- UNIT-IV**     10. Lactation- Development of mammary tissue and role of hormones- Physiology and endocrinology of lactation. Synthesis of milk component, let down reflex, role of hormones. Lactational amenorrhea, effect of breast feeding on maternal health. Human milk composition and factors affecting breast feeding. Human milk banking. Management of lactation: Prenatal breast feeding, skill education. Rooming in problems – Sore nipples, engorged breast, inverted breast. Exclusive breast feeding.
- UNIT-V**     14. Infant physiology: Preterm and low birth weight infant- Implication for feeding and management. Growth and development during infancy, childhood and adolescents. Feeding of infants and children and dietary management. Malnutrition- Etiology and management.

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## PAPER - XII

### METHODS OF INVESTIGATION

Max. Marks: 80

- UNIT-I**    1. Electrolytic dissociation : Principle, technique and theory of electrolytic dissociation.  
Hydrogen ion concentration : Principle and measurement of pH, indicators, buffer.  
Physiochemical techniques : Principles and methodology of the following -  
Diffusion Osmosis Filtration Surface tension Adsorption Centrifugation
- UNIT-II**    4. Chromatography : Principles, techniques and application of the following -  
Paper chromatography - Circular, ascending and descending.  
Ion exchange chromatography column chromatography  
Thin layer chromatography Gas liquid chromatography High performance liquid chromatography
- UNIT- III**    5. Electrophoresis : Principles and techniques of paper and gel electrophoresis.  
Microbiological assay : Principle and methodology of the following - (a) Vitamins  
(b) Amino acids
- UNIT-IV**    7. Colorimetry : Principle, colorimeter applications.  
Radioactive isotopes : Properties of radioactive isotopes, detection of radiations.  
Uses of radioactive isotopes in medical science.
- UNIT-V**    9. Immunological methods : Principle and technique of the following -  
Radio Immuno Assay (RIA)  
Enzyme Linked Immunosorbent Assay (ELISA) Collection of biological samples.

### References ;

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# **PRACTICAL - III**

## **NUTRITIONAL BIOCHEMISTRY**

Max. Marks 100

### **Objectives :**

This course will enable the students to

Understand the principles of biochemical methods used for analysis of food and biological samples. Perform biological analysis with accuracy and reproducibility

Note : Any ten practical.

### **PART-A**

**Calcium :** Estimation of calcium in foods and serum.

**Phosphorous :** Estimation of inorganic phosphorous in foods and serum.

**Ascorbic acid :** Estimation of ascorbic acids in foods.

#### **Proteins:**

Estimation of proteins in foods.

Estimation of albumin, globulin and albumin/globulin ratio in serum and urine.

Estimation of haemoglobin.

**Glucose:** Estimation of glucose in blood and urine.

**Cholesterol:** Estimation of cholesterol in blood.

**Enzyme assay:** Estimation of activity of serum alkaline phosphates and trans aminase.

**Urea and creatinine:** Estimation of urea and creatinine in serum and urine.

**Survey of pathological laboratories.**

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## PART-B

**Acids and alkalis:** Preparation of dilute solutions of common acids and alkalis and determining their exact normality.

**Buffers ;** Preparation of phosphate, carbonate-bicarbonate, ascorbic acid, acetate, chloride and phthalate buffers and determination of their pH by the use of indicators and pH meters.

**Spectrometer:** Beer Lamuert law, absorption maximum, preparation of standard curve and nutrient estimations in UV and visible range, AAS, AES, flame photometry.

**Fluorimetry:** Estimation of thiamin and riboflavin.

**Chromatography:** Paper - Identification of amino acid by circular, ascending and descending methods. Ion-exchange - Separation of amino acids. column Separation of proteins. Thin layer - Identification of amino acids, Gas-liquid Estimation of fatty acids, HPLC - Estimation of  $\alpha$ -carotene and  $\alpha$ -tocopherol.

**15. Electrophoresis:** Fractionation of plasma proteins.

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# Hemchand Yadav Vishwavidyalaya, Durg (C.G)

## FOOD SCIENCE AND NUTRITION

### M.SC. (HOME SCIENCE) FINAL

SYLLABUS 2019-20

#### 4<sup>th</sup> SEMESTER

#### Marking Scheme:

#### PART I – THEORY

No.	Title	Marks			
		Theory	Test	Seminar	Total
Paper XIII	Nutrition for Health and Fitness	80	10	10	100
Paper XIV	Public Nutrition	80	10	10	100
Paper XV	Geriatric Nutrition	80	10	10	100
Paper XVI	Institution Management	80	10	10	100

#### PART II – PRACTICAL

No.	Practical	Marks
Practical IV	Institution Management	100

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## PAPER - XIII

### NUTRITION FOR HEALTH AND FITNESS

Max. Marks - 80

**Objective :** Course will prepare the student to -

Understand the components of health and fitness and the role of nutrition in these. Make nutritional, dietary and physical activity recommendations to achieve fitness and well-being. Develop ability to evaluate fitness and well-being.

- UNIT-I**    1. Definitions, components and assessment criteria of age: specific fitness and health status.  
Anatomical fitness  
Physiological fitness  
Psychological fitness  
Physiological fitness; Growth and development, strength ,speed skill stamina, or endurance, specific fitness, general fitness, and health status. Holistic approach to the management of fitness and health: Energy input and output. Diet and Exercise, Effect of specific nutrition on work performance and physical fitness, Nutrition, exercise, physical fitness and health inter- relation-ship
- UNIT-II**    7. Review of different energy systems for endurance and power activity: Endurance Definition, classification, and factors affecting endurance. Fuels and nutrients to support physical activity: Shifts in carbohydrate and fat metabolism mobilization of fat stores during exercise. Nutrition in Sports: Sports specific requirement.
- UNIT- III**    9. Pre-game and post- game meals. Assessment of different mutagenic acids and commercial supplements. Diets for persons with high energy requirements, stress, fracture and injury. Water and electrolyte balance: Losses and their replenishment during exercise and sports events, effect of dehydration, sport drink.
- UNIT-IV**    11. Significance of physical fitness and nutrition in the prevention and management of weight control, obesity, diabetes mellitus, CV disorders, bone health and cancer Nutrition and exercise regimes for pre and postnatal fitness.  
Nutritional and exercise regimes for management of obesity. Critical review of various dietary regimes for weight and fat reduction. Prevention of weight cycling.
- UNIT-V**    14. Defining nutritional goals/ guidelines appropriate or health fitness and prevention and management of the chronic de-genearative disorders  
Alternative systems for health and fitness like Ayurveda, Yoga, Meditation, Vegetarianism and Traditional diets.

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Parizkova, J. Nutrition, Physical activity and health in early life Ed. Wolinsky, I. CRC Press.

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McArdle, W. Katch, F and Katch, V. (1996) Exercise Physiology, Energy, Nutrion and Human Performance, 4th Edition. Williams and Wikins, Philadelphia.

## Journals

Medicine and Science in Sports and Exercise.

International Journals of Sports Nutrition.

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## PAPER - XIV

### PUBLIC NUTRITION

Max. Marks: 80

- UNIT-I**     **1. Concept of Public Health Nutrition :** Relationship between health and nutrition.  
Role of public nutritionist in the health care delivery system.  
Sectors and public policies relevant to nutrition.  
National health care delivery system.
- UNIT-II**     **4. Population Dynamics:** Demography, demographic cycle, world population trend, birth rates, death rates, growth rates, demographic trends in India, age pyramid, sex ratio.  
**Environment and Health:**  
Water : Water pollution, surveillance of drinking water quality. Air : Air pollution
- UNIT- III**     **6. Nutritional Status:** Determinants of nutritional status of individual and populations. Factors affecting nutritional status.  
**Major Nutritional Problems :** Etiology, prevalence, clinical manifestations.  
Preventive axtherapeutic measures of -  
Macro and micro deficiencies - LBW, PEM, xerophthalmia, nutritional anaemia.  
Other nutritional problems like lathyrism, aflatoxicosis, alcoholism and fluorosis.
- UNIT-IV**     **8. National Nutrition Policy**  
Approaches and strategies for improving nutritional status and health.  
Occupational health  
Health planning and management
- UNIT-V**     **12. Communication for Health Education.**  
Health planning in India.  
Health Care of the Community Concept of health care, health system, levels of health care.

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**PAPER - XV**  
**GERIATRIC NUTRITION**

Max. Marks 80

**Objectives :**

The course is designed to -

Familiarize the students with the multifaceted aspects of ageing. Make the students competent for nutritional and health care of the elderly.

**UNIT-I 1. Ageing : Definition**

(A) Molecular changes during ageing –

(i) Changes in proteins,

(ii) Chromatin,

(iii) Crosslinkers,

(iv) Immune response,

(v) Hormones,

(vi) Ageing of cells in culture,

(vii) Age pigment.

Mechanism of Ageing –

(A) Somatic mutation,

(B) Errors in proteins

(C) Gene regulation Socio-psychological aspects of ageing - Especially problems of elderly women.

**UNIT-II 4. Nutritional and food requirement during old age - Progress of ageing, nutritional requirements, food requirements.**

5. Nutrition related problems of old age –

(i) Osteoporosis,

(ii) Obesity,

(iii) Neurological dysfunction,

(iv) Anaemia,

(v) Malnutrition,

(vii) Constipation.

**UNIT- III 6. Degenerative diseases in old age –**

(1) Atherosclerosis,

(2) Hypertension,

(3) Cancer,

(4) Diabetes mellitus,

(5) Arthritis. Common complaints during old age. Dietary guidelines

**UNIT-IV 9. Drug - Food and nutrient reaction in elderly.**

(a) Effect of drugs on food intake and absorption.

(b) Effect of various foods and beverages on drug action.

(c) Drug nutritional interaction. Ageing and immunity. Ageing and nutrition, nutrition and longevity, food habits of elderly people, stress during old age.

**UNIT-V 12. Exercise, yoga, meditation in old age.**

Policies and programmes of the government to the elderly. Policies and programmes of the NGO sector pertaining to the elderly.

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## References :

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- Chernoff, R. (ed) (1991) : Geriatric Nutrition : The Health Professionals' Handbook, Gaithersburg, MD : Aspen.
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- Talwar, G.R : Textbook of Biochemistry and Human Biology.
- B. Srilakshmi : Dietetics, New Age International (P.) Ltd. Publishers.

## Journals:

American Journal of Clinical Nutrition  
Gerontology  
Journal of American Geriatric Society  
Age Ageing  
Journal of Applied Gerontology  
Age  
Journal of Gerontology

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## PAPER - XVI

### INSTITUTION MANAGEMENT

Max. Marks: 80

- UNIT-I**     1. Development and scope of food service History of Food Service.  
                 2. Food & Economics Money
- UNIT-II**     3. Quantity Cookery:  
                 Purchase, Selection. Storage and handling of food in relation to cost and food value  
                 Food preparation and different types of service of meals snacks. Drink etc. and their  
                 evaluation. Meal planning or various institutions taking into account regional food  
                 habits. Comparative study of different food groups.
- UNIT- III**   4. Organization and Management of food services:  
                 Personnel Management. Selection training. Supervision labour laws.  
                 Organization of work, space, time tables and work simplification.
- UNIT-IV**   5. Food service planning:  
                 Selection of furnishings and equipment for institution kitchens and dining rooms.  
                 Sanitation and cleaning Differences in organization and management problems of  
                 hostels, annapurnas cafeteria. Hospital. School Lunch Programme with reference to  
                 foodservices.
- UNIT-V**     6. Accounting procedure and cost control:  
                 Total budget and its distribution.  
                 Record keeping and accounting.  
                 Selling price and total incomes.  
                 Profit, loss and balance sheet.

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**PRACTICAL - IV**  
**INSTITUTIONAL MANAGEMENT**

**Max. Marks 100**

Practical work at least in one institution related to the above topics. Field trips Management of a canteen in your institution.

**OPTIONAL PRACTICAL - IV**

**DISSERTATION ON CURRENT TRENDS IN FOOD AND NUTRITION**

**Max. Marks 100**

**Dissertation:** In any field of food science, nutrition and systematic writing of report along with statistical analysis of data Current trends in food and nutrition: Acquaintance of the students with current trends in the field of food and nutrition. Collection and compilation of latest reviews. (79)

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# Hemchand Yadav Vishwavidlaya, Durg (C.G)

## HUMAN DEVELOPMENT M.Sc. (HOME SCIENCE) PREVIOUS SYLLABUS 2019-20

### 1<sup>th</sup> SEMESTER

#### Marking Scheme:

#### PART I – THEORY

No.	Title	Marks			
		Theory	Test	Seminar	Total
Paper I	Research Methodology	80	10	10	100
Paper II	Theories of Human Development	80	10	10	100
Paper III	Early Childhood Education	80	10	10	100
Paper IV	Current trends and issues in Human Development	80	10	10	100

#### PART II – PRACTICAL

No.	Practical	Marks
Practical I	Early Childhood Education	100

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# PAPER - I

## RESEARCH METHODOLOGY

Max. Marks: 80

### Objectives:

To understand the significance of research methodology in Home Science research. To understand the types, tools and methods of research and develop the ability to construct data gathering instruments appropriate to the research design.

- UNIT-I**      1. Science, scientific methods, scientific approach.  
Role of research in Home science discipline.  
Objectives of research: Explanation, control and prediction.  
Types of research: Historical, Descriptive, Experimental, case study,  
**Social research and survey:** Meaning, definition, nature, scope, objects, types.  
distinction between social survey & research. Pre-testing and pilot survey.
- UNIT-II**      7. Definition and identification of research problem.  
Selection of research problem.  
Justification.  
Fact, Theory and concept.  
**Hypothesis :** Definition, sources, characteristics, importance, main difficulties in formation of hypothesis, disadvantages, Limitations and Delimitations of the problems.  
Types of variables.
- UNIT- III**   11. Basic principles of research design:  
**Purposes of research design:** fundamental, applied and action, exploratory, and descriptive, experimental, ex-post facto.  
Longitudinal and cross sectional, co-relational.  
Data gathering instrument. Observation, Questionnaire, Interview, Scaling method, Case study, Home visits,  
Reliability and validity of measuring instruments.
- UNIT-IV**   13. Theory of probability: Non-probability sampling: purposive, Quota and volunteer sampling/snow ball sampling  
**Sampling :** Population and sample, Meaning, Characteristics, advantages and disadvantages.  
**Types :** Probability sampling   Random sampling (Simple random, systematic random sampling,)   Purposive sampling   Stratified sampling   Other sampling methods (two stages and multistage sampling, cluster sampling.
- UNIT-V**    15. Classification and tabulation of data.  
Analysis and interpretation of data  
Preparation of report  
Diagrammatic presentation of data

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## References:

Edwards: experimental design in psychological research.

Kerlinger: Foundation of educational research.

Bhandarkar P.L. and Wilkinson T.S. (2000) methodology and techniques of social research, Himalaya publishing house, Mumbai. Bhatnagar G.L.(1990) research methods and measurements in behavioral and social science Agri Cole publishing agency, New Delhi.

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## PAPER - II

### THEORIES OF HUMAN DEVELOPMENT

Max. Marks: 80

#### Objectives :

To understand the need for theories in Human development.

To see theories in context.

To examine historical perspectives in the evolution of theory.

To understand the practical applications of theories.

To discuss various theories of Human development.

**UNIT-I** 1. Early theory –Aristotle Freud’s psychoanalytic theory -, Neo-Freudian-Horney, Sullivan, Eric-fromm ,crosscultural relevance.

**UNIT-II** 4. Learning theory - Pavlov, Watson, Skinner, Thorndike, cross cultural, relevance and current status of learning theory. 5. Social learning theory Bandura’s theory

**UNIT- III** 6. Theory of self - Roger’s. Field theory by Kurt Lewin. Jung’s Theory

**UNIT-IV** 9. Cognitive development theory,- Piaget’s theory Rousseau Theory Motivational theory by Murray and Maslow Erikson’s theory

**UNIT-V** 13. Personality theory by Allport and Murphy

Adler’s theory of individual psychology Jhon Locke

#### References:

1. Baker, C.(2000), Culturod Studies, London Sage.

Berry,J.W.Poolinga. Y.H. & pandey,J.(Eds.)(1981).Handbook of Cross Cultural Psychol-ogy: Theory Method. Boston: Ally and Bacon. Berry, J.W.Poorlinga, Y.H., Sogull, Mane Dasen P.R. (1992).Crosscultural application Cambridge: University Press. Berry, J.W., Dason, P.R. & Saraswathi, T.S.(Eds.)(1997).Handbook of Cross-cultural psychology : Processes and human development (2 edition) Boston: Ally and Bacon.

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## PAPER - III

### EARLY CHILDHOOD EDUCATION

Max. Marks: 80

#### OBJECTIVE :

To gain knowledge and insight regarding principles of early childhood care and education. To develop the skills and techniques to plan activities in ECCE centers of different types, to conduct activities in early childhood care and education and to work effectively with parents and community. To understand the relevance and scope of studying creativity. To discuss the concept of creativity and various approaches to its study. To understand the role of the individual, the context and socialization in developing creativity. To become familiar with psychometric measurement and alternate ways of assessing creativity. To understand the significance of parents role in early childhood programmes. To develop skills to involve parents in early childhood education programmes. To learn to conduct parents education programmes

- UNIT-I**      1. Principles of Early Childhood Care and Education (ECCE)  
Importance, need and scope of ECCE. Objectives of ECCE Types of preschools / programmes : play centres, day care, Montessori, Kindergarten. Balwadi., anganwadi etc. Concept of non-formal, formal and play way methods.
- UNIT-II**      2. Historical trends (Overview)  
Contribution of the following thinkers to the development of ECCE. Their principles, application and limitations in the context of ECCE. Pestalozzi, Rousseau, Frobel, Maria-Montessori, Jhon Dewey, Tarabai Modak, M.K. Gandhi, Rabindranath Tagore.
- UNIT- III**      3. Organisation of pre-school centres  
Concept of organisation and administration of early childhood centres. Administrative set-up and functions of personnel working at different levels. Building and equipment: Location and site, arrangement of rooms, different types and size of rooms, playground, storage facilities, selection of different types of outdoor and indoor equipments, maintenance and display of equipment and material. Staff personnel service conditions and role: Role and responsibilities, essential equalities of a care giver /teacher, other personnel. Record and report: Types, aims and purpose/need, general characteristics anecdotal, cumulative, sample work, medical etc.
- UNIT-IV**      7. Programme planning: Setting goals and objectives of plans, Long term, short term, weekly and daily planning routine and schedules. Activity for ECCE: Language arts : Goals of language, types of listening and activities to promote listening various activities (Songs, object talk, picture talk, free conversation, book, games, riddles, jokes, stories, criteria and selection of activities, teachers role). Art and craft activities - Creative activities of expression Types of activities - Chalk, crayon, paints, paper work and best out of waste. Role of teacher on planning the activity. Motivating children. Fostering appreciation of art and craft activities.

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**UNIT-V**     9. Music: Songs , objectives of music education, establishing goals, setting the stage and role of the teacher. Three aspects of music, making listening and singing. Mathematics - Goals of mathematical learning, developmental concept at different stages. Principles of teaching mathematics - First hand experience, interaction with others, using language, reflection. Mathematical concept like: Classification, conservation, serration, comparison, counting, fraction, one to one correspondence addition and subtraction.

## References:

Curran. J. et al (1977): Mass Communication and Society, London.

Banerjee (eds) (1985): Cultural and Communication, Paroit Publishers, Delhi.

Ruloof, M.E. and Miller, G.R. (ods)(1987):Interpersonal Process: New Direction in Communication Research, Sage, USA. Chatterjee, P.C.(1988): Broadcasting in India, New Delhi, Sage Publications

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## PAPER - IV

### CURRENT TRENDS AND ISSUES IN HUMAN DEVELOPMENT

Max. Marks: 80

- UNIT-I**      1. Trends and issues related to process of development  
Perceptual development  
Cognitive development  
Socio emotional development  
Language development    Moral development
- UNIT-II**      2. Trends and issues related to process of development  
Issues and concerns related to children in difficult circumstances.  
Street children, adopted children, girl child, single parent children.  
Refugee and migrant children, children with disability.  
Issues and concerns related to training of ECCE and accreditation process.
- UNIT- III**    3. Trends and issues related to life span development    Infancy    Early childhood    young adulthood    Adulthood    Old age
- UNIT-IV**    4. Definition of development and self  
Linking the individual and the group, self concept and self-esteem.  
Memories of childhood and their influence.  
Family history and its impact on individual
- UNIT-V**      5. The self in the life span.  
Significance of birth.  
Role of childhood experiences, changing roles and responsibilities.  
With age the sense of self at adolescence. ,Adolescent and their problems.  
Cultural variations, achieving selfhood and adulthood.  
Influence of family peers and school on the development of self esteem.

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# **PRACTICAL - I**

## **EARLY CHILDHOOD EDUCATION**

**Max. Marks: 100**

### **Marks Distribution:**

Sessional	-	20
Viva	-	20
Two practical	-	30 each

### **PART - I**

Visits to various centers, which cater to the preschool stage e.g.: Day care Centre, Balwadi, Anganwadi, Mobile Creche etc.

Preparing a resource unit file on the basis of play way method/approach.

Preparing teaching material kit and presentation in mock set up.

Story and their techniques, types of puppets and mobiles? Art and craft portfolio, song booklet and low cost musical instruments. Readiness games and material, picture tails and object talk related materials etc.

### **PART - II**

Tests of creativity: Torrance Test of Creative Thinking (TTCT), Baquer Mehdi's Indian adaptation. Use brainstorming techniques for problem solving.

Use of Parne's 5 stage method creative problem solving.

In 6-10 sessions, develop a plot of a story with active participation of children and dramatize it with them as role players.

Use of consensual assessment technique to rate the creative work of children and adults (stories, poems and artwork).

### **PART - III**

Conducting home visits and interviewing/ talking to parents. Arranging workshops for parents. Organizing parent education programmes based on parents needs. Conducting parent-teacher meetings. Reports and resource files to be maintained by students.

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# Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

## HUMAN DEVELOPMENT M.Sc. (HOME SCIENCE) PREVIOUS SYLLABUS 2019-20

### 2th SEMESTER Marking Scheme:

#### PART I – THEORY

No.	Title	Marks			
		Theory	Test	Seminar	Total
Paper V	Statistics and Computer Application	80	10	10	100
Paper VI	Adolescent Psychology	80	10	10	100
Paper VII	Parenting in Early Childhood	80	10	10	100
Paper VIII	Management and Project Planning	80	10	10	100

#### PART II – PRACTICAL

No.	Practical	Marks
Practical II	Management and Project Planning	100

#### PART III – INTERNSHIP / FIELD PLACEMENT

The student will be required to under go an internship/field placement for a total duration of six to eight weeks in their chosen area of interest after II<sup>nd</sup> semester which will facilitate their pursuing a professional career in same field.

This programme could be taken up either as a single block or in two different blocks. It is mandatory that the organization / institution (public/private) participating in the field. Placement programme will be of good professional standing. The list could include hospitals (children ward/maternity ward), child care centre Angan wadi ICDS, Psychotherapy counseling centers, nursery schools, etc. The student will be required to submit and present a report of the internship/field placement project after its completion. It is also envisaged that participating organization/institution will give their performance appraisal of the student work. Grade A (60% and above), Grade B (48% to 59%), Grade (40% to 47%) should be given to the student after evaluation of field placement/ internship report by the department. The grade will be mentioned in the mark sheet of the IV<sup>th</sup> semester of the student. Excursion trip/field visits should be arranged regularly by the department for the up liftment of the knowledge of the students. This programme is designed with the following objectives:

To enable the students to acquire an in-depth understanding of the practical aspects of knowledge and skills acquired during the course in the relevant subject/subjects.

To gain hands on experience for higher proficiency in their selected area of expertise

To help the students to develop and have their analytical abilities for situation and analysis and bringing about improvements

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## PAPER - V

### STATISTICS AND COMPUTER APPLICATION

Max. Marks: 80

#### UNIT-I Objectives:

To understand the significance of statistics and research methodology in Home Science research. To understand the types, tools and methods of research and develop the ability to construct data gathering instruments appropriate to the research design.

To understand and apply the appropriate statistical technique to the measurement scale and design.

To understand the role of statistics and computer application in research.

To apply statistical techniques to research data for analysis and interpreting data meaningfully

- UNIT-I** 1. Conceptual understanding of statistical measures – meaning, definition, scope, importance, characteristics, distrust of statistics.

Classification and tabulation of data.

#### **Measurement of central tendency**

Mean

Median

Mode

- UNIT-II** 4. Graphic presentation of data  
Frequency distribution  
Histogram  
Frequency polygons  
Frequency curve  
Ogive  
Binomial distribution  
Parametric and non-parametric tests

- UNIT- III** 5. Methods of Dispersion and variation  
Mean deviation  
Standard deviation  
Quartile deviation Independence of attributes  $2 \times 2$  and  $r \times c$  contingency tables  
Analysis of variance – one way method Direct and short cut.

What is computers characteristics components of computer system, block diagram of computer, CPU, I/O devices and memory (RAM and ROM) second storage devices (hard disk Floppy disk ,Magnetic tape etc.)

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**UNIT-IV** 7. Computer generations –Classification of computers; Analog digital hybrid general and special Types of computers- Micro Mini Mainframe and super computer  
Chi square test Goodness of fit  
Application of student 't' test for small samples

**UNIT-V** 9. Correlation-definition, meaning and types.  
10. Methods of determining coefficient of correlation  
Product moment correlation  
Rank correlation.

### **Working with MS Word**

Getting started with word, formatting text and paragraph.

Applying text and language tools, designing pages, with columns and tables, using graphics.

### **References:**

Garrett, Henry E. 1971: statistics in psychology and education, David and co.

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## PAPER - VI

### ADOLESCENT PSYCHOLOGY

Max. Marks: 80

- UNIT-I    1.    Understanding culture and development**  
Pubertal stage – concept and definition, classification, and characteristics.  
Importance of language  
Social development  
Personality development  
Cognition    Emotion
- UNIT-II    3.    The adolescent stage**  
Its link with middle childhood and youth.  
The concept of adolescence in India  
Developmental task  
Health and Psychological Hazards
- UNIT- III    4.    Physical and sexual development**  
Puberty, development of primary and secondary sex characteristics  
Psychological response to puberty  
Gender differences, sexuality, sexual needs and sex education.  
Roles and responsibilities
- UNIT-IV    5.    Important agent of influence**  
Family, community and culture  
Electronic media  
Social and emotional development  
Interests in adolescents
- UNIT-V    5.    Delinquency and disturbance**  
Juvenile delinquency: Causes and prevention  
Psychological disturbances  
Depression, suicide, substance abuse  
Causes of HIV/AIDS and prevention

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**PAPER - VII**  
**PARENTING IN EARLY CHILDHOOD**

Max. Marks: 80

- UNIT-I**      **1. Science — Activities for ECCE**  
Thinking, observing, inferring, classifying, communicating.  
Concept formation - Differentiation, grouping and labeling. Role of science.  
Developing scientific outlook by a spirit of inquiry, objectivity and observation.  
Role of teacher in some important sciences experiences.  
Social studies: - Goals of social studies. Field trips of fostering good self-concept and respect for others. Promoting social studies through celebrations of festivals. Role of teachers.
- UNIT-II**      **2. Definition and concept of creativity**  
The role of the individual  
Cognition, abilities, interests, attitude, motivation, intelligence, knowledge, skills, beliefs, values and cognitive styles.  
Relationship between creativity and intelligence.  
Influence of child bearing practices, family and culture.  
Enhancing creativity : Brain storming, problem solving, creative dramatics and visualisation    Methods of assessing creativity.
- UNIT- III**      **3. Introduction to**  
The task of parenting and the concept of parenting skills  
Changing concept of parenthood and childhood  
Being a competent parent
- 4. Individual parenting roles**  
Determinants of parenting behavior  
Characteristics of the parenting role.  
The mothering role  
The fathering role  
Concept of family, the family life cycle stages.
- UNIT-IV**      **6. Developmental interaction in early childhood years**  
Parents role in developing self-awareness in children  
Family relations and communication  
Helping the child to learn to express and control emotions  
Helping children discover personal capabilities  
Establishing routines and showing responsible behaviour.  
Learning social role and interactions with others  
Meeting the family needs during this stage  
Meeting the children's needs.

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**UNIT-V**

**7.**

Techniques of parent education in preschool setting

Informal meeting Occasional/accidental meeting, written/printed newsletters.

Circular, notices etc.

Parent library, toy library

Workshop and demonstration centre

Parents corner

Open house

Large/small group meeting

Individual meeting Home visits, individual sessions

Working with vulnerable families.

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**PAPER - VIII**  
**MANAGEMENT AND PROJECT PLANNING**

Max. Marks: 80

- UNIT-I      1. Management**  
Meaning ,importance ,Principles, and characteristics of management  
Management skills, review of success and failure of different programmes.
- UNIT-II      2. Programmes for children and family**  
Identification of specific programmes for children according to Indian and western educationists.  
Types of programmes and their management. Family counseling.
- UNIT- III    3. Maternal and child nutrition**  
Feeding, weaning, supplementary food, diet for preschool children.  
Nutritional problems of children  
Diet during pregnancy and lactation.  
Need and importance of women and child welfare programmes at government level.
- UNIT-IV    4. Planning**  
Basic concepts, need, purpose, feasibility, project, formulation.  
Functions of planning  
Steps in planning, define the objectives, quality, specification and  
Outcomes, decide the time frame plan, the cost, dimension, plan implementation details.
- UNIT-V      5. Project identification**  
Identification and defining the project goals.  
Project design and strategic planning  
Management of the project
- 6. Monitoring and evaluation** Supervisory meeting to plan overview  
Project appraisal, feedback, follow-up meeting    Project report

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## PRACTICAL - II

### MANAGEMENT AND PROJECT PLANNING

Max. Marks: 100

Prepare a project based on the information secured on an existing program in the locality (as a learning exercise on a known case). Prepare short term/long term plan's for enhancing quality of any program/project that exists

in the locality. Organise and implement some activities and evaluate impact. Prepare report.  
Draft action plan for sustainability for any program in the locality, for women and children.

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# Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

## HUMAN DEVELOPMENT M.Sc. (HOME SCIENCE) FINAL SYLLABUS 2019-20

### 3<sup>th</sup> SEMESTER Marking Scheme: PART I - THEORY

No.	Title	Marks			
		Theory	Test	Seminar	Total
Paper IX	Principles of Guidance and Counseling	80	10	10	100
Paper X	Advanced Study in Human Development	80	10	10	100
Paper XI	Childhood Psychopathology	80	10	10	100
Paper XII	Child and Human Rights	80	10	10	100

### PART II - PRACTICAL

No.	Practical	Marks
Practical I	Principles of Guidance and Counseling	100

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## PAPER - IX

### PRINCIPLES OF GUIDANCE AND COUNSELING

Max. Marks: 80

- UNIT-I**    1.    Constructs of guidance, counseling and therapy  
Guidance Meaning, scope and needs.  
Basic differences  
Guidance and counseling needs of individuals, families and system. –  
Role of culture in influencing counselling needs and practices.
- UNIT-II**    3.    Principals of counseling and therapy  
Approaches to counseling at different developmental stages.  
Family therapy approach  
Qualities and skills of a counselor.  
The process of counseling  
First contact, assessment, intervention, closure, follow-up.
- UNIT- III**    6.    Nature of psychological disorders at different stages that require counseling and therapy  
At childhood  
At adolescent and youth  
At adulthood  
In old age  
Types of Guidance  
Educational guidance  
Vocational guidance
- UNIT-IV**    8.    Basic concepts and facts about HIV/AIDS  
Transmission of HIV infection, sign and symptoms of AIDS.  
Diagnosis of HIV infection.  
Management and care of HIV infected persons. ·  
Prevention of HIV infection.
- UNIT-V**    10.    HIV/AIDS Counseling  
The principles of counseling, goals of HIV/AIDS counseling.  
The pre-requisites of counseling, stages of counseling, specific counseling skills.  
Assessment of risk behavior  
Characteristics and attitude of a counselor, the do's and don'ts in counseling.  
Content of communication about HIV/AIDS.

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**PAPER - X**  
**ADVANCED STUDY IN HUMAN DEVELOPMENT**

**Max. Marks 80**

- UNIT-I**      1. Principles and concept of development  
Principals and growth of development  
Developmental tasks  
Basic concepts of development: Maturation and learning, sensitive periods, individual differences.  
Prenatal Development  
Recapitulation of stages in prenatal development, genetic and environmental factors, maternal conditions.
- UNIT-II**      3. Infancy: (Birth - 2years)  
The new born Birth process and the neonate, physical description, sensory capacities and reflexes, becoming coordinated - feeding, sleeping and crying.  
Initiation, objects permanence and other cognitive accomplishments.  
Early language development  
Social relationship during infancy
- UNIT-III**      4. Early childhood (2 to 6 years)  
Transition from infancy to childhood  
Physical and motor development  
Play and social relationship  
Language, cognition and emotions in early years  
Early childhood education  
Middle childhood  
Physical and motor development Changes and challenges  
Personality development Social relationship - Peers and parents
- UNIT-IV**      6. Adolescence (11-18 years)  
Transition from childhood to sexual maturity, puberty and its consequences.  
Emotional changes  
Role of family, peers and community  
Conformity Youth / Young Adulthood (20-35 years)  
Developmental Needs - Importance of social organization.  
Life Cycle Approach - Sexuality, marriage, marital adjustment, parenthood.
- UNIT-V**      8. Middle Adulthood (35-50 years)  
Parenting adult off springs and their marriage  
Menopause in women. Health and disease.  
Work and career development, gender differences.  
Late Adulthood (50-65 years) Continuity and change in personality, the family life cycle.  
Gerard parenthood - Inter generational relations.  
Occupational continuity and change - Effect on identity  
Old Age (65+ years) Physical aspects of ageing Health and disease

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## PAPER - XI

### CHILDHOOD PSYCHOPATHOLOGY

Max. Marks: 80

- UNIT-I**      1. Normality – Meaning, Concept and criteria's of normality  
Cultural differences in normal adaptation  
Features of normal adaptation  
Normal adjustment changes with age  
Meaning and criteria's of abnormality.
- UNIT-II**      2. Stress and adaptation to stress  
Nature of stress  
Types of stress  
Sources of stress  
Effect of stress in psychological functioning  
Effect of stress on physical health    Responding to stress  
Measurement of stress  
Theories of stress  
Factors of moderating the impact of the stress  
Mental health- Definition, concept, and contents. Importance of mental hygiene.
- UNIT- III**      5. Introduction to psychopathology  
History and different models  
Etiology of mental disorders - Psycho-social models  
Psychopathology of neurotic, stress related and somato form disorders.  
Anxiety disorders    Dissociative disorders
- UNIT-IV**      6. Obsessive and compulsive disorder  
Phobic anxiety disorders  
Adjustment disorders and behavioral syndromes associated with psychophysi-ology disturbances.
- UNIT-V**      9. Psychopathology of psychotic disorders.  
Schizophrenia ,Paranoia.  
Mood disorders  
Psychopathology of personality and behavioral disorders  
Specific —personality disorders.  
Habit and impulse disorders  
Mental and behavioral disorders

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## PAPER - XII

### CHILD AND HUMAN RIGHTS

Max. Marks: 80

- UNIT-I**      1. Definition and Evolution of Rights  
Human rights  
Child rights  
Women's rights  
Policy
- UNIT-II**      2. Status of Indian children and their rights
3. Children in difficult circumstances - Children of prostitutes - Child labour -  
Street children - Refugee children
- UNIT-III**      4. Status of women and their rights - Status of women in India - Women and human  
rights
5. Types of violation of women rights - Violence against women in home, work place  
and society
- UNIT-IV**      6. Types of violation against women  
· Sexual harassment  
· Rape  
· Crime against women
7. Classification of human rights - Moral rights - Legal rights
- UNIT-V**      8. Human rights  
Civil and political rights  
Social rights  
Emotional rights  
Cultural rights  
Advocacy of human rights.

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# **PRACTICAL - III**

## **PRINCIPLES OF GUIDANCE AND COUNSELING**

Max. Marks: 100

Interaction with practicing counsellor's and therapists through visit to schools, clinics, women centres and hospitals etc. Learn about the counselling process - Role play, mock sessions etc.

Observation in various ECCE settings e.g. day care, pre-school, ECCE centres, Anganwadi etc.

Planning programmes for various ECCE setting.

Supervising, monitoring and evaluating ECCE programmes in different settings

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13.06.19



# Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

## HUMAN DEVELOPMENT M.Sc. (HOME SCIENCE) FINAL SYLLABUS 2019-20

### 4th SEMESTER

### Marking Scheme: PART I – THEORY

No.	Title	Marks			
		Theory	Test	Seminar	Total
Paper XIII	Methods of Studying Human Development	80	10	10	100
Paper XIV	Persons with Disabilities	80	10	10	100
Paper XV	Study of Family in Society	80	10	10	100
Paper XVI	Communication Technologies	80	10	10	100

### PART II – PRACTICAL

No.	Practical	Marks
Practical IV	Methods of Studying Human Development	100

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**PAPER - XIII**  
**METHODS OF STUDYING HUMAN DEVELOPMENT**

Max. Marks 80

- UNIT-I**      1. Different methods of studying human development.  
Introspection method  
Experimental method  
Longitudinal method  
Cross cultural method  
Survey method  
Field study method  
Issues and concerns related to children in difficult circumstances ·  
Street children, girl child, single parent children, adopted children.
- UNIT-II**      3. Observation Methods -  
Theoretical perspective, use of checklists, establishing reliability in observations, maintaining an observation record, report writing and evaluation.  
Cognitive development  
Language development  
Moral development
- UNIT- III**    7. Interview Methods –  
Theoretical perspectives  
Development of different types of interview, protocols, analysis and coding of interviewed data.
8. Trends and issues related to process of development ·  
Perceptual development
- UNIT-IV**    9. Questionnaire Method –  
Theoretical perspectives, development of different types of questionnaire, protocol, analysis and coding of questionnaire data.
10. Trend and issues related to life span development  
Infancy  
Childhood  
Adulthood  
Old age
- UNIT-V**    11. Case study method  
Theoretical perspectives, development of different types of case study, protocols, analysis and coding of data.  
Some Psychometric Methods – The Wechster Intelligence Scale  
Draw a man test  
The Kaufman Assessment Battery for children or K-ABC.  
Binet Test  
Relation between intelligence and creativity  
Self esteemed test.  
Aptitude test .  
Interest test.

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## PAPER - XIV

### PERSONS WITH DISABILITIES

Max. Marks 80

- UNIT-I**      1. Various approaches to defining and understanding disabilities-  
Physical  
Crippled or orthopaedically handicapped child  
Unhealthy handicapped children  
Education of physically handicapped
- UNIT-II**      2. Sensory handicapped -  
Visually handicapped  
Aurally handicapped  
Speech handicapped  
Emotional
- UNIT- III**    4. Intellectual Handicapped -  
Nature, causes and classification.  
Characteristics and identification  
Diagnosis of mental retardation  
Formal planning, treatment, educational provision  
Education of mentally retarded children
- UNIT-IV**    5. The role of context in the meaning of normality and disability, attitudes of people towards disability.  
Welfare and rehabilitation for handicapped.  
Guidance of the disabilities
- UNIT-V**      8. Physical and social bafflers in the development of persons with disabilities.  
Modification of physical and social environment. Participation of persons with disabilities as a contributing member of a society.  
Examples of programmes and policies for persons with disabilities.

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**PAPER - XV**  
**STUDY OF FAMILY IN SOCIETY**

Max. Marks: 80

- UNIT-I**     **1.** The family in social context  
Family as a component of social system, structure and context.  
Family as an evolving and dynamic institution  
Functions of family    Basic and universal functions of family  
Changes in family
- UNIT-II**     **4.** Socio-cultural studies of family patterns in India -  
Family structure: Traditional / Extended / Joint families  
Nuclear families: Single parent, childless  
Causes and effect of different family structure on changing role of families.
- UNIT- III**   **6.** Forms and types of family -    Modern family    Urban family    Rural family  
Role of family in the development of personality
- UNIT-IV**     **8.** Family and society exchanges / influences  
Work and family  
Education and family  
Health and family  
Religion and family  
Contemporary Issues and Concerns -  
Family violence, battered women, sexual abuse  
Dowry and family violence  
Child rearing and socialization
- UNIT-V**     **10.** Family Disorganization -  
Concept and features of family disorganization  
Causes of family disorganization  
Family tension - Types of family tension    Divorce - Types and causes of divorce  
Re-marriage.

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## PAPER - XVI

### COMMUNICATION TECHNOLOGIES

Max. Marks 80

- UNIT-I**    **1.** Meaning of communication  
              Concept of communication  
              Scope of communication  
              Communication process  
              Approaches to communication
- UNIT-II**    **6.** Elements of Communication: Their significance and characteristics  
              Introduction to new communication technologies  
              Development and use of transparencies  
              Use of video projector, slide and computers.
- UNIT-III**   **10.** Innovation  
              Factors influencing innovation  
  
              Diffusion of innovation and communication  
  
              Characteristics of innovation  
  
              Innovation adoption process
- UNIT-IV**   **15.** Mass media of communication : Development of mass communication  
  
              Different media, their characteristics and use -  
  
              A. Press B. Radio C. Television D. Films E. e-mail  
  
              Inter-dependence of mass media on communication  
  
              Mass media of communication and advertisement.
- UNIT-V**    **19.** Designing -  
              (a) Leaflets  
              (b) Pamphlets  
              (c) Newspaper  
              (d) Photograph  
              (e) Posters  
              (f) Flash card  
              (g) Slide and film strip  
              (h) Television  
              (i) Puppets
- 20.** Presentation using Power Point

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## PRACTICAL - IV

### METHODS OF STUDYING HUMAN DEVELOPMENT

(Any Six) Max. Marks: 100

Study of social developmental behaviour through observation method.

Know about the child through interview method.

Case study based on street children and their problems.

Case study regarding problems behaviour of the child.

To study the curriculum and management of pre-primary standard children in your area.

Development and use of transparencies.

Designing - Leaflets/Pamphlets/Cover pages/Posters

Self concept test.

Personality test.

Vocational interest test.

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# Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

TEXTILES AND CLOTHING  
M.Sc. (HOME SCIENCE) PREVIOUS  
SYLLABUS 2019-20

1st SEMESTER  
Marking Scheme:  
PART I – THEORY

No.	Title	Marks			
Paper I	Research Methodology	Theory	Test	Seminar	Total
Paper II	Textile Chemistry	80	10	10	100
Paper III	Fashion Retailing	80	10	10	100
Paper IV	Textile Designing	80	10	10	100

PART II – PRACTICAL

No.	Practical	Marks
Practical I	Textile Chemistry	100

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PAPER - I  
RESEARCH METHODOLOGY

Max. Marks: 80

**Objectives :**

To understand the significance of research methodology in Home Science research. To understand the types, tools and methods of research and develop the ability to construct data gathering instruments appropriate to the research design.

- UNIT-I**     1. Science, scientific methods, scientific approach.  
Role of research in Home science discipline.  
Objectives of research: Explanation, control and prediction.  
Types of research: Historical, Descriptive, Experimental, case study,  
Social research and survey: Meaning, definition, nature, scope, objects, types.  
distinction between social survey & research. Pre-testing and pilot survey.
- UNIT-II**     7. Definition and identification of research problem.  
Selection of research problem. Justification. Fact, Theory and concept. Hypothesis  
: Definition, sources, characteristics, importance, main difficulties in formation of  
hypothesis, disadvantages, Limitations and Delimitations of the problems. Types of  
variables.
- UNIT- III**   11. Basic principles of research design:  
Purposes of research design: fundamental, applied and action, exploratory, and  
descriptive, experimental, ex-post facto. Longitudinal and cross sectional, co-  
relational. Data gathering instrument.  
Observation,  
Questionnaire,  
Interview,  
Scaling method,  
Case study,  
Home visits,  
Reliability and validity of measuring instruments.
- UNIT-IV**   13. Theory of probability: Non-probability sampling: purposive, Quota and volunteer  
sampling/snow ball sampling  
Sampling : Population and sample, Meaning, Characteristics, advantages and  
disadvantages. Types : Probability sampling  
Random sampling (Simple random, systematic random sampling,)  
Purposive sampling Stratified sampling  
Other sampling methods (two stages and multistage sampling, cluster sampling.
- UNIT-V**     15. Classification and tabulation of data.  
Analysis and interpretation of data  
Preparation of report  
Diagrammatic presentation of data

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## References:

Edwards: experimental design in psychological research.

Kerlinger: Foundation of educational research.

Bhandarkar P.L. and Wilkinson T.S. (2000) methodology and techniques of social research, Himalaya publishing house, Mumbai. Bhatnagar G.L.(1990) research methods and measurements in behavioral and social science Agri Cole publishing agency, New Delhi.

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**PAPER - II**  
**TEXTILE CHEMISTRY**

Max. Marks: 80

**Objectives :**

To acquaint the student about the polymers of which the textile fibers are made. To understand the chemistry, production and fundamental properties of natural and synthetic fibers. To familiarize with the chemical processing from desizing to finishing of textiles and x-principals. To acquaint the students with some advance textile technology. To develop an understanding of the methods and techniques used to analyze textile fiber, yarns, and fabric for end-use performance. To acquire knowledge and understanding of various structural properties of textiles and relate them to end fabric performance and product.

**UNIT-I      1. Introduction:**

Why study of textile chemistry is needed.

Why this subject is related to textile and clothing.

Polymer chemistry: Polymers, Methods of polymerization, polymerization process.

Definition of co-polymer, oligomer, graft-co-polymer.

Degree of polymerization, Molecular weight of polymers and its determination.

Characterization of polymers using chemical and instrumental method.

**UNIT-II      3. Orientation and crystallinity of polymers, their influence on fiber properties.**

Chemistry of cellulosic fibers:

Introduction to cotton, varieties, properties, longitudinal and cross-sectional view.

Molecular structure of cellulose, action of acids and alkalis, hydrocellulose and oxycellulose, mercerization, liquid ammonia treatment. Regenerated cellulosic

fibers: viscose rayon, cuprammonium rayon cellulose acetate rayon polynosic-their manufacture, properties and uses.

**UNIT- III      6. Protein fibers-Wool and silk**

Chemical composition, molecular structure, physical and chemical properties, action of acids, alkalis and other chemicals on protein fibers. Brief description on felting of wool, degumming and weighting silk, shrink proofing of wool.

**UNIT-IV      7. Synthetic Fibers-polyester, polyamide and acrylo nitrite fibers.**

Chemistry of the fibers- raw material, manufacturing process from polymer to fiber stage. Physical and chemical properties of all the fibers and their uses Examples of commercial production in India.

**UNIT-V      10. Blends of different fibers composition and properties and uses in textiles and clothing. Other natural synthetic fibers-Their chemical composition, properties and uses jute, flex, hemp, tencel, polyethylene, polypropylene, carbon, polycarbonate, metallic, glass fiber and polyurethane fibers**

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## References:

Booth, J.E: Principles of textile testing- newness, butter, worth, London.

Billie. J Coller and Helen H. Epps- Textile testing and analysis- Prentice hall, New Jersey.

John H. Skinkle- Textile testing- Booking, New York.

Grover and Hamby- Hand book of textile testing and quality control Wiles.

ASTM standards.

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## PAPER - III

### FASHION RETAILING

Max. Marks: 80

#### Objectives :

Focus on design details creation of styles and rendering techniques using the different media. Pencils, Pens, Markers, Charcoal, Brushes, colours, Papers. To understand the dynamics of fashion and role of fashion designers. To develop understanding visual merchandising and its importance in today's consumer market. To gain knowledge about the management aspects of retailing.

#### UNIT-I      1. The Dynamics of Fashion.

Fashion Terminology, Fashion cycle, Fashion Adoption theories, fashion forecast, the role of designers in merchandising. 2. Famous national and international fashion designers.

#### UNIT-II      3. The concept of Retailing:

Definitions, role of retailing in merchandising, the retail mix, retail environment, types of retail store  
Planning and budgeting for a retail store.

#### UNIT- III    4. Elements and principles for Art and design:

Elements of design: Colour, texture, line, form space. Principles of design: Rhythm, Balance, Proportion, Emphasis, Unity. Interpretation for designing a retail store.

#### UNIT-IV    5. Sketching of different action croaky (based on the basic figures learnt earlier).

Maintenance and ordering of stocks, preparation of sales reports

#### UNIT-V      7. Visual Merchandising.

Plans and schedule –seasons, holiday promotions, sales, themes / ideas. Types and displays –Window displays interior displays. Elements of Display- the merchandise the backdrop walls and shelves mannequins and forms, signage lightings- illuminance levels relation to colour.

#### References:

Abling Oina, Fashion Sketchbook, Fairchild Publishers, New York.

Mckolvey Kathryn, Illustring Fashion Blackwell Science Munslow Janine.

Seaman Julian, Professional Fashion Illustration, B.T. Batsford Ltd London.

Ireland, Patrick John, Fashion Illustration, B.T. Batsford Ltd London. Allen Anne Seaman Julian Fashion Drawing The Basic principles, B.T. Batsford Ltd. London.

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# PAPER - IV

## TEXTILE DESIGNING

Max. Marks: 80

### Objectives :

To develop awareness and appreciation of art and aesthetics in textiles. To impart creative and technical skills for designing textiles with special emphasis on structural design. The course aims at providing in depth working –knowledge of line development and enables a student to use and practice skills and knowledge already acquired and use it to market situation.

- UNIT-I**      1. Elements used in creating a design.  
Composition With one element.  
With more than one element.  
Colour – Its sensitivity and composition in dress.  
Harmony – in form of space coverage to design of the dress.
- UNIT-II**      2. Design analysis:  
Structural and applied design variation in fiber, yarn and fabric construction, embroidery, dyeing printing and finishes. Sources of inspiration for basic sketching and painting: nature, religion and mythology arts and crafts architecture. Understanding the tools and equipment and their appropriate use for sketching, painting and achieving textural effects. Process of designing
- UNIT- III**    6. Components of fashion:  
Silhouette Colour Texture Trims  
Details Fabric Seams
- UNIT-IV**    7. Motif development –geometrical, simplified, naturalized, stylized abstract namental.  
Big and small motifs –enlargement and reduction, growth of a motif.  
Colour consideration –colour harmonies and colour ways. Creation of patterns and designs Combining motifs  
(a) big and small and  
(b) different sources. Placement and repeats for all over patterns.
- UNIT-V**      9. Preparation of fabric for dyeing and printing.  
Scouring, bleaching, designing. Reagents used and their application. Specific preparatory steps for cotton, wool, silk and man made fibers. Equipment used at cottage and industrial level for yarn, fabric and price goods.

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**PRACTICAL - I**  
**TEXTILE CHEMISTRY**

Max. Marks: 100

Identification of fibers – cotton, polyester, viscose, polyimide, silk, wool jute, etc use of test microscopic examination, chemical tests solubility and staining tests. Dyeing of cotton (yarn) with direct, reactive and Val dyes (one each) by exhaust method dyeing of wool and silk with an acid dye. Use of natural dyes and mordant.

Study chemical properties of fiber as related to textile finishing Chlorination of wool. Mercerization in cotton. Felting of wool. Weighing of silk. Degumming of silk.

Determination of hardness of water.

Physical Testing of Textile using appropriate standardized procedures. Fibers-Length, diameter, fineness. Yarn –Count, heaviness twist, crimp, strength. Bursting, Water vapour permeability, cover, stiffness, drapability, crease recovery pilling abrasion. Chemical testing Identification of fibers. Binary fabrics –Blend composition. Shrinkage water, oil repellency. Dyes Identification of dye class. Colour Fastness.

Mechanical Testing Seam strength. Identification of fabric weave, Thread count

Inspection of final Garment.

Mill visit to acquaint students with modern chemical processing

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# Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

TEXTILES AND CLOTHING  
M.Sc. (HOME SCIENCE) PREVIOUS - FINAL  
SYLLABUS 2019-20

2<sup>nd</sup> SEMESTER

Marking Scheme:

PART I - THEORY

No.	Title	Marks			
Paper V	Statistics and Computer Application	Theory	Test	Seminar	Total
Paper VI	Quality Control in Textiles	80	10	10	100
Paper VII	Fashion Illustration	80	10	10	100
Paper VIII	Dyeing and Printing	80	10	10	100

PART II - PRACTICAL

No.	Practical	Marks
Practical I	Textile Designing	100

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## PART - III

### INTERNSHIP / FIELD PLACEMENT

The student will be required to under go an internship/field placement for a total duration of six to eight weeks in their chosen area of interest after IInd semester which will facilitate their pursuing a professional career in same field. This programme could be taken up either as a single block or in two different blocks. It is mandatory that the organization / institution (public/private) participating in the field.

Placement programme will be of good professional standing. the list could include government/non-government textile industries small scale industries (handloom), garment manufacturing units, fashion designing institutes, embroidery units etc. The student will be required to submit and present a report of the internship/field placement project after its completion. It is also envisaged that participating organization/institution will give their performance appraisal of the student work. Grade A (60% and above), Grade B (48% to 59%), Grade C (40% to 47%) should be given to the student after evaluation of field placement/internship report by the department. The grade will be mentioned in the mark sheet of the IV<sup>th</sup> semester of the student. Excursion trip/field visits should be arranged regularly by the department for the up liftment of the knowledge of the students. This programme is designed with the following objectives: I. To enable the students to acquire an in-depth understanding of the practical aspects of knowledge and skills acquired during the course in the relevant subject/subjects.

- I. To gain hands on experience for higher proficiency in their selected area of expertise  
To help the students to develop and have their analytical abilities for situation and analysis and bringing about improvements

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## PAPER - V

### STATISTICS AND COMPUTER APPLICATION

Max. Marks: 80

#### Objectives :

To understand the significance of statistics and research methodology in Home Science research.  
To understand the types, tools and methods of research and develop the ability to construct data gathering instruments appropriate to the research design.

To understand and apply the appropriate statistical technique to the measurement scale and design. To understand the role of statistics and computer application in research.

To apply statistical techniques to research data for analysis and interpreting data meaningfully

- UNIT-I**      1. Conceptual understanding of statistical measures – meaning, definition, scope, importance, characteristics, distrust of statistics.  
Classification and tabulation of data.  
Measurement of central tendency  
Mean  
Median  
Mode
- UNIT-II**      4. Graphic presentation of data  
Frequency distribution Histogram Frequency polygons Frequency curve Ogive  
Binomial distribution Parametric and non-parametric tests
- UNIT- III**    5. Methods of Dispersion and variation  
Mean deviation Standard deviation Quartile deviation Independence of attributes  
2×2 and r×c contingency tables Analysis of variance – one way method Direct and short cut. What is computers characteristics components of computer system, block diagram of computer, CPU, I/O devices and memory ( RAM and ROM) second storage devices (hard disk Floppy disk ,Magnetic tape etc.)
- UNIT-IV**    7. Computer generations –Classification of computers; Analog digital hybrid general and special Types of computers- Micro Mini Mainframe and super computer Chi square test Goodness of it Application of student 't' test for small samples
- UNIT-V**      9. Correlation-definition, meaning and types.
10. Methods of determining coefficient of correlation  
Product moment correlation Rank correlation.
11. Working with MS Word Getting started with word, formatting text and paragraph. Applying text and language tools, designing pages, with columns and tables, using graphics.

#### References:

Garrett, Henry E. 1971: statistics in psychology and education, David and co.

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**PAPER - VI**  
**QUALITY CONTROL IN TEXTILE**

Max. Marks: 80

**Objectives:**

1. To familiarize with the chemical processing from designing to finishing of textiles and x-principals. To acquaint the students with some advance textile technology. To develop an understanding of the methods and techniques used to analyze textile fiber, yarns, and fabric for end-use performance. To acquire knowledge and understanding of various structural properties of textiles and relate them to end fabric performance and product. To familiarize students with the different testing equipments, their underline principles and the international accepted standards, test methods and the language of measurement. To be able to analyze and interpret the result and predict the general textile testing.

**UNIT-I**    **1.** Scientific basis of dyeing and printing of textiles-  
Classification of textiles dyes, commercial dyes, C.I. constitution number and C.I generic number. Theory of dyeing. Chemical structures of various classes of dyes. Application of dyes on various substrates including blends.

**UNIT-II**    **2.** Textile finishing.  
Classification of finishes.  
Mechanical finishes.  
Chemical finishes-Mercerization, parchmentsation, durable press, wash 'n' wear, wrinkle recovery, chlorination. Resins, their application and chemistry. Special purpose finishes Flame retardant, water repellent, antistatic, stain and soil release, proofing.

**UNIT-III**    **3.** Introduction to Testing.  
Concept and scope.  
Application areas.  
Use of statistics in data management.  
Sampling procedures.  
Standardization.  
Standards for fabric performance.  
Organization for standardization (National and International)  
Quality control of Textile products.

**UNIT-IV**    **5.** Properties of textiles at different stages of processing and their principle of measurement.  
Quality standards as applicable to various types of textiles (Garments, Yard- age, knits, woven, carpets, processing, dyeing). Fibers-Length, fineness, evenness. Yarn -strength, evenness, openness, load, elongation, crimp.

**UNIT-V**    **6.** Fabrics -strength, elongation, shrinkage, thickness, cover, air permeability crease recovery, weight, comfort, stiffness, flammability, repellency, colour, fastness. Garment Finishing -colour fastness, shrinkage. Concept of fabric faults as related to stages of manufacture and the remedies.

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## References:

Booth.J.E: Principles of textile testing- newness, butter, worth, London.

Billie. J Coller and Helen H. Epps- Textile testing and analysis- Prentice hall, New Jersey.

John H. Skinkle- Textile testing- Booking, New York.

Grover and Hamby- Hand book of textile testing and quality control Wiles.

ASTM standards.

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# PAPER - VII

## FASHION ILLUSTRATION

Max. Marks: 80

### Objectives:

Focus on design details creation of styles and rendering techniques using the different media. Pencils, Pens, Markers, Charcoal, Brushes, colours, Papers. To understand the dynamics of fashion and role of fashion designers. To develop understanding visual merchandising and its importance in today's consumer market. To gain knowledge about the management aspects of retailing

- UNIT-I**      1. Garments and garment details:  
Necklines and collars   Frills, fringes and gathers, cowls and cascades.   Sleeve details  
Hemlines and insertions.   Skirts and pants
- UNIT-II**      2. Lacing, macramé's and patch work  
Blouses, coats and jackets   Pleats, quilting and ties   Drawstring and fastenings  
Shirring, smoking and zips   Tassels and tucks   Yokes and underskirts.
- UNIT- III**    3. Sketching of Accessories  
Hats and head gears   Footwear   Bags and purses   Jewellery
- UNIT-IV**    4. Basic Rendering Techniques:-  
• Colour matching using different mediums  
• Stripes  
• Checks, gingham and plaids  
• Patterns and textures  
• Reducing a print  
• Shading
- UNIT-V**      5. Theme, Rendering : developing a line of garments based on a theme (any one of the following)  
Beachwear   Cocktail wear   Swimwear   Evening wear   Casual wear   Ramp wear  
Sportswear   Executive wear   Nightwear – Traditional Indian costume

### References:

Abling Oina, Fashion Sketchbook, Fairchild Publishers, New York.

Mckolvey Kathryn, Illustring Fashion Blackwell Science Munslow Janine.

Seaman Julian, Professional Fashion Illustration, B.T. Batsford Ltd London.

Ireland, Patrick John, Fashion Illustration, B.T. Batsford Ltd London.

Allen Anne Seaman Julian Fashion Drawing The Basic principles, B.T. Batsford Ltd. London

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## PAPER - VIII DYEING AND PRINTING

Max. Marks: 80

### Objectives:

To impart the knowledge about preparation of fabric for dyeing and printing.  
To understand the theory of dyeing in relation to various classes of dyes.  
Application of various dyes and properties related to it.  
To introduce the concept of dyeing at commercial level.  
To inculcate awareness of the different methods of printing and appreciate the technical advantages of each. To develop technical competency in printing with different dyes on different fabrics.

- UNIT-I**    1. Dyes Classification, definition, components. Colour and chemical constitution of dyes. Dyeing with chemical dyes. Direct, reactive, vat, sulphur, azo (for cellulosic). Acid, metal complex, chrome mordent (for protein) Basic, nylomine, disperse (for man-made)
- UNIT-I**    2. Dyeing with: natural dyes.  
Use of pigments. Dyeing machines for fibers, yarns and fabrics. Industrial dyeing practices. Dyeing auxiliaries and their uses. Dyeing of blends.
- UNIT-I**    3. Textiles design through dyeing.  
Tie and dye. Union and cross dyeing. Batik Dyeing defects and remedies.
- UNIT-IV**    5. Introduction to printing – difference between dyeing and printing.  
Methods of printing Historical development of printing –block stencil, screen roller and rotary.
8. Screens used at cottage and industrial level.
- UNIT-V**    9. Printing pastes  
Thickening agents and auxiliaries for printing and their suitability to various classes of dyes and fibres. Preparation of printing pastes for different dyes and different fibres. Styles of printing Direct style, resist or reserve style, discharge style and raise style. Style and methods of printing traditionally used in India

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## PRACTICAL - II

### TEXTILE DESIGNING

Max. marks: 100

#### Marks Distribution:

Sessional	-	20
Viva	-	20
Two practical	-	30 each

Preparation of fabric for dyeing and printing.

Dyeing of yarns and fabric with different classes of dyes, in fibre and fibre blends (variables- MLR, con, temp, Leveling/exhausting agents) Direct, reactive, vat, sulphur, azo. Basic, disperse. Acid, chrome, metal complex. Natural dyes. Preparation of fabric for printing – different fibre groups with different dyes, different styles of printing Preparation of screens for printing. Printing with blocks and screens on cotton, silk, wool and blends in different dye classes. Direct style

Mordant or dyed style, Azok style

Discharge style

Resist style.

8. Repot of visits to processing and printing units (cottage and industrial level).

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*13.06.19*

# Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

TEXTILES AND CLOTHING  
M.Sc. (HOME SCIENCE) FINAL  
SYLLABUS 2019-20

3<sup>rd</sup> SEMESTER  
Marking Scheme:  
PART I – THEORY

No.	Title	Marks			
Paper IX	Fabric Construction	Theory	Test	Seminar	Total
Paper X	Apparel Design	80	10	10	100
Paper XI	Historic Textiles	80	10	10	100
Paper XII	Textile Industry	80	10	10	100

PART II – PRACTICAL

No.	Practical	Marks
Practical III	Fabric Construction & Pattern	100

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13.6.19

## PAPER - IX

### FABRIC CONSTRUCTION

Max. Marks: 80

#### Objectives:

To enable the students to understand and learn methods of developing fabrics, using different fibres, yarn and fabric making techniques. To gain knowledge and understanding of fundamentals of weaving machinery and processes. To analyze different weave patterns and learn principles of creating design through weaving. To enable the student to obtain perfect fit and harmony between the fabric and design of the garments.

- UNIT-I**      1. Modern developments in yarns at their manufacture.  
Modern yarn production – Principles of spinning in production of man made fibre  
hot and cold drawing, spun yarn, blend yarn and bicomponent yarn.
- UNIT-II**      3. Texturing yarn technology – Principles method and process of variables in texturing  
and their effect on properties of textured yarns morphological changes induced by  
texture core yarns, network and film yarns and laminated yarns.
- UNIT- III**    4. Principles of fabric manufacture – Basic Principles, Characteristic and significance of  
different processes –woven knitted, non woven, laces, and braids. Weaving. Parts  
and functions of handlooms Types of weave –basic decorative.
- UNIT-IV**    5. Knitting.  
Knitting machines, types of knitting. Properties.
6. Felts and non wovens-different non woven Knotting, braiding and lace making.
- UNIT-V**      7. Introduction to technical textiles –  
Geo textiles Medical textiles-Nano technology in india Fabric faults- Fibre, yarn  
and fabric defects. and their remedies.

#### References:

Spun yarn technology- Eric oxtoby butterwall publication.

Subodh Kumar Agrawal (1980) Textile Processing and Auxillaries.

Aswani K.T. weaving mechanisms- Mahajan Book Distributors, Ahemadabad.

Amalsar D.M yarn and cloth calculation.

Amalsar handloom Weaving.

Hillhouse, M.S and Mansfield E.A dress Design, Draping and flat Patterned, London.

Helen Theory of Fashion.

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**PAPER - X**  
**APPAREL DESIGN**

Max. Marks: 80

**Objectives:**

To impart an in-depth knowledge of style readings, pattern making and garment construction techniques. To develop and understand the principles of pattern making through flat pattern and draping. To create awareness of quality assurance norms and evaluating of quality in apparel.

- UNIT-I**      1. Detailed study of industrial machines and equipment used for-  
Cutting the fabric -Objectives ,methods of cutting fabric and cutting system  
Sewing.-Properties, types, sewing machines    Sewing threads-Type of fiber, thread size, thread package, thread costs, thread properties.    Sewing problems- Stitch formation, damage along with seam line, puckering.    Finishing
- UNIT-II**      2. Embellishment  
Study the interrelationship of needles, thread.    Stitch length, and fabric    Stitch Types
- UNIT- III**    6. Methods of pattern making.  
Drafting. Flat pattern. Draping. Coping paper pattern.
- UNIT-IV**    7. Understanding the commercial paper patter  
Layouts on different fabrics, widths and types    Buying criteria for-  
• Knits, silks, denim and other special fabrics
- UNIT-V**    10. Readymade garments.  
Fitting- factors affecting good fit, common problems encountered and remedies for fitting, defects (upper and lower garments).    Fitting problems and pattern correction

**References:**

Avis M. Dry (1961) The psychology of Jung, Methuen and Co. London.

Natalle Bray Dress Fitting published by Blackwell Science Ltd.

Armstrong, Pattern making for fashion design.

Grate and storm- Concepts of clothing, McGraw Hill Book co., New York.

Bina Abling; fashion Sketch Book, Fairchild Publications, New York.

Slampller, Sharp and donnell: Evaluating.

*R2 13.6.19*    *13.6.19*    *Rough 12/11/19*    *13.06.19*

**PAPER - XI**  
**HISTORIC TEXTILES**

Max. Marks: 80

**Objectives :**

To gain knowledge of the significance developments in production of textiles in the world. To assess similarities and dissimilarities in different civilization in terms of fibre production, ornamentation and usage. To develop sensitivity and understanding towards historic silhouettes and designs. To learn about the designers of international fame and their contribution to the fashion of today.

**UNIT-I**      1. Introduction to textiles: Indian textile development, study of traditional textiles and embroideries of India.

- a. Chicken of U.P.
- b. Kantha of Bengal.
- c. Phulkari of Punjab.
- d. Kathi of Gujarat.
- e. Manipuri of Manipur.
- f. Chamba rumal of H.P.
- g. Kasmiri of Kashmir.
- h. Kasuti of Karnataka.

**UNIT-II**      2. Dance costumes of India:

- a. Bharatnatyam.
- b. Kathak.
- c. Odissi.
- d. Kuchipudi.
- e. Kathakali.
- f. Manipuri.

**UNIT- III**      5. Folk dance costumes of India:

- a. Rajasthan.
- b. Maharashtra.
- c. Gujarat.
- d. Chhattisgarh.
- Madhya Pradesh.

**UNIT-IV**      3. Development of different fibers:

Cotton, silk, wool, linen in India in terms of processing, tools and equipments used, design and ornamentation applied and specialties achievement Development of dyeing and printing since ancient times: dyes, methods of dyeing, decorative dyeing. Methods of styles of printing- tools developed and effects achieved.

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**UNIT-V     6. Historical textiles of special significance:**

- a. Carpets.
- b. Tapestries.
- c. Brocades.
- d. Laces. Shawls.

**References:**

John and sentence Bryan (1999), World Textiles, Thames and Hudson, London.

Harvey Janet (1996): Traditional Textiles of central Asia, Thames and Hudson, London.

Boucher Francois, A history of Costumes in the West Thames and Hudson.

Paine Sheila (1990): Embroidered Textiles Traditions, Thames and Hudson, London.

Revolution in Fashion: The Kyoto costume institute, Abbeville Presi, New

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## PAPER - XII

### TEXTILE INDUSTRY

Max. Marks: 80

- UNIT-I**      1. Business Environment of India  
Merits and Demerits of textile industry in India    Textile Industry-concept, history, Manufacturing unit and importance of knitting ,garment, and testing industry    Co-operation ,co-operative societies    Building customer satisfaction, value and retention.
- UNIT-II**      6. Importance of textile and Clothing industry in the Indian Economy in terms of domestic consumption, employment and per capita income, gross national product and International trade  
7. Foreign Trade policy-The mechanism MFA,-History and current status, WTO,
- UNIT- III**    8. National Textile policy 1986-2001 change in focus over the year in terms of objective function ability regularity mechanism of futuristic trends.  
The Textile and Clothing industry in relation to production and consumption pattern. Local employment potential, R and D problem and prospects, cotton, wool, silk, rayon and synthetic industry, hand loom industry, readymade garment industry and technical textiles.
- UNIT-IV**    10. Marketing and Merchandising core concepts, marketing mix and marketing environment of. India  
12. Demographic economic ,natural .technological ,political, legal ,social, and cultural environment
- UNIT-V**    13. Analyzing business markets and business buying behavior.  
Corporate and division strategic planning.    SWOT analysis

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**PRACTICAL - III**  
**FABRIC CONSTRUCTION AND PATTERN MAKING**

Max. Marks: 100

Marks Distribution:

Sessionals	-	20
Viva	-	20
Two Practical	-	30 each

Dart manipulation. Development of various in sleeves. Sleeves and bodice combination. Development of variation in collars. Roll over collar. Collar with bodice (shawl). Necklines and facings. Scooped necklines. Built up necklines. Cowl necklines. Weaving on simple loom, plain, rib, matt, and twill structures. Visit to weaving mills. Fashion sketches.

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*12/6/19* *A. B. G. 13.06.19*

# Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

TEXTILES AND CLOTHING  
M.Sc. (HOME SCIENCE) FINAL  
SYLLABUS 2019-20

4th SEMESTER  
Marking Scheme:  
PART I – THEORY

No.	Title	Marks			
		Theory	Test	Seminar	Total
Paper XIII	Knitting technology and Draping				
Paper XIV	Apparel And Its Social, Psychological Aspects	80	10	10	100
Paper XV	Historic Costumes	80	10	10	100
Paper XVI	Fashion Merchandising	80	10	10	100

## PART II – PRACTICAL

No.	Practical	Marks
Practical IV	Apparel Designing its Construction and Historic Textiles	100

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## PAPER - XIII

### KNITTING TECHNOLOGY AND DRAPING

Max. Marks: 80

#### Objectives :

To enable the students to understand and learn methods of developing fabrics, using different fibers, yarn and fabric making techniques. To gain knowledge and understanding of fundamentals of weaving machinery and processes. To analyze different weave patterns and learn principles of creating design through weaving. To enable the student to obtain perfect fit and harmony between the fabric and design of the garments.

- UNIT-I**     1. Woven: sequence of operations in warp and weft preparation.  
Various types of looms and their drive. Fabric classification and analysis of fabrics for its construction weaves. Basic and decorative weaves plain, twill and satin derivatives. Dobby and jacquard shedding and weaving terry pile
- UNIT-II**     4. Principle of colour and design in weaving construction of pattern for Dobby and Jacquard looms, brocade, damask, tapestry, wrap and weft pile weaving.  
New developments in woven fabrics new loom and loom developments. Triaxial weaving, knit and weave construction. Textile design through weaving.
- UNIT- III**     7. Introduction to draping and silhouette of the individual – Dress Form, Elements of fabric –Woven knitted. Developments of the ladies block crotch line garments by drafting and draping (short, Bermudas, Trousers etc)
- UNIT-IV**     9. Development of pattern with variation in  
One piece dresses.  
Two piece dresses  
Dart less dresses, Dart manipulation. (Incorporating various collars, sleeves, yokes, necklines, pockets and plackets etc.)
- UNIT-V**     10. Draping of bodice block and shirt block and their variation.  
Draping of symmetrical designs and preparing patterns. Pattern markings, pattern envelopes and guide sheet.

#### References:

Spun yarn technology- Eric oxtoby butterwall publication.  
Subodh Kumar Agrawal (1980) Textile Processing and Auxillaries.  
Aswani K.T. weaving mechanisms- Mahajan Book Distributors, Ahemadabad.  
Amalsar D.M yarn and cloth calculation.  
Amalsar handloom Weaving.  
Hillhouse, M.S and Mansfield E.A dress Design, Draping and flat Patterned, London.  
Helen Theory of Fashion.

*R2 13.6.19*     *Sub* 13.6.19     *Rough* 12/11/19     *Aswani* 13.06.19

**PAPER - IX**  
**APPAREL AND ITS SOCIAL, PSYCHOLOGICAL ASPECTS**

Max. Marks: 80

**Objectives :**

To impart an in-depth knowledge of style readings, pattern making and garment construction techniques. To develop and understand the principles of pattern making through flat pattern and draping. To create awareness of quality assurance norms and evaluating of quality in apparel

- UNIT-I**      1. Caps and Hoods  
Dresses without waistline seems   Built up necklines, Halters, Facings
- UNIT-II**      4. Clothing for people with special needs.  
Maternity and lactation period.  
Old age.  
Physically challenged.
- UNIT-III**      5. Evaluating the quality of apparel  
Identification of the components of apparel.  
Fibre content, shaping devices, underline fabrics, pockets, necklines, hem treatments, decorative details and alteration potential. Standards for evaluating the various components.
- UNIT-IV**      7. Origin of clothing.  
Why costumes differ all over the world, material aspects and climate.  
Religious influence.  
Events of the world.  
Clothing symbols.
8. Socialization and development of the self.  
Social norms.  
Individuality and conformity
- UNIT-V**      9. The study of dress and adornment  
Personality and Types of Personality.  
Determinants of Personality  
Personality theories- Definition, theories, personality traits.  
Sigmund Freud defense mechanisms. Jung Murray

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## References:

Avis M. Dry (1961) The psychology of Jung, Methuen and Co. London.  
Natalie Bray Dress Fitting published by Blackwell Science Ltd.

Armstrong, Pattern making for fashion design.

Grate and storm- Concepts of clothing, McGraw Hill Book co., New York.

Bina Abbing; fashion Sketch Book, Fairchild Publications, New York

Slamper, Sharp and donnell: Evaluating

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## PAPER - XV

### HISTORIC COSTUMES

Max. Marks: 80

#### Objectives :

To gain knowledge of the significance developments in production of textiles in the world. To assess similarities and dissimilarities in different civilization in terms of fibre production, ornamentation and usage. To develop sensitivity and understanding towards historic silhouettes and designs. To learn about the designers of international fame and their contribution to the fashion of today.

- UNIT-I**      1. Clothing- Origin and functions of clothing  
Resist dyeing and ikat fabrics.  
Printed and painted fabrics.  
Banarasi saree  
Sarees of M.P.  
Costume in ancient civilization emphasize on fabric, garment features, use of colour decoration and accessories.
- Indian
  - Egyptian.
  - Greek.
  - Roman.
- UNIT-II**      7. History of Indian state costumes for Male and Female a. Kashmir b. Maharashtra c. Gujrat d. Rajasthan e. West Bengal f. Tamilnadu
- UNIT- III**    8. Costumes for men and women during 10th to 17th costumes) century (Medieval a. India b. French c. European. d. English. Costumes and China and Japan.
- UNIT-IV**    9. Costumes Of 18th century to 20th century
- Indian
  - French.
  - Italian.
  - England.
  - American.
  - Japanese.
  - Australia
- UNIT-V**    10. Growth of costume:  
11. Fashion- Terminology, fashion concepts, its creation and analysis
- Mass Production of clothing.
  - Fashion Designers and his role.
  - Fashion Forecasting.
  - Design Development.

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## References :

John and sentence Bryan (1999), World Textiles, Thames and Hudson, London.

Harvey Janet (1996): Traditional Textiles of central Asia, Thames and Hudson, London.

Boucher Francois, A history of Costumes in the West Thames and Hudson.

Paine Sheila (1990): Embroidered Textiles Traditions, Thames and Hudson, London.

Revolution in Fashion: The Kyoto costume institute, Abbeville Presi, New York.

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## PAPER - XVI

### FASHION MERCHANDIZING

Max. Marks: 80

- UNIT-I**     1. Market segmentation, Targeting and Positioning (STP) concepts and methods of market segmentation need for positioning through various means, formation of positioning maps .
- UNIT-II**     2. Product its type and relation to fashion classification of fashion product life cycle, the process of product life cycle, the process of products development Brand management and brand image building the making of a brand. Branding strategies
- UNIT- III**     5. Promotion and Distribution- Role of promotion, methods of promotion, Advertising, Sales promotion, personal selling, designing and management of different methods of promotion and their employment-in relation to cost effectiveness and product life cycle, different channels of distribution-selection and management
- UNIT-IV**     6. Designing of retail outlets.  
Store layout and design. Front design, Interior design, Lighting design.  
Elements of store environment ,Allocating space ,circulation. Pricing-principles and methods pricing in relation to product type, product life cycle distribution outlets.
- UNIT-V**     10. Domestic vs. Export market-principles of marketing and merchandising for the domestic and export market, channels of distribution. Visual merchandising Types of Displays- window displays, interior displays. elements of displays

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## PRACTICAL - II

### APPAREL DESIGNING ITS-CONSTRUCTION AND HISTORIC COSTUMES

Max. Marks: 100

Distribution of Marks:

Sessional	-	20
Viva	-	20
Two practical	-	30 each

Development of paper pattern and construction of garments: using chocks, stripes, unidirectional and novelty fabrics. Designing through draping Basic draping principles and techniques. Developing a pattern. Designing, Drafting and Construction of skirts. A line, flared, circular, pleated, yoked with godet. Pockets, plackets seams, pleats, Tucks, Bows etc. Plackets - Centre button closing A symmetrical closing Double breasted. Garments- Drafting and construction of different types of blouses. Choli Cut blouse. Belt Blouse. Plain Blouse. Drafting of Salwar and Kammez with design. Semi fitted Kurta. A line kurta. Paneled kurta. Lucknowi Kalidar Kurta. Flared Kurta. Salwar and its different kinds. Churidar. Preparing samples of traditional embroidery of different states. Preparing samples of novelty embroidery stitches.

### OPTIONAL (IN PLACE OF PRACTICAL)

Max. Marks – 100 External – 50% Internal – 50% Project work: Current trends in textile and clothing

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R2 13.6.19

# **DURG VISHWAVIDYALAYA, DURG (C.G.)**

Website - [www.durguniversity.ac.in](http://www.durguniversity.ac.in), Email - [durguniversity@gmail.com](mailto:durguniversity@gmail.com)



## **SCHEME OF EXAMINATION & SYLLABUS of P.G.D.C.A. Semester Exam UNDER FACULTY OF COMPUTER SCIENCE Session 2017-18**

**(Approved by Board of Studies)  
Effective from July 2017**

**POST GRADUATE DIPLOMA IN COMPUTER APPLICATION, 2017-2018**  
**[DURATION - ONE YEAR - FULL TIME]**

The duration of the course shall be one year consisting of two semesters. There shall be three theories and two practical courses in the each semester.

**FIRST SEMESTER**

**PGDCA-101 : Introduction to software organization**

**PGDCA-102 : Programming in “C”**

**PGDCA-103 : Office Automation & Tally**

**PGDCA-104 : Practical based on PGDCA-103.**

**PGDCA-105 : Practical based on PGDCA-102.**

**PGDCA-101**

**INTRODUCTION TO SOFTWARE ORGANISATION**

**UNIT – I: Introduction to Computers**

Computers – Introduction, Computer System Characteristics, Strength and Limitations of Computer, Development of Computers, Types of Computers, Generations of Computers.

Introduction to Personnel Computers – Uses of PC's, Components of PC's, Evolution of PC's, Developments of Processors, Architecture of Pentium IV, Configuration of PC's; Input Device; Output Devices.

**UNIT – II : Computer Organization**

Central Processing Unit – Arithmetic Logic Unit, Control Unit, Registers, Instruction Set, Processor speed. Storage Devices – Storage and its need, Storage Evaluation Units, Primary Storage, Secondary Storage, Data Storage and Retrieval Systems, SIMM, DIMM, Types of Storage Devices.

**UNIT – III : Computer Software**

Basics of Software – needs of Software, Types of Software; Free Domain Software; Open Source Software; Compiler, Interpreter and Assembler; Linker and Loader; Debugger; Integrated Development Environment; Operating System – Introduction, Uses of OS, Functions of OS, Booting process, Types of Reboot, Booting from different OS, Types of OS, DOS, Windows, Linux.

**UNIT – IV: Programming Languages** – Introduction, Comparison between Human and Computer Language; Program; Data, Information and Knowledge; Characteristics of Information; Types of Programming Languages; Generations of Languages; Program Development Steps; Programming Paradigms; Object-Oriented Programming; Structured Programming, Functional Programming, Process Oriented Programming.

**UNIT – V : Communication, Networks and Internet**

Communication – Introduction, Communication process, Communication Types, Communication Protocols, Communication Channels/Media. Networks – Introduction; Types of Network; Topology; Media - NIC, NOS, Bridges, HUB, Routers, Gateways. Internet – Introduction, Growth of Internet, Owner of Internet, Internet Service Provider, Anatomy of Internet, ARPANET and Internet History of World Wide Web, Services Available on Internet - File Transfer Protocol, Gopher, E-mail, Telnet, Newsgroups, WWW, Applications of Internet.

**Books Recommended**

- |  |   |
|--|---|
| 1. Using IT                              | : Williams T M Hill                     |
| 2. Essentials of Information Technology  | : A. Mansoor, Prgya Publications        |
| 3. IT                                    | : Curtin T M Hill                       |
| 4. Fundamental of Information Technology | : Chetan Shrivastava_Kalyani Publishers |
| 5. Computer Fundamentals                 | : P.K Sinha BPB Publications            |
| 6. Fundamental of Computer               | : V.Rajaraman                           |
| 7. Computer today                        | : Sanders D.H                           |

*[Handwritten signatures and dates at the bottom of the page, including "M 20/7/17", "P.M. 20/7/17", "K. Subash 20/7/17", "S. Mansoor 20/7/17", and "Gavef 20/7/17"]*

PROGRAMMING IN 'C'

**UNIT – I: Introduction :**

Introduction Character set, Identifiers and Keywords, Variables, Displaying variables, Reading Variables, Character and Character String, Qualifiers, Type define Statements, Value initialized variables, Constants, Constant Qualifier, Operators and Expressions, Operator Precedence and Associativity, Basic input output: Single Character I/O, Types of Characters in format string, Scanf with specifier.

**UNIT – II : Control Structures -**

Control Structure: If - statement, If -else statement, Multi decision, Compound Statement, Loops: For - loop, While -loop, Do-While loop, Break statement, Switch statement, Continue statement, Go to statement.

**UNIT – III: Functions & Arrays -**

Functions: Function main, Functions accepting more than one parameter, User defined and library functions, Concept associatively with functions, function parameter, Return value, recursion comparisons of Iteration and recursion variable length argument list.

Arrays: Scope and Extent, Multidimensional Arrays, Array of Strings, Function in String, passing arrays to functions, accessing array inside functions.

**UNIT – IV Pointes**

Pointers: Definition and use of pointer, address operator, pointer variable, referencing pointer, void pointers, pointer arithmetic, pointer to pointer, pointer and arrays, pointer and functions, , pointers and two dimensional arrays, array of pointers, pointers constants, pointer and strings.

**UNIT – V: Structure and Union -**

Declaring and using Structure, Structure initialization, Structure within Structure, Operations on Structures, Array of Structure, Array within Structure, Creating user defined data type, pointer to Structure and function. Union, difference between Union and Structure, Operations on Union, Scope of Union.

**Suggested Books:-**

- |                     |                      |
|---------------------|----------------------|
| 1. Let us C         | - Yashwant Kanetkar. |
| 2. Programming in C | - E. Balaguruswamy   |





OFFICE AUTOMATION & TALLY

**UNIT – I: Windows Concept**

Windows Concepts, Features, Structure, Desktop, Icons, Taskbar, Start Menu, My Computer, Recycle Bin, My document, creating shortcut. Accessories: Calculator, Notepad, Paint, Word Pad, Character Map. Windows Explorer: Creating files & folders and other Explorer facilities, Object Linking & Embedding. Communication: Dialup Networking, Phone Dialer. Difference among windows versions.

**UNIT – II : Word Processing & Spreadsheet**

**Word :** Creating, Editing, & Previewing Documents, Formatting, Advanced Features, Using Thesaurus, Mail Merge, Table & Charts, Handling Graphics, Converting Word Documents into other Formats.

**Excel:** Worksheet Basics, Creating, Opening, & Moving in Worksheet, Working with Formula & Cell referencing, Absolute & Relative addressing, Working with Ranges, Formatting of Worksheet, Graphs & Charts, Database, Function, and Macros.

**UNIT – III: Power Point & FoxPro**

**Power Point:** Creating a presentation, Modifying visual Elements, Adding objects, Applying Transitions, animations and linking, preparing handouts, presenting a slide show.

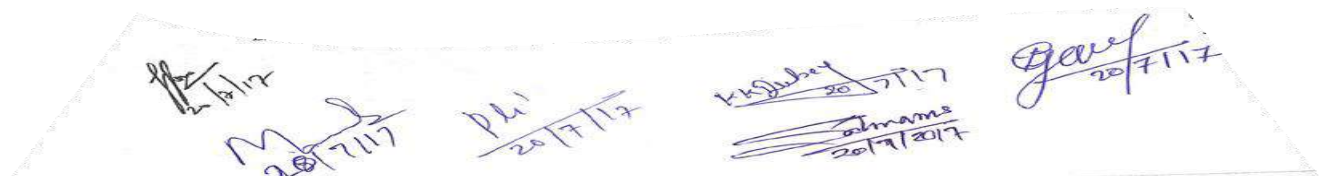
**FoxPro:** Preparing Database files, access & retrieval of records in a data base file, inserting & deleting of records. Programming preliminaries. Sorting & Indexing. Development of programs LOOPING, Branching, report making.

**UNIT – VI: Access**

Introduction to MS Access, The Tables of a Database, Introduction to the Record of a Table, Introduction to Controls Design, Details on Controls Design, The Characteristics of a Table, The Characteristics of a Form, The Characteristics of a Window Control, Data Controls, Introduction to Data Expressions, Getting Assistance With Data Entry, Database Strings, Database Numeric Values, Database Conditional Values, Database Date and Time Values, Creating Reports, Characteristics of Reports.

**UNIT – V: Tally**

Setting up Ledger & Groups. Study of recording of transactions in the 'Voucher'. (According to Golden rules). Study of 'Final A/C preparation & displaying in different mode/format'. Study of alteration & Deletion of ledger/Groups. Study of cash & fund flow, day book, sales register, purchase register, bills receivable/Payable etc. Study of data security & backing up data. Outline of entry for Income Tax, ED, VAT, ST/CST, PF, Gratuity, Bonus, Loans & Depreciation etc.



## PGDCA-104: Practical based on PGDCA-103

### 1. Scheme of Examination: -

Practical examination will be of 3 hours duration. The distribution of practical marks is as follows :

Question 1 (Word)	-	10
Question 2 (Excel/ Power point )	-	10
Question 3 (FoxPro)	-	15
Question 4 (Access)	-	10
Question 5 (Tally)	-	15
Viva-Voice	-	20
[Practical Copy + Internal Record]	-	20
Total	-	<b>100</b>

2 In every program there should be comment for each coded line or block of code.

3 Practical file should contain printed programs with name of author, date, path of program, unit no. and printed output.

4 All the following programs or a similar type of programs should be prepared.

### List of Practical

1. At least 10 practical Questions in Word
2. At least 10 practical Questions in Excel
3. At least 5 practical Questions in Power point
4. At least 10 practical Questions in Access
5. At least 10 practical Questions in FoxPro
6. At least 5 practical Questions in Tally

## PGDCA-105 : Practical based on PGDCA-102

### 1 Scheme of Practical Examination:-

Practical examination will be of 3 hours duration. All programme with flowchart & algorithms. The distribution of practical marks is as follows and

Question 1 (with flowchart & algorithms)	-	20
Question 2 (with flowchart & algorithms)	-	20
Question 3 (with flowchart & algorithms)	-	20
Viva-Voice	-	25
[Practical Copy + Internal Record]	-	15
Total	-	<b>100</b>

2 Practical file should contain printed programs with name of author, date, path of program, unit no. and printed output.

3 In every program there should be comment for each coded line or block of code.

4 All the programs or a similar type of programs should be prepared as per the practical list.

### List of Practical

#### INPUT AND OUTPUT, FORMATTING

1. Write a program in which you declare variable of all data types supported by C language. Get input from user and print the value of each variable with alignment left, right and column width 10. For real numbers print their values with two digits right to the decimal.



## LOOPS, DECISIONS

2. Write program to print all combination of 1 2 3.

3. Write program to generate following pattern

a) \* \* \* \* \*

\* \* \* \* \*

\* \* \*

\* \*

\*

c)

\*

\* \*

\* \* \*

\* \* \* \*

\* \* \* \* \*

b) 1

2 3

4 5 6

7 8 9 10

d)

1

2 1 2

3 2 1 2 3

4 3 2 1 2 3 4

4. Write main function using switch...case, if..else and loops which when called asks pattern type; if user enters 11 then first pattern is generated using for loop. If user enters 12 then first pattern is generated using while loop. If user enters 13 then first pattern is generated using do-while loop. If user enters 21 then a second pattern is generated using for loop and so on.

5. Write program to display number 1 to 10 in octal, decimal and hexadecimal system.

6. Write program to display number from one number system to another number system. The program must ask for the number system in which you will input integer value then the program must ask the number system in which you will want output of the input number after that you have to input the number in specified number system and program will give the output according to number system for output you mentioned.

7. Write a program to perform following tasks using switch...case, loops, and conditional operator (as and when necessary).

a) Find factorial of a number

b) Print fibonacci series up to n terms and its sum.

c) Print sin series up to n terms and its sum.

d) Print prime numbers up n terms.

e) Print whether a given year is leap or not.

8. Write program no. 6 but use library function to perform above tasks.

## ARRAY

9. Create a single program to perform following tasks using switch, if. Else, loop and single dimension character array without using library function:

a) To reverse the string.

b) To count the number of characters in string.

c) To copy the one string to other string;

d) To find whether a given string is palindrome or not.

e) To count no. of vowels, consonants in each word of a sentence and no. of punctuation in sentence.

f) To arrange the alphabets of a string in ascending order.

10. Create a single program to perform following tasks using switch, if. Else, loop and single dimension integer array:

a) Sort the elements.

11. Write a program that read the afternoon day temperature for each day of the month and then report the month average temperature as well as the days on which hottest and coolest days occurred.



12. Create a single program to perform following tasks using switch, if. Else, loop and double dimension integer array of size 3x3:
  - a) Addition of two matrix.
  - b) Subtraction of two matrix.
  - c) Multiplication of two matrix.
13. Create a single program to perform following tasks using switch, if..else, loop and double dimension character array of size 5x40:
  - a) Sorting of string.

## FUNCTIONS

14. Write program using the function power (a, b) to calculate the value of a raised to b.
15. Write program to demonstrate difference between static and auto variable.
16. Write program to demonstrate difference between local and global variable.
17. Write a program to perform following tasks using switch...case, loops and function.
  - a) Find factorial of a number
  - b) Print Fibonacci series up to n terms and its sum.
18. Write a program to perform following tasks using switch...case, loops and **recursive** function.
  - a) Find factorial of a number
  - b) Print Fibonacci series up to n terms and its sum.
19. Write a function to accept 10 characters and display whether each input character is digit, uppercase letter or lower case letter.

## STRUCTURE & UNION

20. Create a structure Student having data members to store roll number, name of student, name of three subjects, max marks, min marks, obtained marks. Declare a structure variable of student. Provide facilities to input data in data members and display result of student.
21. Create a structure Date with data member's dd, mm, yy (to store date). Create another structure Employee with data members to hold name of employee, employee id and date of joining (date of joining will be hold by variable of structure Date which appears as data member in Employee Structure). Store data of an employee and print the same.
22. Create a structure Student having data members to store roll number, name of student, name of three subjects, max marks, min marks, obtained marks. Declare array of structure to hold data of 3 students. Provide facilities to display result of all students. Provide facility to display result of specific student whose roll number is given.
23. Write program to create structure complex having data members to store real and imaginary part. Provide following facilities:
  - a) Add two complex nos. using structure variables.
  - b) Subtract two complex nos. using structure variables.

Use structure as argument to function and function returning structure.



## POINTER

24. Define union Emp having data members:-one integer, one float and one single dimension character array. Declare a union variable in main and test the union variable.
25. Define an enum Days\_of\_Week members of which will be days of week. Declare an enum variable in main and test it.
26. Write a program of swapping two numbers and demonstrates call by value and call by reference.
27. Write program to sort strings using pointer exchange.
28. Write a program in c using pointer and function to receive a string and a character as argument and return the no. of occurrences of this character in the string.
29. Create a program having pointer to void to store address of integer variable then print value of integer variable using pointer to void. Perform the same operation for float variable.
30. Write program to find biggest number among three numbers using pointer and function.
31. Write program to Create a structure Employee having data members to store name of employee, employee id, salary. Use Pointer to structure to store data of employee and print the stored data-using pointer to structure.
32. Write program to Create a structure Employee having data members to store name of employee, employee id, salary. Use Pointer to structure to simulate dynamic array of structure store data of n employees and print the stored data of n employees using pointer to structure.
33. Write a program to sort a single dimension array of integers of n elements simulated by pointer to integer. Use function for sorting the dynamic array.
34. Write a program to sum elements of a double dimension array of integers of m rows and n columns simulated by pointer to pointer to integer. Use function for sum the elements of the dynamic array.
35. Write program to demonstrate difference between character array and pointer to character.
36. Write program to demonstrate difference between constant pointer and pointer to constant.
37. Write program to demonstrate pointer arithmetic.
38. write program to demonstrate function-returning pointer.



The duration of the course shall be one year consisting of two semesters. There shall be three theories and two practical courses in the each semester.

**Second Semester:** PGDCA-106 : GUI - Programming in Visual Basic.  
PGDCA-107 : Database Management System  
PGDCA-108 : Essential of E –Commerce & HTML .  
PGDCA-109 : Practical based on PGDCA106, PGDCA107 & PGDCA-108  
PGDCA-110 : Project

### PGDCA-106

## GUI - PROGRAMMING IN VISUAL BASIC

### UNIT – I

**Introduction to visual Basic** - Editions of Visual Basic, Event Driven Programming, Terminology, Working environment, project and executable files ,Understanding modules, Using the code editor window, Other code navigation features, Code documentation and formatting, environment options, code formatting option, Automatic code completion features.

**Creating Programs** - Introduction to objects, Controlling objects, Properties, methods and events, Working with forms, Interacting with the user: MsgBox function, InputBox function, Code statements, Managing forms, Creating a program in Visual Basic, Printing.

### UNIT – II

**Variable and Procedures** - Overview of variables, Declaring, Scope, arrays, User-defined data types, constants working with procedures, Working with dates and times, Using the Format function, Manipulating text strings.

**Controlling Program Execution** - Comparison and logical operators, If...Then statements, Select Case Statements looping structures, Using Do...Loop structures, For...Next statement, Exiting a loop.

### UNIT – III

**Working with Controls** - Types of controls, Overview of standard controls, Combo Box and List Box, Option Button and Frame controls Menu, Status bars, Toolbars, Advanced standard controls, ActiveX controls, Insert table objects, Validation.

**Error Trapping & Debugging** - Overview of run-time errors, error handling process, The Err object, Errors and calling chain, Errors in an error-handling routine, Inline error handling, Error-handling styles, General error-trapping options Type of errors, Break mode Debug toolbar, Watch window, Immediate window, Local window, Tracing program flow with the Call Stack.

### UNIT – IV

**Sequential and Random Files** - Saving data to file, basic filling, data analysis and file, the extended text editor, Random access file, The design and coding.

**Data Access Using the ADO Data Control** - Overview of ActiveX data Objects, Visual Basic data access features, Relational database concepts Using the ADO Data control to access data, Overview of DAO, RDO, Data Control, structured query language (SQL), Manipulating data Using Data Form Wizard.

### UNIT – V

**Report Generation** - Overview of Report, Data Report, Add groups, Data Environment, Connection to database Introduction to Crystal Report Generator.

**Advances Tools** - Overview of drag and drop, Mouse events, Drag-and drop basics, Date Time Control, Calendar, Print Dialog, MDI (Multiple Document Interface).

### BOOK RECOMMENDED:

Mastering Visual Basic 6 Fundamentals – By Microsoft  
Mastering in Visual Basic – By BPB Publications.  
Introduction to VB Programming – V. K. Jain

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# PGDCA-107

## Database Management System

### UNIT – I : Introduction To DBMS

Data, Information and knowledge, concept of DBMS, Advantages of DBMS, data independence, database administration roles, DBMS architecture, different kinds of DBMS users, importance of data dictionary, contents of data dictionary, types of database languages. Data models: network, hierarchical, relational, Introduction to ODBC concept.

### UNIT – II : E-R Model

Entity - Relationship model as a tool for conceptual design-entities, attributes and relationships. ER diagrams; Concept of keys; Case studies of ER modeling Generalization; specialization and aggregation.

### UNIT – III: Relational Model

Structure to Relational Database, Relational Algebra, Extended Relational- Algebra Operation, Simple and complex queries using relational algebra, The Domain Relational Calculus, Tuple relational calculus.

### UNIT – IV : Relational Database Design

Pitfalls in Relational Database Design, Decomposition, Functional Dependencies, Normalization: 1NF, 2NF, BCNF, 3NF, 4NF, 5NF.

### UNIT – V : Structured Query Language :

**DDL and DML:** Creating Table, Specify Integrity Constraint, Modifying Existing Table, Dropping Table, Inserting, Deleting and Updating Rows in as Table, Where Clause, Operators, ORDER BY, GROUP Function, SQL Function, JOIN, Set Operation, SQL Sub Queries. Views: What is Views, Create, Drop and Retrieving data from views. **Security:** - Management of Roles, Changing Password, Granting Roles & Privilege, with drawing privileges.

### Suggested Books:

- |  |                         |
|--|-------------------------|
| 1. Data base system                    | : Korth & Silberschatz. |
| 2. Data Base Management System         | : Alexies & Mathews     |
| 3. An Introduction to Data base System | : C.J. Date             |
| 4. Data Base Management System         | : Raguramakrishnan.     |
| 5. Data Base Management System         | : Elmasri & Nawathe.    |

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# PGDCA-108

## ESSENTIALS OF E –COMMERCE & HTML

### UNIT – I

**Introduction to Electronic Commerce** –The scope of E-commerce; Size, growth and future projection of E-commerce market Worldwide and in India; Internet and its impact on traditional businesses; Definition of E-commerce; Business models in E –Commerce environment; Case studies.

*Emergence of E-commerce* - E-commerce on private networks, Electronic Data Interchange (EDI), What is EDI, EDI in action, EDI basics, EDI standards, financial EDI, FEDI for international trade transaction, FEDI payment system within the US, ACH credit transfer payment system FEDI, application of EDI, benefits of EDI, Electronics Payment system, E-commerce on the web, E-commerce in India,

### UNIT – II

**Internet, Security and E-Commerce:** Security of Data/Information in Internet/web environment; Client security, Network security; Virus protection and Hacking; Security Measures: Authentication, Integrity, Privacy, Non-repudiation; Public information, Private information, firewall tunnels, encryption, secret key encryption, public key encryption, digital signature. Business-to-Business (B2B), Business-to-Consumer (B2C); Business-to-Business-to-Consumer (B2B2C) and Consumer-to-Consumer (C2C) E-Commerce

### UNIT – III

**HTML Basics & Web Site Design Principles** –Concept of a Web Site, Web Standards, What is HTML? HTML Versions, Naming Scheme for HTML Documents , HTML document/file, HTML Editor , Explanation of the Structure of the homepage , Elements in HTML Documents ,HTML Tags, Basic HTML Tags, Comment tag in HTML, Viewing the Source of a web page, How to download the web page source? XHTML, CSS, Extensible Markup Language (XML), Extensible Style sheet language (XSL), Some tips for designing web pages, HTML Document Structure. HTML Document Structure-Head Section, Illustration of Document Structure,<BASE> Element,<ISINDEX> Element,<LINK> Element ,<META> ,<TITLE> Element,<SCRIPT> Element ,Practical Applications, *HTML Document Structure-Body Section*:-Body elements and its attributes: Background; Background Color; Text; Link; Active Link (ALINK); Visited Link (VLINK); Left margin; Top margin ,Organization of Elements in the BODY of the document: Text Block Elements; Text Emphasis Elements; Special Elements -- Hypertext Anchors; Character-Level Elements; Character References ,Text Block Elements: HR (Horizontal Line); Hn (Headings) ; P (Paragraph); Lists; ADDRESS ; BLOCKQUOTE; TABLE; DIV (HTML 3.2 and up) ; PRE (Preformatted); FORM ,Text Emphasis Elements, Special Elements -- Hypertext Anchors ,Character-Level Elements: line breaks (BR) and Images (IMG),Lists ,ADDRESS Element, BLOCKQUOTE Element, TABLE Element ,COMMENTS in HTML ,CHARACTER Emphasis Modes, Logical & Physical Styles ,Netscape, Microsoft and Advanced Standard Elements List, FONT, BASEFONT and CENTER.

### UNIT – IV

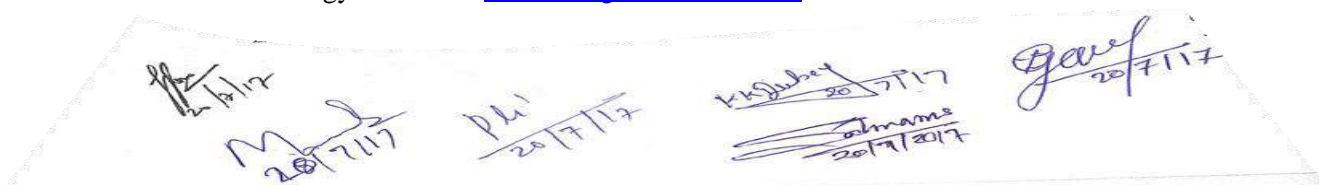
**Image, Internal and External Linking between Web Pages** - Netscape, Microsoft and Advanced Standard Elements List, FONT, BASEFONT and CENTER. Insertion of images using the element IMG (Attributes: SRC (Source), WIDTH, HEIGHT, ALT (Alternative), ALIGN),IMG (In-line Images) Element and Attributes; Illustrations of IMG Alignment, Image as Hypertext Anchor, Internal and External Linking between Web Pages. Hypertext Anchors, HREF in Anchors ,Links to a Particular Place in a Document ,NAME attribute in an Anchor ,Targeting NAME Anchors ,TITLE attribute, Designing Frames in HTML.

### UNIT – V

**Creating Business Websites with Dynamic Web Pages** – Concept of static web pages and dynamic web pages. Hosting & promotion of the web site, Domain Name Registration, Web Space allocation, Uploading / Downloading the website- FTP, cute FTP. Web Site Promotion Search Engines, Banner Advertisements.

### Recommend Books –

1. Business on the net - by Kamlesh N. Agarawala , Amit Lal & Deeksha Agarawal ( Macmillan India Ltd.).
2. Introduction to HTML by Kamlesh N. Agarwala, O.P.Vyas, Prateek A. Agarwala. (Kitab Mahal Publications).
- 3.. ASP Developer's Guide – by Greg Buczek (TATA McGraw Hill).
4. Information Technology Act 2000: [www.mit.gov.in/it-bill.htm](http://www.mit.gov.in/it-bill.htm)





## PGDCA-109: Practical based on PGDCA106, PGDCA107 & PGDCA108

### 1 Scheme of Examination:-

Practical examination will be of 3 hours duration. The distribution of practical marks will be as follows

Question 1 (VB)	-	15
Question 2 (VB)	-	15
Question 3 (SQL)	-	15
Question 4 (HTML/Web Design)-		15
Viva	-	25
[ Practical Copy + Internal Record ]	-	15
Total	-	100

2 In every program there should be comment for each coded line or block of code

3 Practical file should contain printed programs with name of author, date, path of program, unit no. and printed output.

4 All the following programs or a similar type of programs should be prepared

### List of Practical of Visual Basic

1. WAP to perform arithmetic operation **using command buttons**. (**Declare variables globally**).
2. WAP to take input of principal, rate & time and calculate simple interest & compound interest.
3. Write a program to take input of x and print table of x in the following

format.  $X * 1 = X$   
 $X * 2 = 2X$

-----  
-----

$X * 10 = 10 * X$

4. Design an interface, which will appear like marksheet. It will take input of marks in five subjects and calculate total marks and percentage then provide grade according to following criteria. (**Using nested if**) (Use tab index property to move focus).

If %	Then Grade
$> = 90$	A+
$> = 75 \ \& \ < 90$	A
$> = 60 \ \& \ < 75$	B
$> = 45 \ \& \ < 60$	C
Otherwise	F

5. WAP to create a simple calculator (**Using control array**)
6. Write a program to check whether an centered no. is prime or not. (**Using for loop & Exit for**)
7. Write a program which will count all vowels, consonants, digits, special characters and blank spaces in a sentences (**Using select case**)
8. WAP to illustrate all functionalities of **listbox** and **combobox**.
9. WAP using **check boxes** for following font effects. Bold  
Italic  
Underline  
Increase font size  
Decrease font size  
Font color
10. WAP for temperature conversion using **option button**.
11. WAP to launch a rocket using **pictures box** and **timer control**.
12. WAP to change back color of any control (label, textbox) using **scroll box**.
13. WAP to search an element for a **one dimension static array**.
14. WAP to sort a dynamic array  
of (a)n numbers  
(b)n strings (Input array size at run time)
15. WAP to take input of two matrices and perform their addition, subtraction and multiplication using **menu editor**.
17. WAP to illustrate **call by value and call by reference** ( to swap to values)



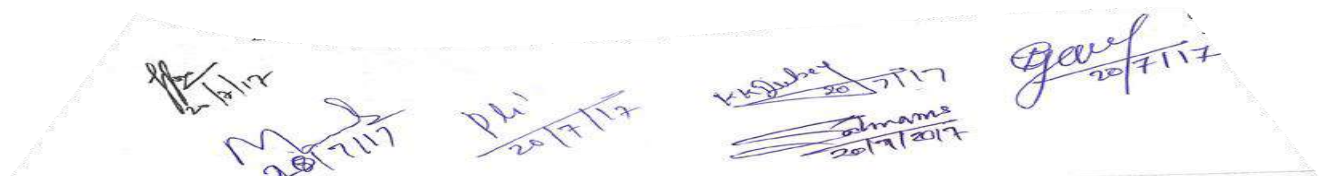
18. Write a program to calculate factorial of a number using **user defined function**.
19. Take input of a word and WAP to check whether it is a palindrome or not. (**Without using structure fun**)
20. WAP to find smallest among given three numbers using **user defined procedures**.
21. WAP to generate, print and find sum of first n elements of fibonacci series using **recursion**.
22. WAP to perform read write operations in a **sequential file**.
23. Create a **user defined data type** having fields name (as string of length 20 bytes), Rollno (as integer), class (as string of 10 bytes). WAP to create a **random access file** to store above data and perform following operations in this file.
  - (a) Write new record      (b) Read / display existing record      (c) Delete any record
  - (d) Search any record      (e) close the file      (f) List selected records
24. WAP to display records of a table using **DAO & bound control** code for buttons to move at first record, next record, previous record, last record in the table.
25. Create a table using **visual data manager** and write a program using **RDO & advanced bound control** to add, delete, edit & navigate records.
26. WAP to access a database using **ADO &** display a key column in the combo box or list box when an item is selected in it, its corresponding records is shown in **MSH flex grid**.
27. Using **Data Environment** create a program to display records of any table.
28. WAP to generate marksheet of students in a class through **data report**.
29. WAP to illustrate various **key board and mouse events**.
30. Using **drive, directory and file list box** (it will show only .bmp files). Let the user select the bmp files, which will appear in picture box as user click on any item in list box.
31. Using **toolbar** design an interface for string manipulation. Toolbar should have tabs to
  - (a) Find length of string (b) No of blank spaces in string (c) Reverse the string
 Also show current date & time in **status bar**.

### **List of Practical of SQL**

1. Using the following database,
  - Colleges (cname, city, address, phone, afdte)
  - Staffs ( sid, sname, saddress, contacts)
  - StaffJoins ( sid, cname, dept, DOJ, post, salary)
  - Teachings ( sid, class, paperid, fsession, tsession)
  - Subjects ( paperid, subject, paperno, papename)

Write SQL statements for the following –

- a. Create the above tables with the given specifications and constraints.
- b. Insert about 10 rows as are appropriate to solve the following queries.
- c. List the names of the teachers teaching computer subjects.
- d. List the names and cities of all staff working in your college.
- e. List the names and cities of all staff working in your college who earn more than 15,000
- f. Find the staffs whose names start with 'M' or 'R' and ends with 'A' and/or 7 characters long.
- g. Find the staffs whose date of joining is 2005.
- h. Modify the database so that staff N1 now works in C2 College.
- i. List the names of subjects, which T1 teaches in this session or all sessions.
- j. Find the classes that T1 do not teach at present session.
  - a. Find the colleges who have most number of staffs.
  - b. Find the staffs that earn a higher salary who earn greater than average salary of their college.
  - c. Find the colleges whose average salary is more than average salary of C2
  - d. Find the college that has the smallest payroll.
  - e. Find the colleges where the total salary is greater than the average salary of all colleges.
  - f. List maximum, average, minimum salary of each college
- a. List the names of the teachers, departments teaching in more than one department.
- b. Acquire details of staffs by name in a college or each college.
- c. Find the names of staff that earn more than each staff of C2 College.
- d. Give all principals a 10% rise in salary unless their salary becomes greater than 20,000 in such case give 5% rise.
- e. Find all staff that do not work in same cities as the colleges they work.



- f. List names of employees in ascending order according to salary who are working in your college or all colleges.
  - a. Create a view having fields sname, cname, dept, DOJ, and post
  - b. Create a view consisting of cname, average salary and total salary of all staff in that college.
  - c. Select the colleges having highest and lowest average salary using above views.
  - d. List the staff names of a department using above views.
  
2. Create the following database,
  - Enrollment (enrollno, name, gender, DOB, address, phone)
  - Admission (admno, enrollno, course, yearsem, date, cname)
  - Colleges (cname, city, address, phone, afdate)
  - FeeStructure (course, yearsem, fee)
  - Payment (billno, admno, amount, pdate, purpose)
  - a. Create the above tables with the given specifications and constraints.
  - b. Insert about 10 rows as are appropriate to solve the following queries.
  - c. Get full detail of all students who took admission this year class wise
  - d. Get detail of students who took admission in Bhilai colleges.
  - e. Calculate the total amount of fees collected in this session
    - i) By your college ii) by each college iii) by all colleges
  - a. List the students who have not payed full fee
    - i) in your college ii) in all colleges
  - b. List the number of admissions in your class in every year.
  - c. List the students in the session who are not in the colleges in the same city as they live in.
  - d. List the students in colleges in your city and also live in your city.
  
3. Create the following database,
  - Subjects ( paperid, subject, paper, papername)
  - Test (paperid, date, time, max, min)
  - Score (rollno, paperid, marks, attendance)
  - Students (admno, rollno, class, yearsem)
  - a. Create the above tables with the given specifications and constraints.
  - b. Insert about 10 rows as are appropriate to solve the following queries.
  - c. List the students who were present in a paper of a subject.
  - d. List all roll numbers who have passed in first division.
  - e. List all students in BCA-II who have scored higher than average
    - i) in your college ii) in every college
  - f. List the highest score, average and minimum score in BCA-II
    - i) in your college ii) in every college
  
4. Using the following database
  - Colleges (cname, city, address, phone, afdate)
  - Staffs ( sid, sname, saddress, contacts)
  - StaffJoins ( sid, cname, dept, DOJ, post, salary)
  - Teachings ( sid, class, paperid, fsession, tsession)
  - Subjects ( paperid, subject, paperno, papername)

Write SQL statements for the following –

  - a. Create the above tables with the given specifications and constraints.
  - b. Insert about 10 rows as are appropriate to solve the following queries.
  - c. List the names of the teachers teaching computer subjects.
  - d. List the names and cities of all staff working in your college.
  - e. List the names and cities of all staff working in your college who earn more than 15,000
  
5. Using the following database
  - Colleges (cname, city, address, phone, afdate)
  - Staffs ( sid, sname, saddress, contacts)
  - StaffJoins ( sid, cname, dept, DOJ, post, salary)
  - Teachings ( sid, class, paperid, fsession, tsession)
  - Subjects ( paperid, subject, paperno, papername)

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- c. Get full detail of all students who took admission this year classwise
  - d. Get detail of students who took admission in Bhilai colleges.
  - e. Calculate the total amount of fees collected in this session
    - i) by your college ii) by each college iii) by all colleges
10. Enrollment (enrollno, name, gender, DOB, address, phone)  
 Admission (admno, enrollno, course, yearsem, date, cname)  
 Colleges (cname, city, address, phone, afdate)  
 FeeStructure (course, yearsem, fee)  
 Payment (billno, admno, amount, pdate, purpose)
- a. List the students who have not payed full fee
    - i) in your college ii) in all colleges
  - b. List the number of admissions in your class in every year.
  - c. List the students in the session who are not in the colleges in the same city as they live in.
  - d. List the students in colleges in your city and also live in your city.
11. Subjects ( paperid, subject, paper, papername)  
 Test (paperid, date, time, max, min)  
 Score (rollno, paperid, marks, attendance)  
 Students (admno, rollno, class, yearsem)
- a. Create the above tables with the given specifications and constraints.
  - b. Insert about 10 rows as are appropriate to solve the following queries.
  - c. List the students who were present in a paper of a subject.
  - d. List all roll numbers who have passed in first division.
  - e. List all students in MCA-II who have scored higher than average
    - i) in your college ii) in every college
  - f. List the highest score, average and minimum score in MCA-II
    - i) in your college ii) in every college

### **List of Practical of HTML**

At least 10 practical of HTML & Web Designing

## **PGDCA-110: Project**

### **1. Scheme of Examination:- The Project should be done by individual student.**

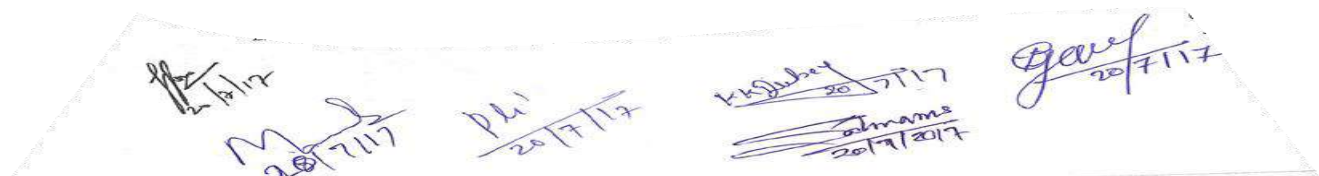
Practical examination will be of 3 hours duration. The distribution of practical marks will be as follows

Software Demonstration	-	40
Project Report (Hard Copy + Soft Copy)	-	20
Project Demonstration/Presentation	-	20
Project Viva	-	20
Total	-	100

### **2. Format of the student project report on completion of the project**

- Cover page as per format
- Certificate of Approval
- Certificate of project guide/Center Manager
- Certificate of the company/Organization
- Certificate of Evaluation
- Declaration / Self Certificate
- Acknowledgement

In the "Acknowledgement" page, the writer recognizes his /her indebtedness for guidance and assistance of the thesis/report adviser and other members of the faculty. Courtesy demands that he/she also recognize specific contributions by other persons or institutions such as libraries and research foundations. Acknowledgements should be expressed simply, tastefully, and tactfully.



- Synopsis of the project
- Main Report
  - ✓ Objectives & Scope of the project
  - ✓ Theoretical Background of Project
  - ✓ Definition of problem
  - ✓ System Analysis & Design
  - ✓ System Planning (PERT Chart)
  - ✓ Methodology adopted, system Implementation & Detail of Hardware & Software used
  - ✓ System maintenance & Evaluation
  - ✓ Cost and benefit Analysis
  - ✓ Detailed Life Cycle of the project
    - ERD,DFD
    - Input and Output Screen Design
    - Process involved
    - Methodology used for testing
    - Test Report, Printout of the code sheet
  - ✓ User/Operational Manual- including security aspects, access rights, back up, Controls etc.
  - ✓ Conclusion
  - ✓ References
  - ✓ Soft copy of the project on CD

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## Formats of various certificates and formatting styles are as:

### 1. Project report Cover Format:

**A**  
**Project Report**  
**On**  
**Title of the Project Report**  
(Times New Roman, Italic, Font Size=24)  
Submitted in partial fulfillment of the requirements for the award of degree  
**Post Graduate Diploma in Computer Application**

### 2. Certificate of Approval by Head of the Department in letter head

#### CERTIFICATE OF APPROVAL

This is to certify that the Project work entitled “\_\_\_\_\_” is carried out by Mr/Ms/Mrs\_\_\_\_\_, a student of PGDCA at (College Name) is hereby approved as a credible work in the discipline of Computer Science & Information Technology for the award of degree of **Post Graduate Diploma in Computer Application** during the year \_\_\_\_\_ From Durg University, Durg (CG).

(Head Name)

### 2. Certificate from the Guide in letter head

#### CERTIFICATE

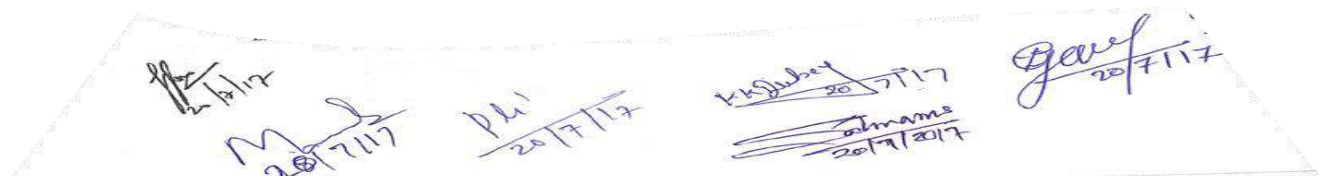
This is to certify that the Project work entitled “\_\_\_\_\_” Submitted to the ( College Name ) by Mr/Ms/Mrs\_\_\_\_\_Roll No\_\_\_\_\_, in partial fulfillment for the requirements relating to nature and standard of the award of **Post Graduate Diploma in Computer Application** degree by , Durg University, Raipur (CG) for the academic year 20\_\_ - 20 \_\_.

This project work has been carried out under my guidance.

(Guide Name)

### 3. Certificate of the Company or Organization from where the Project is done from the Project Manager or Project guide.

### 4. Certificate of evaluation in the department letter head



# CERTIFICATE OF EVALUATION

This is to certify that the Project work entitled “\_\_\_\_\_” is carried out by Mr/Ms/Mrs \_\_\_\_\_, a student of PGDCA at (**College Name**), after proper evaluation and examination, is hereby approved as a credible work in the discipline of Computer Science & Information Technology and is done in a satisfactory manner for its acceptance as a requisite for the award of degree of **Post Graduate Diploma in Computer Application** during the year \_\_\_\_\_ from **Durg University, Durg (CG)**.

Internal Examiner

External Examiner

## 5. Declaration of Student / Self Certificate

### DECLARATION

This to certify that the project report entitled “\_\_\_\_\_”, which is submitted by me in the partial fulfillment for the award of the degree of **Post Graduate Diploma in Computer Application, ( College Name )**, comprises the original work carried out by me.

I further declare that the work reported in this project has not been submitted and will not be submitted, either in part or in full for the award of any other degree or diploma in this Institute or any other Institute or University.

Place :  
Date :

(Name)  
(Roll No)

-----0-----

*[Handwritten signatures and dates at the bottom of the page:]*  
M. J. 20/7/17  
P. J. 20/7/17  
K. G. Dubey 20/7/17  
S. K. 20/7/17  
G. J. 20/7/17



# दुर्ग विश्वविद्यालय, दुर्ग (छ.ग.)



पाठ्यक्रम

परीक्षा – 2017–18

बी.ए. भाग-3

**B.A. Part-III**

**B.A./B.A. (CLASSICS) PART-III**  
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## **REVISED ORDINANCE NO.11**

(As per State U.G.C. Scheme)

### **BACHELOR OF ARTS**

1. The three year course have been broken up in to three Parts.  
Part-I Examination : at the end of the first year.  
Part-II Examination : at the end of the second year and  
Part-III Examination : at the end of the third year.
2. A candidate who after passing (10-2) or intermediate examination of C.G. Board of Secondary Education, Raipur or any other examination recognised by the University or C.G. Board of Secondary Education as equivalent thereto, has attended a regular course of study in an affiliated college or in the Teaching Department of the University for one academic year shall be eligible for appearing at the B.A. Part-I examination.
3. A candidate who after passing B.A. Part-I examination of the University or any other examination recognised by the University as equivalent thereto has attended a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.A. Part II Examination.
4. A candidate who after passing B.A. Part II examination of the University has completed a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.A. Part-III examination.
5. Besides regular students, subject to their compliance with this ordinance, ex-students and non-collegiate candidates shall be eligible for admission to the examination as per provisions of Ordinance N. 6 relating to Examinations (General). Provided that non-collegiate candidates shall be permitted to offer only such subjects/papers as are taught to the regular students at any of the University Teaching Department or College.
6. Every candidate for the Bachelor of Arts examination shall be examined in : A.  
Foundation Course :
  - i) Group B - Hindi Language
  - ii) Group C - English LanguageB. Three Core subjects : One subject from any three groups out of the following six groups :
  1. Sociology/Ancient Indian History/Anthropology.
  2. Political Science/Home Science/Vocational Course.

3. Hindi Literature/Sanskrit Literature/Urdu Literature/Math.
  4. Economics/Music/Linguistics/Defence studies.
  5. Philosophy/Psychology/Geography/Education/Management.
  6. History/English Literature/Statistics.
  7. Practicals (if necessary) for each core subject.
7. Any candidate who has passed the B.A. examination of the University shall be allowed to present himself for examination in any of additional subjects prescribed for the B.A. examination and not taken by him at the degree examination. Such candidate will have to first appear and pass the B.A. Part I examination in the subject which he proposes to offer and then the B.A. Part II and Part III examination in the same subject. Successful candidate will be given a certificate to that effect.
8. In order to pass at any part of the three year degree course examination, an examinee must obtain not less than 33% of the total marks in each subject/group of subjects. In subject/group of subjects, where both theory and practical examination are provided, an examinee must pass in both theory and practical parts of the examination separately.
9. Candidate will have to pass separately at the Part-I, Part II and part-III examination. No division shall be assigned on the result of the Part-I and Part-II examination. In determining the division of the Final examination, total marks obtained by the examinees, in their Part-I, Part-II and Part-III examination in the aggregate shall be taken into account. Candidate will not be allowed to change subjects after passing Part I Examination.
- Provided in case of candidate who has passed the examination through the supplementary examination having failed in one subject only the total aggregate marks being carried over for determining the division shall include the actual marks obtained in the subject in which he appeared at the supplementary examination.
10. Successful examinees at the Part-III examination obtaining 60% or more marks shall be placed in the First division, those obtaining less than 60% but not less than 45% marks in the Second division and other successful examinees in the third division.

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**SCHEME OF EXAMINATION**

	<b>Subject</b>	<b>Paper</b>	<b>Max. Marks</b>	<b>Min. Marks</b>
<b>A. Compulsory Subject - Foundation Course :</b>				
	Hindi Language	I	75	26
	English Language	I	75	26
<b>B. Three Core Subject :</b>				
1.	Hindi Literature	I	75	150
		II	75	
2.	Sanskrit Literature	I	75	150
		II	75	
3.	English Literature	I	75	150
		II	75	
4.	Philosophy	I	75	150
		II	75	
5.	Economics	I	75	150
		II	75	
6.	Political Science	I	75	150
		II	75	
7.	History	I	75	150
		II	75	
8.	Ancient Indian History Culture & Archaeology	I	50	100
		II	50	
			Practical	
9.	Sociology	I	75	150
		II	75	
10.	Geography	I	50	100
		II	50	
			Practical	
11.	Mathematics	I	50	150
		II	50	
		III	50	
12.	Statistics	I	50	100
		II	50	
			Practical	

	Subject	Paper		Max. Marks	Min. Marks
13.	Anthropology	I	50	100	33
		II	50		
			Practical	50	17
14.	Linguistics	I	75	150	50
		II	75		
15.	Indian Music	I	50	100	33
		II	50		
			Practical	50	17
16.	Home Science	I	50	100	33
		II	50		
			Practical	50	17
17.	Education	I	75	150	50
		II	75		
18.	Psychology	I	50	100	33
		II	50		
			Practical	50	17
19.	Management	I	75	150	50
		II	75		
20.	Defence Studies	I	50	100	33
		II	50		
			Practical	50	17
21.	Urdu	I	75	150	50
		II	75		

#### USE OF CALCULATORS

The Students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986-

1. Student will bring their own Calculators.
2. Calculators will not be provided either by the university or examination centres.
3. Calculators with, memory and following variables be permitted +, -, x,  $\div$ , square, reciprocal, expotentials log, square root, trigonometric functions, wize, sine, cosine, tangent etc. factiorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.

- - - - -

**हिन्दी भाषा**  
**(पेपर कोड-0231)**  
**प्रथम प्रश्न पत्र**

**पूर्णांक – 75**

(बी.ए., बी.एस.सी., बी.एच.एस.सी., बी.काम., तृतीय वर्ष के पुनरीक्षण एकीकृत आधार पाठ्यक्रम एवं पाठ्य सामग्री का संयोजन 2000-2001 से लागू है)

**॥ सम्प्रेषण कौशल, हिन्दी भाषा और सामान्य ज्ञान ॥**

आधार पाठ्यक्रम की संरचना और अनिवार्य पाठ्य पुस्तक—हिन्दी भाषा एवं समसामयिकी— का संयोजन इस तरह किया गया है कि सामान्य ज्ञान की विषय वस्तु— विकासशील देशों की समस्याओं— के माध्यम, आधार और साथ-साथ हिन्दी भाषा का ज्ञान और उसमें सम्प्रेषण कौशल अर्जित किया जा सके । इसी प्रयोजन से व्याकरण की अन्तर्वस्तु को विविध विधाओं की संकलित रचनाओं और सामान्य ज्ञान की पाठ्य सामग्री के साथ अन्तर्गुर्क्षित किया गया है । अध्ययन—अभ्यास के लिए पूरी पुस्तक की पाठ्य सामग्री है और अभ्यास के लिये विस्तृत प्रश्नावली है । यह प्रश्नपत्र भाषा का है अतः पाठ्य सामग्री कर व्याख्यात्मक या आलोचनात्मक अध्ययन अपेक्षित नहीं है । पाठ्यक्रम अरैर पाठ्य सामग्री का संयोजन निम्नलिखित पांच इकाइयों में किया जाता है । प्रत्येक इकाई दो भागों में विभक्त किया गया है ।

- इकाई —1** (क) भारत माता : सुमित्रानंदन पंत, परशुराम की प्रतीज्ञा : रामधारी सिंह  
दिनकर, बहुत बड़ा सवाल : मोहन राकेश, संस्कृति और राष्ट्रीय  
एकीकरण : योगेश अटल
- (ख) कथन की शैलियां : रचनागत उदाहरण और प्रयोग ।
- इकाई —2** (क) विकासशील देशों की समस्याएँ, विकासात्मक पुनर्विचार, और  
प्रौद्योगिकी एवं नगरीकरण ।
- (ख) विभिन्न संरचनाएं ।
- इकाई—3** (क) आधुनिक तकनीकी सभ्यता, पर्यावरण प्रदूषण तथा धारणीय  
विकास ।
- (ख) कार्यालयीन पत्र और आलेख ।
- इकाई—4** (क) जनसंख्या : भारत के संदर्भ में और गरीबी तथा बेरोजगारी ।
- (ख) अनुवाद ।
- इकाई—5** (क) ऊर्जा अरैर शक्तिमानता का अर्थशास्त्र ।
- (ख) घटनाओं, समारोहों आदि का प्रतिवेदन और विभिन्न प्रकार के  
निमंत्रण—पत्र ।

**मूल्यांक योजना :** प्रत्येक इकाई से एक-एक प्रश्न पूछा जायेगा । प्रत्येक प्रश्न में आंतरिक विकल्प होगा । प्रत्येक प्रश्न के 15 अंक होंगे । प्रत्येक इकाई दो-दो खण्ड (क्रमशः 'क' और 'ख' में) विभक्त है, इसलिए प्रत्येक प्रश्न के भी दो भाग, (क्रमशः 'क' और 'ख' में) होंगे । 'क' अर्थात् पाठ एवं सामान्य ज्ञान से संबंधित प्रश्न के अंक 8 एवं 'ख' अर्थात् भाषा एवं सम्प्रेषण कौशल से संबंधित प्रश्न के अंक 7 होंगे । इस प्रकार पूरे प्रश्न के पूर्णांक 75 होंगे ।



**PART - II**  
**ENGLISH LANGUAGE**  
**(Paper Code-0232)**

**M.M. 75**

The question paper for B.A./B.Sc./B.Com./B.H.Sc. III Foundation course, English Language and General Answers shall comprise the following items :

Five question to be attempted, each carrying 3 marks.

<b>UNIT-I</b>	Essay type answer in about 200 words. 5 essay type question to be asked three to be attempted.	15
<b>UNIT-II</b>	Essay writing	10
<b>UNIT-III</b>	Precis writing	10
<b>UNIT-IV</b>	(a) Reading comprehension of an unseen passage	05
	(b) Vocabulary based on text	10
<b>UNIT-V</b>	Grammar Advanced Exercises	25

**Note :** Question on unit I and IV (b) shall be asked from the prescribed text. Which will comprise of popular create writing and the following items. Minimum needs housing and transport Geo-economic profile of M.P. communication Educate and culture. Women and Worm in Empowerment Development, management of change, physical quality of life. War and human survival, the question of human social value survival, the question of human social value, new Economic Philosophy Recent Diberalisation Method) Demoration docontralisation (with reference to 73, 74 constitutional Amendment.

**Books Prescribed :**

Aspects of English Language And Development - Published by M.P. Hindi Granth Academy, Bhopal.

- - - - -

Dr. M. C. Chakraborty

Dr. S. Gupta

DR. MERILY ROY



**हिन्दी साहित्य**  
**प्रथम प्रश्न पत्र**  
**जनपदीय भाषा—साहित्य (छत्तीसगढ़ी)**  
**(पेपर कोड 0233)**

**प्रस्तावना—**

हिन्दी केवल खड़ी बोली नहीं है, बल्कि एक बहुत बड़ा भाषिक समूह है। हिन्दी जगत में अनेक विभाषाएं बोलियां और उपबोलियां विद्यमान हैं जिनमें पुष्कल साहित्य सम्प्रदा है। इनके सम्बन्धित अध्ययन और अन्वेषण की आवश्यकता है। जनपदीय भाषा छत्तीसगढ़ी निरन्तर विकास की ओर अग्रसर हो रही है। अस्तु, इस भाषा और इसमें रचित साहित्य का इतिहास—विकास स्पष्ट करतक हुए इनसे संबंधित प्रमुख रचनाकारों का आलोचनात्मक अनुशीलन करना हिन्दी के वृहत्तर हित में होगा। छत्तीसगढ़ी भाषा का पाठ्यक्रम निम्न बिन्दुओं पर आधारित है—

- (क) छत्तीसगढ़ी भाषा का इतिहास — विकास।
- (ख) छत्तीसगढ़ी भाषा में रचित साहित्य का इतिहास।
- (ग) छत्तीसगढ़ी भाषा के प्रमुख प्राचीन एवं अर्वाचीन रचनाओं की कृतियों का अध्ययन।

**पाठ्य विषय—**

**रचनाएं—**

- (1) प्राचीन कवि संत धर्मदास के 3 पद
  - 1. गुरु पड़्या लागों नाम लखा दीजो हो ।
  - 2. नैन आगे ख्याल घनेरा ।
  - 3. भजन करौ भाई रे, अइसन तन पाय के ।(संदर्भ— धर्मदास के शब्दावली से उद्धृत)
- (2) लखनलाल गुप्त का गद्य—
  - 1. सेनपान(गद्य— पुस्तक “सेनपान” के उद्धृत)
- (3) अर्वाचीन रचनाकार
  - डॉ. सत्यभामा आडिल रचित गद्य
  - 1. सीख सीख के गोठ( गद्य— पुस्तक “ गोठ ” के उद्धृत)
- (4) डॉ. विनय पाठक की कविताएं—
  - 1. तंय उठथस सुरुज उथे
  - 2. एक किसिम के नियाव(“ अकादसी और अनचिन्हार” पुस्तक से उद्धृत)



(5)

मुकुन्द कौशल— छत्तीसगढ़ गजल

“ छै बित्ता के मनखे देखों ..... से —मछरी मन लाख लेथे” तक

(पुस्तक “ छत्तीसगढ़ गजल” के पृष्ठ 17 से उद्धृत)

द्रुतपाठ के रचनाकार — (व्यक्तित्व एवं कृतित्व)

1. सुन्दर लाल शर्मा
2. कविलनाथ कश्यप
3. रामचन्द्र देशमुख (रंगकर्मी)

**अंक विभाजन**

3 व्याख्याएं	—	21 अंक
2 आलोचनात्मक प्रश्न	—	24 अंक
5 लघुत्तरी प्रश्न	—	15 अंक
15 वस्तुनिष्ठ/अति लघुत्तरी प्रश्न	—	15 अंक
<b>कुल</b>	<b>—</b>	<b>75 अंक</b>

**इकाई विभाजन**

इकाई एक	—	व्याख्या
इकाई दो	—	प्राचीन एवं अर्वाचीन रचनाकार
इकाई तीन	—	(अ) छत्तीसगढ़ भाषा का इतिहास (ब) छत्तीसगढ़ साहित्य का इतिहास
इकाई चार	—	द्रुतपाठ के तीन रचनाकार
इकाई पांच	—	वस्तुनिष्ठ/ अतिलघुत्तरीय प्रश्न (सम्पूर्ण पाठ्यक्रम से)



**द्वितीय प्रश्न पत्र**  
**हिन्दी भाषा—साहित्य का इतिहास तथा काव्यांग विवेचन**  
**(पेपर कोड — 0234)**

**प्रस्तावना—**

हिन्दी भाषा का इतिहास जितना प्राचीन है, उतना ही गुढ़-गहन भी । इसमें रचित साहित्य ने लगभग डेढ़ हजार वर्षों का इतिहास पूरा कर लिया है । इसलिए हिन्दी भाषा और साहित्य के ऐतिहासिक विवेचन की बड़ी आवश्यकता है । इसी के साथ-साथ हिन्दी ने अपना जो स्वतंत्र साहित्य शास्त्र निर्मित किया है, उसे भी रूपायित करने की आवश्यकता है । इसके संज्ञान द्वारा विद्यार्थी की मर्मग्राहिणी प्रतिभा का विकास होगा और ऐतिहासिक परिप्रेक्ष्य में शुद्ध साहित्यिक विवेक का सन्निवेश होगा ।

**पाठ्य विषय—**

(क) हिन्दी भाषा का स्वरूप विकास — हिन्दी की उत्पत्ति, हिन्दी की मूल आकर भाषाएं तथा विभिन्न विभाषाओं का विकास । हिन्दी भाषा के विभिन्न रूप—

1. बोलचाल की भाषा
2. रचनात्मक भाषा
3. राष्ट्रभाषा
4. राजभाषा
5. सम्पर्क भाषा
6. संचार भाषा

हिन्दी का शब्द भण्डार — तत्सम, तद्भव, देशज, आगत शब्दावली ।

(ख) हिन्दी साहित्य का इतिहास :— आदिकाल, पूर्व मध्यकाल, उत्तर मध्यकाल और आधुनिक काल की सामाजिक, सांस्कृतिक पृष्ठभूमि, प्रमुख युग प्रवृत्तियां, विशिष्ट रचनाकार और उनकी प्रतिनिधि कृतियां, साहित्यिक विशेषताएं ।

(ग) काव्यांग — काव्य का स्वरूप एवं प्रयोजन ।

रस के विभिन्न भेद, विभिन्न अंग, विभावादि तथा उदाहरण ।

प्रमुख 5 छंद—दोहा, सोरठा, चौपाई, कुण्डलियां, सवैया ।

शब्दालंकार— अनुप्रास, यमक, श्लेष, वक्रोक्ति, पुनरुक्ति प्रकाश ।

अर्थालंकार— उपमा, रूपक, उत्प्रेक्षा, अतिशयोक्ति, भ्रांतिमान ।

संदर्भ ग्रंथ — (1) हिन्दी साहित्य का इतिहास

संपादक — डॉ. सुशील त्रिवेदी व बाबूलाल शुक्ल । (प्रकाशक — म.प्र. उ.शि. अनुदान आयोग)

(2) राजभाषा हिन्दी — मलिक मोहम्मद (प्रभात प्रकाशन दिल्ली)

(3) हिन्दी भाषा — डॉ. भोलानाथ तिवारी ।

**अंक विभाजन—**

4 आलोचनात्मक प्रश्न	—	44 अंक
4 लघुउत्तरीय प्रश्न	—	16 अंक
15 वस्तुनिष्ठ प्रश्न	—	15 अंक
<b>कुल अंक</b>	<b>—</b>	<b>75 अंक</b>

**इकाई विभाजन—**

इकाई — 1	हिन्दी भाषा का स्वरूप — विकास— (खण्ड—'क')
इकाई — 2	हिन्दी का शब्द भण्डार (खण्ड—'क' का अंतिम भाग)
इकाई — 3	हिन्दी साहित्य का इतिहास (खण्ड—'ख')
इकाई — 4	काव्यांग — रस, छंद, अलंकार (खण्ड—'ग')
इकाई — 5	लघुउत्तरीय एवं वस्तुनिष्ठ प्रश्न (सम्पूर्ण पाठ्यक्रम से)



## प्राचीन भारतीय इतिहास, संस्कृति एवं पुरातत्व

### प्रथम प्रश्न पत्र

### भारतीय वास्तु तथा कला के मूल तत्व

(पेपर कोड – 0266)

पूर्णांक – 50

- इकाई –1** हड़प्पा कालीन वास्तु, मौर्य कालीन वास्तु (सांची, भरहुत तथा अमरावती), पश्चिमी भारत के चैत्यगृह तथा विहार— भाजा, कार्ले, कोण्डाने, अंजता और एलोरा।
- इकाई –2** मंदिर वास्तु — गुप्तकालीन मंदिर, चंदेल कालीन, चालुक्य, पल्लव, कलचुरि मंदिर।
- इकाई –3** मूर्तिकला — हड़प्पा कालीन, मौर्यकालीन, शुंगकालीन, कुषाण कालीन (गांधार एवं मथुरा)
- इकाई –4** गुप्तकालीन मूर्तिकला, कलचुरि मूर्तिकला।
- इकाई –5** प्रागैतिहासिक चित्रकला, अंजता और बाघ की चित्रकला, सिंधनपुर की चित्रकला, काबरा पहाड़।

### अनुशंसित ग्रंथ—

- |  |   |                                      |
|--|---|--------------------------------------|
| 1. वासुदेव शरण अग्रवाल                       | — | भारतीय कला भाग—1                     |
| 2. रामनाथ मिश्र                              | — | भारतीय मूर्तिकला                     |
| 3. कृष्णदत्त बाजपेयी                         | — | भारतीय वास्तुकला का इतिहास           |
| 4. वासुदेव उपाध्याय                          | — | प्राचीन भारतीय स्तूप, गुहा एवं मंदिर |
| 5. कृष्णदत्त बाजपेयी एवं संतोष कुमार बाजपेयी | — | भारतीय कला                           |
| 6. सच्चिदानंद सहाय                           | — | मंदिर स्थापत्य का इतिहास             |
| 7. जयनारायण पांडेय                           | — | भारतीय कला                           |
| 8. मारुतिनंदन प्रसाद तिवारी तथा कमल गिरी     | — | भारतीय प्रतीमा विज्ञान               |
| 9. ए.एल. श्रीवास्तव                          | — | भारतीय कला                           |
| 10. A.K. Coomarswami                         | — | History of Indian and Indonesian Art |
| 11. Percy Brown                              | — | Indian Architecture. Vol. —I         |
| 12. Krishnadeva                              | — | Temples of north India               |
| 13. S. Kramrisch                             | — | Hindu Temples Part I & II            |

NAZAF  
20/7/17

Prasanna

**द्वितीय प्रश्न पत्र**  
**(अ) भारतीय पुरातत्व के मूलतत्व**  
**(पेपर कोड-0267)**

**पूर्णांक – 50**

- इकाई-1** पुरातत्व विज्ञान की परिभाषा, विस्तार क्षेत्र, अध्ययन की अन्य शाखाओं से सम्बन्ध ।  
**इकाई-2** भारत में पुरातत्व का इतिहास, प्राचीन स्थलों की खोज, तिथि निर्धारण ।  
**इकाई-3** उत्खनन-विधियाँ, सर्वेक्षण स्तर विन्यास, उत्खनन का लेखा-जोखा ।  
**इकाई-4** भृदभाण्ड, गैरिक भृदभाण्ड, चित्रित धूसर भृदभाण्ड, काले और लाल भृदभाण्ड, उत्तरी कृष्ण मार्जित भृदभाण्ड (एन.वी.पी.) ।  
**इकाई-5** प्रमुख पुरास्थलों का अध्ययन –  
कालीबंगा, एरण, कौशाम्बी, हास्तिनापुर, ब्रह्मगिरी, सिरपुर, मल्हार ।

**अनुशंसित ग्रंथ-**

- |                         |   |                        |
|-------------------------|---|------------------------|
| 1. के. डी. बाजपेयी      | — | मध्यप्रदेश का पुरातत्व |
| 2. आर. एम. व्हीलर       | — | पृथ्वी से पुरातत्व     |
| 3. बी.एन. पुरी          | — | पुरातत्व विज्ञान       |
| 4. जयनारायण पाण्डेय     | — | पुरातत्व विमर्श        |
| 5. राकेश प्रकाश पाण्डेय | — | पुरातत्व विज्ञान       |
| 6. मदन मोहन सिंह        | — | पुरातत्व की रूपरेखा    |

*NAZAF*  
20/7/17

*Ram*

“अथवा”  
द्वितीय प्रश्न पत्र  
(ब)पुराभिलेख एवं मुद्राशास्त्र के मूल तत्व  
(पेपर कोड – 0268)

पूर्णांक— 50

**इकाई—1**

1. प्राचीन भारतीय इतिहास की पुनर्रचना में अभिलेखों का महत्व ।
2. लेखन कला का उद्भव एवं विकास ।
3. अभिलेखों में प्रयुक्त भाषाएँ, लिपियाँ तथा सामग्री ।

**इकाई—2** निम्नलिखित अभिलेखों का ऐतिहासिक महत्व:

1. अशोक का द्वितीय शिलालेख ।
2. अशोक का बारहवां शिलालेख ।
3. हेलियोडोरस का बेसनगर स्तम्भलेख ।
4. रुद्रदामन की प्रयाग प्रशस्ति ।
5. समुद्रगुप्त की प्रयाग प्रशस्ति ।
6. पुलकेशिन द्वितीय का ऐहोल अभिलेख ।

**इकाई— 3**

1. इतिहास की पुनर्रचना में मुद्रा का महत्व
2. मुद्रा का उद्भव तथा प्राचीनता ।
3. आहत सिक्के ।

**इकाई— 4** जनपदीय सिक्के: तक्षशीला, कौशम्बी, एरण, कोसल, जनपद के सिक्के ।

**इकाई— 5** गुप्त सिक्के, महेन्द्रादित्य कुमारदित्य प्रकार के सिक्के, (छत्तीसगढ़ अंचल से प्राप्त), नल नरेशों के सिक्के ।

**अनुशंसित ग्रंथ—**

1. डी.सी. सरकार — इंडियन एनिग्राफी
2. डी.सी. सरकार — सेलेक्ट इन्सक्रिप्शन्स भाग 1 व 2
3. एस. एच. दानी — इंडियन पैलियोग्राफी
4. वसुदेव उपाध्याय — प्राचीन भारतीय अभिलेखों का अध्यय
5. कृष्णदत्त बाजपेयी, कन्हैयालाल अग्रवाल, संतोष कुमार बाजपेयी — ऐतिहासिक भारतीय अभिलेख
6. परमेश्वरी लाल गुप्ता — प्राचीन भारतीय मुद्राएं
7. डी. सी. सरकार — स्टडीज एवं इंडियन क्वाएन्स
8. ए.के. शरण — ट्राइबल क्वाएन्स
9. भास्कर चट्टोपाध्याय — द एज ऑफ दि कुषाणाज: ए न्यूमिस्मेटिक स्टडी
10. ए.एस. अल्टेकर — गुप्तकालीन मुद्राएं
11. राजवन्त राव — प्राचीन भारतीय मुद्राएं

**प्रायोगिक तथा मौखिक परीक्षा**

**पूर्णांक — 50**

1. किसी महत्वपूर्ण पुरातात्विक/ऐतिहासिक स्थान का भ्रमण एवं विवरण प्रस्तुति — 20 अंक
2. पुरावस्तुओं की पहचान —20 अंक
3. मौखिकी —10 अंक

**योग —50 अंक**

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NAZAF  
20/7/17

Rasmi

**ENGLISH LITERATURE**  
**PAPER - I**  
**INDIAN WRITING IN ENGLISH**  
**(Paper Code-0235)**

**M.M.: 75**

All questions are compulsory.

- Note : 1. Unit - I is compulsory. Two passages from each of the units II to V to be set and three to be attempted. (3x5 = 15)
2. Short answer questions from unit VII, seven to be set and five to be attempted. (5x2 = 10)
3. Long-answer questions from unit II to VI. Five questions from each unit with internal choice to be set. (5x10 = 50)

**UNIT-I** Annotations and short answer questions.

**UNIT-II Poetry -**

- |                           |    |                                |
|---------------------------|----|--------------------------------|
| Toru Dutt                 | -  | 'Our Casurina Tree'            |
| Tagore                    | -  | Songs 1 & 103 from 'Gitanjali' |
| Sarojini Naidu            | -  | 'The Ecstasy', 'The Lotus'     |
| <b>UNIT-III</b> Kamla Das | -  | 'The old playhouse'            |
| Gauri Deshpandey          | Or | 'The female of the species'    |
| Jayant Mahapatra          | -  | 'Dawn at Puri'                 |
| K.N. Daruwala             | Or | 'Death by Burial'              |
| Shiv K. Kumar             | -  | 'Indian Women'                 |

**UNIT-IV Prose -**

- |                      |   |                            |
|----------------------|---|----------------------------|
| Nirad C. Choudhary   | - | My Birth Place.            |
| Dr. S. Radhakrishnan | - | The call of the suffering. |

**UNIT-V Drama -**

- |               |    |                                    |
|---------------|----|------------------------------------|
| Girish Karnad | -  | Hayavadana                         |
|               | Or |                                    |
| Tendulkar     | -  | Silence ! The Court is in session. |

**UNIT-VI Fiction -**

- |              |   |       |
|--------------|---|-------|
| R.K. Narayan | - | Guide |
|--------------|---|-------|

**UNIT-VII** 1. Lyric, 2. Subjective poetry, 3. Couplet, 4. Fable, 5. Hymn, 6. Allegory, 7. Autobiography,

**BOOK RECOMMENDED :**

1. Indian Poetry in English, Ed. Hari Mohan Prasad, Sterling Publication.
2. An Introduction to the study of English Literature, B. Prasad.
3. A Glossary of Literary Terms - M.H. Abrams.
4. Prose of To day - M.C. Millan.



**PAPER - II**  
**(A) AMERICAN LITERATURE**  
**(Paper Code-0236)**

All questions are compulsory.

- Note :
1. Unit-I is compulsory. Two passages from each of the units II to V to be set and three to be attempted. (3x5 = 15)
  2. Short answer questions from unit VII, seven to be set and five to be attempted. (5x2 = 10)
  3. Long-answer questions from unit II to VI. (word limit for each answer is 300-400 (words) internal choice to be set. (5x10 = 50)

**UNIT-I** Annotations and short answer question.

**UNIT-II Poetry -**

Waiter Whitman	-	O Captain ! My Captain, when the Lilacs Last in the Dooryard Bloomed.
Carl Sandberg	-	'Who Am I ?', 'I am the People, The Mob'
<b>UNIT-III</b> Emily Dickinson	-	'Hope is the thing with Feather' I Felt a funeral in My Brain'
E.E. Cummings	-	'The Cambridge Ladies'
		'As Freedom is a Breakfast food'

**UNIT-IV Prose -**

William Faulkner	-	Nobel Award Acceptance Speech
W. Carlos Williams	-	In the American Grain
Walt Whitman	-	Preface to "Leaves of Grass"

**UNIT-V Drama -**

Miller	-	All My Sons
	Or	
Eugene O'Neill	-	The Hairy Ape

**UNIT-VI Fiction -**

E. Hemingway	-	A Farewell to Arms
	Or	
W. Faulkner	-	The Sound and the Fury

**UNIT-VII** 1. Naturalism, 2. Realism, 3. Art for Art's sake, 4. Poetic-Drama, 5. Symbolism, 6. American Renaissance, 7. Existentialism.

**BOOK RECOMMENDED :**

1. American Literature, An Anthology, Ed. Fr. Egbert S. Oliver.
2. A Glossary of Literary Terms - M.H. Abrams.

Dr. M. C. Chakraborty  
 Dr. S. Ghosh  
 DR. MERILY ROY



**PAPER - II**  
**(B) 20TH CENTURY LITERATURE IN ENGLISH**  
**(Paper Code-0237)**

The paper will be taught as an optional paper to Paper-II(A) which is a paper on American Literature. The Principle focus will be to probe the students a general background and cultural history of this period and also to make them aware of the Literary trends of the twentieth century. The Paper will comprise six units and in all six questions are to be attempted, one from each unit.

**UNIT-I** The following historical and literary topics will be included in this unit. Students are required to write short notes of not more than three hundred words on any two of the following topics. **(10 Marks)**

- i) The Two world wars.
- ii) The Russian Revolution.
- iii) The Great Depression.
- iv) The Vietnam war.
- v) Freudian Thought
- vi) Existentialism.
- vii) Absurdism.
- viii) Modernism and Post Modernism.
- ix) New Development in fiction and Drama.

**UNIT-II** Ten objective type questions on the life History and major poetical works of the following poets of the twentieth century will be asked in this unit. **(10 Marks)**

- i) W.B. Yeats (1865-1939)
- ii) Siegfried Sassoon (1886-1967)
- iii) Rupert Brooke (1887-1915)
- iv) T.S. Eliot (1888-1965)
- v) Wilfred Owen (1893-1918)
- vi) W.H. Auden (1907-1937)
- vii) Louis Macneice (1907-1963)
- viii) Stephen Spender (1909-)
- ix) Dylan Thomas (1914-1953)
- x) Philip Larkin (1922-1985)

**UNIT-III** (15 marks)

T.S. Eliot	-	'The Waste Land'
	Or	
Wilfred Owen	-	'Disabled'
Siegfried Sassoon	-	'Attack', 'Falling Asleep'
Rupert Brooke	-	'The Hill'
W.H. Auden	-	'Miss Gee'

**UNIT-IV** (15 marks)

Joseph Conrad	-	'Heart of Darkness'
	Or	

**UNIT-V** (10 marks)

Chinua Achebe (Non Fictional Prose)	-	'Things Fall Apart'
Virginia Woolf	-	'The Death of the Moth'
Graham Greene	-	'The Lost Childhood'

**UNIT-VI** (15 marks)

(Drama)	-	
Bernard Shaw	-	'Pygmalion'
	Or	
Samuel Beckett	-	'Waiting for Godot'

*Dr. M. C. Chakraborty*

*Dr. S. Ghosh*

*DR. MERILY ROY*

संस्कृत साहित्य  
प्रथम प्रश्न पत्र  
नाट्य, छंद तथा व्याकरण पुर्णांक – 75

**इकाई-1** अभिज्ञान शाकुन्तलम् (कालिदास)

1. दो श्लोकों की ससन्दर्भ व्याख्या 20
2. एक श्लोक का अनुवाद 10

(प्रथम, चतुर्थ, पंचम और सप्तम अंक, व्याख्या हेतु, द्रुतपाठ – शेष अंक)

**इकाई-2** अभिज्ञान शाकुन्तलम् – समीक्षात्मक प्रश्न 10

**इकाई-3** निर्धारण छन्दों के लक्षण तथा उदाहरण 15

अनुष्टुप्, इन्द्रवज्रा, उपेन्द्रवज्रा, उनजाति, वंशस्थ, आर्या, मालिनी, शिखरिणी, वसन्ततिलका, शार्दूलविक्रीडित, स्त्रग्धरा, मन्दाक्रान्ता।

**इकाई-4** व्याकरण – लघुसिद्धांत कौमुदी

कृदन्त प्रकरण

तव्यत्, अनीयर्, यत्, क्सप्, शत्, शानच्, क्त्वा, ल्यप्, क्त, क्तवतु, ण्वुल, तृच्, ल्युट, अण्

**इकाई-5** व्याकरण – लघुसिद्धांत कौमुदी 10

1. तद्धित प्रत्यय अण्, ढक्, ष्यञ्, त्व, तढक्, अमनिच्, तठक्, अञ्, मतप्, इनि, इतच्, इष्टन्, तरप्, मतप्, ण्य, यञ्।
2. स्त्री प्रत्यय, टाप्, डीष्, डीप्, डीन।

**अनुशंसित ग्रंथ –**

1. शीघ्रबोध व्याकरणम् – डॉ. पुष्पा दीक्षित, पाणिनीय शोध संस्थान, तेलीपारा, बिलासपुर
2. लघुसिद्धांत कौमुदी – श्रीधरानंद शास्त्री
3. संस्कृत हिन्दी कोश – वामन शिवनाथ आपटे
4. छन्दोमंजरी – चौखंबा प्रकाशन

  
Dr. Sushma Tiwari

  
Dr. Dinya Deshpande.

**प्रश्न पत्र द्वितीय**  
**काव्य, अलंकार तथा निबन्ध**  
**(पेपर कोड – 0258)**

**पूर्णांक – 75**

**इकाई-1** किरामार्जुनीय (भारवि) प्रथम सर्ग  
दो श्लोको की ससन्दर्भ व्याख्या 20

**इकाई-2** किरामार्जुनीयम् – आलोचनात्मक प्रश्न 10

**इकाई-3** मूलारामायणम् – वाल्मीकी  
व्याख्या अथवा आलोचनात्मक प्रश्न

**इकाई-4** अलंकार-

उपमा, रूपक, उत्प्रेक्षा, अर्थान्तरन्यास, स्वाभावोक्ति, काव्यालिङ्ग, अतिशयोक्ति, दीपक, विभावना, विशेषोक्ति, अपहृति, दृष्टांत, प्रतिवस्तूपमा, निदर्शना, यमन, शब्दश्लेष, अनुप्रास, अनन्वय, ससन्देह, भ्रान्तिमान् ।

**टिप्पणी :** अलंकारों के लक्षण चन्द्रालोक, साहित्य दर्पण, अथवा काव्य प्रकाश से अध्वेतव्य हैं, उदाहरण पाठ्यक्रमों से भी दिये जा सकते हैं ।

**इकाई-5** निबंध (संस्कृत भाषा में ) 15 वाक्यों में

15

टिप्पणी : निबन्ध समीक्षात्मक अथवा विश्लेषणात्मक न होकर वर्णनारत्मक पूछे जायेंगे ।

**अनुवांशिक ग्रंथ :**

- |                         |   |   |
|-------------------------|---|---|
| 1. संस्कृत निबन्ध शतकम् | — | डॉ. कपिलदेव द्विवेदी, चौखंबा प्रकाशन, वाराणसी |
| 2. निबन्ध पारिजात       | — | डॉ. रजनीकान्त लहरी, चौखंबा प्रकाशन, वाराणसी   |
| 3. रचनानुवाद कौमुदी     | — | डॉ. कपिलदेव द्विवेदी, चौखंबा प्रकाशन, वाराणसी |
| 4. प्रबंध रत्नाकर       | — | डॉ. रमेशचन्द्र शुक्ल, चौखंबा प्रकाशन, वाराणसी |

  
Dr. Sushma Tiwari Dr. Divya Deshpande

**राजनीति विज्ञान**  
**प्रश्न नत्र-प्रथम**  
**अंतर्राष्ट्रीय राजनीति**  
**( पेपर कोड- 0244)**

**पूर्णांक – 75**

- इकाई –1** अंतर्राष्ट्रीय राजनीति का अर्थ, प्रकृति, क्षेत्र, अंतर्राष्ट्रीय राजनीति के अध्ययन के उपागम।
- इकाई-2** अंतर्राष्ट्रीय राजनीति के विभिन्न सिद्धांत – शक्ति, परिभाषा, तत्त्व।  
शक्ति संघर्ष, शक्ति संचय, शक्ति वृद्धि, शक्ति प्रदर्शन।
- इकाई-3** शक्ति सन्तुलन की अवधारणा – सैद्धांतिक लाभ एवं मुल्यांकन।  
शांति एवं सुरक्षा की आवश्यकता – सामूहिक सुरक्षा का सिद्धांत।
- इकाई –4** राजनय परिभाषा, प्रकार, कार्य, उद्देश्य एवं साधन निःशस्त्रीकरण – अर्थ, परिभाषा एवं विकास, निःशस्त्रीकरण के मार्ग की बाधाएं एवं निराकरण
- इकाई-5** अंतर्राष्ट्रीय राजनीति के नए प्रतिमान :  
1. पर्यावरणवाद,  
2. वैश्वीकरण,  
3. मानव अधिकार,

**संदर्भ ग्रन्थ –**

1. महेन्द्र कुमार – अन्तर्राष्ट्रीय राजनीति के सैद्धांतिक पत्र
2. विजय कुमार अरोरा – अन्तर्राष्ट्रीय राजनीति
3. दीनानाथ वर्मा – अन्तः संबंध – ज्ञानदर प्रकाशन, दिल्ली
4. मथुरालाल शर्मा – अन्तः संबंध – 1945 से, कॉलेज बुक डिपो, जयपुर
5. डी.सी. चतुर्वेदी – अन्तः संबंध – 1945 से, वर्तमान तक, रस्तौगी प्रकाशन, मेरठ
6. रमेश भारद्वाज – नवीन विश्व व्यवहार और भारती विदेश नीति
7. पंत एवं जैन – अन्तर्राष्ट्रीय संबंध, मीनाक्षी प्रकाशन, मेरठ
8. बी.के. खन्ना एवं अरोरा – भारतीय विदेशनीति के नये आयाम, डी. के. प्रकाशन, नई दिल्ली
9. Palmar and Prkins - International Relations.
10. R. Aron - Peace & war - A theory of International Relations, London.
11. Organski - World Politics
12. C.P. Schliccher - International Relations, Co-operation and Competition.
13. J. Frankel - The making of Foreign policy, london, 1963.
14. H.J. Morgenthau - Politics Among Nations, 6th addition, New York, 1985.
15. K.N. Waltz - Theory of International Politics, Addison - Wesley, 1979.

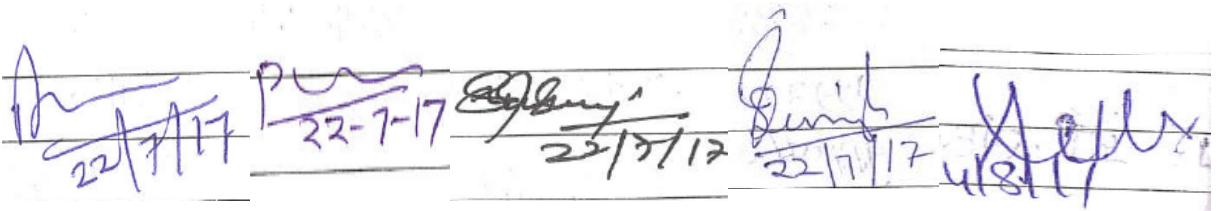
**प्रश्न पत्र— द्वितीय**  
**लोक प्रशासन**  
**(पेपर कोड – 0245)**

**पूर्णांक – 75**

- इकाई –1** लोकप्रशासन का अर्थ, प्रकृति एवं क्षेत्र  
एक अनुशासन के रूप में लोक प्रशासन का मुल्यांकन लोक प्रशासन एवं व्यक्तिगत प्रशासन में समानताएं एवं व्यक्तिगत प्रशासन में समानताएं एवं असमानताएं।
- इकाई –2** लोक प्रशासन के अध्ययन की पद्धति एवं उपागम,  
नवीन लोक प्रशासन।
- इकाई– 3** राजनीति एवं लोकप्रशासन  
प्रशासनिक व्यवहार— नेतृत्व, निर्णय, निर्माण यंचार, जवाबदेही।
- इकाई–4** नौकरशाही एवं बजट प्रक्रिया  
वैश्वीकरण एवं उदारीकरण के युग में लोक प्रशासन के नये आयाम।
- इकाई –5** प्रशासन पर विधायी नियंत्रण,  
प्रशासन पर न्यायिक नियंत्रण।

**संदर्भ ग्रंथ –**

- |                          |  |
|--------------------------|--|
| 1. सी.पी. भाम्भरी        | — लोक प्रशासन की सिद्धांत                                  |
| 2. पी.डी. शर्मा          | — भारत में लोक प्रशासन                                     |
| 3. खान एवं वर्मा         | — प्रशासनिक विचारधाराएं, भाग 1, 2                          |
| 4. इन्द्रीजीत कौर        | — लोक प्रशासन, साहित्यभवन, आगरा                            |
| 5. जे. पह शर्मा          | — लोक प्रशासन रायपुर                                       |
| 6. आर. बसु               | — लोक प्रशासन, नई दिल्ली, जवाहार पब्लिशर्स                 |
| 7. बी. एल. फातिया        | — लोक प्रशासन – सहित्य भवन, आगरा                           |
| 8. निशा वशिष्ठ           | — भारत में नौकरशाही की कार्यप्रणाली                        |
| 9. सी.एन. चतुर्वेदी      | — तुलनात्मक लोक प्रशासन, जयपुर (कॉलेज बुक डिपो)            |
| 10. Pfittner J.M.        | — Public Administration.                                   |
| 11. White L.D.           | — Introduction to the Principles of Public Administration. |
| 12. Bhambhari C.P.       | — Bureaucracy and Politics in India, Delhi Vikas 1971.     |
| 13. Bhattacharya M.      | — Public Administration.                                   |
| 14. Maheshwari S.R.      | — Indian Administration system.                            |
| 15. Awasthi & Maheshwari | — Public Administration.                                   |

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**ECONOMICS**  
**PAPER - I**  
**DEVELOPMENT AND ENVIRONMENTAL ECONOMICS** **M.M. 75**  
**(Paper Code-0242)**

**UNIT-I** Economic Growth and Development - Factors affecting economic growth, Capital and Technology Development & under development, Population of Under-developed Countries, Poverty - Absolute & Relative, Measuring development and Underdevelopment, gap per capita income, inequality of income and wealth.

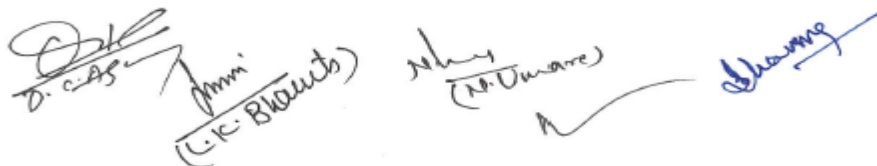
Human Development index GDI, GEM, Poverty Index of development & Quality of life.

**UNIT-II** Population problem and growth, pattern of population. Theory of demographic transition. Population poverty & Environment. Theory of Social Change Immutable laws of Capital Development - Crisis in capitalism. Karl Marx - Theory of Development, Mahalanobis four sectoral Model. Schumpeter's development in Capitalistic economy, Big-Push Balance and unbalanced Growth, Critical Minimum Effort thesis, Low Income Equilibrium Trap-Dualism : Technical, Behavioural & Social.

**Unit-III** Harrod and Domar Growth Model, Neo Classical models, Solow, Meade & Mrs. Joan Robinson's Growth model, Unlimited supply of Labour.

**UNIT-IV** Environment and Ecology : Economic linkage, Environment as a necessary and luxury, Population environment linkage, Environmental use & environmental disruption as an allocation problem. Market failure for environmental goods, environment as a public good, the Common problem. Property Human right approach to environmental problem, valuation of environmental damages-land, water, air & forest Pollution Control-Prevention. Control and abatement of pollution Choice of policy instruments in developing Countries, Environmental legislation Indicators of Sustainable Development, environmental accounting.

**UNIT-V** Concept of Intellectual Capital - Food Security, Education Health & Nutrition, Efficiency & Productivity in Agriculture New Technology & Sustainable Agriculture, Globalization & Agriculture growth, the Choice of Technique & appropriate technology & employment. Role of Monetary & Fiscal policies in developing Countries.

The bottom of the page features several handwritten signatures and initials in blue ink. From left to right, there is a signature that appears to be 'D. C. AS', followed by 'Jmmi' and '(L.K. Bhowmik)', then 'shy' and '(R. Umare)', and finally a signature that looks like 'Sharma'.

**PAPER - II**  
**STATISTICAL METHODS**  
**(Paper Code-0243)**

**M.M. 75**

- UNIT-I** Statistical Methods Statistics - Definition Statistical Data, Statistical Methods, Functions of Statistics. Importance of Statistics, Limitations of Statistics. Statistical Survey & Report writing. Collection of Data, Primary & Secondary Data, Sampling & Sampling Designs. Sampling Errors, Frequency Distribution, Diagrammatic & Graphic Presentation.
- UNIT-II** Central Tendency. Measurement of Mean, Median, Mode, Geometric Mean & Harmonic Mean and their uses.
- UNIT-III** Dispersion : Meaning of Dispersion, Properties good measure of Variation - Methods of Dispersion Range, Quartiles Deviation - Mean Deviation, Standard Deviation, Coefficient of Variation, Lorenz Curve, Skewness & Kurtosis.
- UNIT-IV** Coefficient of Correlation - Karl Pearson's Method, Probable Error, Spearman's Rank Correlation Coefficient.
- UNIT-V** Index Number - Construction of Index Numbers Simple & weighted Index Number's-Fisher's Ideal Index Number & Reversal Test. Consumer Price Index Numbers and Time Series Analysis - components of Time-Series.
- Measurement of Trend - Graphic Method, Semi Average Method. Moving averages, Least Square Method, Measuring Trend by logarithms.

**BOOK RECOMMENDED:**

1. Salvalore, D.L. (1997), International Economics, Prentice Hall, Upper Saddle River, N.J.
2. Sodersten, Bo (1991), International Economics, Macmillan Press Ltd. London.
1. Aggarwal, M.R. (1979), Regional Economic Cooperation in South Asia, S. Chand and Co. New Delhi.
2. Bhagwati J. (Ed.) (1981), International Trade, Selected Readings, Cambridge University Press, Mass.
3. Creckjell A. (1982), International Money, Issue and Analysis, E.I.B.S and Nelson, London.
4. Greenaway, D. (1983) International Monetary Economics, Prentice Hall India.
5. Joshi V. and I.M.D. Little (1998), India's Economic Reforms, 1999-2001, Oxford University Press, Delhi.
6. Panchmukhi, V.R. (1978) Trade Policies of India : A Quantitative Analysis, Concept Publishing Company. New Delhi.
7. Patel, S.J. (1995) Indian Economy Towards the 21st Century. University Press Ltd. India.
8. Singh M. (1964), India Export Trends and the Prospects for sustained growth Oxford University Press, Oxford.

Handwritten signatures and initials at the bottom of the page, including "D.C. AS", "C.K. Bhattacharya", "Neha (not sure)", and "Sharma".

**इतिहास**  
**प्रश्न-पत्र प्रथम**  
**भारत का इतिहास सन् 1761 ई. से 1950 ई. तक**  
**(पेपर कोड-0240)**

**पूर्णांक 75**

**उद्देश्य :** इस पाठ्यक्रम का उद्देश्य आधुनिक काल में भारत के राजनीतिक, सामाजिक आर्थिक एवं सांस्कृतिक इतिहास से विद्यार्थियों को अवगत कराना है ।

**इकाई-1**

1. ब्रिटिश साम्राज्य का विस्तार एवं सुदृढीकरण – युद्ध एवं कुटनीति – कनार्टक युद्ध
2. ब्रिटिश साम्राज्य का विस्तार एवं सुदृढीकरण – प्लासी एवं बक्सर
3. सहायक संधि एवं हड़प् नीति (व्यपगत का सिद्धांत)
4. ब्रिटिश प्रशासन एवं सुधार – बेंटिंग, लिटन, रिपन, कर्जन

**इकाई-2**

1. वाणिज्यवाद – उद्योगों का पतन
2. वाणिज्यवाद – व्यापार का पतन
3. कृषि का ह्रास एवं कृषक आन्दोलन
4. भूराजस्व व्यवस्थाएं – स्थाई बन्दोबस्त, रैयतवाड़ी, महालवाड़ी

**इकाई-3**

1. भारतीय पुनर्जागरण – ब्रह्म समाज, आर्य समाज, प्रार्थना समाज,
2. श्रामकृष्ण मिशन, थियोसोफिकल सोसायटी, अलीगढ़ आन्दोलन
3. पाश्चात्य शिक्षा का विकास एवं प्रेस
4. विभिन्न सामाजिक वर्ग – कृषक, मजदूरी, मध्यम वर्ग एवं महिलाएं

**इकाई-4**

1. राष्ट्रवाद का उदय एवं 1857 की क्रांति
2. भारतीय राष्ट्रीय कांग्रेस – उदारवादी, उग्रवादी
3. क्रान्तिकारी आन्दोलन गांधीवादी आन्दोलन

**इकाई-5**

1. साम्प्रदायिकता : उदय एवं विकास
2. सुभाषचन्द्र बोस एवं आजाद हिन्द सेना
3. भारत का संवैधानिक विकास : 1919 ई. – द्वैध शासन 1935 – प्रान्तीय स्वायत्तता
4. भारत की स्वतंत्रता तथा भारतीय संविधान की विशेषताएं।

**संदर्भ ग्रंथ :**

- |                    |   |  |
|--------------------|---|--|
| 1. Sarkar and Dutt | — | Modern India (English and Hindi Version)   |
| 2. Singh, Nihal    | — | Landmarks in Indian Constitutional Development and National Movement.  |
| 3. Agrawal R.C.    | — | Indian Constitutional Development and National Movement in India.  |
| 4. राधेशरण         | — | भारत की सामाजिक एवं आर्थिक संरचना और संस्कृति के मूल तत्व (आदिकाल से 1950 ई. तक) (म.प्र. हिन्दी ग्रंथ अकादमी का प्रकाशन) |

Narain  
20/7/17

Ramesh



5. मिश्रा जे.पी	—	आधुनिक भारत का इतिहास
6. नागौरी एस.एल. लाल	—	आधुनिक भारत का इतिहास
7. गोवर बी.एल.	—	आधुनिक भारत का इतिहास
8. दुबे सत्यनारायण	—	आधुनिक भारत का इतिहास
9. मजूमदार दत्त राय चौधरी	—	भारत का वृहत इतिहास
10. जैन एम.एस.	—	आधुनिक भारत का इतिहास
11. सिंह प्रपात	—	आधुनिक भारत का सामाजिक एवं आर्थिक इतिहास
12. सिंह प्रपात	—	आधुनिक भारत (1858—1919)
13. सिंह प्रपात	—	आधुनिक भारत (1919—1950)
14. दिल्ली विश्वविद्यालय प्रकाशन	—	आधुनिक भारत का इतिहास
15. दिवाकर ब्रज मोहन	—	आधुनिक भारत
16. छाबड़ा जी. एस.	—	आधुनिक भारत का इतिहास (तीन खण्डों में)
17. नगपाल ओभ	—	भारत का राष्ट्रीय आन्दोलन और.....
18. सीता राम शर्मा	—	उन्नीसवीं सदी भारतीय धार्मिक तथा सामाजिक जागरण
19. डॉ. सीताराम जी 'श्याम '	—	भारतीय स्वतंत्रता संग्राम की रूपरेखा
20. विपिन चन्द्रा	—	भारत का स्वतंत्रता संग्राम
21. रामलखन शुक्ल	—	आधुनिक भारत
22. रमेशचन्द्र दत्त	—	ब्रिटिश भारत का आर्थिक इतिहास
23. डॉ. आयोध्यासिंह	—	भारत का मुक्ति संग्राम
24. डॉ. एग्नेस ठाकुर	—	आधुनिक भारत का इतिहास

Narap  
20/7/17



**प्रश्न- पत्र द्वितीय**  
**विश्व इतिहास – सन् 1871 ई. से 1945 ई. तक**  
**(पेपर कोड – 0241)**

**पूर्णांक 75**

**उद्देश्य :** इस पाठ्यक्रम का उद्देश्य विश्व इतिहास की प्रमुख घटनाओं से विद्यार्थियों को अवगत कराना है साथ ही अन्तर्राष्ट्रीय परिदृश्य का ज्ञान भी इन्हें देना है ।

**इकाई-1**

1. फ्रांस का तृतीय गणतंत्र
2. बिस्मार्क – सह एवं विदेश नीति
3. विलियम द्वितीय की विदेश नीति
4. अफ्रीका का विभाजन

**इकाई-2**

1. जापान का आधुनिकीकरण
2. रूस – जापान युद्ध : कारण एवं परिणाम
3. चीन की क्रान्ति – कारण एवं परिणाम
4. डाफ. सन-यत-सेन

**इकाई-3**

1. पूर्वी समस्या- बलिदान कांग्रेस, युवा तुर्क आन्दोलन
2. बाल्कन युद्ध : कारण एवं परिणाम
3. प्रथम विश्व युद्ध : कारण एवं परिणाम
4. रूस की क्रान्ति 1917

**इकाई-4**

1. वर्साई की संधि
2. फासीवाद – मुसोलिनी
3. नजीवाद – हटलर
4. जपान का सैन्यवाद – तोजो

**इकाई-5**

1. राष्ट्रसंघ : स्थापना एवं विल्सन के 14 सूत्र
2. द्वितीय विश्वयुद्ध – कारण एवं परिणाम
3. संयुक्त राष्ट्र संघ – स्थापना एवं संगठन
4. संयुक्त राष्ट्र संघ – उपलब्धियां

**अनुशंसित ग्रंथ :**

- |                         |   |
|-------------------------|---|
| 1. Grant and Temperley  | - Europe in the 19th and 20th Century (also Hi-- Version) |
| 2. Kettelby             | - History of the Modern Times                             |
| 3. Moon                 | - Imperialism in World Politics                           |
| 4. Plamor & Parkins     | - International Politics                                  |
| 5. Parks, Hengy Bamford | - The United States of America A History                  |

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- |     |                                  |   |
|-----|----------------------------------|---|
| 6.  | Panikkar K.M.                    | - Asia and Western Dominance  |
| 7.  | Schuman                          | - International politics  |
| 8.  | Taylor, A.J.P.                   | - Struggle for Mastery over Europe  |
| 9.  | Vinacke, H.M.                    | - A History of Far East in Modern Times   |
| 10. | Fay                              | - Origins of the World War  |
| 11. | Robert. Engong                   | - Europe since waterloo   |
| 12. | Manazir Ahmad                    | - Europe ka Itihas (in Hindi)   |
| 13. | Satyaketu Vidyalkar              | - Sudurpurva ka Itihas (in Hindi)   |
| 14. | Deonath Verma                    | - Aungla ka Itihas (in Hindi)   |
| 15. | वर्मा भगवान सिंह                 | — विश्व इतिहास की प्रमुख धारायें (1871—1956)<br>(म.प्र. हिन्दी ग्रंथ अकादमी का प्रकाशन) |
| 16. | शर्मा भथुरालाल एवं बघेला हेतसिंह | — युरोप का इतिहास (1789—1945) : एक शोध पूर्ण<br>अध्ययन एवं माधुर कौशिक इत्यादि          |
| 17. | अहमद लइक                         | — आधुनिक विश्व का इतिहास  |

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## **G E O G R A P H Y**

1. The B.A. Part III Examination in Geography will be of 150 marks. There will be two theory papers and one practical each of 50 marks as follows :  
Paper – I            Resource and Environment  
Paper – II            Geography of India (with special reference to Chhattisgarh)  
Paper – III           Practical Geography
2. Each theory paper shall be of three hours' duration.
3. Candidates will be required to pass separately in theory and practical examinations.
4. Each theory paper is divided into five units.
5. (a) In the practical examination the following shall be allotment of time and marks.

i) Lab work	-	20 marks	up to three hours
ii) Survey	-	10 marks	Two hours
iii) Field Report	-	10 marks	
iv) Practical Record and viva-voce	-	10 marks	

(b) The external and internal examiners shall jointly submit marks.

(c) The candidates shall present at the time of the practical examination their practical records regularly signed by the teachers concerned.

### **PAPER - I**

#### **RESOURCES AND ENVIRONMENT**

**M.M. 50**

**(Paper Code-0248)**

#### **A. Resources**

**UNIT-I** Meaning, nature and components of resources and environment. Resources and environment interface. Classification of resources : renewable and nonrenewable : biotic (forests, wild-life, live-stock, fisheries, agricultural crops) and abiotic (land, water, mineral)

**UNIT-II** Distribution and utilization of water mineral and energy resources, their economic and environmental significance and conservation. Types and distribution of forests, fauna and fisheries, their economic, and environmental significance and conservation. Major soil types and their distribution; problems of soil erosion and soil conservation.

**UNIT-III** Number, density, growth and distribution of population; population pressure and resource utilization.

#### **B. Environment**

**UNIT-IV** Classification of environment: Natural and Human. Man environment interrelations with respect to population size, types of economy and technology; exploitation of natural resources and environmental hazards.

**UNIT-V** Emerging environmental issues - population explosion; food security; deforestation; global warming, conservation of bio-diversity; sustainable development.



**PAPER - II**  
**GEOGRAPHY OF INDIA**  
**(With Special reference to Chhattisgarh)**  
**(Paper Code-0249)**

**M.M. 50**

**UNIT - I** Physical features : Structure, Relief and Physiographic regions, Drainage, Climate-origin and mechanism of monsoon, and regional and seasonal variation.

**UNIT-II** Natural resources : Soils - types, their distribution and characteristics. Water resources (major irrigation and hydel power projects); Forests-types, distribution, economic significance and conservation. Mineral and Power resources-Iron-ore, Manganese, Copper, Coal, Petroleum and Natural gas, Non conventional sources of energy.

**UNIT-III** Cultural Features : Agriculture - Major crops, impact of green revolution and agricultural regions; Industries - Iron and steel, Cotton Textile, Cement, Sugar, Population - growth, density and distribution. Transport, Foreign Trade.

**UNIT-IV** Chhattisgarh :

Physical Features : Structure, Physiography, Drainage, Climate, Soils, Natural vegetation, Water resources - availability and development. Mineral and Power resources, Power projects.

**UNIT-V** Chhattisgarh :

Cultural features : Agriculture, Industries, Population - growth, distribution and density, social groups, literacy and sex-ratio, urbanisation. Major tribes-their habitat, economy and society. Transport and Tourism.

**SUGGESTED READING :**

1. Sharma, T.C. and Coutinho, O. : Economic and Commercial Geography of India, Vikas Pub. House, New Delhi, 1988.
2. Singh, R.L. (Ed.) : India : A regional Geography, Nat. Geog. Soc. of India, Varanasi, 1971.
3. Spate, O.H.K. and Learmonth, A.T.A. India and Pakistan : A General and Regional Geography, Methuen & Co. Ltd. London, 1967.
4. Tiwari, R.C. : Geography of India, Prayag Pustak Bhawan. Allhabad, 2003.
5. प्रमीला कुमार (सम्पादक) : मध्यप्रदेश का प्रादेशिक भूगोल, म.प्र. हिन्दी ग्रंथ अकादमी, भोपाल
6. अग्रवाल प्रेमचंद : भारत का भौतिक भूगोल

**PAPER - III**  
**PRACTICAL GEOGRAPHY**

**M.M. 50**

**UNIT-I** Band graph, Hythergraph and Climograph. Square root, cube-root and vernier scales.

**UNIT-II** Map Projection : Conical Projection : one standard parallel, two standard parallels, Bonne's, Ployconic, Polar Zenithal Projections; Gnomonic, Stereographic and Orthographic.

**UNIT-III** Study and Interpretation of Indian topographical sheets : classification and numbering system, Interpretation of topographical sheets with respect to cultural and physical features.

**UNIT-IV** Surveying - Plane Table Survey, Basic Principles of plane table surveying, Plane table survey including intersection and resection.

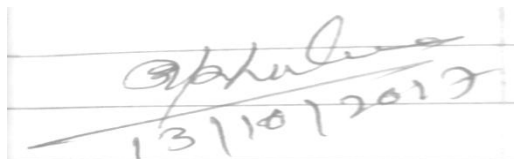
**UNIT-V** Importance of field work in Geography. Field work and field report : physical, social and economic survey of a micro-region.

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**MUSIC**  
**PAPER - I**  
**THEORY OF INDIAN MUSIC, VOCAL/INSTRUMENTAL**      **M.M.:50**  
**(Paper Code-0264)**

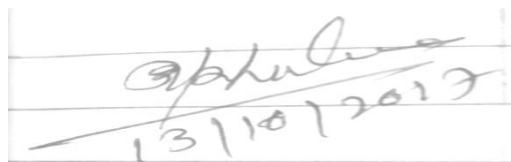
- I. Definitions and Elementary Knowledge of the following terms : Shruti, Gram, Murchana, Jaati, Sadaj-Pancham Bhav, Sadaj-Madhyam Bhav, Sada-jantar Bhav, Chatuh Sarana by acharya Bharat, Praman Shruti, Kaku Bhed, Jhala, Razakhani gat, Maseetkhani gat, Toda.
- I. Introduction of Harmony and Melody Characteristics and comparative study of Harmony and Melody.
- III. Methods of Placement of swars :
  - (a) Method of placing shudha and Vilkrit Swaras on Veena by Ahobal, Pt. Srinivas and Pt. V.N. Bhatkhande.
  - (b) Shruti Swar system of different granthakars (authors) Ancient, Medieval and Modern period.
- IV. Evolution and Development of Swar Saptaka of western and Indian scales :
  - (a) Phthogorian Scale.
  - (b) Scale from Sadaj-Pancham Bhav,
  - (c) Scale from Sadaj-Madhyam Bhav,
  - (d) Equally tempered Scale
  - (e) Diatonic Scale
  - (f) Mean tempered Scale
  - (g) Concept of Acharya Bharat and Bilawal Thata.
  - (h) Chromatic Scale.
- V. Definition and prime elements of Gharana and their history.  
Gwalior, Agra, Kirana, Patiyala, Jaipur, Senia Gharana of Instrumental Music.
- VI. Difinition of Gram and Gram Bhed -  
Sadaj Gram, Madhyam Gram, Gandhar Gram and their Swaras.
- VII. Writing of Talas in Natation with Dugun and Chaugun layakaris in all the Talas prescribed in Ist and IInd Year.

  
13/10/2017

**PAPER - II**  
**THEORY OF MUSIC, VOCAL/INSTRUMENTAL**  
**(Paper Code-0265)**

**M.M.:50**

1. Study of Theoretical details of Ragas prescribed for practical course and their comparative study.
2. Writing in notation of Bandish / Gat of prescribed Ragas.
3. Biographics and contributions of the musicians : Haddu - Hassu khan, Inayat Kan, Pandit Omkar Nath Thakur, Matang, Ramamatya, Srinivas, Lochan, Hrideya Narayan Dev, Somnath, Bhav Bhatta.
4. History of Indian Music : Medieval and Modern period; Analytical study of the styles, position and effects of granthkaras and eminent musician of medieval and modern Period.
5. Classical Music and Folk Music : Comparative study of Classical and Folk music. Intensive study of the Folks of Chhattisgarh.
6. Voice-Culture : Definition, Importance and utility of voice-culture. Construction of throat and production of sound. General scientific methods of voice-culture.
7. Guided listening to Radio and T.V. national Programmes of Indian classical Music and ability to write their critical appreciation.
8. Essay on topics related to music.

  
13/10/2017



**PRACTICAL  
VOCAL/INSTRUMENTAL**

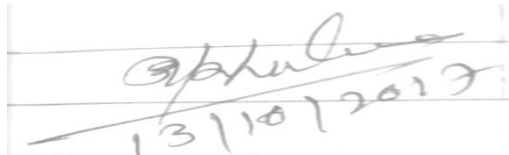
- I. Study of Eight Ragas from the following :  
Ramkali, Jaijaiwanti, Miyan ki Malhar, Pooriya, Basant, Bahar, Darbavi Kanhada, Miyan ki Todi, Adana, Kalavati, Hansdhwani, Shuddhkalyan, Pooriyadhamashri, Marwa.
1. Two Vilambit Khayalas / Maseethkhani Gats in any of the above mentioned Ragas with Alap and Tanas / Todas.  
One Vilambit Khayalas / Maseethkhani / Gat choice Raga and one asked by the examiner.  
(5+5 = 10 marks)
3. Lakshan Geets, Sargams, Madhayalaya Khyals / Razakhani Gats with Tanas / Todas in all the eight Ragas. (5+5 = 10 marks)
4. Study of One Dhrupad and one dhamar with Dwigun, Trigun Chaugun / study of Two Madhayata gats in other than Trital out of the Ragas prescribed in the course. 8 marks
5. Study of one Tarana, One Bhajan / One Dhun. 4 marks
6. Ability to demonstrate (orally by given Tali Khali on hand) Talas prescribed in 1st year and IInd year Matta Tala, Panjabi Trital, Ganesh Tal, Rudra Tala. 4 marks

**SESSIONAL WORK**

1. Keeping upto date practical and theory note Books. Attendance and activities in the class and college.
2. Ten descriptions of Music programmes of Radio, T.V. or personally attended.

**BOOK RECOMMENDED:**

1. Kramik pustak Malika Part I, II, III, IV by Pt. V.N. Bhatkhande.
2. Sangeetanjali Part I, II, III, IV, V, VI by Pt. Omkarnath Thakur.
3. Raga Vigyan Part I, II, III, IV, V by Pt. V.N. Patvardhan.
4. Rag Bodh. B.R. Devdhar, Part I, II & III.
5. Sitar Vadan, S.G. Vyas.
6. Sangeet Visharad, Vasant
7. Sangeet Bodh - S.C. Paranjape
8. Sangeet Darshika - Navigopal Banerjee
9. Sangeet Shastra Darpan - Shanti Gowardhan Part I, II & III
10. Dawadhavi and Sangeet - Lalit Kishore singh
11. Shrimallakshay Sangeetam - Chatur Pandit.



**PSYCHOLOGY**  
**PAPER - I**  
**PSYCHOLOGICAL STATISTICS**  
**M.M.:50**

**(Paper Code-0250)**

**UNIT-I** Statistics: Meaning and application in Psychology, nature of score, categorical and continuous variables, frequency distribution, Graphic representation of data.

**UNIT-II** Measures of Central Tendency : Mean, Median and mode of group and un group data, Measures of variability : Range, S.D., Q.D., A.D., applications of measures of central tendency and variability.

**UNIT-III** Nature and characteristics of normal probability curve : concept of skewness and Kurtosis, Correlation : Concept, Types and methods - rank difference and product moment (in ungrouped data), Biserial and Tetrachoric coefficient.

**UNIT-IV** Inferential statistics: Concept of null Hypothesis, level of significance, type I error & type II error, T-test (uncorrelated data)

**UNIT-V** Distribution free statistics: Chi-square, Median and sign test, applications of computer in psychological statistics.

**REFERENCES:**

1. Siegel S., (1994) Non parametric statistics New York : Mcgraw Hill  
Garret: Statistics in Psychology and Education Times of India Publisher.
2. कपील एस. के. – सांख्यिकी के मूल तत्व  
गैरेट— मनोविज्ञान एवं शिक्षा में सांख्यिकी

*U. Chhabra*  
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**PAPER - II (Optional)**  
**(A) HUMAN DEVELOPMENT**  
**(Paper Code-0251)**

**M.M.:50**

Candidate has to opt. any one of the following Optional papers.

**UNIT-I** Concept of Human Development, Theories of Human Development: Psychoanalytical and Maslow, Determinants of Human Development - Biological, social, cultural factors, Approaches to study human developments: Longitudinal and cross - sectional.

**UNIT-II** Socialisation : Role of family, peers and school, Media and socialisation, Ecological factors in Human Development, Cognitive Development : Theoretical Perspectives Piaget, Information Processing, Vygotsky.

**UNIT-III** Self and Identity : Emergence of self, Development of personal identity, identity crises, Physical and sexual maturation, Sequential development of emotions.

**UNIT-IV** Development of morality and self concept, Development of gender differences and gender roles. Role of marriage, family and occupation in Human Development.

**UNIT-V** Problems of Aging - Cognitive, conative, affective, Developmental Disabilities.

**BOOK RECOMMENDED :**

1. Berk L.E. (1989) Child Development. Boston : Allyn and Bacon.
2. Santrock J.W. (1999) Lifespan development. New York McGraw Hill.
3. E.B. Hurlock (1997) Development Psychology : A life span approach. V, edition.
4. शाह गोवर्धण — विकासारात्मक मनोविज्ञान



**PAPER - II (Optional)**  
**(B) ENVIRONMENTAL PSYCHOLOGY**  
**(Paper Code-0252)**

**M.M.:50**

**UNIT-I** Evaluating environmental ethics from values about nature in the ancient India systems. Earth as a living system, Psychological approaches to environment : Eco cultural Psychology (Berry), Bio-social Psychology (Dawson), Ecological Psychology (Berkar) Person Environment Transactions (Sokol, Itelson)

**UNIT-II** Effects of environment on behaviour : Noise pollution chemical Pollution, crowding and personal space. Effect of behaviour on environment : Perception, Preferences and awareness of environment.

**UNIT-III** Human Nature and environmental problems : Pro-social and pro environment behaviours, Eco-systems and their components Demography : Mortality and fertility, Resource Use : Common Property resources, Sustainable Development, Ecology : Acculturation and Psychological adaptation.

**UNIT-IV** Methods : Naturalistic observation and field surveys. Environmental Assessment : Naturalistic observation and field surveys Socio - Psychological dimensions of environments impact Environmental deprivation : Nature and consequences, Creating environmental awareness - Social Movements : Chipko, Tehri Narmad.

**UNIT-V** Application of Psychology in man environment fit : Education - Classroom environment, Industry - Industrial / Organisational effectiveness, Health - Physical, mental and spiritual, Social - Communal harmony and National integration.

**REFERENCES :**

1. Goldsmith E. (1991) - The way : The ecological world vic Boston : Shambhala.
2. Jain U (1987) The Psychological consequences of crowding New Delhi : Sage.
3. Mishra R.C. Sinha D & Berry, J.W. (1996) Ecology, Community and life style, New Delhi.

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## PSYCHOLOGY PRACTICALS

M.M.:50

This paper carries 50 marks. It comprises of two parts. Part A comprises of psychological experiments and testing while part B comprises of completion of Project Report.

### PART - A

**Note :** From the following experiment any 5 are to be done-

1. Bilateral transfer of training.
2. Measurement of Illusion.
3. Habit interference.
4. Effect of need priority on selection of Advertising material.
5. Effect of mental fatigue upon performance.
6. Reaction Time
7. Effect of frustration on learning.
8. Depth Perception.

**Note :** From the following tests any 4 are to be done-

1. Level of aspiration
2. Need for guidance
3. Maturity scale
4. Attitude Scale.
5. Classroom environment scale.
6. Mental health
7. Family environment test
8. Test of Moral values.

### PART - B

The candidate will be allotted a topic of project by the departmental committee. He/she is required to carry out a small scale project based on small sample. He/she is required to complete the project and submit its report. 15-20 pages, covering all major steps of scientific enquiry under the supervision of the departmental teacher. This will be the part of practical work. The suggested areas for the project work are as under Mental health, sibling rivalry, deprivation, identity crises, drug abuse, aging, media effect, woman employment, Job satisfaction, stress, stress management, problems of adolescent etc.

### DISTRIBUTION OF MARKS

Conduction of Experiment	-	10 marks
Administration of test	-	10 marks
Evaluation of Project Report and Practical record	-	10 marks
Viva - Voce	-	10 marks

**Note :** Candidate is required to attend practical work regularly. His/Her attendance should not be less than 75%. If his / her practical work performance is not satisfactory, he / she shall be debarred from the examinations.

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U. W. Chaturvedi  
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**ANTHROPOLOGY**  
**PAPER-I (Paper Code-0275)**  
**"FUNDAMENTALS OF HUMAN GENETICS & HUMAN GROWTH"**

AIM- The aim of this paper is to introduce the students the basics of Human Genetics and Human Growth.

**UNIT-I** Human Genetics : aims and scope. Cell division : Mitosis and Meiosis. Mendelism, Chromosomes ; Normal and Abnormal chromosomes. Genes, concept of DNA & RNA. Types of Inheritance : autosomal, (Dominant and Recessive). Sex linked Inheritance.

**UNIT-II** Concept of Race. Formation of Racial groups. Criteria for racial classification. Racial elements in India. Major stocks of the world and their broad sub divisions.

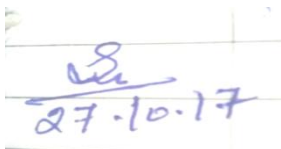
**UNIT-III** Types of twins and their importance in genetic investigation. Inheritance of ABO Blood groups, P.T.C., Colour blindness and dermatoglyphics. Genetic counselling, Eugenics. Population Genetics.

**UNIT-IV** Definition and scope of Human growth. Methods of studying human growth and Development. Ageing, Nutritional requirement for normal growth. Common nutritional disorder (Protein, Fat, Carbohydrates, Mineral, Vitamin).

**UNIT-V** Ecology : definition and scope. Varieties of human ecosystems. Environmental Population. Definition, nature and scope of biological demography. Demographic Profiles : Fertility, Mortality, Morbidity.

**RECOMMENDED READINGS :**

- |                                 |   |                                     |
|---------------------------------|---|-------------------------------------|
| 1. Agrawal S.N.                 | : | India Population Problems           |
| 2. Bogue                        | : | Principles of Demography            |
| 3. Bresler                      | : | Human Ecology                       |
| 4. Gran and Shamir              | : | Methods of Research in Human Growth |
| 5. Harri.II.                    | : | Biochemical Genetics Man            |
| 6. Harrison. A.E. (editor)      | : | Human Biology                       |
| 7. Phyllis and Home, P.S.       | : | Basic nutrition in health & disease |
| 8. Race, R.R. & Sanger R.       | : | Blood Group in Man                  |
| 9. Stern C.                     | : | Principles of Human Genetics        |
| 10. Tanner, J.M.                | : | Human Growth                        |
| 11. Theodaron                   | : | Studies in Human Ecology            |
| 12. Walson and Lowry            | : | Growth and Development of Children  |
| 13. Winchester A.W.             | : | Principal of Genetics               |
| 14. रघुवंशी अरुण एवं चन्द्रलेखा | : | पर्यावरण प्रदूषण                    |
| 15. Sinnot, Dunn & Dozansky     | : | Principles of Genetics              |

  
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**PAPER-II (Paper Code-0276)**

**THEORIES IN SOCIAL CULTURAL ANTHROPOLOGY**

**AIM :** The main aim of this course is to introduce the student about the basic principles and Theories of Social cultural Anthropology to provide preliminary understanding of various theoretical models evolved by Social and Cultural Anthropology.

- UNIT-I** The contributions made by the following Anthropologists to Social-Cultural Anthropology.  
(I) E. Durkheim, (II) F. Boas, (III) R. Redfield, (IV) A. L. Kroeber, (V) S.C. Dube, (VI) M.N. Shrinivas, (VII) L.P. Vidyarthi.
- UNIT-II** Evolution: Biological and cultural Evolutionism; classical Evolutionism; E.B. Tylor, L.H. Morgan.  
Neo - Evolutionism; jLeslie white, Gordon Childe.  
Culture traits, Culture Complex, Culture Area, Culture focus.  
Diffusion of Culture : British diffusionist : German - Austrian diffusionist ( Kuttre Kriesse American diffusionist ( Culture Area).
- UNIT-III** Function and structure: Functionalism ( Malinowski) and Structure Functionalism ( Redcliffe Brown ) Structuralism ( Levi Strauss).
- UNIT-IV** Personality : Basic personality and Model personality.  
Culture pattern : Configurationalism ( Ruth Benedict). Anthropological study of National character.
- UNIT-V** Field work tradition in Anthropology Major tools of Research: Schedule, Questionnaire, Participant observation, interview, case study, Genealogical Method. The main bases of Anthropological Methods: Historical Method, Comparative Method and Functional Method.

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PAPER-III  
PRACTICAL

**Obejctive :** The main of this practical coures is to introduce the student about the tools and Method, analysis & statistical methods used in Human Biology. Laboratory Procedures in blood grouping and dermatoglyphics would give confidence in Dealing with all the applied dimensions they process.

**PART-I : Somatometry :**

- (a) Measurements on body :
  - (i) Height vertex, (ii) Height tragus, (iii) Suprasternale height, (iv) Biacromial Breadth,
  - (v) Bi-illioncristal breadth, (vi) Tibial Height, (vii) Upper extremity Length,
  - (viii) Sitting height, (ix) height dactylion, (x) Body weight.
- (b) Head and Face Measurement :
  - (i) Morphological upper facial length. (i) Physiognomic upper facial length.
  - (i) Morphological facial length. (iv) Bizygomatic breadth.
  - (v) Max head length (vi) Max head breadth
  - (vii) Nasal length (viii) Nasal breadth
- (c) Indices :
  - (i) Cephalic Index (i) Nasal Index
  - (i) Facial Index

**PART-II Genetic Traits :**

ABO blood group ; colour blindness, PTC taste sensitivity, Dermatioglyphics, Methods of taking finger and palm prints and their analysis.

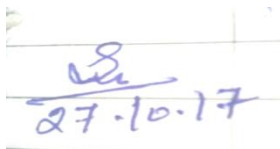
**PART-III Statistics**

Mean, Median, Standard deviation, X2 test.

**BOOKS RECOMMENDED:**

- |                              |   |  |
|------------------------------|---|--|
| 1. Basin M.K. and I.P. Singh | : | Anthropometry                            |
| 2. Cummins H. and Midlo C.   | : | An Introduction of Dermatoglyphics       |
| 3. Dunsford and Bowley       | : | Blood Group Techniques                   |
| 4. Fisher R.S.               | : | Statistical methods for Research Workers |
| 5. मित्रा मिताश्री           | : | प्रायोगिक मानव विज्ञान भाग-2             |
| 6. Olivia                    | : | Practical Anthropology                   |

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**भाषाविज्ञान**  
**प्रश्न पत्र प्रथम**  
**भाषा का सामाजिक परिप्रेक्ष्य**  
**(पेपर कोड - 0238)**

**कुल अंक : 75**

- इकाई -1** भोलाराम तिवारी व्यक्ति , भाषा एवं समाज — भाषा—ज्ञान—सहजात एवं सामाजिक संदर्भ, भाषा—संप्रेषण, साधना के रूप में, साण्स के स्न में, भाषा एवं अस्मिता, भाषा के माध्यम से सामाजिक संरचना।
- इकाई -2** भाषा का सामाजिक संदर्भ — मानक भाषा, परिनिष्ठित भाषा, पिजिन एवं क्रियोल, क्षेत्रीय भाषा, संपर्क—भाषा, डिग्लोसिया (भाषा—द्वैत)।
- इकाई— 3** भाषा—भेद—सामाजिक एवं क्षेत्रीय भेद, सामाजिक एवं भाषिक भेद में संबंध, समाजभाषिय परिवर्त।
- इकाई -4** भाषा—नियोजन—उद्देश्य, राष्ट्रीय नियोजन के अंग के रूप में भाषा—नियोजन, भाषा—मानकीकरण।
- इकाई—5** द्विभाषिता एवं बहुभाषिकता — कोड—मिश्रण एवं कोड—परिवर्तन।

**निर्धारित पुस्तकें :**

1. हिन्दी का सामाजिक संदर्भ — रामनाथ सहाय एवं अन्य (सं.), केन्द्रीय हिन्दी संस्था, आगरा
2. हिन्दी भाषा का समाज शास्त्र — रवीन्द्रनाथ श्रीवास्तव
3. हिन्दी भाषा का सामाजिक संरचना — डॉ. भोलाराम तिवारी (सं.)
4. हिन्दी का सामाजिक भूमिका — डॉ. भोलाराम तिवारी एवं मुकुल प्रियदर्शिनी
5. Sociolinguistics : R.s. Hudson, Cambridge University Press Cambridge
6. An Introduction to Sociolinguistics : R. Warddhagh, Prenguin, Hurm.

**द्वितीय प्रश्नपत्र**  
**भाषा एवं साहित्य**  
**(पेपर कोड -0239)**

**कुल अंक : 75**

- इकाई -1** भाषा एवं साहित्य का संबंध — मानक भाषा और काव्य भाषा, सामान्य भाषा और काव्य भाषा, भावनात्मक भाषा एवं वैज्ञानिक तथा तकनीकी भाषा, भाषा की सर्जनात्मकता, भाषा का सौंदर्यशास्त्र काव्यशास्त्र एवं साहित्यिक समीक्षा।
- इकाई—2** शैली एवं प्रकार्य — शैली विज्ञान एवं भाषाविज्ञान का संबंध, शैली की उपयोगिता, शैली—भेद एवं संदर्भ—भेद, भाषा प्रयोग एवं संदर्भ।
- इकाई -3** प्राक्ति —परिभाषा एवं विभिन्न आधारों पर प्राक्ति के प्रकार, चयन विचलन, समांतरता, प्रतीकात्मकता एवं बिम्बात्मकता।
- इकाई -4** भाषा—शिक्षण — सिद्धांत एवं महत्व, भाषा—शिक्षण की विधियां, मातृभाषा शिक्षण, अन्य भाषा—शिक्षण, अन्य भाषा के रूप में हिन्दी का शिक्षण, भाषा—शिक्षण में व्याघात, संस्कृति का प्रभाव।
- इकाई -5** साहित्य—शिक्षण — साहित्य—शिक्षण : उद्देश्य, विधियां, एवं सिद्धांत, कविता—शिक्षण, नाट्य—शिक्षण, कहानी—शिक्षणका परिचय, साहित्य—शिक्षण में दृश्य—श्रण्य उपकरणों का उपयोग एवं महत्व।

**निर्धारित पुस्तकें—**

1. शैलीविज्ञान —भोलानाथ तिवारी
2. प्रारंभिक शैलीविज्ञान — डॉ. चित्तरंजनकर
3. शैलीविज्ञान — सुरेश कुमार
4. हिन्दी भाषा—शिक्षण — रविन्द्रनाथ श्रीवास्तव एवं अन्य
5. भाषाशिक्षण — मनोरमा गुप्त

**STATISTICS**  
**PAPER-I**  
**APPLIED STATISTICS**

**(Paper Code-0289)**

**UNIT-I** Indian Applied Statistical System : Present official statistical system in India, Methods of collection of official statistics, their reliability and limitations, and the principal publications containing such statistics on the topics- population agriculture, industry, trade, price, labour and employment, transport and communications, banking and finance.

(15L)

**UNIT-II** Demographic Methods : Sources of demographic data - census, register, adhoc survey, hospital records, demographic profiles of Indian census. Measurement of mortality and life tables- crude, death rates, infant mortality rates, death date by cause, standardized death rate, complete life table - its main features, mortality rate and probability of dying, use of survival tables. Measurement of fertility - crude birth rate, general fertility rate, total fertility rate, gross reproduction rate, net reproduction rate.

(25L)

**UNIT-III** Economic Statistics : Index number - its definition, applications of index numbers. price relatives and quantity or volume relatives, link and chain relatives, problems involved in computation of index numbers, use of averages, simple aggregative and weighted average methods, Laspeyre's, Paasche's and Fisher's index numbers, time and factor reversal tests of index numbers. Consumer Price Index.

(20L)

**UNIT-IV** Static laws of demand and supply, price elasticity of demand, analysis of income and allied size distribution - Pareto distribution, graphical test, fitting of Pareto's law, log normal distribution and its properties, Lorenz curve and estimation of elasticity from time series data. Gini's coefficient.

**UNIT-V** Time Series Analysis: Economic time series, its different components, Illustrations, additive and multiplicative models, determination of trend, growth curves, analysis of seasonal fluctuations construction of seasonal indices.

(15L)

**REFERENCES :**

1. Croxton F.E. and Cowden D.J. (1969) : Applied General Statistics, Prentice Hall of India.
2. Goon, A.M., Gupta, M.K., Das gupta, B (1986) : Fundamentals of statistics, vol.-II, World Press, Calcutta.
3. Guide to Current Indian Official Statistics : Central Statistical Organization, Govt. of India, New Delhi.
4. Saluja M.P. ( ) Indian Official statistical Systems, Statistical Publishing Society, Calcutta.
5. Srivastava, O.S. (1983): A textbook of Demography, Vikas Publishing.

**ADDITIONAL REFERENCES:**

1. Gupta and Mukhopadhyay P.P. ( ) Aplied Statistics, Central Book Agency.
2. Pressat R. (1978) : Statistical Demography, Methuen and Co. Ltd.

**PAPER-II**  
**STATISTICAL QUALITY CONTROL AND COMPUTATIONAL TECHNIQUES**

**(Paper Code-0290)**

**UNIT-I** Importance of statistical methods in industrial research and practice, specification of items and lot qualities corresponding to visual gauging, count and measurements, types of inspection, determination of tolerance limits. General theory of control charts, causes of variation in quality, control limits, sub-grouping, summary of out-of-control criteria, charts for attributes, np chart, p-chart, c-chart, u-chart, Charts for variables- X- and R charts, design of X and R charts versus p-charts, process capability studies.

(30L)

**UNIT-II** Principle of acceptance sampling- problem of lot acceptance, stipulation of good and bad lots, producer's and consumer's risks, single and double sampling plans, their OC functions, concepts of AQL, LTPD, AOQL, average amount of inspection and ASN function, rectifying inspection plans, Sampling inspection plans, Indian Standards Tables Part-I (including applications), IS 2500 Part I.

(15L)

**UNIT-III** Computational techniques : Difference tables and methods of interpolation, Newton's and Lagrange's methods of interpolation, Divided differences, numerical differentiation and integration, Trapezoidal rule, Simpson's one-third formula, iterative solution of non-linear equations.

(15L)

**UNIT-IV** Linear Programming : Elementary theory of convex sets, definition of general linear programming problems (LPP), formulation problems of LPP, examples of LPP, Problems occurring in various fields, graphical and Simplex method of solving an LPP, artificial variables, duality of LPP. Transportation Problem (non-degenerate and balanced cases only), Assignment Problem.

(30L)

**UNIT-V** Four short notes, one from each unit. Student have to answer any two.

**REFERENCES :**

1. Brownless K.A. (1960) : Statistical theory and Methodology in Science and Engineering. John Wiley and Sons.
2. Grant E.L. (1964) : Statistical Quality Control, McGraw Hill.
3. Duncan A.J. (1974) : Quality Control and Industrial Statistics, Traporewala and Sons.
4. Gass S.I. (1975) : Linear Programming Methods and Applications, McGraw Hill.
5. Rajaraman, V. (1981) : Computer Oriented Numerical Methods, Prentice Hall.
6. Sastry S.S. (1987) : Introductory Methods of Numerical Analysis, Prentice Hall.
7. Taha H.A. (1989) : Operations Research : An Introduction, Macmillan Publishing Company.

**ADDITIONAL REFERENCES :**

1. Bowker H.A. and Liberman G.T. (1962) : Engineering Statistics, Prentice Hall.
2. Cowden D.J. (1960) : Statistical Methods in Quality Control, Asia Publishing Society.
3. Garvin W.W. (1960) : Introduction to Linear Programming, McGraw Hill.
4. Mahajan M. (2001) : Statistical Quality Control, Dhanpat Rai & Co. (P) Ltd.
5. Rao S.S. (1984) : Optimization Theory and Applications, Wiley Eastern.
6. Krishnamurthy E.V. and Sen S.K. (1976) : Computer Based Numerical Algorithms, Affiliated East-West Press.

### **PRACTICAL**

1. Computing measures of mortality & fertility, Construction of life tables and examples involving use of life tables, Graduation of mortality rates by Gompertz curve, fitting of a logistic curve.
2. Construction of Index Numbers by Laspeyre's, Paasche's, Fisher's method.
3. Determination of trend in a time series, construction of seasonal indices.
4. Fitting of Pareto curve to income data, Lorenz curve of concentration, Estimation of price elasticity of demand from time series data.
5. Drawing of X-R, np, p and c- charts. Drawing of OC curve for single and double sampling plans for attributes, AOQ and ATI curves.
6. Construction of difference tables, use of Newton's Lagrange's methods of interpolation and divided difference formulae, numerical evaluation of integrals using Trapezoidal and Simpson's one-third formulae, solution of non-linear equation by Newton-Raphson iterative method.
7. Formulation of LPP's and their duals. Solving LPPs by graphical and simplex methods, transportation and assignment problems.

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## MATHEMATIS

There shall be three theory papers. Two compulsory and one optional Each paper carrying 50 marks is divided into five units and each unit carry equal marks.

### PAPER - I

#### ANALYSIS

(Paper Code-0279)

#### REAL ANALYSIS

**UNIT-I** Series of arbitrary terms. Convergence, divergence and Oscillation. Abel's and Dirichlet's test. Multiplication of series. Double series.

Partial derivation and differentiability of real-valued functions of two variables. Schwarz and Young's theorem. Implicit function theorem.

Fourier series. Fourier expansion of piecewise monotonic functions.

**UNIT-II** Riemann integral. Integrability of continuous and monotonic functions. The fundamental theorem of integral calculus. Mean value theorems of integral calculus.

Improper integrals and their convergence, Comparison tests. Abel's and Dirichlet's tests.

Frullani's integral. Integral as a function of a parameter. Continuity, derivability and integrability of an integral of a function of a parameter.

#### COMPLEX ANALYSIS

**UNIT-III** Complex numbers as ordered pairs. Geometric representation of Complex numbers.

Stereographic projection.

Continuity and differentiability of Complex functions. Analytic functions. Cauchy-Riemann equations. Harmonic functions.

Elementary functions. Mapping by elementary functions.

Mobius transformations. Fixedpoints, Cross ratio. Inverse points and critical mappings.

Conformal mappings.

#### METRIC SPACES

**UNIT-IV** Definition and examples of metric spaces. Neighbourhoods, Limit points, Interior points, Open and closed sets, Closure and interior. Boundary points, Sub-space of a metric space. Cauchy sequences, Completeness, Cantor's intersection theorem. Contraction principle, Construction of real numbers as the completion of the incomplete metric space of rationals. Real numbers as a complete ordered field.

**UNIT-V** Dense subsets. Baire Category theorem. Separable, second countable and first countable spaces. Continuous functions. Extension theorem. Uniform continuity, Isometry and homeomorphism. Equivalent metrics. Compactness, Sequential compactness. Totally bounded spaces. Finite intersection property. Continuous functions and compact sets, Connectedness, Components, Continuous functions and connected sets.

## REFERENCES :

1. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
2. R.R. Goldberg, Real Analysis, Oxford & IBH publishing Co., New Delhi, 1970.
3. S. Lang, Undergraduate Analysis, Springer-Verlag, New York, 1983.
4. D. Somasundaram and B. Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997.
5. Shanti Narayan, A Course of Mathematical Analysis, S. Chand & Co. New Delhi.
6. P.K. Jain and S.K. Kaushik, An introduction to Real Analysis, S. Chand & Co., New Delhi, 2000.
7. R.v. Churchill & J.W. Brown, Complex Variables and Applications, 5<sup>th</sup> Edition, McGraw-Hill, New York, 1990.
8. MarkJ. Ablowitz & A.S.Fokas, Complex Variables : Introduction and Applications, Cambridge University Press, South Asian Edition, 1998.
9. Shanti Narayan, Theory of Functions of a Complex Variable, S. Chand & Co., New Delhi.
10. E.t. Copson, Metric Spaces, Cambridge University Press, 1968.
11. P.K. Jain and K. Ahmad, Metric Spaces, Narosa Publishing House, New Delhi, 1996.
12. G.F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill, 1963.



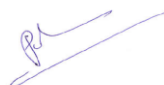
**PART - II**  
**ABSTRACT ALGEBRA**

**(Paper Code-0280)**

- UNIT-I** Group-Automorphisms, inner automorphism. Automorphism groups and their computations, Conjugacy relation, Normaliser, Counting principle and the class equation of a finite group. Center for Group of prime-order, Abelianizing of a group and its universal property. Sylow's theorems, Sylow subgroup, Structure theorem for finite Abelian groups.
- UNIT-II** Ring theory-Ring homomorphism. Ideals and Quotient Rings. Field of Quotients of an Integral Domain, Euclidean Rings, Polynomial Rings, Polynomials over the Rational Field. The Eisenstien Criterion, Polynomial Rings over Commutative Rings, Unique factorization domain.  $R$  unique factorisation domain implies so is  $R[x_1, x_2, \dots, x_n]$  Modules, Submodules, Quotient modules, Homomorphism and Isomorphism theorems.
- UNIT-III** Definition and examples of vector spaces. Subspaces. Sum and direct sum of subspaces, Linear span. Linear dependence, independence and their basic properties. Basis. Finite dimensional vector spaces. Existence theorem for bases. Invariance of the number of elements of a basis set. Dimension. Existence of complementary subspace of a subspace of a finite dimensional vector space. Dimension of sums of subspaces. Quotient space and its dimension.
- UNIT-IV** Linear transformations and their representation as matrices. The Algebra of linear transformations. The rank nullity theorem. Change of basis. Dual space. Bidual space and natural isomorphism. Adjoint of a linear transformation. Eigenvalues and eigenvectors of a linear transformation. Diagonalisation. Annihilator of a subspace. Bilinear, Quadratic and Hermitian forms.
- UNIT-V** Inner Product Spaces-Cauchy-Schwarz inequality. Orthogonal vectors. Orthogonal Complements. Orthonormal sets and bases. Bessel's inequality for finite dimensional spaces. Gram-Schmidt Orthogonalization process.

**REFERENCES :**

1. I.N. Herstein, Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975.
2. N. Jacobson, Basic Algebra, Vols. I & II. W.H. Freeman, 1980 (also published by Hindustan Publishing Company).
3. Shanti Narayan, A Text Book of Modern Abstract Algebra, S.Chand & Co. New Delhi.
4. K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
5. P.B. Bhattacharya, S.K. Jain and S.R. Nagpal, Basic Abstract Algebra (2<sup>nd</sup> Edition) Cambridge University Press, Indian Edition, 1997.
6. K. Hoffman and R. Kunze, Linear Algebra, 2<sup>nd</sup> Edition, Prentice Hall. Englewood Cliffs, New Jersey, 1971.
7. S.K. Jain, A. Gunawardena & P.B. Bhattacharya, Basic Linear Algebra with MATLAB. Key College Publishing (Springer-Verlag) 2001.
8. S. Kumaresan, Linear Algebra, A Geometric Approach, Prentice-Hall of India, 2000.
9. Vivek Sahai and Vikas Bist, Algebra, Narosa Publishing House, 1997.
10. I.S. Luther and I.B.S. Passi, Algebra, Vol. I-Groups, Vol. II-Rings. Narosa Publishing House (Vol. I-1996, Vol. II-1999)
11. D.S. Malik, J.N. Mordeson, and M.K. Sen, Fundamentals of Abstract Algebra, McGraw-Hill International Edition, 1997.



**PAPER - III - (OPTIONAL)**  
**(I) PRINCIPLES OF COMPUTER SCIENCE**  
**(Paper Code-0281)**

**UNIT-I Data Storage** - Storage of bits. Main Memory. Mass Storage. Coding Information of Storage. The Binary System. Storing integers, storing fractions, communication errors.

**Data Manipulation** - The Central Processing Unit. The Stored-Program Concept. Programme Execution. Other Architectures. Arithmetic/Logic Instructions. Computer-Peripheral Communication.

**UNIT-II Operating System and Networks** - The Evolution of Operating System. Operating System Architecture. Coordinating the Machine's Activities. Handling Competition Among Process. Networks. Networks Protocol.

**Software Engineering** - The Software Engineering Discipline. The Software Life Cycle. Modularity. Development Tools and Techniques. Documentation. Software Ownership and Liability.

**UNIT-III Algorithms** - The Concept of an Algorithm, Algorithm Representation. Algorithm Discovery. Iterative Structures. Recursive Structures. Efficiency and Correctness.

(Algorithms to be implemented in C++).

**Programming Languages** - Historical Perspective. Traditional Programming Concepts, Program Units. Language Implementation. Parallel Computing. Declarative Computing.

**UNIT-IV Data Structures** - Arrays. Lists. Stacks. Queues. Trees. Customised Data Types. Object Oriented Programming.

**File Structure** - Sequential Files. Text Files. Indexed Files. Hashed Files. The Role of The Operating System.


**Database Structure** - General Issues. The Layered Approach to Database Implementation. The Relational Model. Object-Oriented Database. Maintaining Database Integrity. E-R models.

**UNIT-V Artificial Intelligence** - Some Philosophical Issues. Image Analysis. Reasoning, Control System Activities. Using Heuristics. Artificial Neural Networks. Application of Artificial Intelligence.

**Theory of Computation** - Turing Machines. Computable functions. A Non computable Function. Complexity and its Measures. Problem Classification.

**REFERENCES :**

1. J. Glen Brookshear, Computer Science : An Overview, Addison -Wesley.
2. Stanley B. Lippman, Josee Lojoie, C++ Primer (3rd Edition), Addison-Wesley.





**PAPER - III - (OPTIONAL)**  
**(II) DISCRETE MATHEMATICS**  
**(Paper Code-0282)**

**UNIT-I Sets and Propositions** - Cardinality. Mathematical Induction, Principle of Inclusion and exclusion.

Computability and Formal Languages - Ordered Sets. Languages. Phrase Structure Grammars. Types of Grammars and Languages. Permutations. Combinations and Discrete Probability.

**UNIT-II Relations and Functions** - Binary Relations, Equivalence Relations and Partitions. Partial Order Relations and Lattices. Chains and Antichains. Pigeon Hole Principle.

**Graphs and Planar Graphs** - Basic Terminology. Multigraphs. Weighted Graphs. Paths and Circuits. Shortest Paths. Eulerian Paths and Circuits. Travelling Salesman Problem. Planner Graphs.

**TREES.**

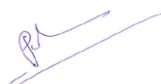
**UNIT-III Finite State Machines** - Equivalent Machines. Finite State Machines as Language Recognizers. Analysis of Algorithms - Time Complexity. Complexity of Problems. Discrete Numeric Functions and Generating Functions.

**UNIT-IV1 Recurrence Relations and Recursive Algorithms** - Linear Recurrence Relations with Constant Coefficients. Homogeneous Solutions. Particular Solution. Total Solution. Solution by the Method of Generating Functions. Brief review of Groups and Rings.

**UNIT-V Boolean Algebras** - Lattices and Algebraic Structures. Duality, Distributive and Complemented Lattices. Boolean Lattices and Boolean Algebras. Boolean Functions and Expressions. Propositional Calculus. Design and Implementation of Digital Networks. Switching Circuits.

**REFERENCES :**

C.L. Liu, Elements of Discrete Mathematics, (Second Edition), McGraw Hill, International Edition, Computer Science Series, 1986.



### **PAPER - III - (OPTIONAL)**

#### **(III) APPLICATION OF MATHEMATICS IN FINANCE AND INSURANCE**

**(Paper Code-0283)**

##### **Application of Mathematics in Finance :**

**UNIT-I Financial Management** - An overview. Nature and Scope of Financial Management. Goals of Financial Management and main decisions of financial management. Difference between risk, speculation and gambling. Time value of Money-Interest rate and discount rate. Present value and future value discrete case as well as continuous compounding case. Annuities and its kinds.

**UNIT-II** Meaning of return. Return as Internal Rate of Return (IRR). Numerical Methods like Newton Raphson Method to calculate IRR. Measurement of returns under uncertainty situations. Meaning of risk. Difference between risk and uncertainty. Types of risks. Measurement of risk. Calculation of security and Portfolio Risk and Return-Markowitz Model. Sharpe's Single Index Model Systematic Risk and Unsystematic Risk.

**UNIT-III** Taylor series and Bond Valuation. Calculation of Duration and Convexity of bonds. Financial Derivatives - Futures. Forward. Swaps and Options. Call and Put Option. Call and Put Parity Theorem. Pricing of contingent claims through Arbitrage and Arbitrage Theorem.

##### **Application of Mathematics in Insurance**

**UNIT-IV** Insurance Fundamentals - Insurance defined. Meaning of loss. Chances of loss, peril, hazard, and proximate cause in insurance. Costs and benefits of insurance to the society and branches of insurance-life insurance and various types of general insurance. Insurable loss exposures feature of a loss that is ideal for insurance. Life Insurance Mathematics - Construction of Mortality Tables. Computation of Premium of Life Insurance for a fixed duration and for the whole life.

**UNIT-V** Determination of claims for General Insurance - Using Poisson Distribution and Negative Binomial Distribution-the Polya Case. Determination of the amount of Claims in General Insurance - Compound Aggregate claim model and its properties, and claims of reinsurance. Calculation of a compound claim density function. F-recursive and approximate formulae for F.

##### **REFERENCES :**

1. Aswath Damodaran, Corporate Finance - Theory and Practice, John Wiley & Sons Inc.
2. John C. Hull, Options, Futures, and Other Derivatives, Prentice-Hall of Indian Private Limited.
3. Sheldon M. Ross, An Introduction to Mathematical Finance, Cambridge University Press.
4. Mark S. Dorfman, Introduction to Risk Management and Insurance, Prentice Hall, Englewood Cliffs, New Jersey.
5. C.D. Daykin, T. Pentikainen and M. Pesonen, Practical Risk Theory for Actuaries, Chapman & Hall.

**PAPER - III - (OPTIONAL)**

**(Paper Code-0284)**

**Theory component will have maximum marks 30.**

**Practical component will have maximum marks 20.**

**(IV) PROGRAMMING IN C AND NUMERICAL ANALYSIS (Theory & Practical)**

**Programming in C**

**UNIT-I** Programmer's model of a computer. Algorithms. Flow Charts. Data Types. Arithmetic and input/output instructions. Decisions control structures. Decision statements. Logical and Conditional operators. Loop. Case control structures. Functions. Recursions. Preprocessors. Arrays. Puppeting of strings. Structures. Pointers. File formatting.

**Numerical Analysis**

**UNIT-II** Solution of Equations : Bisection, Secant, Regula Falsi, Newton's Method, Roots of Polynomials : Interpolation : Lagrange and Hermite Interpolation, Divided Differences, Difference Schemes, Interpolation Formulas using Differences. Numerical Differentiation.

Numerical Quadrature : Newton-Cote's Formulas. Gauss Quadrature Formulas, Chebychev's Formulas.

**UNIT-III** Linear Equations : Direct Methods for Solving. Systems of Linear Equations (Gauss Elimination, LU Decomposition, Cholesky Decomposition), Iterative Methods (Jacobi, Gauss-Seidel, Relaxation Methods).

The Algebraic Eigenvalue problem : Jacobi's Method, Givens' Method, Householder's Method, Power Method, QR Method, Lanezos' Method.

**UNIT-IV** Ordinary Differential Equations : Euler Method, Single-step Methods, Runge-Kutta's Method, Multi-step Methods, Milne-Simpson Method, Methods Based on Numerical Integration, Methods Based on Numerical Differentiation, Boundary Value Problems, Eigenvalue Problems.

Approximation : Different Types of Approximation, Least Square Polynomial Approximation, Polynomial Approximation using Orthogonal Polynomials, Approximation with Trigonometric Functions, Exponential Functions, Chebychev Polynomials, Rational Functions.

**Unit-V** Monte Carlo Methods Random number generation, congruential generators, statistical tests of pseudo-random numbers.

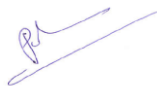
Random variate generation, inverse transform method, composition method, acceptance-rejection method, generation of exponential, normal variates, binomial and Poisson variates.

Monte Carlo integration, hit or miss Monte Carlo integration, Monte Carlo integration for improper integrals, error analysis for Monte Carlo integration.



## REFERENCES :

1. Henry Mullish & Herbert L. Cooper, Spirit of C : An Introduction to Modern Programming, Jaico Publishers, Bombay.
2. B.W. Kernighan and D.M. Ritchie. The C Programming Language 2<sup>nd</sup> Edition, (ANSI features) Prentice Hall, 1989.
3. Peter A Darnel and Philip E. Margolis, C : A Software Engineering Approach, Narosa Publishing House, 1993.
4. Robert C. Hutehison and Steven B. Just, Programming using C Language, McGraw Hill, 1988.
5. Les Hancock and Morris Krieger, The C Primer, McGraw Hill, 1988.
6. V. Rajaraman, Programming in C, Prentice Hall of India, 1994.
7. Byron S. Gottfried, Theory and Problems of Programming with C, tata McGraw-Hill Publishing Co. Ltd., 1998.
8. C.E. Froberg, Introduction to Numerical Analysis, (Second Edition), Addison-Wesley, 1979.
9. James B. Scarborough, Numerical Mathematical Analysis, Oxford and IBH Publishing Co. Pvt. Ltd. 1966.
10. Melvin J. Maron, Numerical Analysis A Practical Approach, Macmillan publishing Co., Inc. New York, 1982.
11. M.K. Jain, S.R.K. Iyengar, R.K. Jain, Numerical Methods Problems and Solutions, New Age International (P) Ltd., 1996.
12. M.K. Jain, S.R.K. Iyengar, R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International (P) Ltd., 1999.
13. R.Y. Rubinstein, Simulation and the Monte Carlo Methods, John Wiley, 1981.
14. D.J. Yakowitz Computational Probability and Simulation, Addison-Wesley, 1977.



**PAPER - III - (OPTIONAL)**  
**(V) MATHEMATICAL MODELLING**  
**(Paper Code-0285)**

**The Process of Applied mathematics.**

**UNIT-I** Setting up first-order differential equations - Qualitative solution sketching. Difference and differential equation growth models.

**UNIT-II** Single-species population models. Population growth-An age structure model. The spread of Technological innovation.

**UNIT-III** Higher-order linear models- A model for the detection of diabetes. Combat modes.  
Traffic models - Car-following models. Equilibrium speed distributions.

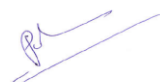
**UNIT-IV** Nonlinear population growth models. Prey-Predator models. Epidemic growth models.  
Models from political science - Proportional representation-cumulative voting, comparison voting.

**UNIT-V** Applications in Ecological and Environmental subject areas- Urban waste water management planning.

**REFERENCES :**

1. Differential equation models, Eds. Martin Braun, C.S. Coleman, D.A. Drew.
2. Political and Related Models, Steven. J. Brams, W.F. Lucas, P.D. Straffin (Eds.)
3. Discrete and System models, W.F. Lucas, F.S. Roberts, R.M. Thrall.
4. Life Science Models, H.M. Roberts & M. Thompson.  
All volumes published as modules in applied Mathematics, Springer-Verlag, 1982.
5. Mathematical Modelling by J.N. Kapur, New Age International, New Delhi.

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**SOCIOLOGY**  
**PAPER - I**  
**SOCIOLOGY OF TRIBAL SOCIETY**  
**(Paper Code-0246)**

**M.M. 75**

- UNIT-I** The concept of Tribe.  
Characteristics of Tribal society Distinction in Tribe and Caste.
- UNIT-II** Classification of Tribal people :-  
Food gatherers and hunters, shifting cultivates, nomads, peasants settled agriculturists, artisans.
- Sociocultural profile - Kinship, marriage and family, religions beliefs cultural traditions.
- UNIT-III**
- UNIT-IV** Social mobility and change sensitization.  
Schemes of Tribal Development Various tribal movements.
- UNIT-V** Problems of Tribal people -  
Poverty, illitracy, indebtedness, agrarian issues, exploitation study of tribal immunities in Chhattisgarh with special reference to "oraon", "Kanwar" and "Gond".

**PAPER - II**  
**SOCIAL RESEARCH METHODS**  
**(Paper Code-0247)**

**M.M. 75**

- UNIT-I** Meaning and significance of Social Research.  
Hypothesis and its formulation Scientific method and its applicability.
- UNIT-II** Positivism  
Ethnography, observation, case study, content analysis.
- Unit-III** Types of Research -  
Historical, descriptive, comparative exploratory, experimental.
- UNIT-IV** Techniques of data collection - survey sampling, Questionnaire, Interview schedule and Interview guide.
- UNIT-V** Meaning, importance and limitations of social statistics.  
Graphs, diagrams and measures of central tendency - mean mode, mediaJ correlation.

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### नृत्य (भारत नाट्यम)

इस विषय में दो सैद्धांतिक प्रश्न पत्र एक प्रायोगिक परीखा होगी। पूर्णांक एवं उत्तीर्णांक इस प्रकार होंगे—

क्रं	विवरण	पूर्णांक	उत्तीर्णांक
1	सैद्धांतिक प्रश्न पत्र प्रथम	50	17
2	सैद्धांतिक प्रश्न पत्र द्वितीय	50	17
3	प्रायोगिक	50	17
	योग	150	51

#### विस्तृत पाठ्यक्रम – सैद्धांतिक

##### प्रथम प्रश्न पत्र

(पेपर कोड – 0287)

1. गुप्त काल में आधुनिक काल तक नृत्य का इतिहास
2. नृत्य का परम्परागत परिवर्तन।
3. नृत्य विषय संबंधी निबंध।
4. नवरा विवरण।
5. भारतीय प्रेक्षागृहों की जानकारी (भरत नाट्यमशास्त्र के द्वितीय अध्ययन के अनुसार)


##### द्वितीय प्रश्न पत्र

(पेपर कोड – 0288)

1. ताण्डव और लाक्ष्य नृत्य का परिचय
2. (1) लेकधर्मी नाट्य परम्परा— किन्ही तीन की संक्षिप्त जानकारी — यक्षमान, कुचिपुड़ी, ..... ओट्टनदुल्लन।  
(2) लोक नृत्य परिचय—  
(अ) कोलाट्टम्,  
(ब) पिन्नल कोला पट्टम्,  
(स) कोरतीकुम्मी,  
(द) कुचिपूड़ी,  
(इ) भांबडा (कोई भी चार)
3. नायक — नायिका भेद निरूपण।
4. भारतीय नृत्य में ताल का महत्व।
5. नृत्य कलाकारों की जीवनी—  
(1) रुक्मिणी देवी अरुण्डेल, (2) श्रीमति वाला सरस्वती,  
(3) श्री शंभू महाराज, (4) श्री लच्छू महाराज।
6. संक्षिप्त टिप्पणियाँ—  
(1) कीर्तनम्, (2) जावली, (3) वर्जम्,  
(4) तिल्लाना, (5) प्रलीकत्।

#### प्रायोगिक

1. मौखिक मुद्रा प्रदर्शन—  
(1) समस्त असंयुक्त हरत मुद्राओं का विनियोग एवं पांच संयुक्त हस्त..... विनियोग  
(2) जाति हस्त  
(3) दशावतार हस्त।
2. सप्ततालों का जाति के अनुसार प्रयोग।
3. देहाभ्यास — कूदना, झकना, अरमंडी (अर्धबैठक) मुरुमंडी, नड्य आदि।
4. अष्टपदी या कीर्तनम् पदम् या जावली का प्रदर्शन।



**HOME SCIENCE**  
**Paper - I**  
**"HUMAN DEVELOPMENT"**  
**(Paper Code-0253)**

- UNIT-I**
1. Development-meaning of child growth and development. Defferent aspects of growth, principles of development, factors affecting child development, heredity and environment.
  2. Stages of development -
    1. Physiology of pregnancy
    2. Prenatal
      - (a) Reproductive system
      - (b) Prenatal development
    3. Infancy
      - (a) Early infancy
      - (b) Babyhood
    4. Childhood
      - (a) Early childhood
      - (b) Late childhood
    5. Adolescence
      - (a) Early adolescence
      - (b) Late adolescence
    - (i) Prenatal growth and development -
      - (a) Sources of studing prenatal life
      - (b) Stages of growth prenatal and development
      - (c) Factors affecting prenatal and development growth
        - (1) Mother's food
        - (2) Health of mother
        - (3) Narcotics
        - (4) Age of parents
        - (5) Effect of season
        - (6) Emotion of mother
- UNIT-2**
1. Effect of normal and scissoring delivery.
  2. Adjustment to new environment -
    - (a) Temperature
    - (b) Respiration
    - (c) Food consumption
    - (d) Excretion
  3. Physical development of infant-
    - (a) Physical proportion
    - (b) Height
    - (c) Weight
    - (d) Pulse rate
    - (e) Respiration rate
    - (f) Body temperature
    - (g) Frequency of hunger.

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4. Sensory development of infant
  - (b) Light
  - (c) Sound
  - (d) Taste
  - (e) Smell
  - (f) Skin sensitivity
5. Motor activity of infants -
  - (a) Mass activities
  - (b) Specific activities -
    - (i) Reflex activities
    - (i) Advanages of reflex action
6. Emotions of infants -
  - (a) Types of emotions
  - (b) Significance of emotions
7. Characteristics of infant behaviour -
  - (a) Dependancy
  - (b) Individual difference
  - (c) Adjustment

**UNIT-3** Childhood : Adolescence.

1. Characterstics of this stage.
2. Factors affecting growth and development during childhood and adolescence.
3. Physical growth height, weight, body proportion, teeth
4. Growth and development of internal organs (a) Nervous (b) Mental (c) Circulatory system (d) Digestive system, (e) Respiratory system (f) Tissues and muscles systems.
5. Development of motor abilities (i) Types of motor abilities (ii) importance and characteristics of motor abilities in childhood (iii) Development of motor skills, Types of motor skills (iv) Delayed motor development.

- UNIT-4**
6. Development of emotional behaviour-characteristics special emotions (affection, anger, fear, jealousy and worries) factors affecting emotional behaviour.
  7. Social developments stages - (a) during infancy, (b) nursery school period (c) elementary school period (d) Factor affecting social development.
  8. Development of intelligence - Types according to throndyke, theories regarding intellegence.

- UNIT-5**
9. Play meaning of play, work and play, theories of play, characteristics of children's play, types of play, factors effecting play and importance of play.

10. Habits :
  1. Definition.
  2. Functions performed by habits.
  3. Habits and learning
  4. Laws of habit formation-identical to laws of learning.
  5. Habit formation.
    - (a) Principles of habit formation.
    - (b) Rules for habit formation.
11. Children delinquency-Types causes and remedial measures.

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**द्वितीय पेपर**  
**आहार एवं पोषण विज्ञान**  
**(पेपर कोड – 0254)**

**पुर्णांक— 50**

**यूनिट— 1 पोषक**

1. पेषण की परिभाषा।
2. कार्यो के आधार पर पौष्टिक तत्वों का वर्गीकरण।  
(अ) उष्मा प्रदान करने वाले कार्बोज, वसा।  
(ब) शरीर का निर्माण करने वाले—प्रोटीन, खनिज तत्व।  
(स) सुरक्षा व नियमन करने वाले जल, जीवन तत्व।
3. कार्बोज— परिभाषा, कार्य पाचन, अभिपोषण, चरापचय, रक्त शर्करा स्तर व इसके नियतन अधिकता का प्रभाव प्राप्ति का साधन एवं दैनिक आवश्यकता।
4. वसा — परिभाषा, कार्य, वर्गीकरण, पाचन, अभिशोषण, चयानचय, संतुप्त व असंतुप्त वसीय अम्ल, आवश्यक वसीय अम्ल, कोलेस्टेरॉल कमी व अधिकता के प्रभाव एवं दैनिक आवश्यकता।
5. प्रोटीन — परिभाषा, कार्य, वर्गीकरण, पाचन, अभिशोषण, चयानचय, नाइट्रोजन संतुलन, प्रोटीन का जैविक मूल्य, प्रोटीन का पूरक मूल्य, प्रोटीन व कैलोरी कुपोषण, प्राप्ति के साधन एवं दैनिक आवश्यकता।
6. खनिज तत्व— सामान्य वर्गीकरण व कार्य, कार्य, अभिपोषण को प्रभावित करने वाले तत्व कमी व अधिकता के प्रभाव, साधन (कैल्शियम, फास्फोरस, लौहलवण, आयोडीन सोडियम, व क्लोराईड)
7. विटामिन्स — (जीवन तत्व) सामान्य वर्गीकरण व कार्य, कमी व अधिकता के प्रभाव, प्राप्ति के साधन, (जीवन सत्व ए.बी.सी.डी.ई. के)
8. जल— सामान्य कार्य, जल का संतुलन अधिकता के प्रभाव व निर्जलीकरण।

**यूनिट— 1 आहार**

1. आहार का वर्गीकरण व कार्य, आधारीय चार—भोज्य समूह व सात—भोज्य समूह
2. आनाज — प्रकार, रचना, संगठन, पकाने से पहले की प्रक्रिया — मौलिंग, पालिशिंग, पारवाईलिंग, फनोरिंग, पारचिंग, आनाज को उपयोग करने के विभिन्न तरीके, आनाज—ताप, क्षार खमीरीकरण व ब्रीडिंग के प्रभाव।
3. दालें — प्रकार, संलग्न, अंकुरण, व खमीरीकरण के प्रभाव।
4. दुध — प्रकार, संगठन, दुध से बने पदार्थ — दही, मकखन, चीज आदि पाश्चुराइलेशन एवम् होमोजीनाइजेशन।
5. फल व सब्जियां — वर्गीकरण, संगठन, वर्णक, प्रोटीन का महत्व, परिपक्व होने की प्रक्रिया।
6. अण्डा — संगठन, पकाने का प्रभाव।
7. मांस मछली, पोल्ट्री — संगठन, पकाने से होने वाले परिवर्तन।
8. शक्कर, गुड, शहद — संगठन, प्रकार, विधियों में उपयोग।
9. पेय पदार्थ — वर्गीकरण, पोषण की दृष्टि से महत्व, आत्यधिक उपयोग का प्रभाव।
10. मसाले — प्रकार, संगठन, पोषण की दृष्टि से महत्व।

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### यूनिट- 3

1. खाद्य संरक्षण – उद्देश्य, विधियां, घरेलू संरक्षण, औद्योगिक संरक्षण।
2. खाद्य पदार्थों में सड़द – कारण, प्रकार, पहचान, उपचारात्मक विधिया।
  1. भोज्य विषाक्तता – कारण, प्रकार, पहचान, उपचारात्मक तरीके।
  2. खाद्य मिलावट – आवश्यकता, प्रकार, महत्वपूर्ण मिलावटी पदार्थ, मिलावटी पदार्थों को पहचानने की सरल विधिया।
  3. टाहार, स्वास्थ्य व स्वच्छता – प्रकार, उपचारात्मक तरीके।
  4. खाद्य संग्रहण – आवश्यकता, प्रकार, उपयोग में होने वाले महत्वपूर्ण रसायन।

### यूनिट- 4 आहार नियोजन :

1. महत्व – आहार नियोजन के सिद्धांत प्रतिदिन की निर्धारित मात्रा (आर.टी.ए.), आहार आयोजन को प्रभावित करने वाले तत्व समय व शक्ति बचाने वाले आहार का आयोजन करना—
  - (अ) पहले से योजना बनाना
  - (ब) क्रय करने की योजना बनाना
  - (स) सरल आहार तालिकाआर्थिक स्तर के आधार पर आहार का आयोजन करना। चुनाव संग्रहण पूरक पदार्थों का उपयोग, बचे खाद्य पदार्थों का उपयोग।
2. शिशु विभिन्न आयु में पौष्टिक तत्वों च खाद्य पदार्थों की आवश्यकता, आहार माता का दूध, फार्मूला फीडिंग।
3. बालाक का पोषण – आयु समूह की विशेषताएं, पौष्टिक तत्व एवं आहार को आवश्यकता, शालेय आहार कार्यक्रम—प्रकार, महत्व, कीमत, पोषण स्तर, आहारित व लवक्षण शरीर मापन विधियां।
4. गर्भावस्था व छात्रावस्था में पोषण – शारीरिक, पौष्टिक तत्वों की आवश्यकता। असामान्य परिस्थितियां,
5. वृद्धावस्था में आहार एवम् पोषण – शारीरिक परिवर्तन, पौष्टिक तत्वों की आवश्यकता। असामान्य स्थितियां।

### यूनिट- 5 उपचारात्मक पोषण – परिभाषा

सामान्य आहार परिवर्तन – तरलता, पौष्टिक तत्व, गंध की उपस्थिति/अनुपस्थिति, कुछ खाद्य पदार्थों का सम्मिलित न करना।

### चयापचयी रोग—

1. मधुमेय – परिभाषा, लक्षण, कारण, इन्सुलेशन के प्रकार, आहार का प्रभाव, हाइपोग्लोसेमिक दवाईयां, मधुमेय में आसामान्य स्थितियां, मधुमेय व गर्भावस्था, मधुमेय व बाल्यावस्था।
2. अधिक वनज/कम वनज – परिभाषा, कारण, उपचारात्मक तरीके, असामान्य स्थितियां। पौष्टिक तत्वों की कमी से होने वाले रोग—
  1. रक्तहीनता – प्रकार, कारण, पहचान, आहार।
  2. ए – विटामीनोसिस – प्रकार, कारण, आहार।
  3. प्राटिन कैलोरी कुपोषण – कारण, उपचारात्मक तरीके। रोग जिसमें आहारीय चिकित्सा सम्मिलित है—
  4. यकृत के रोग – प्रकार, कारण, आहार, (पौष्टिक तत्वों की आवश्यकता)

### आमाशय के रोग—

1. पेटिक अल्सर – कारण, लक्षण, आहार (पौष्टिक तत्वों की आवश्यकता)
2. अपचन – कारण, पौष्टिक तत्वों की आवश्यकता।
3. अतिसार – प्रकार, कारण, आहार।
4. कब्ज – प्रकार, कारण, आहार।
5. उक्त रक्तचाप – कारण, आहार।

*[Signature]*  
22/7/17

*[Signature]*  
22/7/17

*[Signature]*  
22/7/17

*[Signature]*  
22/7/17

गृह विज्ञान  
प्रायोगिक

पूर्णांक : 50

1. आनाज – दालें, अण्डा, दुध, मेवे, सब्जियां, फलो के उपयोग तैयार करना, हर भोज्य पदार्थ की कोई भी तीन पात्र विधियों के प्रायोगिक रिकार्ड बुक में लिखना। कैलोरी एवं प्रोटीन की गणना।
2. आहार आयोजन –
  - (अ) गर्भावती महिला
  - (ब) कब्ज की स्थिति
  - (स) मधुमेह रोग
  - (द) अधिक वजन की स्थिति
3. विभिन्न आर्थिक स्थिति में आहार योजनाएं
4. खाद्य संरक्षण कोई भी चार विधि से बनायी जाये।
5. सम्पूर्ण भोजन – आयोजन, गणना।
6. व्यक्तिव मापन विधि
7. बुद्धियापन विधि

प्रायोगिक परीक्षा अंको का विभाजन

सेशनल	10
योजना	10
तैयारी	10
गणना	10
मैखिक प्रश्न	10
कुल अंक	50

REFERENCES BOOKS:

Normal & Therapeutic Nutrition.

- |     |                 |   |  |
|-----|-----------------|---|--|
| 1   | C.H.Robinson    | - | Normal & Therapeutic Nutrition.                  |
| 2   | F.P.Antia       | - | Clinical Nutrition & Dietetics.                  |
| 3   | M.Swaminathan   | - | Essentials of Nutrition Vol. I & II.             |
| 4   | P.Rajalaxmi     | - | Applied Nutrition.                               |
| 5   | C.Gopalan-etal  | - | The Nutrition value of Indian Foods. ICHR. 1991. |
| 6   | MangodeKonge    | - | Normal & Therapeutic Nutrition (In Hindi).       |
| 7   | Jyotikulkarni   | - | Normal & Therapeutic Nutrition.                  |
| 8   | GeetaPushpaShaw | - |  |
| 9   | KreuselM.N.     | - | Food Nutrition & Diet Therapy.                   |
| 10  | आहार एवं पोषण   | - | डॉ. अरुणा पल्ला, शिवा प्रकाशन, इन्दौर            |
| 11. | खाद्य परिक्षण   | - | डॉ. अमिता सहगल, शिवा प्रकाशन, इन्दौर।            |

*Handwritten signatures and dates:*  
A. S. Gopal 22.07.17  
22/7/17  
22/7  
22.7.17  
22/7/17

बी.ए. भाग तीन दशन शास्त्र विषय में कुल दो प्रश्न पत्र होंगे तथा प्रत्येक में 75 अंक होंगे । प्रत्येक प्रश्न पत्र 5 इकाईयों में विभाजित है । प्रथम प्रश्नपत्र, 'तर्कशास्त्र' अनिवार्य है। द्वितीय प्रश्न पत्र में दो विकल्प दिये गये हैं –

- प्रश्न- पत्र प्रथम  
तर्क शास्त्र (Logic)  
(पेपर कोड - 0259)

1. न्याय — बौद्ध जैन दशैन में अनुमान की परिभाषा, अवयव एवं पक्षता
2. अनुमान के प्रकार
3. हेत्वाभास

11/8/77  
Dr. S. A. A. A.

### अनुशंसित ग्रंथ—

- |                       |                                |
|-----------------------|--------------------------------|
| 1. रमाशंकर मिश्र      | — आधुनिक तर्कशास्त्र, एक परिचय |
| 2. राज्य श्री अग्रवाल | — तर्कशास्त्र                  |
| 3. केदारनाथ           | — प्रतीकात्मक तर्कशास्त्र      |
| 4. ब्रजनारायण         | — अनुमान का विवेचन             |
| 5. बी.एन.सिंह         | — भारतीय दर्शन                 |
| 6. डॉ. शोभा निगम      | — भारतीय दर्शन                 |
| 7. Copi I. M.         | - Introduction of Logic        |
| 8. S.C Chaatterjee    | - Nyaya Thoeory Knowledge      |
| 9. Choen & Negel      | - Introduction to Logic        |

1/8/17  
Dr. S. S. S. S. S.

**प्रश्न — पत्र द्वितीय (वैकल्पिक)**  
**(अ) ज्ञान मीमांस एवं मीमांस (भारतीय एवं पाश्चात्य)**  
**(पेपर कोड—0260)**

**इकाई— 1** ज्ञान मीमांस एवं तत्व मीमांस : स्वरूप एवं विषय वस्तु  
ज्ञान प्रमाण : प्रमा एवं अप्रमा

**इकाई — 2** प्रामाण्य : स्वतः प्रामाण्य एवं परतः प्रामाण्य  
ख्यातिवाद : सत्ख्यातिवाद, अख्यातिवाद, अन्यगी अनिवर्तनीय ख्यातिवाद

**इकाई— 3**

**1. कारण का सिद्धांत (कारणकार्यवाद)**

- अ. सत्कार्यवाद : प्रकृति परिणामवाद, ब्रम्हा परिणामवाद, विवर्तवाद  
ब. असत्कर्तवाद

**2. सत्य के सिद्धांत**

- अ. संवादिता  
ब. संसक्तता  
स. अर्थक्रियावादी सिद्धांत

**इकाई— 4**

1. जड़वाद
2. अभ्यात्मवाद
3. वस्तुवाद

**इकाई— 5**

1. बुद्धिवाद
2. अनुभववाद
3. कांट का परीक्षावाद

**अनुशंसित ग्रंथ :**

1. दिवाकर पाठक एवं अविनाश श्रीवास्तव : भारतीय दर्शन की मूल समस्याएं
2. अर्जुन मिश्र : दर्शन की मूल धाराएं
3. डॉ. शोभा निगम : पाश्चात्य दर्शन के सम्प्रदाय
4. डॉ. शोभा निगम : भारतीय दर्शन
5. सुरेन्द्र वर्मा : भारतीय दर्शन
6. बंदिष्टे : भारतीय दर्शनिक निबंध
7. Patric : Introduction of Philosophy
8. Chhaya Rai : Studies in Philosophical methods
9. ब्रजगोपाल तिवारी : पाश्चात्य दर्शन

11/8/17  
Dr. S. S. Meena

**प्रश्न – पत्र द्वितीय (वैकल्पिक)**  
**ग्रीक दर्शन**  
**(पेपर कोड: 0261)**

- इकाई– 1**      ग्रीक दर्शन : मुख्य विशेषताएं  
माइलेशियन विचारक
1. थेलिस
  2. एलेक्जिमेंडर
  3. एनेक्जिमेनीज

- इकाई– 2**
1. हेराक्लाइट्स
  2. जेनोफीनीज
  3. पार्मेनाइनीज
  4. जीनो

- इकाई– 3**
1. एम्पीडोक्लीज
  2. एनेक्जागोरस
  3. ल्यूगिपस
  4. डेमोक्राइट्स

- इकाई– 4**
1. सोफिस्ट विचारक : प्रोटोगोरस, गार्जियस
  2. सुकरात

- इकाई– 5**
1. प्लेटो
  2. अरस्तू

अनुशंसित ग्रंथ :

1. जगदीश सहन श्रीवास्तव : ग्रीक एवं मध्ययुगीन दर्शन
2. शोभा निगम : ग्रीक एवं मध्ययुगीन दर्शन
3. नरेन्द्र तिवरी : ग्रीक दर्शन
4. रामनाथ शर्मा : पाश्चात्य दर्शन का इतिहास
5. Stace : Greek Philodphy
6. Burnet : Geek Philosophy
7. Gorpers : The Greek Thinkers

*Handwritten signature and date*  
11/8/17  
Dr. h. s. Meena



निसाब उर्दू अदब  
पहला पर्चा  
'नस्र' (पेपर कोड-0262)  
(दास्तान, ड्रामा, अफसाना)

नं. 75

निसाब:

दस्ताना :

1. किस्सा आजाद बख्त : इन्तेखाब बागोबहार मीर अमान ।
2. मुलात मलकाए महन निगार : इन्तेखाब फसनए अजाइब रजब अली बेग शुरुए ।

ड्रामा :

1. डाक्टर तयकीन की उलझन : अज इब्राहीम युसुफ
2. आगरा बाजार : अज हकीब तनवीर

अफसाना:

1. कफन : प्रेमचंद्र
2. नया कानून : सजादत हुसैन मन्टी
3. यूकिलिप्टस की हाली : कृष्ण चन्द्र
4. लाजवंती : राजेन्द्र सिंह वैदी
5. दो भीगे हुए लोग : इकबाल मजीद
6. झूठा संच/काठ का घोड़ा : रतन सिंह
7. छीमक : गयास अहमद गद्दी
8. अफसाना : जीलानी बानो

इकाईयां :

- |         |  |        |
|---------|--|--------|
| इकाई— 1 | शामिले निसाब असनाप पर सवालात                           | नं. 15 |
| इकाई— 2 | दास्तान निगारो पर सवालात                               | नं. 15 |
| इकाई— 3 | ड्रामा निगारों पर सवालात                               | नं. 15 |
| इकाई— 4 | अफसाना निगारों पर सवालात और अफसानों का खुलासा और जायजा | नं. 15 |
| इकाई— 5 | दस्ताना और अफसानो से तशरीह                             | नं. 15 |

**दूसरा पर्चा (शायरी)**  
(पेपर कोड-0263)  
(कसायूद, मरासी और मजमून निगारी)

नं. 75

**निसाब:**

**कसाइद :**

1. फज्र होते जो गई आज मेरी आंख झपकअज सौदा देहलबी
2. सवन में दिया फिर महे शव्वाल दिखाईअज जौक देहलबी
3. स्मते काशी से जानिबे मथुरा बादल अज मोहसिन काकोरवी

**मरासी:**

1. किस शेर की आमद है के रन कॉफ रहा है अज दबीर (15 बंद)
2. ब खुदा फारसे मैदाने तहव्वूर या हुर अज अनील (15 बंद)

**इकाईयां :**

- |   |        |
|---|--------|
| इकाई— 1 शामिले निसाब असनाफ पर सवालात      | नं. 15 |
| इकाई— 2 कसोदा निगारों पर सवालात           | नं. 15 |
| इकाई— 3 मर्तिया निगारों पर तन्कीदी सवालात | नं. 15 |
| इकाई —4 तशरीहजशारे कसाइद और गरासी         | नं. 20 |
| इकाई— 5 अदबी माजू पर मजमून                | नं. 10 |

**MANAGEMENT (प्रबंध)**

**PAPER - I**

**MONEY, BANKING TRADE & FOREIGN EXCHANGE M.M. : 75**

**(Paper Code-0269)**

**UNIT-I** Definition of Money : Functions, importance & types Value of money, quantity theory. Cash transactions approach case balance approach & income approach.

**UNIT-II** Inflation : Cost push demand pull-effects of inflation and methods of control, deflation measures against deflation monetary standards gold and paper standards.

**UNIT-III** Banking types and their function : Credit creation & methods of control nationalisation of commercial banks - R.B.I. and its functions financing.

**UNIT-IV** International and inter regional trade theory of comparative costs general equilibrium theory. Terms of trade, free trade versus protection. Dumping balance of trade and balance of payments.

**UNIT-V** Foreign exchange : Meaning, rate of exchange, its determination mint par theory, purchasing power parity theory Balance of payment theory Exchange control objects and methods of IMI.

**BOOKS RECOMMENDED :**

1. K.P.M. Sundram : Money, Banking & International Trade.
2. K.R. Gupta : International Economics.
3. Charles. P. : International Economics.
4. हरिशचंद्र शर्मा : मुद्रा एवं बैंकिंग

**PAPER - II**  
**AUDITING, COSTING AND INCOME TAX**  
**(Paper Code-0270)**

**M.M. : 75**

**UNIT-I Principles of auditing :**

Origin of Audit, the nature & definition of audit objects of audit, various class of audits and their advantages, audit under statute. The accounts of private firms, the audit of the accounts of private individuals the audit of the trust accounts.

**UNIT-II Audit procedure and conduct of an audit :**

Internal audit the qualities required of an auditor. Continuous and final or completed audit, consideration of the commencement of a new audit, audit note book methods of work.

**UNIT-III The audit of cash transactions :**

Audit of bank transactions : Audit of petty of cash book : Audit of trading transactions. Internal check as regards cash, vouching, Internal check as regards wages. Audit of trading transaction : Purchases Purchases returns,. sales, sales returns, sales ledger.

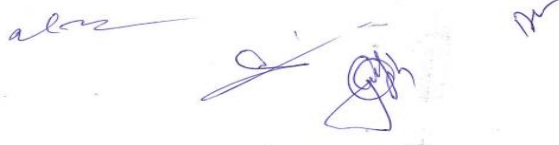
**UNIT-IV** Fundamental of cost accountancy. Definition, Advantages, disadvantage and functions. Methods of cost accounting Unit costing. departmental costing. process costing. contract costing.; Elementary know ledger of Break even Analysis.

**UNIT-V** Income : tax on salary and capital gains, tax deduction at source, Rates of income tax and surcharge on income tax. Deduction in respect of C.P.F., L.I.C. premiums and commulative time deposits short term capital gains and long term capital gains deduction in respect of capital gains.

**BOOKS RECOMMENDED :**

- |    |                   |   |                                    |
|----|-------------------|---|------------------------------------|
| 1. | Agrawal & Khanuja | : | Cost Accounting                    |
| 2. | Grewal & Shukla   | : | Advanced Accounts                  |
| 3. | Dr. R. R. Gupta   | : | Cost Accounting                    |
| 4. | D. N. Agarwal     | : | The Higher Science of Accountancy. |
| 5. | Bhagwati Prasad   | : | Income Tax-Law & Practice          |
| 6. | Choudhary & Patel | : | Income Tax                         |
| 7. | Dr. B. K. Agarwal | : | Income Tax                         |
| 8. | Dr. S. M. Shukla  | : | Auditing                           |
| 9. | मेहरोत्रा         | : | आयकर विधान एवं लेखे।               |

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**FUNCTIONAL ENGLISH**  
**PAPER - I**  
**COMMUNICATION SKILL AND BROADCASTING** **M.M. 50**  
**(Paper Code-0271)**

**.I Oral Communication**

- |                      |                             |
|----------------------|-----------------------------|
| (1) Interview        | (2) Dictation               |
| (3) Meetings         | (4) Seminars and Conference |
| (5) Group Discussion | (6) Audio Visual Aids       |

**I. Writing Skill**

- |                              |                         |
|------------------------------|-------------------------|
| (1) Business Correspondance. | (2) Agenda and Minutes. |
| (3) Advertising.             | (4) Reports             |

**III. Broadcasting.**

- (1) Fundamentals, of Broadcasting
- (2) Radio as a medium of Broadcasting.
- (3) T.V. as a medium of Broadcasting.
- (4) Current affairs of general Knowledge.

**PAPER - II**  
**ADVANCED GRAMMER**  
**(Paper Code-0272)**

**Section A**

- (1) Constituent-  
Students will be requised to devide each Sentence into its Constituent and label each A,V,C,O, or E.
- (2) Use of dynamic and stative verb :-
- (3) Use of Adjective and Adverb :-
- (4) use of Prepositions :-
- (5) Question Tag :-
- (6) Nodal verb :-
- (7) Introducing word 'it' There '
- (8) Use of Sentence in the Passive.

**Section - B**

20

- (1) Use of Redio and its Sentance.
- (2) Use & Function of T.V.
- (3) Importance of Non Communication.
- (4) Importance of News papers in the modern context.

Dr. M. C. Chakraborty

Dr. S. K. Ghosh

DR. MERILY ROY

# **PRINCIPAL OF INSURANCE & PRACTICE**

## **PAPER- I**

### **PROPERTY AND LIABILITY INSURANCE**

**50 Marks**

**(Paper Code-0273)**

#### **UNIT-I INTRODUCTION**

Risk and Insurance; Insurable and non-Insurable; Nature of Property and liability insurance, crop and cattle insurance, types of liability insurance reinsurance.

#### **UNIT-II Basic concepts of Liability Insurance**

- (a) Basic concepts :- Specific and all risk insurance; valuation of risk; Indemnity contracts and specific value contracts; Average and contribution; Excess and short insurance careers.
- (b) Liability Insurance:- Procedure for obtaining liability insurance. Legal position of insurance agent; construction and issue of policy; Records of liability insurance; policy conditions.

#### **UNIT-III Types of liability Insurance policy-**

Mandatory public Liability Insurance.

Dwelling Property losses; Business interruption and related losses, Theft Insurance contracts, Budgetary covers, m Auto Insurance, Medical Benefit Insurance; Dishonesty, disappearance and destruction insurance; Employer's Liability; Aviation Insurance Personal and residential Insurance; Boiler Machinery insurance; commercial enterprises and industrial property insurance.

#### **UNIT-IV Insurance Problems of Institutions**

Insurance Problems of educational and religious institutions hospitals, clubs and association; Professional package contracts; Errors and omissions insurance; professional liability insurance; Accountants liability insurance; Limits on amount of insurance Marketing and underwriting of liability insurance; Finance of liability insurance.

#### **UNIT-V Adjustment of Losses and claims compensation:-**

Nature of Losses and their adjustment: Procedure of adjustment Functions of adjuster's; Responsibilities of adjuster's; survey of losses; Procedure for preparing claims statements; Documents in use in claim settlements. Requirement of the insured in the event of loss. Apportionment and loss valuation; statutory control over liability insurance in India.

Liability policies by General Insurance Corporation of India.

**PAPER - II**  
**GROUP      INSURANCE AND RETIREMENT BENEFIT SCHEMES**  
**(Paper Code-0274)**

**50 Marks**

**UNIT - I** Introduction

Superannuation Schemes I  
Superannuation Schemes II

**UNIT-II**      Superannuation Schemes III  
Gratuity Schemes

**UNIT-III**    Group Life Insurance Schemes I  
Group Life Insurance Schemes II

**UNIT-IV**    Provident Fund & Employees Family, Pension and Deposit linked insurance Schemes.  
Taxation Treatment of provisions for retirement Benefits-I

**UNIT-V**      Taxation Treatment of Provisions for Retirement Benefits II  
Group Schemes and Data Processing.

**THEORY**  
**HISTORY OF INDIAN PAINTING (Paper Code-0286)**

**(Bangal School to Modern age)**

**50 Marks**

- |                      |   |   |
|----------------------|---|---|
| <b>Bangal School</b> | - | Abanendra Nath Tagor<br>Rabindra Nath Tagor<br>Gaganendra Nath Tagor<br>Nandalal Bose |
| <b>Modern Age</b>    | - | Raja Ravi Varma<br>Amrita Sher Gil<br>Yamini Ray                                      |

- |                             |   |  |
|-----------------------------|---|--|
| <b>Progresive Art Group</b> |   |  |
| <b>Souza</b>                | - | M.F. Husain<br>S.H. Raza<br>N.S. Bendra<br>K.K. Hebber |

**List of Book Recomendaded for theory :**

- Bharatiya Chitrakala Ke Itihas - Shym Bihari Agrawal
- Kala Vilas - R.A. Agrawal

**PRACTICAL**

There will be two practical paper. Evalution will be made by the external and the internal examiners together, and sessional marking is made by the class teacher.

The time of each paper is four hour's and there will be a half hour's recess in between.

**PAPER - I**

**Copy from Indian meniature painting**

**Total Mark - 50**

**Scheme of examination**

**Examination - 40**

Time - 4 Hours

Sessional - 10

Paper - 1/4 Imp size

Medium - Water colour or potter colour

Sessional mark - 10

Minimum class work to be submitted five painting size 1/4 Imp paper Copying

from the Indian miniature painting style Mugal. Pahadi, Rajsthani.





**PAPER - II**  
**CREATIVE COMPOSITION**

Scheme of examination

Total Mark - 50

Time Four hour's

Examination - 40

Size 1/2 Imp. paper

Sessional - 10

Medium - Water, Oil, acrylic or any

Sessional mark - 10

Minimum Class work to be submitted -

Five painting size 1/2 Imp.

Student will be experimented ith any media and form.

Above syllabus based on the syllabus of following Universities.

1. Vikram University, Ujjain
2. Rani Durgavati Vishwavidyalaya, Jabalpur.
3. Indira Kala Sangeet Vishwavidyalaya, Khairagarh.

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## DEFENCE STUDIES

### PAPER-I

#### PROBLEMS OF WAR AND PEACE (Paper Code-0277)

**Aim :** The objective of this paper is to acquaint the students about the multidimensional problems of war and peace.

**Note :** Question will be set from each unit, there will be only internal choice.

#### Unit-I U.N.O. AND WORLD PEACE

1. Organs and its role.
2. Main specialized agencies of U.N.O.
3. Role of U.N.O. in world peace.
4. Peace keeping forces of the U.N.O.
5. Veto power and Security Council.

#### Unit-II WAR AND PEACE

1. Settlement of International Disputes.
2. Diplomatic agents and Consuls.
3. War Crimes.
4. Neutrality.
5. Intervention.

#### Unit-III HUMANITARIAN LAW

1. Basic concepts and development of Humanitarian law.
2. UN General Assembly declaration of human rights on Dec. 10, 1948.
3. Protection of Victims and defenceless in armed conflict, POWs, wounded and civilians in Armed Forces.
4. Central Human Right Commission : Organisation and Function.
5. State Human Right Commission : Organisation and Function.

#### Unit-IV REFUGEE LAW

1. Meaning, Concept and causes of Refugee.
2. Refugee and IDPs.
3. Refugee law in India.
4. Refugee Problem in South Asia.
5. Role of International Committee of Red Cross and UNO in Refugee Problems.

#### Unit-V LAWS OF WAR

1. Law of Land war.
2. Law of Sea war.
3. Law of Air war.
4. Space law.
5. The International Court of Justice.

#### SELECTED READINGS :

1. Maunce clark, J: Readings in the Economics of War.
2. International Security : Modern political Science series.
3. Rajani Kothari : Word order.
4. Openhem, I : Use of Forces by states and International law.

## PAPER - II

### MODERN WARFARE (Paper Code-0278)

**AIM :** To enable students to appreciate the impact of Political, economic and technological developments on the patterns of conflicts between nations.

**Note :** Question will be set from each unit, there will be only internal choice.

- UNIT-I**
1. Development of Nuclear weapons.
  2. Effects of Nuclear Explosion.
  3. Spread of Nuclear Weapons.
  4. Missile and their characteristics.
  5. Type of Missiles.
- UNIT-II**
1. Trends in Science and Technology and their impact on war.
  2. Role of Research and Development.
  3. Development of Weapons and their impact on tactics
  4. Command, Control, Communication and Intelligence (C<sup>3</sup> I) in Modern Warfare.
  5. Elements of National Power.
- UNIT-III**
1. Military Satellites.
  2. Explosive Bombs.
  3. War Gases.
  4. Micro Organs : as a weapons.
  5. Smart Weapons.
- UNIT-IV**
1. Rocket Technology and India.
  2. Missile Technology and India.
  3. Nuclear Technology and India.
  4. Atomic Minerals and India.
  5. Space Technology and India.
- UNIT-V**
1. New world order - Political, Social and Economical.
  2. Alliance and Regional co-operation.
  3. Mobilisation of resources for war.
  4. War time economics.
  5. New trends.

#### SELECTED READINGS :

- |                       |   |                                |
|-----------------------|---|--------------------------------|
| 1. Halailan Morton    | : | Contemporary Military strategy |
| 2. Brodue, Y.         | : | Strategy in the Missile Age.   |
| 3. Markabi, Y.        | : | Nuclear war and Nuclear peace  |
| 4. Osanka. F.M.       | : | Modern Guerilla warfare        |
| 5. Gerald. J.         | : | Defence Psychology             |
| 6. Know Kalus         | : | Science and Defence            |
| 7. Pandey Girish Kant | : | Yudh mein Vigyan avem Tackniki |

## PRACTICALS

There shall be practical examination of 3.5 hours duration carrying.

50 marks

The division of marks shall be as follows :

- |                                      |   |           |
|--------------------------------------|---|-----------|
| (1) Plain Table Survey               | : | 15 Marks. |
| (2) Experimental Military Psychology | : | 15 Marks. |
| (3) Group Discussion & Lectring      | : | 05 Marks. |
| (4) Viva-Voce                        | : | 05 Marks. |
| (5) Sessional work & Record          | : | 10 Marks. |

#### SECTION - A

Plain Table Survey by inter section methods.

(Ateast ten exercises in a session).

**SECTION - B**

Military psychology Experiment :

- (1) Muller-Layer-Illusion test.
- (2) Koh's Block Design Test.
- (3) Allexander Pass Along Test.

**SECTION - C**

Group Discussion and Lectures based on current topic on any international Problems as issue.

**EDUCATION**  
**PAPER - I**  
**EDUCATIONAL MANAGEMENT AND EDUCATIONAL TECHNOLOGY**  
**(Paper Code-0255)**

**COURSE OBJECTIVES**

1. To develop knowledge and understanding of the meaning, scope process and types of management.
2. To develop the ability to identify the roles of participating members (individual or collective) and to plan various institutionalized managerial activities.
3. To develop the ability of making objective decisions in educational management.
4. To enable the students to understand about the concept, nature and scope of educational technology.
5. To expose the students to the basic developments in Educational Technology.

**COURSE CONTENTS**

- UNIT-I** - Concept of Educational Management : Meaning, nature, need and scope.
- Types of Educational Management : Centralized and decentralized, external and internal. Authoritarian / autocratic and democratic, dynamic / creative and Laissez-faire.
- UNIT-II** - Managerial Behaviour : Factors affecting managerial behaviours; personal, social, cultural, political, institutional etc.
- Aspects of institutional management : Curricular and co-curricular programmes; student welfare auxiliary services including school health services; school plant including equipment and assets; sanitation and beautification; institutional planning; time table; interpersonal relationship; institutional climate and discipline;
  - hostel and staff accommodation; management of finance; home, school and community relationships; evaluation of students achievement and promotion; admission, office management etc.
- UNIT-III** - Educational planning : Meaning, need and significance of educational planning; types of educational planning, strategies in educational planning; steps in educational planning.

**UNIT-IV** - Communication Process : theory, concept, nature, process, components, types of classroom communication, mass media approach in educational technology.

**UNIT-V** - System Approach to Instruction : System approach in instructional process, instructional system designing : concept, components, physical and human resources, steps.

- Innovations in Educational Technology : Programmed learning, micro and macro teaching, team teaching.
- Personalized system of instruction, computer assisted instruction, simulated teaching distance teaching.

**BOOKS :**

1. Educational Technology. R.A. Dhaowa, Lall Book Depot, Meerut.
2. शैक्षणिक तकनीकी आर. ए. वर्मा, लाल बुक डिपो मेरठ।

**PAPER - II**  
**PHILOSOPHY OF EDUCATIONAL**  
**(Paper Code-0256)**

- UNIT-I** - Naturatism  
- Progmation
- UNIT-II** - Realism  
- Ideatims
- UNIT-III** - Dayanand  
- Gandhi  
- Tagore
- UNIT-IV** - Aurbindo  
- Vivekanand  
- Azkir Hussan
- UNIT-V** - Montesson  
- Froebel  
- Festalloggi.

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## हेमचंद्र यादव विश्वविद्यालय, दुर्ग (छ.ग.)

(पूर्व नाम- दुर्ग विश्वविद्यालय, दुर्ग)

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दूरभाष : 0788-2359400

क्र. 1460 /अका./2019

दुर्ग, दिनांक 04/07/2019

प्रति,

प्राचार्य,  
समस्त संबद्ध महाविद्यालय,  
हेमचंद्र यादव विश्वविद्यालय,  
दुर्ग (छ.ग.)

विषय:- स्नातक स्तर भाग-एक के पाठ्यक्रम विषयक।

संदर्भ:- संयुक्त संचालक, उच्च शिक्षा विभाग के पत्र क्र. 2456/315/आउशि/सम/2019, दिनांक 16.05.2019।

—00—

विषयांतर्गत लेख है कि संदर्भित पत्र के माध्यम से प्राप्त स्नातक स्तर भाग-एक के निम्नलिखित कक्षा/विषयों के परिवर्तित/संशोधित पाठ्यक्रम शिक्षा सत्र 2019-20 से लागू किये जाते हैं:-

1. बी.ए. — आधार पाठ्यक्रम-हिन्दी भाषा, हिन्दी साहित्य, राजनीतिशास्त्र, अर्थशास्त्र, नृत्य, दर्शनशास्त्र, समाजशास्त्र, इतिहास, मानवविज्ञान, संस्कृत, सांख्यिकी, प्राचीन भारतीय इतिहास, भूगोल, मनोविज्ञान, लाईब्रेरी साईंस
2. बी.एस-सी. — आधार पाठ्यक्रम-हिन्दी भाषा, जीव विज्ञान, मानवविज्ञान, बायोटेक्नोलॉजी, कम्प्यूटर साईंस, गणित, भौतिक शास्त्र, प्राणीशास्त्र, सूक्ष्मजीव विज्ञान, वनस्पतिशास्त्र, भूविज्ञान, इलेक्ट्रॉनिक्स, रसायन शास्त्र, सांख्यिकी, भूगोल।
3. बी.एस.सी- (गृह विज्ञान) — आधार पाठ्यक्रम — हिन्दी भाषा एवं गृह विज्ञान।
4. विधि — एल.एल.बी.
5. प्रबंध — बी.बी.ए.

उपरोक्त विषयों को शिक्षा सत्र 2019-20 से संशोधित रूप में स्नातक स्तर भाग-एक के लिए लागू किया जाता है स्नातक स्तर भाग दो एवं तीन के पाठ्यक्रम यथावत रहेंगे।

अतः आपसे अनुरोध है कि पाठ्यक्रम परिवर्तन/संशोधन से महाविद्यालय के शिक्षकों एवं छात्र-छात्राओं को अवगत कराने का कष्ट करेंगे।

टीप :- परिवर्तित/संशोधित पाठ्यक्रम विश्वविद्यालय की वेबसाईट पर उपलब्ध है।

संलग्न : उपरोक्तानुसार।

कुलसचिव



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**REVISED ORDINANCE NO.11**  
**(As per State U.G.C. Scheme)**  
**BACHELOR OF ARTS**

1. The three year course has been broken up in to three Parts.  
Part-I Examination: at the end of the first year.  
Part-II Examination: at the end of the second year and  
Part-III Examination: at the end of the third year.
2. A candidate who after passing (10+2) or intermediate examination of C.G. Board of Secondary Education, C.G. or any other examination recognized by the University or C.G. Board of Secondary Education as equivalent thereto, has attended regular course of study in an affiliated college or in the Teaching Department of the University for one academic year shall be eligible for appearing at the B.A. Part-I examination.
3. A candidate who after passing B.A. Part-I examination of the University or any other examination recognized by the University as equivalent thereto has attended regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.A. Part II Examination.
4. A candidate who after passing B.A. Part II examination of the University has completed a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.A. Part-III examination.
5. Besides regular students, subject to their compliance with this ordinance, ex-students and non-college students shall be eligible for admission to other examination as per provisions of Ordinance N. 6 relating to Examinations (General). Provided that non-college students can be admitted at such subjects/papers as are taught to the regular students at any of the University Teaching Department or College.
6. Every candidate for the Bachelor of arts examination shall be examined in:
  - A Foundation Course:
    - (i) Group A - Hindi Language
    - (ii) Group B - English Language
  - B Three course subjects: One subject from any three group out of the following six groups:
    - 1 Sociology / Ancient Indian History/Anthropology
    - 2 Political Science/Home Science / Drawing & Painting / Vocational Course.
    - 3 Hindi Literature/ Sanskrit Literature/Urdu Literature/Mathematics.
    - 4 Economics/Music/Defense Studies/Linguistics/ Urdu;
    - 5 Philosophy/Psychology/ Geography/ Education/Management.
    - 6 History/English Literature/Statistics.
    - 7 Practicals (If Necessary) for each core subject.

- 7 Any candidate who has passed the B.A. examination of the University shall be allowed to present himself for examination in any of additional subject spres cribbed for the B.A. exami-nation and not taken by him at the degree examination. Such candidate will have to first appear and pass the B.A. PartI examination in the subject which he proposes to offer and then the B.A.PartII and PartIII examinationin the same subject. Successfull candidate will be given acertificate to that effect.
- 8 Inorder to pass atany part of the three year degree course examination, an examinee must obtain not less than33% of the total makrs in each subject/group of subjects .In subject /group of subjects, where both theory and practical examination are provided, an examinee must pass in both the ory and practical part so the examination separately.
- 9 Candidate will have to pass separately at the Part-I, Part II and part-III examination. No division shall be assigned on the result of the Part-I and Part-II examination. In deter mining the divison of the Final examination, total marks obtained by the examinees, in their Part-I,Part-II and Part-III examination in the aggregate shall be taken in to account. Candidate will not be allowed to change subjects after passing Part IExamination.  
Provided in case of candidate who has passed the examination through the supplementary examination having fail edin one subject only the total aggregate marks being carried over for determining the division shall in cluded the actual mark so btained in the subject in which he appeared at the supplementary examination.
- D Successful exminee sat the Part-III examination obtaining 60% or more marks shall be placed in the First division, those obtain in gless than 60% but not less than 45% marks in the Second division and other successful examinees in the third division.

## SCHEME OF EXAMINATION

Subject		Paper	Max. Marks	Min. Marks
A.	i) Environmental Studies		75	33
	Fild Work		25	
	Foundation Course			
	i) Hindi Language - I		75	26
	ii) English Language - II		75	26
B.	Three Core Subject :			
	1. Hindi Literature	I	75	50
		II	75	
	2. Sanskrit Literature	I	75	50
		II	75	
	3. English Literature	I	75	50
		II	75	
	4. Philosophy	I	75	50
		II	75	
	5. Economics	I	75	50
		II	75	
	6. Political Science	I	75	50
		II	75	
	7. History	I	75	50
		II	75	
	8. Ancient Indian History	I	75	50
	Culture & Archaeology	II	75	
	9. Sociology	I	75	50
		II	75	
	10. Geography	I	50	33
		II	50	
		Practical	50	17
	11. Mathematics	I	50	
		II	50	50
		III	50	
	12. Statistics	I	50	33
		II	50	
		Practical	50	17

	<b>Subject</b>	<b>Paper</b>	<b>Max. Marks</b>	<b>Min. Marks</b>
13.	Anthropology	I	50	33
		II	50	
		Practical	50	17
14.	Linguistics	I	75	50
		II	75	
15.	Music	I	50	33
		II	50	
		Practical	50	17
16.	Home Science	I	50	33
		II	50	
		Practical	50	17
17.	Education	I	75	50
		II	75	
18.	Psychology	I	50	33
		II	50	
		Practical	50	17
19.	Management	I	75	50
		II	75	
20.	Defence Studies	I	50	
		II	50	33
		Practical	50	17
21.	Urdu	I	75	50
		II	75	
22.	Dance	I	50	33
		II	50	
		Practical	50	17

## Part - I

### SYLLABUS FORENVIRONMENTAL STUDIES AND HUMAN RIGHTS

(Papercode-0828)

MM. 75

इन्वारमेंटल साईंसे के पाठ्यक्रम को स्नातक स्तर भाग—एक की कक्षाओं में विश्वविद्यालय अनुदान आयोग के निर्देशानुसार अनिवार्य रूप से शिक्षा सत्र 2003—2004 (परीक्षा 2004) से प्रभावशील किया गया है। स्वशासी महाविद्यालयों द्वारा भी अनिवार्य रूप से अंगीकृत किया जाएगा।

भाग 1, 2 एवं 3 में से किसी भी वर्ष में पर्यावरण प्रश्न—पत्र उत्तीर्ण करना अनिवार्य है। तभी उपाधि प्रदाय योग्य होगी।

पाठ्यक्रम 100 अंकों का होगा, जिसमें से 75 अंक सैद्धांतिक प्रश्नों पर होंगे एवं 25 अंकक्षेत्रीय कार्य (Field Work) पर्यावरण पर होंगे।

**सैद्धांतिक प्रश्नों पर अंक — 75** (सभी प्रश्न इकाई आधार पर रहेंगे जिसमें विकल्प रहेगा)

- |                      |   |        |
|----------------------|---|--------|
| (अ) लघु प्रश्नोंत्तर | — | 25 अंक |
| (ब) निबंधात्मक       | — | 50 अंक |

**Field Work—** 25 अंकों का मूल्यांकन आंतरिक मूल्यांकन पद्धति से कर विश्वविद्यालय को प्रेषित किया जावेगा। अभिलेखों की प्रायोगिक उत्तर पुस्तिकाओं के समान संबंधित महाविद्यालयों द्वारा सुरक्षित रखेंगे।

उपरोक्त पाठ्यक्रम से संबंधित परीक्षा का आयोजन वार्षिक परीक्षा के साथ किया जाएगा।

पर्यावरण विज्ञान विषय अनिवार्य विषय है, जिसमें अनुत्तीर्ण होने पर स्नातक स्तर भाग—एक के छात्र/छात्राओं को एक अन्य विषय के साथ पूरक की पात्रता होगी। पर्यावरण विज्ञान के

सैद्धांतिक एवं फील्ड वर्क के संयुक्त रूप से 33: (तीस प्रतिशत) अंक उत्तीर्ण होने के लिए अनिवार्य होंगे।

स्नातक स्तर भाग—एक के समस्त नियमित/भूतपूर्व/अमहाविद्यालयीन छात्र/छात्राओं को अपना फील्ड वर्क सैद्धांतिक परीक्षा की समाप्ति के पश्चात् 10 (दस) दिनों के भीतर संबंधित महाविद्यालय/परीक्षा केन्द्र में जमा करेंगे एवं महाविद्यालय के प्राचार्य/केन्द्र अधीक्षक, परीक्षकों की नियुक्ति के लिए अधिकृत रहेंगे तथा फील्ड वर्क जमा होने के सात दिनों के भीतर प्राप्त अंक विश्वविद्यालय को भेजेंगे।

## **UNIT-I THE MULTI DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES**

### **Definition, Scope and**

### **Importance Natural Resources:**

### **Renewable and Nonrenewable Resources**

- (a) Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people and relevant forest Act.
- (b) Water resources: Use and over-utilization of surface and ground water, floods drought, conflicts over water, dam's benefits and problems and relevant Act.
- (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.
- (d) food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.
- (e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.
- (f) Land resources: Land as a resource, land degradation, man induced landslides soil erosion and desertification.

**(12 Lecture)**

## **UNIT-II ECOSYSTEM**

### **(a) Concept, Structure and Function of an ecosystem**

- Producers, consumers and decomposers.
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids.
- Introduction, Types, Characteristics Features, Structure and Function of Forest, Grass, Desert and Aquatic Ecosystem.

### **(b) Biodiversity and its Conservation**

- Introduction - Definition: genetic, species and ecosystem diversity
- Bio-geographical classification of India.
- Value of biodiversity: Consumptive use, productive use, social ethics, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as mega-diversity nation.
- Hot spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wild life conflict.
- Endangered and endemic species of India.
- Conservation of biodiversity: In situ and Ex-situ conservation of biodiversity.

### UNIT- III

**(a) Causes, effect and control measures of**

- Air water, soil, marine, noise, nuclear pollution and Human population.
- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Disaster Management: floods, earthquake, cyclone and landslides.

(12Lecture)

**(b) Environmental Management**

- From Unsustainable to sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people, its problems and concerns.
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
- Wasteland reclamation
- Environment protection Act: Issues involved in enforcement of environmental legislation.
- Role of Information Technology in Environment and Human Health.



## UNIT- IV

General background and historical perspective- Historical development and concept of Human Rights, Meaning and definition of Human Rights, Kind and Classification of Human Rights.

Protection of Human Rights under the UNO Charter, protection of Human Rights under the Universal Declaration of Human Rights, 1948.

Convention on the Elimination of all forms of Discrimination against women.

Convention on the Rights of the Child, 1989.

## UNIT-V

Impact of Human Rights norms in India, Human Rights under the Constitution of India, Fundamental Rights under the Constitution of India, Directive Principles of State policy under the Constitution of India, Enforcement of Human Rights in India.

Protection of Human Rights under the Human Rights Act, 1993- National Human Rights Commission, State Human Rights Commission and Human Rights court in India. Fundamental Duties under the Constitution of India.

## Reference/ Books Recommended

1. SK Kapoor- Human rights under International Law and Indian Law.
2. HO Agrawal- International Law and Human Rights
3. एस.के. कपूर –मानव अधिकार
4. जे.एन. पान्डेय – भारत का संविधान
5. एम.डी. चतुर्वेदी – भारत का संविधान
6. J.N.Pandey - Constitutional Law of India
7. Agarwal K.C. 2001 Environmental Biology, Nidi pub. Ltd. Bikaner
8. Bharucha Erach, the Biodiversity of India, Mapin pub. Ltd. Ahmedabad 380013, India, Email: mapin@icenet.net(R)
9. Bruinner R.C. 1989, Hazardous Waste Incineration. McGraw Hill Inc. 480p
10. Clark R.S. Marine pollution, Clanderson press Oxford (TB)
11. Cuningham, W.P. Cooper. T.H. Gorhani, E & Hepworth. M.T, 200
12. Dr. A.K.- Environmental Chemistry. Wiley Eastern Ltd.
13. Down to Earth, Center for Science and Environment (R)
14. Gloick, H.P. 1993 Water in crisis. Pacific Institute for Studies in Development, Environment & Security. Stockholm Eng. Institute. Oxford University, Press. m473p.
15. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Mumbai (R)
16. Heywood, V.H. & Watson, T.T. 1995 Global Biodiversity Assessment, Cambridge Univ. Press 1140p
17. Jadhav H. & Bhosale, V.H. 1995 Environmental Protection and Law. Himalaya pub. House, Delhi 284p
18. McKinney M.L. & School R.M. 1996, Environmental Science systems & solutions, web enhanced edition, 639p
19. Mhadkar A.K. Matter Hazardous, Techno-Science publication (TB)
20. Miller T.G. Jr. Environment Science, Wadsworth publication co. (TB)
21. Odum E.P. 1971, Fundamentals of Ecology, W.B. Saunders Co. USA, 574p
22. Rao M.N. & Datta, A.K. 1987, Waste water treatment. Oxford & IBH pub. co. Pvt. Ltd 345p
23. Sharma B.K. 2001, Environmental chemistry, Goel pub. House, Meerut
24. Survey of the Environment, The Hindu (M)
25. Townsend C. Harper J. And Michael Begon, Essentials of Ecology, Blackwell Science (TB)
26. Trivedi R.K. Handbook of Environment Laws, Rules, Guidelines, Compliances and Standards, Vol I and II, Environment Media (R)
27. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science publication (TB)
28. Wanger K.D. 1998, Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

**संशोधित पाठ्यक्रम**  
बी.ए./ बी.एस-सी./ बी.कॉम./ बी.एच.एस.-सी.  
भाग - एक (आधार पाठ्यक्रम)  
प्रश्न पत्र- प्रथम (हिन्दी भाषा)  
(पेपर कोड -0101)

पूर्णांक- 75

नोट :-

1. प्रश्न पत्र 75 अंक का होगा।
2. प्रश्न पत्र अनिवार्य होगा।
3. इसके अंक श्रेणी निर्धारण के लिए जोड़े जायेंगे।
4. प्रत्येक इकाई के अंक समान होंगे।

**पाठ्य विषय :-**

**इकाई-1**

- क. पल्लवन, पत्राचार, अनुवाद, पारिभाषिक शब्दावली एवं हिंदी में पदनाम  
ख. ईदगाह (कहानी) - मुंशी प्रेमचंद

**इकाई-2**

- क. शब्द शुद्धि, वाक्य शुद्धि, शब्द ज्ञान-पर्यायवाची शब्द, विलोम शब्द, अनेकार्थी शब्द, समश्रुत शब्द, अनेक शब्दों के लिए एक शब्द एवं मुहावरे-लोकोक्तियाँ  
ख. भारत वंदना (कविता)- सूर्यकान्त त्रिपाठी निराला

**इकाई-3**

- क. देवनागरी लिपि - नामकरण, स्वरूप एवं देवनागरी लिपि की विशेषताएँ, हिंदी अपठित गद्यांश, संक्षेपण, हिंदी में संक्षिप्तीकरण  
ख. भोलाराम का जीव (व्यंग्य) - हरिशंकर परसाई

**इकाई-4**

- क. कम्प्यूटर का परिचय एवं कम्प्यूटर में हिंदी का अनुप्रयोग  
ख. शिकागो से स्वामी विवेकानंद का पत्र

**इकाई-5**

- क. मानक हिन्दी भाषा का अर्थ, स्वरूप, विशेषताएँ, मानक, उपमानक, अमानक भाषा  
ख. सामाजिक गतिशीलता - प्राचीन काल, मध्यकाल, आधुनिक काल

**मूल्यांकन योजना :-**

प्रत्येक इकाई से एक-एक प्रश्न पूछा जाएगा। प्रत्येक प्रश्न में आंतरिक विकल्प होगा। प्रत्येक प्रश्न के 15 अंक होंगे। प्रत्येक प्रश्न के दो भाग 'क' और 'ख' होंगे एवं अंक क्रमशः 8 एवं 7 होंगे। प्रश्न-पत्र का पूर्णांक 75 निर्धारित है।

### पाठ्यक्रम संशोधन का औचित्य :-

व्याकरण के बुनियादी ज्ञान, संप्रेषण, कौशल, सामाजिक संदेश एवं भाषायी दक्षता को ध्यान में रखते हुए यह पाठ्यक्रम प्रस्तावित है।

## FOUNDATION COURSE

### PAPER - II

#### ENGLISH LANGUAGE (Paper Code-0102)

M.M. 75

**UNIT-1** Basic Language skills : Grammar and Usage.

Grammar and Vocabulary based on the prescribed text. To be assessed by objective / multiple choice tests.

(Grammar - 20 Marks  
Vocabulary - 15 Marks)

**UNIT-2** Comprehension of an unseen passage.

05

This should simply not only (a) an understanding of the passage in question, but also

(b) a grasp of general language skills and issues with reference to words and usage

within the passage and (c) the Power of short independent composition based on themes and issues raised in the passage.

To be assessed by both objective multiple choice and short answer type tests.

**UNIT-3** Composition : Paragraph writing

10

**UNIT-4** Letter writing (The formal and one Informal)

10

Two letters to be attempted of 5 marks each. One formal and one informal.

**UNIT-5** Texts :

15

Short prose pieces (Fiction and not fiction) short poems, the pieces should cover a range of authors, subjects and contexts. With poetry if may sometimes be advisable to include pieces from earlier periods, which are often simpler than modern examples. In all cases, the language should be accessible (with a minimum of explanation and reference to standard dictionaries) to the general body of students schooled in the medium of an Indian language.

Students should be able to grasp the contents of each piece; explain specific words, phrases and allusions; and comment on general points of narrative or argument. Formal Principles of Literary criticism should not be taken up at this stage.

To be assessed by five short answers of three marks each.

### BOOKS PRESCRIBED -

English Language and Indian Culture - Published by M.P. Hindi Grant Academy Bhopal.

Dr. M. C. Chakraborty - Dr. S. Gupta - DR. MERILY ROY

संशोधित पाठ्यक्रम

बी. ए. भाग-1

हिन्दी साहित्य

प्रथम- प्रश्न पत्र

(प्राचीन हिन्दी काव्य)

पूर्णांक 75

(पेपर कोड- 0103)

उद्देश्य एवं प्रस्तावना-

प्राचीन से तात्पर्य है- आधुनिक काल से पूर्व का काल। सही अर्थ में हिन्दी भाषा और साहित्य का विकास आदिकाल से शुरू होता है। इसमें धार्मिक तथा ऐतिहासिक दो प्रकार का साहित्य मिलता है, जो प्रबंध, मुत्तक, रासो, फागु, चरित, सुभाषित आदि विविध काव्यरूपों में अभिव्यंजित है। मध्यकालीन साहित्य की पृष्ठभूमि के रूप में इसे प्रतिष्ठापित किया जाता है।

मध्यकालीन काव्य में भक्तिकाव्य, जहां लोक जागरण को स्वर देने वाला है, वहीं रीतिकाल अपने लौकिक- श्रृंगारिका, परिदृश्य में तत्कालीन सामाजिक, सांस्कृतिक, राजनीतिक स्थितियों को बेलौस अभिव्यंजित करता है। अतः भाषा, संस्कृति, विचार, मानवता, काव्यरूपता, लौकिकता- पारलौकिकता, आदि दृष्टियों से इसका अध्ययन अत्यावश्यक है।

पाठ्य विषय-



1. कबीर (कबीर- कांतिकुमार जैन, प्रारंभिक 50 साखियाँ)
2. जायसी- (संक्षिप्त पद्यावत- श्यामसुंदर दास, नागमती वियोग वर्णन)
3. सूर (भ्रमर गीत सार- सं. आचार्य रामचन्द्र शुक्ल, प्रारंभिक 25 पद)
4. तुलसी - "रामचरित मानस" के सुंदरकाण्ड से प्रारंभिक 30 दोहे चौपाई छंद साहित्य
5. घनानन्द (घनानन्द- सं. विश्वनाथ प्रसाद मिश्र, प्रारंभिक 25 छंद)

द्वुत पाठ हेतु निम्नांकित तीन कवियों का अध्ययन किया जावेगा- जिसमें से किन्हीं दो पर लघुउत्तरीय प्रश्न पूछे जायेंगे-

1. विद्यापति
2. रहीम
3. रसखान

अंक विभाजन-

1. व्याख्याएँ (3) - 21 अंक
2. आलोचनात्मक प्रश्न (2) - 24 अंक
3. लघुउत्तरीय प्रश्न (5) - 15 अंक
4. वस्तुनिष्ठ प्रश्न (15) - 15 अंक

 2 

संशोधित  
बी. ए. भाग-1  
हिन्दी साहित्य  
द्वितीय- प्रश्न पत्र  
हिन्दी कथा साहित्य  
(पेपर कोड- 0104)

पूर्णांक 75

उद्देश्य एवं प्रस्तावना-

गद्य की प्रमुख विधाओं का इतना द्रुत विकास इनकी लोकप्रियता का प्रमाण प्रस्तुत करता है। इसमें आधुनिक जीवन, अपनी विविध कमियों के साथ यथार्थ रूप में अभिव्यंजित हुआ है। जीवन की अनुभूतियाँ, संवेदनाओं तथा विविध परिस्थितियों के साक्षात्कार के लिए इनका अध्ययन सर्वथा अपेक्षित है।

पाठ्य विषय-

व्याख्या एवं आलोचनात्मक प्रश्नों के लिए एक उपन्यास एवं आठ कहानीकारों की एक- एक प्रतिनिधि कहानी का अध्ययन आवश्यक है।

उपन्यास 1. प्रेमचंद - गबन

कहानी 1. प्रेमचंद - कफन  
2. जयशंकर प्रसाद - आकाश दीप  
3. यशपाल - परदा  
4. फणीश्वरनाथ रेणु - ठेस  
5. मोहन राकेश - मलबे का मालिक  
6. भीष्म साहनी - चीफ की दावत  
7. गुलशेर ख़ाँ शानी - जली हुई रस्सी  
8. रांगेय राघव - गदल

द्रुत पाठ के लिए निम्नांकित तीन कथाकारों का अध्ययन अपेक्षित है, जिनमें से किन्हीं दो पर लघुउत्तरीय प्रश्न पूछे जावेंगे-

1. उपेन्द्रनाथ अशक, 2. बाल शौरि रेड्डी 3. शिवानी

अंक विभाजन- व्याख्या (3) 21 अंक  
आलोचनात्मक प्रश्न (2) 24 अंक  
लघुउत्तरीय प्रश्न (5) 15 अंक  
वस्तुनिष्ठ प्रश्न (15) 15 अंक



**B.A. Part-I**  
**ENGLISH LITERATURE**

There will be two literatures in English-1550-1750 Papers, each carrying

**Maximum marks-75.**

Nine questions are to be attempted in each paper. Each question carries the marks according to the scheme mentioned in each paper.

**ENGLISH LITERATURE**  
**PAPER - I**

**LITERATURE IN ENGLISH - 1550-1750 (Paper Code-0105)**

**M.M.75**

(i) Unit-1 of annotation is compulsory, and passages to be set from Units (II to V), at least one from each unit, 3 to be attempted.

3x5 = 15

(ii) Multiple choice/objective type questions to be set unit vii, 15 to be set 10 be attempted.

1x1 = 10

(iii) From Unit-II to VI-8 questions to be set at least one from each unit-5 to be attempted.

10x5 = 50

Word Limit for each answer 300 to 400 words.

**UNIT-1 ANNOTATIONS.**

**UNIT-2 POETRY**

- a) Shakespeare-Sonnet No. 1 From Fairest Creatures, Sonnet No. 154., The little Love God.
- b) Milton-How Soon Hath Time the Subtle Thief of Youth...
- c) John Donne - Sweetest Love I Don't go, This is my play's Last Scene.

**UNIT-3 POETRY**

- a) John Dryden - Portrait of Shadwell.
- b) Alexander-Pope-From An Essay on Criticism (True case in writing....) and the world's Victor stood subdued by sound.

**UNIT-4 PROSE**

- a) Bacon Of Studies, Of Health, Of Friendship
- b) Addison-Sir Roger at Home
- c) Steele Of the Club.

**UNIT-5 DRAMA**

Shakespeare - The Merchant of Venice

**UNIT-6 Fiction - Swift - The Battle of the Books.**

**UNIT-7 Historical and Literary Topics**

- i. The Renaissance.
- ii. Humanism.
- iii. Reformation.
- iv. The Restoration.
- v. The Earlier Drama
- vi. Petrarchism and the Sonnet Cycle.
- vii. The Influence of Seneca and Classical Dramatic Theory
- viii. The Elizabethan and Jacobean stage.
- ix. Restoration Drama
- x. The Rise of Periodical Essay

**BOOKS RECOMMENDED for Unit VII in Papers I and II**

Edward Albert	-	A History of English Literature.
Ifor Evans	-	A short History of English Literature.
Hudson	-	An Outline History of English Literature.

Both the papers of B.A.Part-I are included in the anthologies prescribed in the previous syllabus for B.A.Part-I and B.A.Part-II

Dr. M. C. Chakraborty  Dr. S. Gupta  DR. MERILY ROY 



**ENGLISH LITERATURE  
PAPER - II**

**LITERATURE IN ENGLISH FROM 1750-1900 (Paper Code-0106)**

**Note-**

- i. Unit-1. of annotation is compulsory, 6 passages be set from Units (II to IV) at least one from each unit, 3 to be attempted.  
3x5 = 15
- ii. Multiple Choice/objective type questions to be set from unit-VII, 25 to be set 10 to be attempted.  
1x10 = 10
- iii. From Units I to VI-8 questions to be set at least one from each Unit-5 to be attempted.  
10x5 = 50

Word Limit for each answer 300 to 400 words.

**UNIT-1 ANNOTATIONS**

**UNIT-2 POETRY -**

- a) Blake-Tiger, Tiger Burning Bright.
- b) Wordsworth - Daffodils and Solitary Reaper.
- c) Coleridge-Frost at Midnight.

**UNIT-3 POETRY-**

- a) Shelley - Ode to a Skylark.
- b) Keats - Ode to Autumn.
- c) Tennyson - Crossing the Bar.
- d) Browning - Prospice.

**UNIT-4 PROSE**

- a) Lamb - Dream Children : A Reverie
- b) Hazlitt - On Actors and Acting

**UNIT-5 Fiction Jane Austen - Pride and Prejudice.**

**UNIT-6 Fiction Charles Dickens - David Copperfield**

**UNIT-7 Historical and Literary Topics.**

- i. The Reform Acts.
- ii. The Impact of Industrialization.
- iii. Colonialism And Imperialism.
- iv. Scientific thoughts and discoveries.
- v. Faith and Doubt.
- vi. Classical and Romantic Concepts of Imagination.
- vii. Varieties of Romantic and Victorian Poetry.
- viii. The Victorian Novel.
- ix. Realism and the Novel.
- x. Aestheticism.

Dr. M. C. Chakraborty  Dr. S. Gupta  DR. MERILY ROY 

# Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

## B.A. – I P S Y C H O L O G Y

Paper	Name of the Paper	Max. Marks	Duration
I	Basic Psychological Processes	50	3 hrs.
II.	Psychopathology	50	3 hrs.
III.	Practicum	50	4 Hrs.

### PAPER - I

#### BASIC PSYCHOLOGICAL PROCESSES (Paper Code-0119)

M.M.:50

**Note:** This paper consists of five units. From each unit a minimum of two questions would be set and the candidates would be required to attempt one from the each unit.

**UNIT-1** Introduction: Definition and Goals of Psychology; Behaviouristic, Cognitive and Humanistic; Cross-cultural Perspectives. Methods: Experimental, Observational, Interview, Questionnaire, and Case study.

**UNIT-2** Biological Basis of Behaviour: Genes and Behaviour, The Nervous System: The Central Nervous System (C.N.S.), The Autonomic Nervous System (A.N.S.) and The Peripheral Nervous System (P.N.S.); Glands and Hormones; Emotions- Types and Bodily changes (internal and external).

**UNIT-3** Sensory and Perceptual Processes: Nature and Types of Sensation, Perception and Attention: Process, Definition, Types and Determinants; Principles of Perceptual Organization; Illusion: Nature and Types.

**UNIT-4** Learning and Memory: Classical and Operant Conditioning- Basic Processes; Verbal and Observational Learning; Memory: Sensory (S.M.), Short-term (S.T.M.) and Long-term (L.T.M.); Forgetting: Process and Theories.

**UNIT-5** Cognitive and Non-Cognitive Processes: Intelligence: Nature and Types; Motivation: Biogenic and Sociogenic Motives; Thinking Process: Nature and Types. Personality: Nature and Determinants; Approaches to study Personality: Trait and Type Approaches; Assessment of Personality.

### References

1. सिंह अरुण कुमार सामान्य मनोविज्ञान। मोतीलाल बनारसीदास
2. वर्मा, आधुनिक, सामान्य मनोविज्ञान।
3. Baron, R.A. & Byrne, D.A. Understanding Behavior. Tokyo: Holt Sounders.
4. Zimbardo, P.G. Psychology. New York: Haper Collings College publishers.
5. Lefton, L. A. (1985). Psychology. Bosten-Allyn Publishers.
6. Walser, A.L. (1997).

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**B.A. – I**

**PSYCHOLOGY**

**PAPER- II**

**PSYCHOPATHOLOGY (Paper Code-0120)**

**M.M.:50**

**Note:** This paper consists of five units. From each unit a minimum of two questions would be set and the candidates would be required to attempt one from the each unit.

**UNIT-1** Introduction: The concept of Normality and Abnormality; Models of Psychopathology: Psychodynamic, Behavioral and Cognitive.

**UNIT-2** Assessment of Psychopathology: Diagnostic Tests, Rating Scales, Clinical Interview, and Projective Tests.

**UNIT-3** Anxiety Disorders: Panic Disorder, Phobias, Obsessive Compulsive Disorder (OCD), and Generalized Anxiety Disorder (GAD).


**UNIT-4** Mood Disorders: Manic-Depressive Episode and Dysthemia; Personality Disorders: Paranoid, Schizoid, and Dependent Personality Disorder, Dissociative disorder and Obesity.

**UNIT-5** Management of Psychopathology: Stress Management; Medico and Psychosocial Therapy: Shock Therapy, Psychoanalysis, Group therapy and Behavior therapy.

**References**

1. Lamm, A. (1997). Introduction to Psychopathology. NY: Sage.
2. Buss, A. H. (1999). Psychopathology. NY: John Wiley.
3. सिंह तथा तिवारी। अस्नामान्य मनविज्ञान। आगरा विनाद पुस्तकालय द्वारा।
4. कपिल, एच. क.। अस्नामान्य मनविज्ञान। आगरा हरप्रसाद शर्मा।

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**B.A. – I**  
**PSYCHOLOGY**  
**PAPER- III**  
**PRACTICUM**

**M.M.:50**

**Note:** This paper consists of two parts:

**Part-A**

- (a) Comprises of Laboratory **Experiments**.
- (b) Comprises of Psychological **Testing** and understanding of self and others.

(a) **Experiments-** (Any five of the following) :-

- (i) Effect of Set on Perception
- (ii) Effect of Frustration on Performance.
- (iii) Division of Attention.
- (iv) Learning Curve/ Serial Position Curve.
- (v) Retroactive Inhibition (RI).
- (vi) S.T.M.
- (vii) Concept Formation.
- (viii) Judgment of Emotions through Facial Expressions.
- (ix) Personality Test

(b) **Psychological Tests** (Any four of the following)

- (i) Verbal/ Nonverbal Intelligence Test/ Performance Tests.
- (ii) E.P.I./ Personality
- (iii) Anxiety test.
- (iv) Depression Scale
- (v) Adjustment Inventory.
- (vi) Achievement motivation.
- (vii) Stress Tolerance Test.

**Part-B**

**Anecdotal Record:** Each student will be required to observe the behaviour of pupil in different setting and select an anecdote to understand, judge and narrate it as objectively as possible, so as to reveal his/her psychological insight existing in that anecdotal behavior. This record constitutes a part of psychological assessment of the students. Introduction to the measures of central tendency and graphical presentation of the ungrouped data.

**Distribution of Marks**

A. Conduction of Psychological Experiment and Reporting	-	15 Marks
B. Administration of one Psychological Test and Reporting	-	15 Marks
C. Evaluation of Practical notebook and Anecdotal record	-	10 Marks
D. Viva-voce	-	10 Marks

**Note :** No candidate will be allowed to appear in the practical examination unless his/her day-to-day practical work and the report are found satisfactory.

**References** Choubey, A. (2015). Psycho-lab- Experiment and Test. Raipur: Vaibhav Prak

*U. Mahabey*  
22.6.19

*[Signature]*  
22.06.2019

# हेमचंद यादव विश्वविद्यालय, दुर्ग (छ.ग.)

बी.ए. प्रथम वर्ष

इतिहास

प्रश्न पत्र – प्रथम

भारत का इतिहास, प्रारंभ से 1206 ई. तक

इकाई-1

1. भारत की भौगोलिक संरचना
2. भारतीय इतिहास के स्रोतों का सर्वेक्षण
3. पूर्ण पाषाण काल एवं उत्तर पाषाण काल
4. हड़प्पा सभ्यता— निर्माता, प्रसार, नगर योजना, राजनीतिक, सामाजिक, आर्थिक संरचना

इकाई-2

5. ऋग्वैदिक काल — राजनीतिक, सामाजिक, आर्थिक
6. ईसा पूर्व छठवीं शताब्दी का भारत —महाजनपद काल
7. जैन एवं बौद्ध धर्म
8. सिकंदर का आक्रमण और उसका प्रभाव

इकाई-3

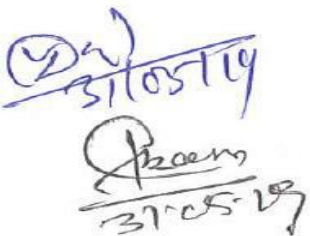
9. चंद्रगुप्त मौर्य एवं अशोक
10. मौर्य प्रशासन, कला एवं संस्कृति, अशोक का धम्म
11. मौर्योत्तरकाल — शुंग, कुषाण एवं सातवाहन
12. संगमयुग— साहित्य, संस्कृति, चोल एवं पाण्ड्य

इकाई-4

13. गुप्तयुग— समुद्रगुप्त की विजयें एवं चंद्रगुप्त द्वितीय, प्रशासन, आर्थिक, सामाजिक, सांस्कृतिक दशा
14. राजपूतों की उत्पत्ति एवं प्रशासनिक तथा सामाजिक विशेषताएं
15. पल्लव, चालुक्य, वर्धन, पाल, राष्ट्रकुट
16. भारत का दक्षिण पूर्व एशिया एवं श्रीलंका से संबंध
17. मोहम्मद बिन कासिम, महमूद गजनवी एवं मुहम्मद गोरी का आक्रमण

इकाई-5

18. छत्तीसगढ़ का परिचय— नामकरण एवं भौगोलिक स्थिति
19. छत्तीसगढ़ के प्रमुख क्षेत्रीय राजवंश—पाण्डुवंश, शरभपुरीय,
20. छत्तीसगढ़ के प्रमुख राजवंश— नलवंश, छिन्दक नागवंश,
21. दक्षिण कोसल के कलचुरी वंश, राजनीतिक एवं प्रशासनिक व्यवस्था

  
31/05/19

  
31-5-19

  
31.5.19

### संदर्भ ग्रन्थ सूची:-

1. रतिभानु सिंह नाहर
2. शांता शुक्ला
3. द्विजेन्द्र नारायण एवं श्रीमाली
4. ओम प्रकाश
5. बी.एन. लूनिया
6. एस.आर. शर्मा  
तक
7. K.L. Khurana
8. K.L. Khurana
9. Vincent Smith
10. भार्गव
11. L. Prasad  
A.D
12. भगवान सिंह वर्मा
13. राम कुमार बेहार
14. ऋषिराज पांडे
15. व्ही.व्ही. मिराशी
16. सुरेश चंद्र शुक्ला
17. किशोर अग्रवाल
18. सुरेश चंद्र शुक्ला  
अर्चना शुक्ला
19. लाला जगदलपुरी
20. प्यारेलाल गुप्त
21. सी.एल. शर्मा
22. हीरालाल शुक्ल
23. पी.एल. मिश्र

प्राचीन भारतीय इतिहास एवं संस्कृति  
भारत का राजनीतिक इतिहास  
प्राचीन भारत  
प्राचीन भारत  
प्राचीन भारतीय संस्कृति  
प्राचीन भारत— प्रगैतिहासिक युग से 1200 ई.

Ancient India from Earliest Time to 1206 A.D.  
History of India from Earliest Time to 1526 A.D  
Oxford History of India  
प्राचीन भारत  
Ancient India- Indus Valley Civilization to 1200

छत्तीसगढ़ का इतिहास प्रारंभ से 1947ई. तक  
छत्तीसगढ़ का इतिहास  
दक्षिण कौशल के कलचुरी  
कलचुरी नरेश और उनका काल  
छत्तीसगढ़ का समग्र अध्ययन  
बीसवीं शताब्दी का छत्तीसगढ़  
छत्तीसगढ़ की रियासतों का विलीनीकरण एवं

बस्तर इतिहास एवं संस्कृति  
प्राचीन छत्तीसगढ़  
छत्तीसगढ़ की रियासतें  
छत्तीसगढ़ का जनजातीय इतिहास  
मुगलकालीन छत्तीसगढ़

Dr. J. K. Singh  
31/05/19

Dr. J. K. Singh  
31-5-19

Dr. J. K. Singh  
31.5.19

# हेमचंद यादव विश्वविद्यालय, दुर्ग (छ.ग.)

बी.ए. प्रथम वर्ष

इतिहास

प्रश्न पत्र — द्वितीय

विश्व का इतिहास—1453 ई. से 1890 ई. तक

इकाई—1

1. यूरोप में आधुनिक युग की विशेषतायें, पुनर्जागरण
2. धर्म सुधार एवं प्रति धर्म सुधार आंदोलन
3. राष्ट्रीय राज्यों का उदय स्पेन, फ्रांस
4. राष्ट्रीय राज्यों का उदय इंग्लैण्ड, रूस

इकाई—2

1. वाणिज्यवाद, उपनिवेशवाद
2. औद्योगिक क्रान्ति
3. इंग्लैण्ड में गृह युद्ध : घटनाएँ, कारण एवं परिणाम
4. गौरव पूर्ण क्रांति (1688)

इकाई—3

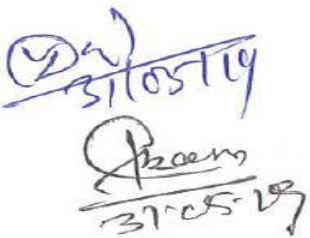
1. अमेरिका का स्वतंत्रता संग्राम
2. फ्रांस की क्रान्ति के कारण एवं प्रभाव
3. नेपोलियन युग
4. विएना कांग्रेस

इकाई—4

1. अनुदारवाद— मैटरनिक, आंतरिक एवं विदेश नीति
2. यूरोप में 1830 ई. एवं 1848 ई. की क्रान्ति
3. इंग्लैण्ड में उदारवाद 1832 एवं 1867 ई. का सुधार अधिनियम
4. पूर्वी समस्या— कारण, क्रीमिया युद्ध, बर्लिन सम्मेलन

इकाई—5

1. इटली का एकीकरण
2. जर्मनी का एकीकरण
3. बिस्मार्क की गृह नीति
4. बिस्मार्क की विदेश नीति

  
31/05/19

  
31-5-19

  
31.5.19

## संदर्भ ग्रन्थ सूची:-

- बी. एन. मेहता
- K.L. Khurana
- Khurana And Sharma
- जैन एवं माथुर
- कौलेश्वर राय
- मथुरा लाल शर्मा
- वी.एस. माथुर
- बी.एन. लूणिया
- एल.पी. शर्मा
- वी.डी. महाजन
- जे.आर. काम्बले
- A.C. Gupta
- विपिन बिहारी सिन्हा

अर्वाचीन यूरोप  
History of Modern World  
Modern Europe 1453- 1789 A.D.  
आधुनिक विश्व  
आधुनिक यूरोप  
संयुक्त राज्य अमेरिका का इतिहास  
संयुक्त राज्य अमेरिका का इतिहास  
आधुनिक पाश्चात्य इतिहास की प्रमुख धाराएं  
इंग्लैंड का इतिहास  
इंग्लैंड का इतिहास  
अमेरिका का इतिहास  
A History of China  
आधुनिक ग्रेटब्रिटेन

Dr. S. S. S. S.  
31-5-19

Dr. S. S. S. S.  
31-5-19

Dr. S. S. S. S.  
31-5-19



# **HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**

## **REVISED SYLLBUS**

### **B. A. Part- I (Economics)**

#### **Subject : Micro Economics, Paper-I (Code: 0111)**

##### **UNIT 1**

Introduction - Definitions Nature and scope of Economics, Methodology in Economics, Utility - Cardinal and Ordinal approaches, Indifference curve, Consumer's equilibrium, Giffin goods, Demand - Law of Demand, Elasticity of demand Consumer's surplus

##### **UNIT 2**

Theory of production and cost, Production decision, Production function, Iso-quant, Factor substitution, Law of variable proportions, Returns to scale, Economies of scale, Different concepts of cost and their interrelation, Equilibrium of the firm.

##### **UNIT 3**

Market structure-perfect and imperfect markets, Equilibrium of a firm-Perfect competition, Monopoly and price discrimination, Monopolistic competition, Duopoly, Oligopoly, controlled and administered prices

##### **UNIT 4**

Factor pricing-Marginal productivity theory of distribution, Euler's theorem, Theories of wage determination, wages and collective bargaining, wage differentials, Rent - Scarcity Rent, differential rent, Quasi rent, Modern Rent Theory, Interest Classical and Keynesian Theories, Modern Theory, Profits - Innovation, Risk bearing and uncertainty theories

##### **UNIT 5**

Welfare economics: , What welfare economics is about ?, Role of value judgments in welfare economics, Pigou's contribution in the field of welfare economics, Concept and condition of Pareto optimality, New welfare economics: Kaldor-Hicks welfare criterion, Scitovsky paradox, Social welfare function and social choice: Bergson-



Samuelson social welfare function, Prof. Amartya Sen's critique, Arrow impossibility theorem.

**References:**

1. Bach, G. L. (1977) "Economics," Prentice Hall of India, New Delhi.
2. Gauld, J.P. and Edward P. L. (1996), "Microeconomic Theory," Richard Irwin, Homewood.
3. Henderson J. and R. E. Quandt (1980), "Microeconomic Theory : A Mathematical Approach", McGraw Hill, New Delhi.
4. Heathfield and Wibe (1987), " An Introduction to Cost and Production Functions", Macmillan. London.
5. Koutsoyiannis, A. (1990), " Modern Microeconomics" , Macmillan.
6. Lipsey, R. G. and K. A. Chrystal (1999) "Principles of Economics ", (9th Edition), Oxford University Press, Oxford. B.A.-Part-I (21) P



# **HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**

## **REVISED SYLLBUS**

### **B. A. Part- I (Economics)**

#### **Subject : Indian Economy , Paper-II (Code: 0112)**

##### **UNIT 1**

Pre and post independent Indian economy: A short introduction of economic policies of British India, State of economy at the time of independence, Planning exercise in India-Planning in India through different five Year Plans, The planning commission and NITI Aayog, Growth and development in pre-reform period, New Economic Reforms: Liberalization, Privatization and Globalization, Growth, development and structural change in post-reform period.

##### **UNIT 2**

Population and human development: Demographic trends and issues of education, health, malnutrition and migration. Growth and distribution: Trends and policies in poverty, inequality, unemployment and occupational distribution, International comparison in human development and poverty reduction

##### **UNIT 3**

Agriculture: Nature and importance, Trends in agriculture production and productivity, factors determining productivity, Land reforms, new agriculture strategies and green revolution, rural credit, Agricultural marketing, natural resources and infra-structure development: Performance, problems and policies, MUDRA Yojana.

##### **UNIT 4**

Industry: Growth and productivity, Industrial policy and reforms, Growth and problems of small and cottage scale industries, Role of public sector enterprises in India's industrialization. Trends and performance in services.

##### **UNIT 5**

External Sector - Role of foreign trade, Trends in exports and imports, Composition and direction of India's foreign trade, Export promotion measures and the new



trade policies, Recent macroeconomic scenario: National Income, investment, saving and inflation, Current macroeconomic policies and their impact, fiscal policies and monetary policy.

#### References

1. Uma Kapila "Indian Economy: Performance and Policies," published by Academic Foundation.
2. Dutta and Sundram, "Indian Economy", S. Chand Publications.
3. Mishra and Puri, "Indian Economy," Himalaya Publishing House.
4. Economic Survey of India: various Issues, Published by Government of India.



# हेमचंद यादव विश्वविद्यालय, दुर्ग (छ.ग.)

नवीन संशोधित पाठ्यक्रम

सत्र 2019-20

दर्शन शास्त्र

बी.ए. भाग-एक, दर्शन शास्त्र में दो प्रश्न पत्र (75 अंक) के होंगे।

1. भारतीय दर्शन की रूपरेखा

2. पाश्चात्य दर्शन का इतिहास

प्रत्येक प्रश्न पत्र पांच इकाईयों में विभाजित है। प्रत्येक इकाई में से एक प्रश्न हल करना अनिवार्य होगा।

बी.ए. भाग – एक

दर्शन शास्त्र

प्रथम – प्रश्न पत्र

भारतीय दर्शन की रूपरेखा

- इकाई-1
1. भारतीय दर्शन – परिचय एवं मुख्य विशेषताएं
  2. वेद एवं उपनिषद— ब्रह्म , आत्मा
  3. चार्वाक दर्शन – तत्त्व मीमांसा
- इकाई-2
1. जैन दर्शन – स्यादवाद, जीव, बंधन एवं मोक्ष
  2. बौद्ध दर्शन— चार आर्यसत्य, अनात्मवाद
- इकाई-3
1. न्याय दर्शन – प्रमाण (प्रत्यक्ष एवं अनुमान), ईश्वर
  2. वैशेषिक दर्शन— परमाणुवाद, सप्त पदार्थ
- इकाई-4
1. सांख्य दर्शन – प्रकृति , पुरुष, विकासवाद
  2. योग दर्शन – अष्टांग योग, ईश्वर
- इकाई-5
1. शंकराचार्य का अद्वैत दर्शन— ब्रह्म, आत्मा, माया
  2. रामानुज का विशिष्टाद्वैत – ब्रह्म, जीव, मोक्ष

उपरोक्त समस्त संशोधन विषय की स्पष्टता व ज्ञानवर्धन को ध्यान में रखकर समिति के सभी सदस्यों की सहमति से किया गया।

115A  
29/6/19

# हेमचंद यादव विश्वविद्यालय, दुर्ग (छ.ग.)

## नवीन संशोधित पाठ्यक्रम

बी.ए. भाग – एक

दर्शन शास्त्र

द्वितीय – प्रश्न पत्र

पाश्चात्य दर्शन का इतिहास

- इकाई—1      1. पाश्चात्य दर्शन – परिचय  
                    2. प्लेटो— प्रत्ययों का सिद्धांत  
                    3. अरस्तू— कारणता का सिद्धांत
- इकाई—2      1. थामस एक्वीनास— ईश्वर के अस्तित्व के प्रमाण  
                    2. डेकार्ट— संदेह पद्धति, आत्मा का अस्तित्व, ईश्वर का अस्तित्व
- इकाई 3.      1. स्पिनोजा – द्रव्य, गुण, पर्याय  
                    2. लाइबनिट्ज— चिद्बिन्दुवाद
- इकाई—4      1. जॉन लॉक— सहज प्रत्ययों का खंडन, मूलगुण एवं उपगुण  
                    2. जॉन बर्कले – मूलगुण एवं उपगुण का खंडन, विज्ञानवाद
- इकाई—5      1. ह्यूम— संस्कार और प्रत्यय, संदेहवाद, आत्मा का खंडन  
                    2. कांट – समीक्षावाद

उपरोक्त समस्त संशोधन विषय की स्पष्टता व ज्ञानवर्धन को ध्यान में रखकर समिति के सभी सदस्यों की सहमति से किया गया ।

—HSA  
29/6/19

बी.ए. प्रथम वर्ष  
संस्कृत साहित्य  
प्रथम प्रश्नपत्र

टीप — बी.ए. प्रथम वर्ष में संस्कृत साहित्य के दो प्रश्न-पत्र होंगे एवं दोनों प्रश्न-पत्र  
75- 75 अंकों के होंगे ।

नाटक, व्याकरण और अनुवाद

पूर्णांक — 75

- इकाई —1 स्वप्नवासवदत्तम् — व्याख्या अंक — 15  
इकाई —2 स्वप्नवासवदत्तम् — समीक्षात्मक प्रश्न अंक — 15  
इकाई —3 1. सुबन्त (शब्दरूप) — अंक — 15  
राम, मुनि, भानु, पितृ, करिन्, कर्तृ, आत्मन्, लता, मति, नदी,  
धेनु, मातृ, फल, वारि, सर्व, तद्, एतद्, यद्, इदम्, अस्मद्, युष्मद् ।  
2. तिङन्त (धातुरूप) —  
भ्वादि, दिवादि, तुदादि, चुरादि गण के अतिरिक्त अस् एवं कृ  
धातुओं के लट्, लृट्, लङ्, लोट् एवं विधिलिङ् लकारों के रूप  
3. अपठित गद्यांश पर आधारित प्रश्न  
नोट— शब्द रूप एवं धातु रूप के विकल्प के रूप में अपठित गद्यांश पर आधारित प्रश्न  
भी पूछे जा सकते हैं ।  
इकाई —4 प्रत्याहार, संज्ञा, सन्धि और विभक्त्यर्थ अंक — 15  
इकाई —5 हिन्दी से संस्कृत में अनुवाद अंक — 15

अनुशंसित ग्रन्थ —

1. रचनानुवाद कौमुदी — डा. कपिलदेव द्विवेदी
2. संस्कृतस्य व्यावहारिकस्वरूपम् — डा. नरेन्द्र, श्री अरविन्द आश्रम
3. संस्कृतव्याकरण — श्रीधर वसिष्ठ
4. संस्कृत में अनुवाद कैसे करें — उमाकान्त मिश्र शास्त्री, प्रकाशक — भारती भवन
5. लघु सिद्धान्त कौमुदी — श्री महेश सिंह कुशवाहा, प्रकाशक — चौखम्बा विद्याभवन,  
वाराणसी

31/05/19

बी.ए. प्रथम वर्ष  
संस्कृत साहित्य  
द्वितीय प्रश्नपत्र  
गद्य, कथा एवं साहित्येतिहास

पूर्णांक — 75

इकाई —1	शुकनासोपदेश: — व्याख्या	अंक — 15
इकाई —2	हितोपदेश: (मित्रलाभ:) — व्याख्या	अंक — 15
इकाई —3	शुकनासोपदेश एवं हितोपदेश के समीक्षात्मक प्रश्न	अंक — 15
इकाई —4	वैदिक एवं पौराणिक साहित्य का सामान्य परिचय (वेद, ब्राह्मण, आरण्यक, उपनिषद्, वेदांगों एवं पुराणों का संक्षिप्त परिचय)	अंक — 15
इकाई —5	निम्नलिखित कवियों का परिचय — महाकवि कालिदास, भारवि, माघ, श्रीहर्ष, विशाखदत्त, बाणभट्ट, शूद्रक, विशाखदत्त, भवभूति ।	अंक — 15

अनुशंसित ग्रन्थ —

1. शुकनासोपदेश — प्रकाशक — मोतीलाल बनारसीदास, वाराणसी
2. हितोपदेश (मित्रलाभ) — प्रकाशक — मोतीलाल बनारसीदास, वाराणसी
3. वैदिक साहित्य और संस्कृति — आचार्य बलदेव उपाध्याय
4. संस्कृत साहित्य का इतिहास — आचार्य बलदेव उपाध्याय
5. संस्कृत साहित्य का अभिनव इतिहास — डा. राधावल्लभ त्रिपाठी, वि.वि. प्रकाशन, सागर, म.प्र.

31/05/19



# **Syllabus of Geography**

**(B.A./B. Sc. I Year)**

**Session**

**2019-2020**

**2020-2021**

*[Signature]*  
27.5.19  
(Dr. S. K. Das)

*[Signature]*  
27.5.19

*[Signature]*  
27.05.19  
DR. R. Chakraborty

*[Signature]*  
27/05/19

## Brief Summary

### 3 Year Integrated UG Courses (B.A./ B.Sc.) in Geography

#### B.A. /B.Sc. Part I

The B.A. /B.Sc. Part-I Examination in Geography will be 150 marks. There will be two theory papers and one Practical each of 50 marks as follows:

- |             |                     |
|-------------|---------------------|
| Paper - I   | Physical Geography  |
| Paper - II  | Human Geography.    |
| Paper - III | Practical Geography |

#### B.A. /B.Sc. Part-II

The B.A./B.Sc. Part-II Examination in Geography will be 150 marks. There will be two theory papers and one Practical each of 50 marks as follows:

- |           |                                  |
|-----------|----------------------------------|
| Paper-I   | Economic and Resources Geography |
| Paper-II  | Regional Geography of India      |
| Paper-III | Practical Geography              |

#### B.A. /B.Sc. Part III

The B.A. /B.Sc. Part III Examination in Geography will be 150 marks. There will be two theory papers and one Practical each of 50 marks as follows

- |             |                           |
|-------------|---------------------------|
| Paper – I   | Remote Sensing and GIS    |
| Paper - II  | Geography of Chhattisgarh |
| Paper - III | Practical Geography       |

  
(Dr. S. K. Das)  
27.5.19

  
27.5.19

  
27.5.19  
DR. R. Sharma

  
27/05/19

**B.A. /B.Sc. Part I**

**PAPER - I**

**PHYSICAL GEOGRAPHY**

**Max. Marks: 50**

**(Paper Code-0117)**

- Unit I** The Nature and Scope of Physical Geography. Origin of the Earth, Geological Time Scale, Earth's Interior, Continental Drift Theory (Wegner), Plate Tectonics, Isostasy.
- Unit II** Earth movements: Earthquakes and Volcanoes. Rocks, Weathering, Erosion, and Normal cycle of erosion, Evaluation of landscapes- Fluvial, Arid, Glacial, Karts and Coastal landscape.
- Unit III** Elements of Weather and Climate, Composition and Structure of the Atmosphere. World patterns of Atmospheric Temperature, Pressure, and Wind.
- Unit IV** Atmospheric Moisture, and Disturbances, Climatic Classification (Koppen and Thornthwait ) types, characteristics and World patterns.
- Unit V** Surface relief of Pacific Ocean, Atlantic Ocean, and Indian Ocean. Distribution of Temperature and Salinity of oceans and seas, Currents and Tides, Ocean Deposits and Coral Reefs, and Oceanic Resources.

**Books Recommended:**

1. Barry, R. G. and Chorley, R. J. (1998): Atmosphere, Weather and Climate. Routledge, London.
2. Bryant, H. Richard (2001): Physical Geography Made Simple, Rupa and Company. New Delhi
3. Bunnett, R.B. (2003): Physical Geography in Diagrams, Fourth GCSE edition, Pearson Education (Singapore) Private Ltd.
4. Garrison, T. (1998): Oceanography, Wordsworth Company., Belmont.
5. Lake, P. (1979): Physical Geography (English and Hindi editions), Cambridge University Press, Cambridge.
6. Lal, D.S. 1993 : Climatology, 3rd edition, Chaitanya Pub. House, New Delhi
7. Leong Goh Cheng (2003): Certificate Physical and Human Geography, Oxford University Press, New Delhi.
8. Monkhouse, F.J. (1979): Physical Geography. Methuen, London
9. Singh, S. (2003): Physical Geography. (English and Hindi editions.). Prayag Pustak Bhawan, Allahabad;
10. Trewartha, G.T., Robinson, A.H., Hammond, E.H., and Horn, A.T. (1976/1990): Fundamentals of Physical Geography, 3rd edition. MacGraw-Hill, New York.
11. Singh, M.B. (2001): *Bhoutik Bhugol*, Tara Book Agency, Varanasi
12. Strahler, A.N. and Stahler, A.M. (1992): Modern Physical Geography. John Wiley and Sons, New York.

*(Dr. S. K. Das)*  
27.5.19

*Ashad Shah*  
27.5.19

*V.S.*  
27/05/19  
*R.R.*  
27.05.19  
*DR. R. Sharma*

**B.A. /B.Sc. Part I**

**PAPER - II  
HUMAN GEOGRAPHY**

**Max. Marks: 50**

**(Paper Code-0118)**

- Unit I** Definition and Scope of Human Geography. Man - environment relationship; Determinism, Possibilism, and Probabilism; Human Development Index (HDI).
- Unit II** Classification of Human Races – their Characteristics and Distribution; Human adaptation to environment: Eskimos, Bushman, Pigmy, Gond, Masai, and Naga.
- Unit III** Growth, Density and Distribution of World Population and factors influencing Spatial distribution; Over , Under, and Optimum Population; Migration of Population. .
- Unit IV** Settlements – Urban Settlements: Urbanization, Evolution and Classification, Trends of Urbanization.  
Rural settlements: Characteristics, Types and Regional Pattern, Rural Houses in India - Types, Classification and Regional Pattern.
- Unit V** Issues – Global Warming, Climate Change, Deforestation, Desertification, Air, Water and Soil Pollution.

**Books Recommended:**

1. Chisholm, M. (1985): Human Geography, 2nd edition, Penguin Books, London.
2. De Blij, H.J.(1996): Human Geography: Culture, Society and Space,. 2nd edition. John Wiley and Sons, New York,
3. Fellman, J. D., Arthur, G., Judith, G., Hopkins, J. and Dan, S. (2007): Human Geography: Landscapes of Human Activities. McGraw-Hill, New York. 10<sup>th</sup> edition.
4. Haggett, P. (2004): Geography: A Modern Synthesis. 8th edition, Harper and Row, New York.
5. Huggett, R. J. (1998): Fundamentals of Biogeography, Routledge, London.
6. Hussain, M. (1994): Human Geography, Rawat Publications, Jaipur.
7. Johnston, R. J., Gregory, D., Pratt, G. and Watts, M. (2009): The Dictionary of Human Geography. 5th edition, Basil Blackwell Publishers, Oxford.
8. Kaushik, S.D. and Sharma, A.K. (1996): Principles of Human Geography (in Hindi), Rastogi Publication, Meerut.
9. Norton, W. (2008): Human Geography, Oxford University Press, New York. 5<sup>th</sup> ed.
10. Saxena, H. M. (2000): Environmental Management. Rawat Publications., Jaipur and New Delhi.
11. Singh, K. N. and Singh, J. (2001): *Manav Bhugol*. Gyanodaya Prakashan, Gorakhpur. 2<sup>nd</sup> edition.
12. Singh, L.R. (2005): Fundamentals of Human Geography, Sharda Pustak Bhawan, Allahabad
13. Smith, D. M.(1977): Human Geography- A Welfare Approach, Edward Arnold (Publishers) Ltd.,London
14. Stoddard, R.H., Wishart, D.J. and Blouet, B.W. (1986): Human Geography. Prentice-Hall, Englewood Cliffs, New Jersey.

*(Dr. S.K. Das)*  
27.5.19

*Ashish Das*  
27.5.19

*VS*  
27/05/19  
*DR. R. Sharma*

**B.A. /B.Sc. Part I**  
**PAPER - III**  
**PRACTICAL GEOGRAPHY**  
**Max. Marks: 50**

**SECTION A**

**CARTOGRAPHY AND STATISTICAL METHODS** (M.M. 25)

**Unit I** Scale: Statement Scale, Representative Fraction (R.F.), Linear scale – Simple, Diagonal, Comparative, and Time Scales.

**Unit II** Contour: Methods of showing relief; Hachures, Contours; Representation of different landforms by contours.

**Unit III** Graph and Diagram: Line graph, Bar Diagram (Simple and Compound), Circle Diagram, Pie Diagram

**Unit IV** Statistical Technique: Mean, Median and Mode

**SECTION B**

**SURVEYING -** (M.M. 15)

**Unit V** Chain and Tape Survey. Triangulation method, Open Traverse and Closed Traverse

**PRACTICAL RECORD AND VIVA VOCE** (M.M. 10)

**Books Recommended:**

1. Davis, R.E. and Foote, F.S. (1953): Surveying, 4<sup>th</sup> edition, McGraw Hill Publication, New York
2. Jones, P.A. (1968): Fieldwork in Geography, Longmans, Green and Company Ltd., First Publication, London
3. Monkhouse, F. J. and Wilkinson, F.J. (1985): Maps and Diagrams. Methuen, London
4. Natrajan, V. (1976): Advanced Surveying, B.I. Publications., Mumbai
5. Pugh, J.C. (1975): Surveying for Field Scientists, Methuen and Company Ltd., London, First Publication.
6. Raisz, E. (1962): General Cartography. John Wiley and Sons, New York. 5<sup>th</sup> edition.
7. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
8. Sharma, J. P. (2001): *Prayogik Bhugol*, Rastogi Publication, Meerut 3<sup>rd</sup> edition.
9. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi,.
10. Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.
11. Venkatramaiah, C. (1997): A Text Book of Surveying, Universities Press, Hyderabad.

*(Dr. S. K. Das)*  
27.5.19

*Ashad Shah*  
27.5.19

*VS*  
27/05/19  
*R.R.*  
27.05.19  
DR. R. Sharma

बी.ए./बी.एस.सी. – प्रथम वर्ष  
प्रश्न पत्र–प्रथम  
भौतिक भूगोल

अधिकतम अंक : 50

(कोड क्रमांक 0117)

**इकाई –1.** भौतिक भूगोल की प्रकृति एवं विषय क्षेत्र, पृथ्वी की उत्पत्ति, भूगर्भिक समय मापनी, पृथ्वी की आंतरिक संरचना, वेगनर का महाद्वीपीय प्रवाह सिद्धांत, पट्ट विवर्तन, भूसंतुलन ।

**इकाई –2.** पृथ्वी की हलचल–भूकंप, ज्वालामुखी, चट्टान अपक्षय, अपरदन, सामान्य अपरदन चक्र, वायु, हिम बहता जल, भूमिगत जल और सागरीय जल से निर्मित भूदृश्य ।

**इकाई –3.** मौसम और जलवायु के तत्व, वायुमंडल की संरचना एवं संघटन, वायुमंडलीय ताप, दाब तथा हवाएं ।

**इकाई –4.** वायुमंडलीय आर्द्रता विक्षोभ, जलवायु वर्गीकरण कोपेन और थार्नथ्वेट के आधार पर वैश्विक जलवायु की विशेषताएँ और विश्व प्रतिरूप ।

**इकाई –5.** महासागरीय उच्चावच प्रशांत महासागर, आंध्रमहासागर एवं हिन्द महासागर । सामुद्रिक तापमान लवणता जलधाराएँ एवं, ज्वारभाटा, सामुद्रिक निक्षेप एवं प्रवाल भित्ति, सामुद्रिक संसाधन ।

**Books Recommended:**

1. Barry, R. G. and Chorley, R. J. (1998): Atmosphere, Weather and Climate. Routledge, London.
2. Bryant, H. Richard (2001): Physical Geography Made Simple, Rupa and Company. New Delhi
3. Bunnett, R.B. (2003): Physical Geography in Diagrams, Fourth GCSE edition, Pearson Education (Singapore) Private Ltd.
4. Garrison, T. (1998): Oceanography, Wordsworth Company., Belmont.
5. Lake, P. (1979): Physical Geography (English and Hindi editions), Cambridge University Press, Cambridge.
6. Lal, D.S. 1993: Climatology, 3rd edition, Chaitanya Pub. House, New Delhi
7. Leong Goh Cheng (2003): Certificate Physical and Human Geography, Oxford University Press, New Delhi.
8. Monkhouse, F.J. (1979): Physical Geography. Methuen, London
9. Singh, S. (2003): Physical Geography. (English and Hindi editions.). Prayag Pustak Bhawan, Allahabad;
10. Trewartha, G.T., Robinson, A.H., Hammond, E.H., and Horn, A.T. (1976/1990): Fundamentals of Physical Geography, 3rd edition. MacGraw-Hill, New York.
11. Singh, M.B. (2001): *Bhoutik Bhugol*, Tara Book Agency, Varanasi
12. Strahler, A.N. and Stahler, A.M. (1992): Modern Physical Geography. John Wiley and Sons, New York.

Dr. S.K. Das  
27.5.19

Ashtadash  
27.5.19

VS  
27/05/19  
DR. R. Sharma

बी.ए./बी.एस.सी. – प्रथम वर्ष  
प्रश्न पत्र-द्वितीय  
मानव भूगोल

अधिकतम अंक : 50

(कोड क्रमांक 0118)

- इकाई –1. मानव भूगोल की परिभाषा एवं विषय क्षेत्र मानव वातावरण संबंध, निश्चयवाद, संभववाद प्रसम्भववाद, मानव विकास सूचकांक ।
- इकाई –2. मानव प्रजाति उद्भव प्रकार विशेषताएँ एवं वितरण, मानव द्वारा वातावरण से अनुकूलन एस्किमो, बुशमेन, पिग्मी, गोंड, मसाई, और नागा ।
- इकाई –3. वैश्विक जनसंख्या- वृद्धि, घनत्व, जनसंख्या के वितरण को प्रभावित करने वाले स्थानिक कारक, जनाधिक्य, न्यूनतम जनसंख्या और अनुकूलतम आदर्श जनसंख्या, जनसंख्या एवं प्रवास ।
- इकाई –4. अधिवास- नगरीय अधिवास: नगरीकरण उद्भव, प्रकार एवं नगरीकरण के प्रतिरूप ।  
ग्रामीण अधिवास : विशेषताएँ, प्रकार और क्षेत्रीय प्रतिरूप, भारत में ग्रामीण अधिवास, प्रकार, वर्गीकरण और क्षेत्रीय प्रतिरूप ।
- इकाई –5. उभरते पर्यावरणीय मुद्दे- ग्लोबल वार्मिंग, जलवायु परिवर्तन निर्वन्निकरण, मरुस्थलीकरण प्रदूषण – जल, वायु और मृदा प्रदूषण ।

**Books Recommended:**

1. Chisholm, M. (1985): Human Geography, 2nd edition, Penguin Books, London.
2. De Blij, H.J.(1996): Human Geography: Culture, Society and Space,. 2nd edition. John Wiley and Sons, New York,
3. Fellman, J. D., Arthur, G., Judith, G., Hopkins, J. and Dan, S. (2007): Human Geography: Landscapes of Human Activities. McGraw-Hill, New York. 10<sup>th</sup> edition.
4. Haggett, P. (2004): Geography: A Modern Synthesis. 8th edition, Harper and Row, New York.
5. Huggett, R. J. (1998): Fundamentals of Biogeography, Routledge, London.
6. Hussain, M. (1994): Human Geography, Rawat Publications, Jaipur.
7. Johnston, R. J., Gregory, D., Pratt, G. and Watts, M. (2009): The Dictionary of Human Geography. 5th edition, Basil Blackwell Publishers, Oxford.
8. Kaushik, S.D. and Sharma, A.K. (1996): Principles of Human Geography (in Hindi), Rastogi Publication, Meerut.
9. Norton, W. (2008): Human Geography, Oxford University Press, New York. 5<sup>th</sup> ed.
10. Saxena, H. M. (2000): Environmental Management. Rawat Publications., Jaipur and New Delhi.
11. Singh, K. N. and Singh, J. (2001): *Manav Bhugol*. Gyanodaya Prakashan, Gorakhpur. 2<sup>nd</sup> edition.
12. Singh, L.R. (2005): Fundamentals of Human Geography, Sharda Pustak Bhawan, Allahabad
13. Smith, D. M.(1977): Human Geography- A Welfare Approach, Edward Arnold (Publishers) Ltd., London
14. Stoddard, R.H., Wishart, D.J. and Blouet, B.W. (1986): Human Geography. Prentice-Hall, Englewood Cliffs, New Jersey.

*(Dr. S.K. Das)* 27.5.19  
*Ashish Das* 27.5.19  
*Relu* 27.05.19  
*DR. R. Sharma*

बी.ए./बी.एस.सी.—प्रथम वर्ष  
प्रश्न पत्र—तृतीय  
प्रायोगिक भूगोल

अधिकतम अंक : 50

भाग— अ मानचित्र तकनीक एवं सांख्यिकी विधियां (25)

इकाई —1 मपनी— कथनात्मक मापन, प्रतिनिधि भिन्न सामान्य रैखिक मापनी विकर्ण तुलनात्मक एवं समय मापनी.

इकाई —2 उच्चावच प्रदर्शन की विधियां — हैश्यूर समोच्च रेखा, तथा विविध स्थलाकृतियों की प्रदर्शन.

इकाई —3 रैखिक आरेख, दंड आरेख, (सामान्य एवं मिश्रित) चक्र आरेख — समानुपातिक वृत्त आरेख विभाजित वृत्तारेख

इकाई —4 सांख्यिकी विधियां : औसत, माध्यिका , बहुलक

भाग— ब सर्वेक्षण (15)

इकाई —5 चैन और फीता सर्वेक्षण—त्रिभुजीकरण, खुला एवं बंद मार्ग मापन,

प्रायोगिक पुस्तिका और मौखिक परिक्षण परीक्षा (10)

**Books Recommended:**

1. Davis, R.E. and Foote, F.S. (1953): Surveying, 4<sup>th</sup> edition, McGraw Hill Publication, New York
2. Jones, P.A.(1968): Fieldwork in Geography, Longmans, Green and Company Ltd., First Publication, London
3. Monkhouse, F. J. and Wilkinson, F.J. (1985): Maps and Diagrams. Methuen, London
4. Natrajan, V. (1976): Advanced Surveying, B.I. Publications., Mumbai
5. Pugh, J.C. (1975): Surveying for Field Scientists, Methuen and Company Ltd., London, First Publication.
6. Raisz, E. (1962): General Cartography. John Wiley and Sons, New York. 5<sup>th</sup> edition.
7. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
8. Sharma, J. P. (2001): *Prayogik Bhugol*, Rastogi Publication, Meerut 3<sup>rd</sup>. edition.
9. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi.,
10. Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.
11. Venkatramaiah, C. (1997): A Text Book of Surveying, Universities Press, Hyderabad.

Dr. S.K. Das  
27.5.19

Dr. R. Sharma  
27.5.19

Dr. R. Sharma  
27.5.19

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**Revised syllabus**  
**SOCIOLOGY**      **2019 - 2020**

**B.A. PART-I**

**Paper – I**

**INTRODUCTION TO SOCIOLOGY (Paper Code - 0115)**

- UNIT-I    **Sociology** : Meaning, Nature, scope, Subject matter and significance.  
            **Basic concepts** : Society, Community, institution, Association, group, Status and role.
- UNIT-II    **Social Institutions**: Marriage, Family and kinship.  
            **Culture and society**: Culture, socialization, The individual and society, social control, norms and values.
- UNIT-III    **Social Stratification**: Meaning, forms and theories.  
            **Social Mobility**: Meaning, forms and theories.
- UNIT-IV    **Social change**: Meaning and patterns, types, factors, evolution and progress.
- UNIT-V    **Social System and process**: Social System- meaning, characteristics and elements.  
            Social process- Meaning, elements, characteristics and types.

**ESSENTIAL READINGS :-**

- 1 Bottomore T.B., Sociology- A guide to Problems and Literature, Bombay. George Allen and unwin(India) 1972.
- 2 Inkeles, Alex, What is Sociology ? New Delhi, Prentice Hall of India 1987.
- 3 Jayram, N., Introductory Sociology, Madras Maomillan India 1988.
- 4 Johnson Harry, M., Sociology of systematic Introduction New Delhi Allied Publishers 1995.

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**Revised syllabus**  
**SOCIOLOGY -2019-2020**

**B.A. PART-I**

**Paper –II**

**CONTEMPORARY INDIAN SOCIETY (Paper Code-0116)**

- UNIT-I Classical View about Indian Society:** Verna, Asharam, Karma, Dharma and Purusharth.
- UNIT-II The Structure and composition of Indian society.**  
**Structure ;** Village , Towns, Cities and Rural – Urban Linkage,  
**Compositions:** Tribes, Dalits, Women and Minorities.
- UNIT-III Basic Institutions of Indian Society:**  
Caste system, Joint Family, Marriage and Changing dimensions.
- UNIT-IV Familial Problems:**  
Dowry, Domestic violence, Divorce, Intra-intergenerational conflict, problem of elderly.
- UNIT-V Social Problems:**  
Surrogate Motherhood, Live in Relationship, Regionalism, Communalism, Corruption, Youth unrest.

**ESSENTIAL READINGS :-**

- 1 Dube, S. C. 1995. Society in India, New Delhi: National Book Trust.
- 2 Mandelbaum, D.G. 1970. Society in India, Bombay: Poular Prakashan.
- 3 Shrinivas, M.N. 1973. Social Change in Modern India, California: University of California Press.
- 4 Shrinivas, M.N. 1990. Social Change Structure, New Delhi: Hindustan Publishing Corporation.
- 5 Uberoi Patricia, 1993. Family and Marriage In India, New Delhi: Oxford University Press.

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10-6-19

## बी. ए.. भाग एक B.A. Part I

### राजनीति विज्ञान Political Science

प्रथम प्रश्न पत्र : राजनीतिक सिद्धान्त Paper I : Political Theory

- इकाई 1 : राजनीति विज्ञान का अर्थ, परिभाषा ( आधुनिक अवधारणा सहित ) । राजनीति एक विशिष्ट मानवीय व्यवहार के रूप में । शक्ति, सत्ता, प्रभाव : अर्थ, विशेषताएं, प्रकार । राजनीति विज्ञान की अध्ययन पद्धतियां : परम्परागत एवं व्यवहारवाद एवं उत्तर व्यवहारवाद ।
- Unit I : Meaning and Definition of Political Science ( with modern concept ). Politics as a specific human behaviour. Power, Authority and Influence : meaning, features and kinds. Method of Study to Political Science : Traditional , Behaviouralism and Post Behaviouralism.
- इकाई 2 : राज्य एवं उसके आवश्यक तत्व । राज्योत्पत्ति के विभिन्न सिद्धान्त, मार्क्सवादी सिद्धान्त । सावयविक सिद्धान्त ।
- Unit 2 : State and its essential elements. Various theories of the origin of the State, Marxist theory . Organismic Theory.
- इकाई 3 : सम्प्रभुता एवं उसकी बहुलवादी आलोचना । अधिकार: अर्थ, प्रकार , सिद्धान्त । कर्तव्य । स्वतन्त्रता : अर्थ , प्रकार, संरक्षण । समानता : अर्थ , प्रकार एवं स्वतन्त्रता से सम्बंध । प्रजातन्त्र : परिभाषा, व्यापक अर्थ, चुनौतियां, सफलता के लिए आवश्यक शर्तें , गुण-दोष । प्रत्यक्ष प्रजातन्त्र ।
- Unit 3: Sovereignty and its pluralistic criticism. Rights : meaning, kinds and theories. Duties. Liberty : meaning, kinds , safeguards. Equality : meaning, kinds and relations with Liberty. Democracy : meaning, comprehensive meaning, challenges, conditions for its success, merits and demerits. Direct Democracy.
- इकाई 4 : शासन के प्रकार : एकात्मक व संघात्मक , संसदीय व अध्यक्षीय, निरंकुशतन्त्र । शासन के अंग : कार्यपालिका, व्यवस्थापिका, न्यायपालिका । शक्ति पृथक्करण का सिद्धान्त व नियंत्रण –संतुलन का सिद्धान्त । संविधान : अर्थ , प्रकार । प्रतिनिधित्व के सिद्धान्त एवं निर्वाचन प्रणालियां ।
- Unit 4 : Kinds of Government : Unitary and Federal, Parliamentary and Presidential. Dictatorship. Organs of Government : Executive, Legislature and Judiciary. Theory of Separation of Powers and Checks and Balances. Constitution : meaning and kinds. Theories of representation and Electoral Process.
- इकाई 5 : लोककल्याणकारी राज्य । दल पद्धति : अर्थ , प्रकार, पद्धति । दबाव समूह : अर्थ, प्रकार, तकनीक । सामाजिक परिवर्तन : अर्थ, विशेषताएं , सिद्धान्त । नारीवाद, राष्ट्रवाद ।
- Unit 5 : Public Welfare State. Party System : meaning , kinds , process. Pressure Groups : meaning, kinds and technique. Social Change : meaning, characteristics, theories. Feminism. Nationalism.

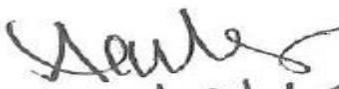
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बी.ए. प्रथम  
प्रथम प्रश्न पत्र

राजनीतिक सिद्धान्त

1. ओ.पी. गाबा, समकालीन राजनीतिक सिद्धांत, मयूर पेपर बैक्स नोएडा।
2. ओ.पी. गाबा, राजनीति सिद्धांत की रूपरेखा, मयूर पेपर बैक्स नोएडा।
3. जे.सी. जौहरी व सीमा जौहरी, आधुनिक राजनीति विज्ञान के सिद्धांत, स्टर्लिंग पब्लिकेशन।
4. पंत गुप्ता जैन, राजनीति शास्त्र के आधार, सेन्ट्रल पब्लिकेशिंग हाऊस इलाहाबाद।
5. प्रो. आनंद प्रकाश अवस्थी, भारतीय शासन एवं राजनीति, लक्ष्मीनारायण अग्रवाल, आगरा।
6. Andrew Haywood Political Theory, An Introduction.
7. O.P. Gaba An Introduction to Political Theory, Macmillan India Ltd.

  
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बी. ए. भाग एक B. A. Part I

राजनीति विज्ञान Political Science

द्वितीय प्रश्न पत्र : भारतीय शासन एवं राजनीति Paper II : Indian Government and Politics

इकाई 1 : भारतीय राष्ट्रीय आन्दोलन : 1858 का प्रथम स्वतन्त्रता संग्राम, असहयोग आन्दोलन, सविनय अवज्ञा आन्दोलन, भारत छोड़ो आन्दोलन । भारत का संविधानिक विकास : 1858, 1909, 1919 और 1935 का भारत शासन अधिनियम ।

Unit 1 : Indian National Movement : First Independence Movement 1858, Non cooperation Movement, Civil Disobedience Movement and Quit India Movement. Constitutional Development of India : Govt. of India Act of 1858, 1909, 1919 and 1935.

इकाई 2 : भारतीय संविधान : विशेषताएं , प्रस्तावना, स्रोत, । संघीय व्यवस्था , मौलिक अधिकार, मूल कर्तव्य, नीति निर्देशक तत्व । संविधान संशोधन प्रक्रिया ।

Unit 2 : Constitution of India : Characteristics, Preamble, Sources. Federal System. Fundamental Rights and Duties, Directive Principles of State Policy. Constitution Amendment Process.

इकाई 3 : संघीय कार्यपालिका : राष्ट्रपति, उपराष्ट्रपति, मन्त्रिपरिषद् और प्रधानमंत्री । संघीय व्यवस्थापिका : संसद : लोकसभा और राज्यसभा । संसदीय प्रक्रिया ।

Unit 3 : Union Executive : President , Vice President, Council of Ministers and Prime Minister. Union Legislature : Parliament: Lok Sabha and Rajya Sabha. Parliamentary Procedure.

इकाई 4 : संघीय न्यायपालिका : सर्वोच्च न्यायालय : गठन, क्षेत्राधिकार, न्यायिक पुनरावलोकन, न्यायिक सक्रियतावाद । राज्य कार्यपालिका : राज्यपाल , मन्त्रिपरिषद् और मुख्यमंत्री ।

Unit 4 : Union Judiciary : Supreme Court : Organisation, Jurisdiction, Judicial Review, Judicial Activism. State Executive : Governor, Council of Ministers and Chief Minister.

इकाई 5 : राज्य व्यवस्थापिका : विधानसभा एवं विधानपरिषद् । निर्वाचन आयोग व चुनाव सुधार । राष्ट्रीय व क्षेत्रीय दल । भारतीय राजनीति के प्रमुख मुद्दे : जाति, धर्म, भाषा और क्षेत्र । पंचायती राज व्यवस्था ।

Unit 5 : State Legislature : Legislative Assembly and Legislative Council. Election Commission and Election Reforms. National and Regional Parties. Major issues of Indian Politics : Caste, Religion, Language and Region. Panchayati Raj System.

संदर्भ पुस्तक (Reference Books)

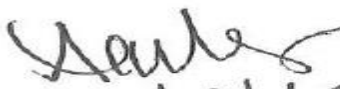
8. डॉ. सुभाष कश्यप, भारत का संवैधानिक विकास और संविधान, हिन्दी माध्यम कार्यान्वयन निदेशालय दिल्ली विश्वविद्यालय ।

डॉ. सुभाष कश्यप, हमारी संसद, भारत की संसद एक परिचय, राष्ट्रीय पुस्तक न्यास ।

10. डॉ. रूपा मंगलानी, भारतीय शासन एवं राजनीति, राजस्थान हिन्दी ग्रंथ अकादमी जयपुर ।

11- M.V. Pylee , Constitutional History of India , S.Chand.

12- D.D. Basu Indian Constitution

  
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**B.A. – 1<sup>st</sup> Year**  
**MUSIC**  
**Session- 2019-20**

**Note :-** 1. B. A.(General) three year degree course with the relative weight of practical and theory being in the proportion 50 and 50 respectively (Model curriculum, page No.21A) courses. Hence the Central Board of Studies divide the ratio as :-

1 <sup>st</sup> paper	40 marks (written or Theory) Revised as 50
2 <sup>nd</sup> paper	40 marks (written or Theory) Revised as 50

Practical of 10 marks from which 10 marks are for the internal sessional work.  
B.A. General (as one of the optional objects).  
Hindustani Music (Vocal +Instrumental..)

**THEORY**  
**PAPER - I**  
**THEORY OF INDIAN MUSIC- VOCAL \ INSTRUMENTAL** **M.M. : 50**  
**(Paper Code-0131)**

- 1. Definition and Illustrations :-** Naad, Shruti, Swara, Saptak, Purvang, Uttarang, Vadi, Samvadi, Vivadi, Anuvadi, Alankar, That, Mind, Soota, Bol Alap, Tan, Tihai, pakad.
- 2. General knowledge of the Musical Styles:-**  
Dhrupad, Dhamar, khyal, Thumari, Tarana, Tappa, Hori, Chaturang, Geet, Bhajan, Ghazal,
- 3. General Knowledge of the biographies and the contributions of the following Musicians** Ameer khusro, Swami Haridas, Tansen, Nayak Baiju, Nayak Gopal, Tyagraja.
- 4. Merits and Demerits of Musicians according to the Shastras.**
- 5. Study of the Theoretical details of prescribed Ragas for Practical Course as follows :-** Yaman, Bhupali, Allhaiya Bilawal, Bhairav, Kafi, Khamaj, Brindavani - sarang, Durga (Bilawal That).

  
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# THEORY

## PAPER - II

### THEORY OF INDIAN MUSIC- VOCAL /INSTRUMENTAL

M.M. : 50

(Paper Code-0132)

SESSION – 2019-20

1. Hindustani Music and Karnatak Music, short history, similarities and Differences.
2. Study of Notation Systems - Bhatkhande and Paluskar Notation system.
3. Time Theory of the Ragas, Purva Raga, Uttar Raga, Sandhi Prakash Raga, Parmel Praveshak Ragas.
4. Formation of Ragas, Sampurna, Shadav, Audawa, Jati. That or Mel Theory.
5. Definition of Tala, Matra, Avartan, Bol, Vibhag, Khali, Bhari, Vilambit, Madhya and Drutlaya. Writing of the Talas in Notation with Dugan

## PRACTICAL

M.M. : 50

1. Alankar (Palta)
2. Study of the following Ragas :- Yaman, Bhupali, Allahaiya Bilawal, Bhairav, Kafi, Khamaj, Brindavani Sarang, Durga (Bilawal That)
3. Two Vilambit Khyalas or Masitkhani Gat in any two of the above mentioned Ragas.
4. Madhya Laya Khyalas or Razakhani Gat with Alap, Tan, Tora Jhala, in any five of the above Ragas.
5. Lakshan Geet, Saragam Geet in all the above Ragas.
6. Ability to demonstrate (orally by giving Tali and Khali of on hand) Talas Prescribed in course as follows :- Dadra, Kaharva, Teen Tal, Ektal, Chautal, Jhaptal.
7. One Dhrupad or Dhamar / one Gat other than teen Tal (Composition only)
8. One Bhajan, Ghazal, Geet, Patrioteec song and prayer.

  
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## INTERNAL SCSSIONAL WORK -

1. Ten Descriptions of Music Programmes (Radio and T. V. personally attended)

## RECOMMENDED BOOK -

1. Kramik Pustak Malika (Part I to Part IV) By pt. V.N. Bhatkhande.
2. Sangitanjali Part I to VI By Pt. Onkar Nath Thakur.
3. Sangeet Visharad (Hathras) By Vasant
4. Sangeet Bodh, By Dr. Sharad Chandra Paranjape
5. Dhawani aur Sangeet, by Prof. L. K. Sing
6. Tan Malika, by Raja Bhaiya Puchhwale
7. Hamare Sangeet Ratna, by Lakshmi Narayan Garg.
8. Rag Parichaya Part I to IV By Harish Chandra Shrivastava
9. All Journals and Magazenes of Music
10. Sitar Malika, (Hathras)
11. Tabla Vigyan, by Dr. Lalmani Misra
12. Swar aur Ragon ke Vikas me Vadyon ka Yogdan, By Prof. Indrani Chakrawarty.
13. Sangeet Manjusha By Prof. Indrani Chakrawarty.
14. Music - its methods and technique and teaching in Higher Education. By Prof. Indrani Chakrawarty.
15. Sangeetanjali Part I to V By Pt. Ramashraya Jha.



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**M A N A G E M E N T**  
**Paper - I**  
**PRINCIPLE OF MANAGEMENT**  
**(Paper Code-0135)**

**Time : 3 HoursMax.**

**Marks : 75**

**UNIT-I** Evolution of Modern Industrial Organisation and Management Thought.

- Industrial Revolution - Impact on society
- Contribution - Frederic Winslow Taylor Eiton Moyo
- Douglas Mc. Gregor

The nature and scope of Management process definition of Management and Management process important characteristics of the process. The eight prepositions for effective organisation Philosophy, Urwick's Ten Principles, Different Schools of Thought.

- UNIT-II** Coordination - Definition and Meaning, Need and importance principles and Techni-ques.  
Definition, Nature and purpose nature and process of  
Planning - forecasting.  
Basic objective & - Objectives long and short range criteria of sound objectives.  
Types of Plan  
Types of Plans Decision making Meaning and basis  
- for selecting alternatives.  
- Strategies : Policies and Procedure.  
- Qualities of Planning Process.

**ORGANISATION**

- UNIT-III** Nature, Importance, Components of Organisation,  
Departmentation - Methods.  
Span of Control - Wide and Narrow Spans.  
Authority - Line and Staff, Decentralization, delegation, types of staff authority, factors determining the degree of decentralization.  
Staffing : Nature and Importance.  
Factors determining the selection of Managerial personnel.  
Management Appraisals.  
Development and Training of Managers.

- UNIT-IV** Deirection : Nature and importance of Communication.  
Methods of building a communication net work.  
Personal communication and use of orders.  
Changing patterns of supervisory responsibility.  
Factors of effective supervision  
Selection and training of supervisors.



T.W.I. Programmes.

Nature and Importance of discipline.

Causes of Indiscipline.

Means of effective discipline.

**UNIT-V** Basic steps in control process.

Importance of Control.

Requirements for an effective control.

Purpose of Budgeting.

Types of budgets.

Elements of costs and types of costing.

Role of cost accounting.

**BOOKS RECOMMENDED:**

1. Koontz, Harold : Principles of Management
2. Chatterjee, S. S. : An Introduction to Management
3. Kast, Fremont E. : Organisation Management
4. Asthena G. P. : The Ground Work of Management.
5. डॉ. गुप्ता : व्यवसाय प्रशासन एवं प्रबंध
6. डॉ. आर. सी. सक्सेना : व्यवसाय प्रशासन एवं प्रबंध
7. Dr. K. N. Dinesh : Structure of Medium Scale Industries.



■

**Paper-II**  
**COMMERCIAL ACCOUNTANCY**  
**(Paper Code-0136)**

**Max. Marks : 75**

**UNIT-1** Definition and objects of book-keeping, principle of Double Entry, its object and advantages.

Journal Simple journal entries, compound journal entries rules for recording journal.

**UNIT-2** Ledger & ledger account, posting of journal entries, types of ledger accounts  
Balancing of ledger accounts Cash book: Cash book with cash and discount columns three column or cash book, petty cash book.

**UNIT-3** Bank reconciliation statement.

Bill Transaction.

Endorsement of Bill

Dishonourment of Bill

Accommodation Bill

**UNIT-4** 1. Trial Balance.  
2. Rectification of errors  
3. Capital

and revenue expenditure. **UNIT-5 Final**

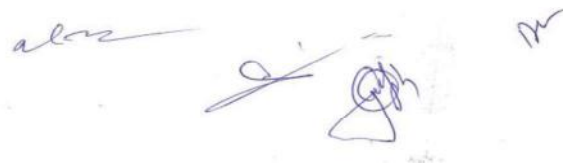
**Accounts:**

1. Manufacturing account trading
2. Profit and loss account
3. Balance Sheet.

**BOOKS RECOMMENDED:**

1. M.M.Shah : Double entry Bookkeeping
2. R.R.Gupta : Book keeping & Accounts.
3. T.S.Grewal : Introduction to accountancy.
4. Juneja, Chawla & Saxena: Elementary Book-keeping.
5. Karim & Khanuja : Financial Accounting

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## **B.A./B.Sc. – First Year**

**Session : 2019-20**

Name of the Subject :- Anthropology  
Paper :- First  
Name of the Paper :- FOUNDATION OF ANTHROPOLOGY

Total Marks : 50

Pass Marks : 17

### **Syllabus**

- UNIT – I Meaning and scope of Anthropology. History of Anthropology. Branches of Anthropology -
- (a) Socio-cultural Anthropology
  - (b) Physical Biological Anthropology
  - (c) Archaeological Anthropology
  - (d) Linguistic Anthropology
- UNIT – II Relationship of Anthropology with other disciplines: Life Sciences, Medical Sciences, Social Sciences: History, Economics, Sociology, Psychology, Political Science
- UNIT – III Foundation in Biological Anthropology
- (a) Human Evolution with respect to Hominid fossils
  - (b) Human Variation: Types and causes
  - (c) Human Genetics: Concept, scope and branches
  - (d) Human growth and development: Definition, scope, methods and factors effecting human growth and development
- UNIT – IV Fundamentals in Social-Cultural Anthropology.
- (a) Culture, Society, Community, Group, Institution
  - (b) Human Institution:-
    - Family: Definition, types and function of family
    - Marriage: Definition, forms of marriage and its functions
    - Kinship: Definition, types and functions
    - Religion: Theories on the origin of religion
  - (c) Basic techniques of data collection :
    - Observation , Schedule, Questionnaire, Geneology
- UNIT – V Fundamentals in Archaeological Anthropology.
- (a) Tool typology & Technology: Paleolithic, Mesolithic & Neolithic
  - (b) Cultural evolution: Broad outlines of cultures (Stone age to metal age)
  - (c) Dating techniques in archaeology

  
20/06/19

## **B.A. /B.Sc. – First Year**

**Session: 2019-20**

Name of the Subject :- Anthropology  
Paper :- Second  
Name of the Paper :- PHYSICAL/ BIOLOGICAL ANTHROPOLOGY

Total Marks : 50

Pass Marks : 17

### **Syllabus**

- UNIT – I      Meaning, scope, History of Physical Anthropology & its applied aspects  
Theories of organic evolution: Lamarckism, Neo-lamarckism, Darwinism, Neo-darwinism & Synthetic theory of evolution
- UNIT – II      Position of Man in animal kingdom, Classification of living primates, Comparative anatomy of Man and Apes (with special reference to skull, pelvis, dentition and long bones)
- UNIT – III      Fossil evidence of human evolution: Ramapithecus, Australopithecus, Pithecanthropus, Sinanthropus, Neanderthal, Cromagnon, Grimaldi man, Chancelade man.
- UNIT – IV      Concept of Race: Race formation and Criteria of racial classification, UNESCO Statement, Racial element in India, Major races of the world.
- UNIT – V      Human Genetics:  
a.      Structure of Chromosome, DNA & RNA  
b.      Mendelian principle.  
c.      Types of Inheritance in Human

  
20/06/19

**B.A./B.Sc. – First Year**


**Session : 2018-19**

Name of the Subject :- Anthropology  
Paper :- Practical  
Name of the Paper :- OSTEOLOGY AND CRANIOMETRY

Total Marks : 50

Pass Marks : 17

- I. Identification of bones of human Skeleton. Sketching and labeling of various norms of skull, Overview of Pectoral & Pelvic girdles, Femur & Humerus bone
- II. Craniometry :-
  1. Maximum Cranial length.
  2. Maximum Cranial Breadth.
  3. Maximum frontal Breadth.
  4. Bizygomatic Breadth.
  5. Nasal Height.
  6. Nasal Breadth
  7. Minimum frontal breadth
  8. Bimaxillary Breadth.
  9. Maximum Biorbital Breadth
  10. Length of magnum foramen.
- III. Craniometric indices :
  1. Cranial Index
  2. Nasal Index

  
20/06/19

## MATHEMATICS

There shall be three compulsory papers. Each paper of 50 marks is divided into five units and each unit carry equal marks.

### **B.A. Part-I MATHEMATICS**

#### **PAPER - I**

#### **ALGEBRA AND TRIGONOMETRY**

- UNIT-I** Elementary operations on matrices, Inverse of a matrix. Linear independence of row and column matrices, Row rank, column rank and rank of a matrix. Equivalence of column and row ranks. Eigenvalues, eigenvectors and the characteristic equations of a matrix. Cayley Hamilton theorem and its use in finding inverse of a matrix.
- UNIT-II** Application of matrices to a system of linear (both homogeneous and nonhomogeneous) equations. Theorems on consistency of a system of linear equations. Relation between the roots and coefficients of general polynomial equations in one variable. Transformation of equations. Descartes's rule of signs. Solutions of cubic equations (Cardan's method), Biquadratic equation.
- UNIT-III** Mappings, Equivalence relations and partitions. Congruence modulo  $n$ . Definition of a group with examples and simple properties. Subgroups, generation of groups, cyclic groups, coset decomposition, Lagrange's theorem and its consequences. Fermat's and Euler's theorems. Normal subgroups. Quotient group, Permutation groups. Even and odd permutations. The alternating groups  $A_n$ . Cayley's theorem.
- UNIT-IV** Homomorphism and Isomorphism of groups. The fundamental theorems of homomorphism. Introduction, properties and examples of rings, Subrings, Integral domain and fields Characteristic of a ring and Field.
- TRIGONOMETRY :**
- UNIT-V** De-Moivre's theorem and its applications. Direct and inverse circular and hyperbolic functions. Logarithm of a complex quantity. Expansion of trigonometrical functions. Gregory's series. Summation of series.

#### **TEXT BOOK :**

1. I.N. Herstein, Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975
2. K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd. New Delhi, 2000.
3. Chandrika Prasad, Text-Book on Algebra and Theory of equations, Pothishala Private Ltd., Allahabad.
4. S.L. Loney, Plane Trigonometry Part II, Macmillan and Company, London.

#### **REFERENCES :**

1. P.B. Bhattacharya, S.K. Jain and S.R. Nagpaul, First Course in linear Algebra, Wiley Eastern, New Delhi, 1983.
2. P.B. Bhattacharya, S.K. Jain and S.R. Nagpaul, Basic Abstract Algebra (2 edition), Cambridge University Press, Indian Edition, 1997.
3. S.K. Jain, A. Gunawardena and P.B. Bhattacharya, Basic linear Algebra with MATLAB, Key College Publishing (Springer-Verlag), 2001.
4. H.S. Hall and S.R. Knight, Higher Algebra, H.M. Publications, 1994.
5. R.S. Verma and K.S. Shukla, Text Book on Trigonometry, Pothishala Pvt. Ltd., Allahabad.

**B.A. Part-I**  
**MATHEMATICS**  
**PAPER - II**  
**CALCULUS**

**DIFFERENTIAL CALCULUS:**

**UNIT-I**  $\varepsilon - \delta$  definition of the limit of a function. Basic properties of limits. Continuous functions and classification of discontinuities. Differentiability. Successive differentiation. Leibnitz theorem. Maclaurin and Taylor series expansions.

**UNIT-II** Asymptotes. Curvature. Tests for concavity and convexity. Points of inflexion. Multiple points. Tracing of curves in cartesian and polar coordinates.

**INTEGRAL CALCULUS:**

**UNIT-III** Integration of transcendental functions. Reduction formulae. Definite integrals. Quadrature. Rectification. Volumes and surfaces of solids of revolution.

**ORDINARY DIFFERENTIAL EQUATIONS:**

**UNIT-IV** Degree and order of a differential equation. Equations reducible to the linear form. Exact differential equations. First order higher degree equations solvable for x, y, p. Clairaut's form and singular solutions. Geometrical meaning of a differential equation. Orthogonal trajectories. Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations.

**UNIT-V** Linear differential equations of second order. Transformation of the equation by changing the dependent variable/the independent variable. Method of variation of parameters. Ordinary simultaneous differential equations.

**TEXT BOOK :**

1. Gorakh Prasad, Differential Calculus, Pothishala Private Ltd. Allahabad.
2. Gorakh Prasad, Integral Calculus, Pothishala Private Ltd. Allahabad.
3. D.A. Murray Introductory Course in Differential Equations, Orient Longman (India), 1976.

**REFERENCES :**

1. Gabriel Klambauer, Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975.
2. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum's outline series, Schaum Publishing Co. New York.
3. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
4. P.K. Jain and S.K. Kaushik, An Introduction to Real Analysis, S. Chand & Co. New Delhi, 2000.
5. G.F. Simmons, Differential Equations, Tata Mc Graw Hill, 1972.
6. E.A. Codington, An Introduction to Ordinary Differential Equations, Prentics Hall of India, 1961.
7. H.T.H. Piaggio, Elementary Treatise on Differential Equations and their Applications, C.B.S. Publishe & Distributors, Dehli, 1985.
8. W.E. Boyce and P.O. Dprima, Elementary Differential Equations and Boundary Value Problems, John Wiley, 1986.
12. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley and Sons, 1999.





**B.A. Part-I**  
**MATHEMATICS**  
**PAPER - III**  
**VECTOR ANALYSIS AND GEOMETRY**

**VECTOR ANALYSIS:**

- UNIT-I**      Scalar and vector product of three vectors. Product of four vectors. Reciprocal Vectors. Vector differentiation. Gradient, divergence and curl.
- UNIT-II**      Vector integration. Theorems of Gauss, Green, Stokes and problems based on these.
- UNIT-III**     General equation of second degree. Tracing of conics. System of conics. Confocal conics. Polar equation of a conic.
- UNIT-IV**      Sphere. Cone. Cylinder.
- UNIT-V**      Central Conicoids. Paraboloids. Plane sections of conicoids. Generating lines. Confocal Conicoids. Reduction of second degree equations.

**TEXT BOOKS:**

1. N. Saran and S.N. Nigam, Introduction to vector Analysis, Pothishala Pvt. Ltd. Allahabad.
2. Gorakh Prasad and H.C. Gupta, Text Book on Coordinate Geometry, Pothishala Pvt. Ltd., Allahabad.
3. R.J.T. Bell, Elementary Treatise on Coordinate Geometry of three dimensions, Machmillan India Ltd. 1994.

**REFERENCES:**

1. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Company, New York.
2. Murray R. Spiegel, Vector Analysis, Schaum Publishing Company, New York.
3. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 1999.
4. Shanti Narayan, A Text Book of Vector Calculus, S. Chand & Co., New Delhi.
5. S.L. Loney, The Elements of Coordinate Geometry, Macmillan and Company, London.
6. P.K. Jain and Khalil Ahmad, A Text Book of Analytical Geometry of two Dimensions, Wiley Eastern Ltd., 1994.
7. P.K. Jain and Khalil Ahmad, A Text Book of Analytical Geometry of three Dimensions, Wiley Eastern Ltd., 1999.
8. N. Saran and R.S. Gupta, Analytical Geometry of three Dimensions, Pothishala Pvt. Ltd. Allahabad.



**भाषाविज्ञान**  
**प्रथम प्रश्न पत्र**  
**भाषा की प्रकृति**  
**(पेपर कोड – 0107)**

1. भाषा—मानव एवं मानवेत्तर, संप्रेषण, परिभाषा, विशेषताएं, भाषा विज्ञान की उपयोगिता, भाषा विज्ञान की विभिन्न शाखाएं, भाषा विज्ञान का अन्य विषयों के साथ संबंध ।
2. भाषा सीखने की प्रक्रिया — मौखिक एवं लिखित भाषा के विविध रूप, भाषा बोली के भाषा बन जाने के कारण, भाषाई परिवर्तन के प्रकार एवं कारण ।
3. मनोभाषाविज्ञान —भाषा एवं मस्तिष्क, मस्तिष्क में भाषा के अवयव, स्थानीयकरण, भाषित व्यक्तिक्रम अस्पष्टार्थकता, अनकार्थकता ।
4. भाषा एवं विचार — भाषा — सामर्थ्य एवं भाषा—व्यवहार, सहजात परिकल्पना, निश्चयवाद — अनुभववाद ।
5. हिन्दी भाषा का उद्भव और विकास, हिन्दी की उपभाषाएं तथा विविध बोलियां छत्तीसगढ़ी की विशेषताएं ।

**निर्धारित पुस्तकें —**

1. सैद्धांतिक भाषाविज्ञान — जे. लियांस (अनवाद— सत्यकाम वर्मा)
2. सामान्य भाषाविज्ञान — रॉबिंस
3. सामान्य भाषाविज्ञान — बाबूराम सक्सेना
4. भाषाविज्ञान — भोलानाथ तिवारी
5. भाषा , विचार और वास्तविकता — बेंजामिन ली होर्फ
6. भाषाविज्ञान — राजमल बोरा
7. भाषा विज्ञान सैद्धांतिक चिंतन — रविन्द्रनाथ श्रीवास्तव
- 8- Philosophy of Language and – S. Chopman, Routledge, London.
- 9- An Introduction to Language and – A. Akimajian (etal.)
- 10- Communication – Met Press Massachusetts, 1990/1996

(Indian Reprint] Prentice Hall] 1996)

**द्वितीय प्रश्न पत्र**  
**ध्वनि और शब्द अभिरचना**  
**(पेपर कोड – 0108)**

1. ध्वनि विज्ञान –स्वरूप एवं शाखाएं, वाग्यंत्र की संरचना एवं कार्य, स्वर तथा व्यंजन की परिभाषा एवं अंतर ।
2. स्वर – वर्गीकरण के विभिन्न आधार, मान स्वर – त्रिकोण, प्रधान एवं गौण मान संध्यक्षर (संयुक्त स्वर)
3. व्यंजन– वर्गीकरण के विभिन्न आधार, संयुक्त व्यंजन, अंतर्राष्ट्रीय ध्वन्मात्मक प्रतिलिपि चिह्न (आई.पी.ए.)
4. अक्षर एवं ध्वनि गुण – मात्रा, बलाघात, सुर अनुतान (सुर लहर), संग्रम, व्यतिरेकी विवरण, परिपूरक विवरण सह स्वरों का निर्धारण ।
5. शब्द परिभाषा, वर्गीकरण, हिन्दी में आगत शब्दावली, शब्द समूह में परिवर्तन –कारण एवं दिशाएं (प्रकार)

**निर्धारित पुस्तकें –**

- |                                  |  |
|----------------------------------|--|
| 1. ध्वनि विज्ञान                 | – गोलोक बिहारी धल  |
| 2. स्वन विज्ञान                  | – चतुर्भुज सहाय  |
| 3. भाषा विज्ञान                  | – भोलानाथ तिवारी   |
| 4. शब्दों का अध्ययन              | – भोलानाथ तिवारी   |
| 5. हिन्दी का नवीनतम बीज –व्याकरण | – रमेश चंद्र महरोत्रा एवं चित्तरंजन कर                     |
| 6. Linguistics : An Introduction | – A. Radford (ed al.), Cambridge University Press, 1999    |
| 7. A Course in Phonetics         | – P. Lodefoged, Hardcourt Brace Jovanovich New York, 1993. |

# हेमचंद यादव विश्वविद्यालय, दुर्ग (छ.ग.)

संशोधित पाठ्यक्रम – बी.ए. प्रथम वर्ष के अंतर्गत

सत्र 2019 – 20

विषय – नृत्य (भरत नाट्यम)

बी.ए. भाग (1) के लिये इस विषय में प्रायोगिक और सैद्धांतिक दो भाग होंगे। प्रायोगिक 50 अंक एवं सैद्धांतिक 100 अंक का होगा। इस हेतु 50-50 अंक के दो प्रश्नपत्र होंगे। प्रत्येक वर्ष के पूर्णांक कुल मिलाकर 150 अंक के होंगे।

क्र	विवरण	पूर्णांक	उत्तीर्णांक
1	सैद्धांतिक प्रथम प्रश्न पत्र	50	17
2	सैद्धांतिक द्वितीय प्रश्न पत्र	50	17
3	प्रायोगिक	50	17
योग		150	51

## सैद्धांतिक (विस्तृत पाठ्यक्रम)

प्रथम प्रश्न पत्र

शीर्षक – नृत्य का इतिहास एवं सामान्य अध्ययन

पेपर कोड (0153)

- नृत्य का इतिहास – सिंधु सभ्यता, वैदिक काल, रामायण एवं महाभारत काल में नृत्य की स्थिति।
- पुराणों के आधार पर – उमाशंकर एवं नटवर श्री कृष्ण की नृत्य संबंधी कथाएँ – त्रिपुरडाह, उमा तांडव, मोहिनी-भस्मासुर, माखन लीला, कालिया दमन, रासलीला।
- नृत्य का अन्य ललित कलाओं से संबंध – संगीत, साहित्य, चित्रकला एवं मूर्तिकला से संबंध।
- नाट्य की उत्पत्ति कथा – भरत के नाट्यशास्त्र के प्रथम अध्याय में वर्णित।
- लोकधर्मी नाट्य परंपरा – निम्न की संक्षिप्त जानकारी –
  1. रामलीला
  2. रासलीला
  3. भवाई
  4. माच

  
14/06/19

  
14/06/19

  
14/06/19

# हेमचंद यादव विश्वविद्यालय, दुर्ग (छ.ग.)

सैद्धांतिक (विस्तृत पाठ्यक्रम)

सत्र 2019 – 20

द्वितीय प्रश्न पत्र

शीर्षक – शास्त्रीय नृत्य सिद्धान्त

पेपर कोड (0154)

- |  |   |                                     |              |
|--|---|-------------------------------------|--------------|
| 1. ताल की प्रारंभिक जानकारी                    | – | 1. ताल के दस प्राण।                 |              |
|  |   | 2. लय – विलंबित, मध्य एवं द्रुत लय। |              |
| 2. संक्षिप्त जीवन परिचय                        | – | भरत मुनि, आचार्य नंदिकेश्वर।        |              |
| 3. नृत्य के अभ्यास से शारीरिक एवं मानसिक लाभ।  |   |                                     |              |
| 4. भारतीय नाट्य परंपरा में गुरुवंदना का महत्व। |   |                                     |              |
| 5. छत्तीसगढ़ी नृत्यों का सामान्य परिचय         | – | 1. करमा                             | 2. ददरिया    |
|  |   | 3. सुवा                             | 4. रीना, परब |

## प्रायोगिक

- |                          |   |   |
|--------------------------|---|---|
| 1. मौखिक मुद्रा प्रदर्शन | – | (अभिनय दर्पण के अनुसार)<br>(1) शिवस्तुति (2) शिरोभेद (3) ग्रीवाभेद<br>(4) दृष्टिभेद (5) असंयुक्त हस्त (6) संयुक्त हस्त          |
| 2. कार्यक्रम विभाग       | – | (1) शारीरिक अभ्यास<br>(2) आरंभिक – 05 अङ्क भेद<br>(पद + हस्त संचालन तीन काल में)<br>(3) पूजा नृत्य<br>(4) अलारिपु (तिस्त्रजाति) |

  
14/06/19

  
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14/06/19

**HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**  
**Syllabus for B.A. / B.Sc. Course, 2019-20**  
**Subject: Statistics**

Each year of B.A. /B.Sc. I, II, III shall have two theories and one practical course. All the Theory as well as Practical Examinations will be of 3 hours duration. In each practical examination 10% marks shall be fixed for viva –voce and 20% marks for practical record.

**Scheme of Examination**

	<b>Title of the paper</b>	<b>MAX. Marks</b>
<b>B.A./B.Sc. I</b>	<b>Paper-I</b> (Code No. 0803): <b>Probability I</b>	50
	<b>Paper-II</b> (Code No. 0804): <b>Descriptive Statistics I</b>	50
	<b>Paper III: Practical-</b> Based on Theory Papers I & II	50
	<b>Total</b>	<b>150</b>
<b>B.A./B.Sc. II</b>	<b>Paper-I</b> (Code No. 0853): <b>Statistical Methods</b>	50
	<b>Paper-II</b> (Code No. 0854): <b>Sampling Theory and Design of Experiments</b>	50
	<b>Paper III: Practical-</b> Based on Theory Papers I & II	50
	<b>Total</b>	<b>150</b>
<b>B.A./B.Sc. III</b>	<b>Paper I</b> (Code No. 0907): <b>Applied Statistics</b>	50
	<b>Paper II</b> ( Code No. 0908): <b>Statistical Quality Control and Computational Techniques</b>	50
	<b>Paper III: Practical-</b> Based on Theory Papers I & II	50
	<b>Total</b>	<b>150</b>

**B.A. /B.Sc. –I**  
**Subject-Statistics**  
**Paper – I ( Paper Code-0803)**  
**PROBABILITY THEORY**

**Unit-I**

Important concepts in probability: Random experiment: trial, sample point and sample space, event, Operations of events, concepts of mutually exclusive and exhaustive events. Definition of probability: classical and relative frequency approach. Richard Von Misses, Cramer and Kolmogrove approaches to probability, merits and demerits to these approaches, any general idea to be given. Discrete probability space, Properties of probability based on axiomatic approaches, Independence of events, Conditional probability, total and compound probability rules, Baye's theorem and its applications.

**Unit-II**

Random variables: Definition of discrete random variable (rv); probability mass function (pmf) and cumulative distribution function (cdf). Joint pmf of several discrete rvs. Marginal and conditional pmfs. Independence of rvs. Idea of continuous random variables, probability density function, illustration of random variables and its properties. Expectation of a random variable and its properties -moments, measures of location and dispersion, skewness and kurtosis, Moment generating function, raw and central moments, Probability generating function (pgf) and, their properties and uses.

**Unit-III**

Standard univariate discrete distributions: degenerate, discrete uniform, hypergeometric, Poisson, geometric and negative binomial distributions. Marginal and conditional distributions, Distributions of functions of discrete rvs, reproductive property of standard distributions.

**Unit-IV**

Univariate continuous distributions and their properties: Uniform, Beta, Gamma, Exponential, Normal, Cauchy, Lognormal. Moment generating function (mgf) : its properties and applications. Tchebycheff's inequality and applications, statements and applications of weak law of large numbers and central limit theorems.

**Unit-V**

Four short notes, one from each unit will be asked. Students have to answer any two.

**REFERENCES**

1. Bhat B.R., Srivankataramana T. and Rao Madhav K.S. (1997): Statistics; A Beachners Vol. II, New Age International (P) Ltd.
2. Chung, K.L. (1979). Elementary Probability Theory with Stochastic Processes, Springer International Student Edition.
3. Edward P.J., Ford J.S. and Lin (1974): Probability for Statistical Decision-Marketing. Prentice Hall
4. Goon A.M., Gupta M.K. and Dasgupta B.(1999): Fundamentals of Statistics, Vol. I , World Press, Calcutta
5. Mood A.M., Grabill F.A. and Bose D.C.(1974): Introduction to the theory of Statistics, Mc. Graw Hall.

### **ADDITIONAL REFERENCES:**

6. Cook, Cramer and Clark (): Basic Statistical Computing, Chapman and Hall.
7. David Stirzaker (1994). Elementary Probability, Cambridge University Press.
8. Feller, W. (1968). An Introduction to Probability Theory and its Applications, Wiley.
9. Hoel P.G. (1971): Introduction to Mathematical Statistics
10. Mayer P.L. (1970): Introductory Probability and Statistical Applications, Addition Wesley
11. Mukhopadhyay, P. (1996). Mathematical Statistics, New Central Book Agency, Calcutta.
12. Parzen, E. (1960). Modern Probability Theory and its Applications, Wiley Eastern.
13. Pitman, Jim (1993). Probability, Narosa Publishing House.



**Paper – II( Paper Code-0804)**  
**DESCRIPTIVE STATISTICS**

**Unit - I**

Origin and Development of statistical importance, uses and limitations of Statistics. Types of Data: Concepts of a statistics population and sample from a population; qualitative and quantitative data; nominal and ordinal data; cross sectional and time series data; discrete and continuous data; frequency and non-frequency data.

Collection and Scrutiny of Data; Primary data – designing a questionnaire and a schedule; checking their consistency. Secondary data – their major sources including some government publications. Complete enumeration, controlled experiments, observational studies and sample surveys. Scrutiny of data for internal consistency and detection of errors of recording. Ideas of cross-validation.

Presentation of Data: Construction of tables with one or more factors of classification. Diagrammatic and graphical representation of non-frequency data. Frequency distributions, cumulative frequency distributions and their graphical and diagrammatic representation – column diagram, histogram, frequency polygon and ogives. Stem and leaf chart. Box plot.

**Unit -II**

Analysis of Quantitative Data: Univariate data: Concepts of central tendency or location, and their measures; arithmetic, geometric and harmonic mean, median and mode.

**Unit -III**

Dispersion and relative measures of dispersion, skewness and kurtosis, and their measures including those based on quartiles and moments. Sheppard's corrections for moments for grouped data (without deviation).

**Unit -IV**

Bivariate data: Scatter diagram. Product moment correlation coefficient and its properties. Coefficient of determination. Correlation ratio. Concepts of regression. intra - class correlation coefficient with equal and unequal group sizes. Rank correlation – Spearman's and Kendall's measures. Correlation index. Principle of least squares. Fitting of linear and quadratic regression and related results. Fitting of curves reducible to polynomials by log and inverse transformation. Multivariate data: Multiple regression, multiple correlation and partial correlation in 3 variables. Their measures and related results.

**Unit V**

Four short notes, one from each unit will be asked. Students have to answer any two.

**REFERENCES**

1. Bhat B.R.,Srivankataramana T. and Rao Madhav K.S. (1997): Statistics; A Beachners Vol. II, New Age International (P) Ltd.
- 2.Croxtan FE, Cowden DJ and Klein S: Applied General Statistics (1973): Prentice Hall of India.
- 3.Goon A.M., Gupta M.K., Dasgupta B. Fundamentals of Statistics, Vol. 1(1991) & Vol. 2(2001). World Press, Calcutta.
- 5.Gupta V.K. and Kapor S.C. : Fundamentals of Mathematical Statistics S. Chand and Sons.

**ADDITIONAI REFERENCES:**

- 6.Cook, Cramer and Clark (): Basic Statistical Computing, Chapman and Hall.
7. Mood A.M., Grabill F.A. and Bose D.C.(1974): Introduction to the theory of Statistics, McGraw Hill.
- 8.Snedecor GW and Cochran WG: Statistical Methods (1967) : Iowa State University Press.
- 9.Spiegel, MR (1967): Theory & Problems of Statistics (1967): Schaum's Publishing Series.

## **Paper III**

### **Practical: Practical Based on Paper I & II**

1. Presentation of data by Frequency tables, diagrams and graphs.
2. Calculation of Measures of Central Tendency, dispersion , skewness and kurtosis
3. Product Moment Correlation and Correlation Ratio
4. Fitting of Curves by the least square method
5. Regression of two variables
6. Spearman's Rank correlation Coefficient
7. Multiple regression of three variables
8. Multiple correlation and partial correlation
9. Evaluation of probabilities using addition and multiplication theorems, conditional probabilities and Bayes theorems
10. Exercises on mathematical expectations and finding measures of central tendency, dispersion, skewness and kurtosis of univariate probability distributions
11. Fitting of univariate and conditional distributions

प्राचीन भारतीय इतिहास, संस्कृति तथा पुरातत्व  
Ancient India History, Culture and Archaeology

बी.ए. प्रथम वर्ष

B.A. Part I Year

पाठ्यक्रम  
Syllabus

सत्र : 2019–20

Session 2019-20

Dr. 31/05/19  
Prasen  
31.05.19

Prasen  
31-5-19

RA 31.5.19

**बी.ए. प्रथम वर्ष**  
प्राचीन भारतीय इतिहास, संस्कृति तथा पुरातत्व  
प्रथम : प्रश्न-पत्र  
**B.A. Part I Paper I**  
भारत का राजनीतिक इतिहास (पेपर कोड 0133)  
(हड़प्पा संस्कृति से 319 ई. तक)  
Political History of India (Harappa Culture to 319 A.D.)

पूर्णांक : 75

उद्देश्य : इस पाठ्यक्रम का उद्देश्य छात्रों को संबंधित कालखण्ड के राजनीतिक इतिहास की समुचित जानकारी देना है।

- इकाई- 1 (1) प्राचीन भारतीय इतिहास के स्रोत (Sources of Ancient Indian History)  
(2) हड़प्पा तथा समकालीन ताम्रश्रम संस्कृतियाँ (Harappa and Contemporary Chalcolithic Culture)  
(3) वैदिक युग (Vedic Age)
- इकाई- 2 (1) महाजन पद युग (Mahajanpada Age)  
(2) मगध साम्राज्य का उत्कर्ष (Rise of Magadha Kingdom)
- इकाई- 3 (1) सिकन्दर का आक्रमण और उसके प्रभाव (Alexander's Invasion and its impact)  
(2) मौर्य साम्राज्य का उत्थान और उसके प्रभाव (Rise of Mauryan empire and its impact)
- इकाई- 4 (1) हिन्द-यूनानी (Indo-Greeks)  
(2) शुंग (Shungas)  
(3) सातवाहन (Satvahanas)  
(4) शक-क्षत्रप, पार्थियन (Shak-Kshatrapas, Parthiyans)  
(5) खारवेल (Kharvela)
- इकाई- 5 (1) संगम युग (Sangam Age)  
(2) कुषाण (Kushanas)  
(3) मालव, यौधेय, अर्जुनायन तथा औदुम्बर (Malavas, Yaudheyas, Arjunayana and Audumbara)  
(4) नागवंश (Nagas)

सहायक ग्रंथ :

- |  |  |
|--|--|
| 1. एच.सी. रायचौधरी                             | — प्राचीन भारत का राजनीतिक इतिहास                      |
| 2. के.ए. नीलकण्ठ शास्त्री                      | — दक्षिण भारत का इतिहास                                |
| 3. कृष्णदत्त बाजपेयी तथा विमलचन्द्र पांडेय     | — प्राचीन भारत का इतिहास                               |
| 4. विमल चन्द्र पांडेय                          | — प्राचीन भारत का राजनीति तथा सांस्कृतिक इतिहास भाग एक |
| 5. किरन कुमार थप्याल                           | — सैधव सम्यता  |
| 6. गुलाम, याजदानी (संपा.)                      | — दकन का इतिहास  |
| 7. राजबली पाण्डेय                              | — प्राचीन भारत   |
| 8. H.C. Roycoudhary                            | - Political History of Ancient India                   |
| 9. R.C. Majumdar (Ed.)                         | - The Age of Imperial Unity                            |
| 10. Romila Thaper                              | - History of India                                     |
| 11. K.A. Nilkanta Shastri                      | - History of South India                               |
| 12. व्ही.डी.झा. सुष्मिता पाण्डेय, डॉ.ओम प्रकाश | — Ashoka and the declaim of Moury empire               |

(24)  
डा. अ. सी. रायचौधरी  
31-5-19

R.C. Majumdar  
31-5-19

R.A. Thaper  
31.5.19

**बी.ए. प्रथम वर्ष**  
प्राचीन भारतीय इतिहास, संस्कृति तथा पुरातत्व  
प्रथम : प्रश्न-पत्र  
**B.A. Part I Paper II**  
भारत का राजनीतिक इतिहास (319 ई.से 1300 ई. सन् तक)  
Political History of India (From 319 A.D. to 1300 A.D.)

पूर्णांक : 75

उद्देश्य : इस पाठ्यक्रम का उद्देश्य विद्यार्थियों को संबंधित कालखण्ड के राजनीतिक इतिहास का समुचित ज्ञान प्रदान करना है।

- इकाई- 1 (1) गुप्तों की उत्पत्ति एवं प्रारंभिक इतिहास (Rise of Guptas and their early History)  
(2) चन्द्रगुप्त प्रथम, रामगुप्त, समुद्रगुप्त (Chandragupta – I, Ramagupta, Samudragupta)  
(3) कुमारगुप्त प्रथम, स्कन्दगुप्त (Kumargupta – I, Shandgupta)  
(4) वाकाटक राजवंश, गुप्त-वाकाटक सम्बन्ध (Vakataka Dynasty, Gupta Vakataka relation)

- इकाई- 2 (1) परवर्ती गुप्त राजवंश (Later Gupta Rulers)  
(2) मौखरी (Maukharis)  
(3) वर्धन राजवंश और हर्ष का प्रशासन (Vardhana Dynasty and Administration of Harsha)

- इकाई- 3 (1) बादामी के चालुक्य (Chalukyas of Badami)  
(2) कांची के पल्लव (Pallavas of Kanchi)  
(3) चोल तथा उनका प्रशासन (Cholas and their administration)

- इकाई- 4 (1) गुर्जर प्रतिहार (Gurjara Pratihara)  
(2) राष्ट्रकूट (Rashtrakutas)  
(3) पाल (Palas)  
(4) गाहड़वाल (Gahadwalas)

- इकाई- 5 (1) चन्देल (Chandela)  
(2) परमार (Parmaras)  
(3) चाहमान (Chahmanas)  
(4) त्रिपुरी के कलचुरि (Kalachuris of Tripuri)  
(5) रतनपुर के कलचुरि (Kalachuris of Ratanpur)

अनुशंसित पुस्तकें :

- |   |   |
|---|---|
| 1. उदयनारायण राय                        | – गुप्त राजवंश तथा उसका इतिहास (नया संस्करण) 1988                           |
| 2. श्री राम गोयल                        | – भारत का राजनैतिक इतिहास भाग 2 एवं 3                                       |
| 3. श्री राम गोयल                        | – गुप्त साम्राज्य का इतिहास   |
| 4. Ashvini Agrawal                      | - Rise and Fall of the imperial Gupta                                       |
| 5. विशुद्धानंद पाठक                     | – उत्तर भारत का राजनीतिक इतिहास   |
| 6. अवध बिहारी लाल अवस्थी                | – राजपूत राजवंश   |
| 7. डी.सी.गांगुली                        | – परमार राजवंश  |
| 8. भगवती प्रसाद पांथरी                  | – मौखरी और पुष्यभूमि राजवंश   |
| 9. डॉ.के.ए.नीलकंठ शास्त्री              | – दक्षिण भारत का इतिहास   |
| 10. डॉ.बैजनाथ शर्मा                     | – हर्षवर्धन   |
| 11. R.C. Majumdar & A.D. Pusalkar (Ed.) | - The Classicale Age “The age of Imperial Unity”<br>The Strangle for Empire |
| 12. Majumdar, Roy Choudhary             | - An Advanced History of India Vol. I                                       |

  
31-5-19

  
31-5-19

  
31.5.19

**DEFENCE - STUDIES**  
**PAPER - I**  
**INDIAN MILITARY HISTORY**  
**(Paper Code-0143)**

**M.M. 50**

**AIM :** The main idea behind this paper is to give a conceptual background about the events and factors which influenced course of history and helped in developing the art of war in India.

**Note :** Questions will be set from each unit, There will be only internal choice.

**UNIT-11.** The definition and scope of Defence Studies and its relationship with other sub-jects.

2. Art of war of Epic and Puranic period.
3. Comparative study of Indo-Greek art of war with special reference to the Battle of Hydaspes 326 B.C.
4. Mauryan Military system and art of war.

**UNIT-21.** Kautilya's Philosophy of war.

2. Gupta's military system and art of war.
3. Military system of Harshavardhan.
4. Decline of Chariots and Importance of Elephant and Cavalry.

**UNIT-31.** Mughal military system.

2. Rajput and Turk pattern of warfare with special reference to Battle of Somnath and Battle of Tarain up to 12th century A.D.
3. Causes of the fall of Rajput Military system.
4. Army organization during Sultanate period.
5. Battle of Panipat 1526 A.D. and Battle of Haldighati 1576 A.D.

**UNIT-4 1.** Maratha Military system.

2. Warfare of Shivaji.
3. Battle of Assaye 1803 A.D.
4. Sikh Military system.
5. Battle of Sobraon 1846 A.D.

**UNIT-5 1.** 1857 Liberation Movement.

2. Reorganizations of Indian Army under the Crown.
3. Nationalization of Indian Army after independence.
4. Military reforms of Lord Kitchner's.

**READING LIST :**

- |                                       |   |               |
|---------------------------------------|---|---------------|
| 1. Military System of Ancient India   | : | B.K. Majumdar |
| 2. Generalship of Alexander the Great | : | J.F.C. Fuller |
| 3. Kautilya Arthashastra              | : | K.P. Kanbley  |
| 4. Military history of India          | : | J.N. Sarkar   |

**PAPER - II**  
**DEFENCE MECHANISM OF THE MODERN STATE**  
**(Paper Code-0144)**

**AIM :** To enable students to appreciate the importance of higher political direction in the for-mulation of national defence policy and roles as political and military leadership in fur-thering national security.

**Note :** Question will be from each unit, there will be only internal choice.

**UNIT-1** 1. Evolution of National defence policy.

2. Inter dependence of Foreign, Defence and Economics policies.
3. Higher defence organization of U.S.A., U.K. and RUSSIA.
4. Higher defence organization of CHINA, PAKISTAN and NATO.

**UNIT-2** 1. Higher defence organization in India.

2. Powers of President and relation to Armed forces.
3. Parliament and the Armed forces.
4. Defence (Political affair) committee of the cabinet. Its composition, methods of working during war and peace.
5. National Defence Council and its Valiant.

**UNIT-3** 1. Organization of Ministry of Defence.

2. Organization of Army head quarter.
3. Organization of Naval head quarter.
4. Orgatiization of Air head quarter.

**UNIT-4** 1. Organization and role of Para-militaty forces - B.S.F., I.T.B.P., C.I.S.F. etc.

2. Organization and role of Intelligence Agencies - RAW, CBI, CID., IB etc.
3. Military Intelligence.
4. Role of N.C.C. in preparing youth for Defence services.

**UNIT-5** 1. Organization of Civil - defence.

2. Importance and role of civil defence during war and peace.
3. Air-Raid signal and precaution before and after bombardment.
3. Role of Indian armed forces in war and peace.

**READING LIST :**

1. Indian Army, A Sketch of its History & Organisation : E.H.E. Choen  
: Venkateshwar m
2. Defence Organization in India

## **PRACTICAL**

**M.M. : 50**

There shall be practical examination of 3 hours duration and carrying 50 marks. The distribution of marks shall be as follows -

1. Exercises based on Map reading : 20 Marks
2. Exercises based on models : 10 Marks
3. Sessional Work and Record : 10 marks
4. Viva-Voce : 10 marks,



**PART - A**  
**ELEMENTARY MAP READING**

1. Maps- Definition, types, Marginal Information.
2. Conventional signs - Military and Geographical.
3. Direction and cardinal points.
4. Types of North, Angle of Convergence.
5. Study of Liquid compass, its parts, various tactical uses and preparation of Night navigation chart.
6. service Protractor and its uses.
7. To find North by Compass, Watch, Sun, Stars etc.
8. Bearing and interconversion of bearing.
9. Setting of Map.
10. Grid System.

**PART - B**  
**RECOGNITION & ELEMENTARY STUDY OF FOLLOWING MODELS**

1. equivalent Rank and Badges of Indian Army, Navy and Air Force.
2. Famous Armoured vehicles used in war.
3. Weapons used in Infantry.
4. Various Ships of Indian Navy.
5. Famous Air-Crafts Used by Air-Force.

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## पाठ्यक्रम उर्दू निसाब

नोट : इस इम्तेहान में दो पर्चे में 75 नम्बर पर मुश्तमिल होगा।

1. नस्र

2. नज्म

### पहला पर्चा

नस्र( पेपर कोड— 0129)

(सवानेह, खाके, इन्शाईये)

#### निसाब

##### 1. सवानेह :

1. गालिब के सवानेही हालात —' यादगारे गालिब ' के मुसन्निक अल्लाफ हुसैन हाली
2. शिब्ली की बेनियाजी और खुद्दारी शिब्ली ' से सैयद सुलेमान नदवी
3. नजीर अहमद की कहानी : ' कुछ मेरी, कुछ उनकी जबानी ' मुसन्निक फरहत उल्ला बेग

##### 2. खाके :

1. नामदेव माली : चन्द्र हम अस्र से मुसन्निक मौलवा अब्दुल हक
2. हकीम अजमल खां : 'खिमालिस्तान ' सज्जाद हदर यलद्रम'
3. अकबर इलाहाबादी :इन्शाएं माजिद हिस्सा—2 मुसन्निक अब्दुल माजिद दरयावादी
4. जिगर साहब : 'सहाब' से मुसन्निक मोहम्मद तुफैल
5. मौलाना अब्बुल कालाम आजाद : 'अब्बुल कालाम आजाद' से मुसन्निक ख्वाजा सहन निकामी

##### 3. इन्शाईये :

1. तास्सुब : 'मजामीने सर सैयद' सर सैयद
2. मुझे मेरे दोस्तों से बचाओ : 'खिमालिस्तान' सज्जाद हदर यलद्रम
3. शहजादे का बाजार में घिसटना : गदरे देहली के अफसाने सुसन्निक सहन निजामी
4. स्बरे जो कल आंख मेरी खुली : 'मजामीने पितरस' अज पितरस बुखारी
5. बरसात : निगारिस्तान अज नियाज फतहपूरी
6. शायर होना क्या माने रखना है : अज रशीद अहमद सिद्दीकी

## पर्चा प्रथम

नोट : मुन्दरजा बाला पर्चा पांच इकाईयों में तफसीम होगा ।

### इकाई-1

1. सवाने, निगारी, खाका निगारी और इन्शाईया निगारी पर सवालात नंबर 15
2. शामिले निशाब हसबाफ पर सवाल नंबर 15
3. शामिले निशाब खाकों पर सवालात नंबर 15
4. शामिले निशाबइन्शाईयों पर सवालात नंबर 15
5. शामिले निशाब असबाफ सवानेही और इन्शाईयों में इक्तेबायात की तशरीह 15 नंबर

## पर्चाद्वितीय (शायरी)

गजलियात

(पेपर कोड – 0130)

निसाब :

### (1) बली :

1. याद करना हर घड़ी उस यार का
2. शराबे शौक से सरशार हैं हम

### (2) मीर तरी मीर :

1. उल्टी हो गई सब तदवीरें
2. मुहं तकाही करें है जिस तिस का

### (3) गालीब :

1. दिल ही ताक है न संगो खिश्त दर्द से भर आये क्यो
2. यह न थी हमारे किस्मत के विसाले यार होता

### (4) मौमिन :

1. अगर उसकी जरा नहीं होता
2. गैरो पर खुल न जाएं कही राज देखना

### (5) आतिश :

1. मगर उसको फरेबे नर्गिये मस्ताना आता है
2. हवाएं दौरे गए खुशगवार राह में है

**(6) दाग देहलावी :**

1. खातिर से या खअयाल से मैं मान तो गया
2. गाब किया तेरे बादे पे एतेवार किया

**(7) सिरज मिर खां सैहर**

1. सोने में दिल है दिल में दाग
2. वक्ते जिबाह मुहं फिर गया शमशीरे कातिल का

**(8) डॉ. इकबाल**

1. कभी ये हकीकते मुसुन्तजिर नजर आ लिबाजे गजाज
2. फिर चरागे लाबा से रोशन हुए कोहो दमन

**(9) हसरत मौहानी**

1. रस्मे जफा कामयाब देखिए कब तक रहे
2. हुस्ने बे परवा को कुद बीन खुद आरा कर दिया

**(10) फानी बदायूरी**

1. खल्क कहती है जिसे दिल तेरे दिवाने का
2. दुनियां मैरा बला जाने मेंहगी है के सस्ती है

**(11) जिगर मुरादाबादी**

1. दिल गया रोकने हायत गई
2. सेरले खिदर ने दिल यह दिखाएं

**(12) फराक गौरखपुरी**

1. निगारे नाज दे पर्दे उठाए है क्या—क्या
2. बहुद पहले से उन कदमों की आहट जान लेते है

**(13) मजरूम सुलतान पुरी**

1. जला के मशअले जॉ हम जुन सिफात चले
2. मुझे सहल हो गई मंजिले

**(14) ताल भोपाली**

1. मैं हूं गदाए हुस्न न यूँ हँस के टाल दे
2. है अजब भीड़ भाड़ सड़कों पर

**(15) जॉ निसार अख्तर**

1. हम से भागा न करो दूर गजालो की तरह
2. न ख्वाब, खलिश न खुमार यह आदमी तो कोई सानेहा लगे है मुझे

(16) खलील उर्रेहमान आंजमी

1. हम जिन्दगी की साज पे गाते रहे नगमा तेरा
2. मै सूने मकान का दिया हूँ

(17) फजला ताबिशं

1. एक दो धोखे हो तो यारो दिल रखने को खा भी लो
2. न कर शुमार के हर शै गिनी नहीं आती

इकाईयां : इकाई नं.

- |                                       |          |
|---------------------------------------|----------|
| 1. गजल से मुजाल्लिक सवालात            | 15 नम्बर |
| 3. कदीम शुअरा पर तन्दीकी सवालात       | 15 नम्बर |
| 4. जरीद गजल गो शुअरा पर सावालात       | 15 नम्बर |
| 5. कदीम गजल गो शुअरा के अशआर की तशरीह | 15 नम्बर |
| 6. जदीद गजल गो शुअरा के अशआरकी तशरीह  | 15 नम्बर |

**M.M.: 50**

<b>NIT-1</b>	Structure & functions of cell general introduction of Tissue and their functions skeletal system - Types of bones, classification general structure & functions of bones. Muscular system - General structure, types and function.
<b>UNIT-2</b>	Circulatory system - General structure of organs and functions, composition of blood & function. Respiratory system - General structure of organs and functions.
<b>UNIT-3</b>	Digestive system - General introduction of Nutrients, Liver and spleen organs of digestion their general structure and function. Excretory system - organs of excretion. Kidney & skin - structure & function.
<b>UNIT-4</b>	Nervous system - Central nervous system structure and function. Senses and Sensory organs - ear and eye structure & function.
<b>UNIT-5</b>	Hygiene - Personal Hygiene <div style="text-align: center;">Social Hygiene</div> Environmental and Industrial Hygiene Water - its importance and purification. Air - its importance and purification. First aid home nursing - Principles, qualities of nurse, Responsibilities, selection of sick room, care of the patient. Some common accidents and their aid, poison, bleeding, Burns and scalds, fracture sprain, dislocation.

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**HOME SCIENCE**  
**Paper – II**  
**HOME SCIENCE - EXTENSION EDUCATION**  
**(Paper Code-0122)**

**UNIT-1 Introduction of Home Science Extension**

**Education:**

- (A) Home Science - Concepts, goals and Areas of Home Science & their inter relationship with extension.
- (B) Principles and methods of home science extension education general concepts of extension work.
- (C) Objectives of extension education qualities of extension workers, extension education process.

**UNIT-2 Community Development problems and Role of Home Scientists:**

- (A) Principles of community development organization and function of community development.
- (B) Role of home scientists in community development, programmes of extension education for community, programmes of community development at central, state, district, block and village level.  
Family planning programme.  
Community problems, child marriage, Dowry system, parda pratha, rural indebtedness unemployment.

**UNIT-3 Teaching methods & aids:**

Methods of learning - Discussion, demonstration, observation and their application to home science teaching.

Extension Methods - their scope advantages and application. scope and use in Home Science teaching

Extension Methods - their scope advantages and application.

**UNIT-4 Attitude towards Home Science:**

Attitudes towards Home Science, Motivation towards Home Science.  
Application of Home Science towards improvement in family living. Job opportunities in Home Science National and International agencies and their

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collaboration with Home Science, Official organization Home Science Association of India, W.H.O. FAG, CARE, ICAR, ICDS, ICSSR, ICMR, IRDR Adult education.

#### **UNIT-5 Curriculum Planning in Home Science:**

Basic concept of curriculum planning components of curriculum planning implementation. Mentation evolution and improvement required in the existing system of H.Sc. education policy and its relevance to H.Sc. Programme planning- concept, principles objectives and steps in programme planning.

#### **REFERENCE:**

1. Extension -education and community development by Dhama O. P.
2. Co-operative Extension Work by Kelsey, L.D. and Reame C. R.
3. Extension education, Shri Lakshmi press by Reddy A. A.
4. An Introduction to programme evaluation John Wiley. Fracklin, J.K. & Thrashe / J.H.

*[Handwritten signatures and dates]*  
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13.6.19  
13.06.19  
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## प्रायोगिक

कुल समय 3 घंटे

कुल अंक-50

### अंको का विभाजन

1. स्पेशल	10
2. प्राथमिक उपचार	10
3. गृह परिचर्या	15
4. शरीर रचना एवं स्वास्थ्य विज्ञान	15

**स्पेशल :** (परीक्षा के समय छात्राएँ प्रायोगिक नोट बुक एवं उपचार पेटी जमा करें ।)

**प्रयोग क्रमांक -1** रिपोर्ट : कालेज की कक्षाओं का प्रतिदिन की सफाई एवं वायुविजन संबंधित निरीक्षण।

**प्रयोग क्रमांक - 2** स्वयं के परिवार में पीने के पानी के प्राप्ति के साधन, संग्रह के प्रकार एवं साधन पानी की शुद्ध एवं स्वच्छता के लिये प्रयुक्त विधि।

**प्रयोग क्रमांक -3** रिपोर्ट : स्वयं के परिवार एवं अन्य दो पड़ोसी परिचर्यवार के घर में अगस्त से दिसम्बर ( अनुमानत : पांच महीने) के दौरान हुई बीमारियों के संबंध में जानकारी ।

1. रोग का नाम ।
2. प्राथमिक उपचार- जो दिया गया।
3. आहार (जो उपयोग में लाया गया )

**प्रयोग क्रमांक - 4** प्राथमिक उपचार पेटी (आवश्यक सामान)

1. घाव धोने एवं बांधने का सामान।
2. दर्द कम करने की दवाईयां।
3. अपाचन- में प्रयुक्त दवाईयां।

प्राथमिक उपचार पेटी छात्राएं परीक्षा के समय अपना नाम एवं परिवार के सदस्यों की संख्या लिखकर प्रस्तुत करें।

**प्रयोग क्रमांक - 5** रोगी के लिये उपचारात्मक व्यंजनो का अध्यापक द्वारा करके बताना।

1. सब्जियों का सूप।
2. दाल का सूप।
3. उबला अंडा।
4. फटे दूध का पानी (व्हे वाटर)
5. सब्जी एवं फलों का स्टू

इन व्यंजनो की विधि एवं उपयोगिता नोट बुक में अंकित की जावेगी।

**प्रयोग क्रमांक - 6** प्राथमिक उपचार

1. विभिन्न प्रकार की पट्टियां (तिकोनी, गोल)
2. घाव की देखभाल।
3. कृत्रिम श्वसन।

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प्रयोग क्रमांक - 7 गृह परिचर्चा

1. शरीर के तापमान का चार्ट
2. गरम एवं ठंडे पानी की थैली तैयार करना।
3. बिस्तर लगाना/चद्दर बदलना।

प्रयोग क्रमांक- 8 दृष्य श्रव्य यंत्र का बनाना।

महत्वपूर्ण निर्देश- प्रयोग क्रमांक 1, 2, 3 तथा 5 की रिपोर्ट छात्राओं द्वारा प्रायोगिक नोट बुक में लिखकर एवं अध्यापक द्वारा प्रति हस्ताक्षरित/प्रमाणित करवाकर परीक्षा के समय प्रस्तुत की जावेगी।

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*Bu*  
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*Ashu* 13.06.19

**INSURANCE PRINCIPAL & PRACTICE (Paper Code-0139)**

**PAPER - I**

**LIFE INSURANCE :**

**M.M. : 50**

- UNIT-1** Introduction :  
Need for security against economic difficulties, Risk and uncertainty, Individual value system, Individual, Life Insurance Nature and uses of Life Insurance, Life Insurance as a collateral, as a measure of financing business continuation, as a protection to property, as a measure of investment.
- UNIT-2** Life Insurance Contract :  
Distinguishing characteristics, Utmost Good Faith, Insurable Interest, Caveat Emptor, Unilateral and aleatory nature of contract, proposal and application form, Warranties Medical examination, policy construction and delivery, policy provision, lapse revival, surrender value, paid-up policies, maturity, nomination and assignment. Suicide and payment of insured amount, Loan, to policy holders.
- UNIT-3** Life Insurance Risk :  
Factors governing sum assured, Methods of calculating economic risk in life insurance proposal. Measurement of risk and mortality table, Calculation of Premium, Treatment of sub-standard risks. Life Insurance Fund, valuation and investment of surplus, Payment of bonus.
- UNIT-4** Life Insurance Policies :  
Types and their applicability to different. Situations, Important life Insurance Policies issued by the life Insurance Corporation of India. Life Insurance annuities. Important legal provisions and judicial pronouncements in India.
- UNIT-5** Salesmanship Life Insurance p :  
Rules of agency Essential qualities of an ideal insurance salesman, Rules to canvass business from prospective customers, After-sale service to policy holders.

**GENERAL INSURANCE (Paper Code-0140)**

**PAPER - II**

**M.M. :**

**50**

**UNIT-1** 1. Introduction to risk and insurance.

(A) Risk (B) The treatment of Risk

2. The structure and operation of the insurance business.

**UNIT-2** (a) Insurance contract fundamentals.

(b) Insurance marketing.

(c) Insurance loss payment.

(d) Underwriting, rating, reinsurance, and other functions.

**UNIT-3** General Insurance corporation and other Insurance institutions.

Working of GIC in India; Types of risks assumed and specific policies issued by ECGC.

**UNIT-4 Health Insurance :**

(a) Individual health insurance.

(b) Group health insurance.

**UNIT-5** (a) Motor Insurance.

(b) Multiple line and all lines Insurance such as rural Insurance - Hull Insurance-etc.

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## FUNCTIONAL ENGLISH

(Paper Code-0137)

### PAPER - I

M.M. : 50

- UNIT-1 (a) Linguistics and Phonetics.  
(b) Phonology.
- UNIT-2 (a) The Organs of Speech  
(b) Speech Sounds - Vowels and Consonants
- UNIT-3 Consonant Clusters in English
- UNIT-4 Phonetic symbols
- UNIT-5 Transcriptions  
Based on a text of English Phonetics for Indian students by Bal-sybramanium.

## FUNTIONAL ENGLISH

(Paper Code-0138)

### PAPER - II

M.M. : 50

- UNIT-1 Articles, Parts of Speech, Linking Verbs Negative sentences.  
Questions, Agreement of verb and subject, Transitive and Intransitive regular
- UNIT-2 and in-  
regular verbs.
- UNIT-3 Tenses
- UNIT-4 Question Tags, Transformetin Active and Passive Voice, Direct and Indirects S
- UNIT-5 Common Errors in English.  
Based on F.T. words Grammer

Dr. M. Chakraborty  Dr. S. Gupta  DR. MERILY ROY 

# VIVA - VOCE

## SYALLABUS FOR THEORY AND PRACTICAL

(Drawing and painting)

M.M. 50

B.A. (Drawing and painting) course is divided into three parts : B.A. 1<sup>st</sup> year, B.A. II<sup>nd</sup> year, B.A. III Year, all Examination is conducted by University for all class Maximum marks will be 150 the three parts details are as under :-

### B.A. I<sup>st</sup> Year

### SESSION – 2019-20

#### THEORY FUNDAMENTAL OF PAINTING (ART)

The Time Of Theory Paper Is Three Hours M.M. : 50

1. Defination of Art
2. Classificaction of Art
3. Elements of painting - Line, Form, Colour, Tone, Texture, Space.
4. Shadang - Rupa Veda, Pramanani, Bhava, Labanya, Yojan, Sadrusya, Varnika Bhang.

#### BOOK RECOMMENDED :

- |                        |   |               |
|------------------------|---|---------------|
| 1. Still life Painting | - | Richmend.     |
| 2. Akar Kalpna         | - | Ranbir Saxana |
| 3. Chirta Sayanjan     | - | P. N. Choyal  |
| 4. Kala ke mull Tatya  | - | Dr. C. L. Jha |



## PRACTICAL

There will be Two Practical Paper Evaluation will be made by the external and the internal examiners. Together, and Sessional Marking is made by the class Teacher.

\* The time of each paper is four hour's and there will be a half hour's recess in between.

## STILL LIFE

(Paper Code-0150)

PAPER – I

SESSION – 2019-20

Scheme of Examination  
Time - 4 Hours  
Paper - 1/4 Imp Size  
Medium - Water Colour

Total Mark - 50  
Examination - 40  
Sessional - 10

**Class Work** - Minimum work to be Submitted. Five Paining Size 1/4 IMP  
Any type of still object will be drawn books, flower pot's Fruits etc.

## BASIC DESIGN

(Paper Code-0150 A)

PAPER – II

SESSION – 2019-20

Scheme of Examination  
Time - 4 Hours  
Paper - 1/4 Imp Size  
Medium - Water Colour or Poster Colour

Total Mark - 50  
Examination - 40  
Sessional - 10

**Class Work** - Minimum work to be Submitted. Five Paining Size 1/4 IMP  
Form of natural element and object will be decorated and repeated. Form like Flower, leaf, fruits, pot. Ball and Geometrical design will be drawn and painted with water colour and poster colour.

The block contains three handwritten signatures. The first signature is on the left, the second is in the middle, and the third is on the right. Below the third signature is a date stamp that reads "14/06/19".



**B.A. EDUCATION PART - I**  
**PAPER - I**  
**EDUCATION AND SOCIETY**  
**(Paper Code-0123)**

**M.M. 75**

**COURSE OBJECTIVES**

To enable the students to understand -

1. The general aims of Education alongwith Nature types and Scope of educations.
2. Meaning of Major Philosophies of education and function of education.
3. Meaning of curriculum and its Planning and Construction.
4. The Importance of Play and activity oriented education and Modern Methods of Teaching.
5. Specific aims of education as per the present day needs.

**UNIT-1** Nature and Scope of Education, Education as a Science, Education as a Social Process, Factors of Education.

- Aims of Education-Individual, Social, Vocational and Democratic.
- Formal, informal and non formal agencies of education, Relation between School and Society.

**UNIT-2** • School a Miniature Society.

- Education and State-To talitarian and Democratic concepts, State Control over Education, Nature.
- Centralization and Decentralization.

**UNIT-3**

- Curriculum definition, Types of Curricula. Principles of Curriculum Construction,
- Child Centred and Life Centred Curricula.
- Co-Curricular activities.
- Education and Craft, Principle of Basic Education.
- Freedom and Discipline, Need of discipline in and out of school, discipline and
- Order, Free disciplin

#### **UNIT-4**

- Value Education, MEaning of Human Values. Their development, Some Transactional Strategies.

#### **UNIT-5**

Education for National Integration, I nternational understanding and education  
for Human resource development, Education for Licture.  
Secularism and Education.

Shiksha Sidhant - Pathak and Tyagi - Vinod Pustak Mandir, Agra.

**PAPER - II**  
**PROBLEMS OF**  
**EDUCATION**  
**(Paper Code-0124)**

**M.M.**  
**75**

- UNIT-1** ● Problems and suggestions for improvement in Primary Educn.  
● Problems and suggestions for improvement in Secondary Educn.
- UNIT-2** ● Problems and Suggestions for improvement in Higher Educn.  
● Problems and Suggestions for improvement in Teacher Educn.
- UNIT-3** ● Problems and Suggestions for improvement in Women Educn.  
● Problems and Suggestions for improvement in Adult Educn.
- UNIT-4** ● Problems and Suggestions for improvement in Technical Education.  
● Problems and Suggestions for improvement in Distance Education.
- UNIT-5** ● Problems and Suggestions for improvement in Population Education.  
● Problems and Suggestions for improvement in Environmental Education.

**BOOK RECOMMENDED :**

- |     |                   |   |  |
|-----|-------------------|---|--|
| 1.  | A. Mishra         | - | The Financing of Indian Education.     |
| 2.  | Nurullah and Naik | - | A History of Education in India.       |
| 3.  | S. N. Mukherjee   | - | Education in India Today and Tomorrow. |
| 4.  | K.G. Saiyad       | - | Problems of Education Reconstruction.  |
| 5.  | Mahatma Gandhi    | - | Our Language Problems.                 |
| 6.  | S.R. Dongerkerry  | - | University and their Problems.         |
| 7.  | R.V. Parulacker   | - | Literacy in India.                     |
| 8.  | G. Ghaurasia      | - | New Era in Teacher Education.          |
| 9.  | J.P. Naik         | - | Education Planning in India.           |
| 10. | J.C. Agrawal      | - | Progress of Education in India.        |

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# हेमचंद यादव विश्वविद्यालय, दुर्ग (छ.ग.)

(पूर्व नाम- दुर्ग विश्वविद्यालय, दुर्ग)

रायपुर नाका दुर्ग (छ.ग.)-491001

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दूरभाष : 0788-2359400

क्र. 2960/A / अका. / 2020

दुर्ग, दिनांक 10/9/2020

प्रति,

प्राचार्य,  
समस्त संबद्ध महाविद्यालय,  
हेमचंद यादव विश्वविद्यालय,  
दुर्ग (छ.ग.)

विषय:- स्नातक स्तर भाग-दो के पाठ्यक्रम विषयक।

संदर्भ:- संयुक्त संचालक, उच्च शिक्षा विभाग के पत्र क्र. 2456/315/आउशि/सम/2019, दिनांक 16.05.2019।

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विषयांतर्गत लेख है कि संदर्भित पत्र के माध्यम से प्राप्त स्नातक स्तर भाग-दो के निम्नलिखित कक्षा/विषयों के परिवर्तित/संशोधित पाठ्यक्रम शिक्षा सत्र 2020-21 से लागू किये जाते हैं:-

1. बी.ए. — आधार पाठ्यक्रम-हिन्दी भाषा, हिन्दी साहित्य, राजनीतिशास्त्र, अर्थशास्त्र, नृत्य, दर्शनशास्त्र, समाजशास्त्र, इतिहास, मानवविज्ञान, संस्कृत, सांख्यिकी प्राचीन भारतीय इतिहास, भूगोल, मनोविज्ञान
2. बी.एस-सी.- आधार पाठ्यक्रम-हिन्दी भाषा, जीव विज्ञान, मानवविज्ञान, बायोटेक्नोलॉजी, कम्प्यूटर साईंस, गणित, भौतिक शास्त्र, प्राणीशास्त्र, सूक्ष्मजीव विज्ञान, वनस्पतिशास्त्र, भूविज्ञान, इलेक्ट्रॉनिक्स, रसायन शास्त्र, सांख्यिकी, भूगोल।
3. बी.ए./बी.एस.सी (गृह विज्ञान) — आधार पाठ्यक्रम — हिन्दी भाषा एवं गृह विज्ञान।

उपरोक्त विषयों को शिक्षा सत्र 2020-21 से संशोधित रूप में स्नातक स्तर भाग-दो के लिए लागू किया जाता है स्नातक स्तर भाग-एक हेतु सत्र 2019-20 में लागू पाठ्यक्रम मान्य होंगे एवं भाग — तीन के पाठ्यक्रम यथावत रहेंगे।

टीप:- परिवर्तित/संशोधित पाठ्यक्रम विश्वविद्यालय के परीक्षा विभाग एवं वेबसाइट पर प्रकाशित करने हेतु वेबसाइट प्रभारी को उपलब्ध करा दी गई है।

कुलसचिव

क्र. 2961/A / अका. / 2020

दुर्ग, दिनांक 10/9/2020

प्रतिलिपि:-

1. संयुक्त संचालक, उच्च शिक्षा विभाग के पत्र क्र. 2456/315/आउशि/सम/2019, दिनांक 16.05.2019 परिपेक्ष्य में सूचनार्थ।
2. उपकुलसचिव, परीक्षा विभाग एवं उपकुलसचिव, गोपनीय विभाग हेमचंद यादव विश्वविद्यालय, दुर्ग।
3. कुलपति के निज सहायक एवं कुलसचिव के निज सहायक, हेमचंद यादव विश्वविद्यालय, दुर्ग।

सहा. कुलसचिव (अका.)

## **REVISED ORDINANCE NO.11**

(As per State U.G.C. Scheme)

### **BACHELOR OF ARTS**

1. The three year course have been broken up into three Parts.  
Part-I Examination : at the end of the first year.  
Part-II Examination : at the end of the second year and  
Part-III Examination : at the end of the third year.
2. A candidate who after passing (10+2) or Intermediate Examination of C.G. Board of Secondary Education, Raipur or any other examination recognised by the University or C.G. Board of Secondary Education as equivalent thereto, has attended a regular course of study in an affiliated college or in the Teaching Department of the University for one academic year shall be eligible for appearing at the B.A. Part-I examination.
3. A candidate who after passing B.A. Part-I examination of the University or any other examination recognised by the University as equivalent thereto has attended a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.A. Part II Examination.
4. A candidate who after passing B.A. Part II examination of the University has completed a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.A. Part-III examination.
5. Besides regular students, subject to their compliance with this ordinance, ex-students and non-collegiate candidates shall be eligible for admission to the examination as per provisions of Ordinance N. 6 relating to Examinations (General). Provided that non-collegiate candidates shall be permitted to offer only such subjects/papers as are taught to the regular students at any of the University Teaching Department or College.

6. Every candidate for the Bachelor of arts examination shall be examined in :  
A. Foundation Course:  
    I - Group      - Hindi Language  
    II - Group     - English Language  
B. Three Course subjects : One subject from any  
    three groups out of the following six groups :
1. Sociology/Ancient Indian History Culture and Anthropology.
  2. Political Science/Home Science / Drawing & Painting / Vocational Course.
  3. Hindi Literature/Sanskrit Literature /Urdu Literature/Mathematics
  4. Economics/Music/Defence studies / Linguistics.
  5. Philosophy/Psychology/Geography/Education/Management.
  6. History/English Literature/Statistics.
  7. Practicals (if necessary) for each core subject.
7. Any candidate who has passed the B.A. examination of the University shall be allowed to present himself for examination in any of additional subjects prescribed for the B.A. examination and not taken by him at the degree examination. Such candidate will have to first appear and pass the B.A. Part I examination in the subject which he proposes to offer and then the B.A. Part II and Part III examination in the same subject. Successful candidate will be given a certificate to that effect.
8. In order to pass at any part of the three year degree course examination, an examinee must obtain not less than 33% of the total marks in each subject/group of subjects. In subject/group of subjects, where both theory and practical examination are provided, an examinee must pass in both theory and practical parts of the examination separately.
9. Candidate will have to pass separately at the Part-I, Part II and part-III examination. No division shall be assigned on the result of the Part-I and Part-II examination. In determining the division of the Final examination, total marks obtained by the examinees, in their Part-I, Part-II and Part-III examination in the aggregate shall be taken into account. Candidate will not be allowed to change subjects after passing Part I Examination.

Provided in case of candidate who has passed the examination through the supplementary examination having failed in one subject only the total aggregate marks being carried over for determining the division shall include the actual marks obtained in the subject in which he appeared at the supplementary examination.

10. Successful examinees at the Part-III examination obtaining 60% or more marks shall be placed in the First division, those obtaining less than 60% but not less than 45% marks in the Second division and other successful examinees in the third division.

- - - - -

# SCHEME OF EXAMINATION

Subject	Paper	Max. Marks	Min. Marks
i) Environmental Studies		75	
Fild Work		25	33
A. Foundation Course			
i) Hindi Language - I		75	26
ii) English Language - II		75	26
B. Three Core Subject :			
1. Hindi Literature	I	75	
	II	75	50
2. Sanskrit Literature	I	75	
	II	75	50
3. English Literature	I	75	
			50
	II	75	
4. Philosophy	I	75	
			50
	II	75	
5. Economics	I	75	
			50
	II	75	
6. Political Science	I	75	
	II	75	50
7. History	I	75	
	II	75	50
8. Ancient Indian History	I	75	
Culture & Archaeology	II	75	50
9. Sociology	I	75	
	II	75	50
10. Geography	I	50	
			33
	II	50	
	Practical	50	17
11. Mathematics	I	50	
	II	50	50
	III	50	
12. Statistics	I	50	
	II	50	33
	Practical	50	17
13. Anthropology	I	50	
			33
	II	50	
	Practical	50	17



14. Linguistics	I	75	50
	II	75	
15. Indian Music	I	50	33
	II	50	
	Practical	50	17
16. Home Science	I	50	33
	II	50	
	Practical	50	17
17. Education	I	75	50
	II	75	
18. Psychology	I	50	33
	II	50	
	Practical	50	17
19. Management	I	75	50
	II	75	
20. Defence Studies	I	50	33
	II	50	
	Practical	50	17
21. Urdu	I	75	50
	II	75	
22. Dance	I	50	33
	II	50	
	Practical	50	17
23. Vocational Course	I	50	33
	II	50	
	Practical	50	17

### USE OF CALCULATORS

The Students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986-

1. Student will bring their own Calculators.
2. Calculators will not be provided either by the university or examination centres.
3. Calculators with, memory and following variables be permitted +, -, x, , square, reciprocal, expotentials log, square root, trigonometric functions, wize, sine, cosine, tangent etc. factiorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.

संशोधित पाठ्यक्रम  
बी.ए./बी.एस-सी./बी.कॉम./बी.एच.एस.-सी.  
भाग - दो, आधार पाठ्यक्रम  
प्रश्न पत्र - प्रथम (हिन्दी भाषा) (पेपर कोड - 0171)

पूर्णांक- 75

खण्ड - क निम्नलिखित 5 लेखकों के पाठ शामिल होंगे -

अंक-35

- |                        |   |                          |
|------------------------|---|--------------------------|
| 1. महात्मा गांधी       | — | चोरी और प्रायश्चित       |
| 2. आचार्य नरेंद्र देव  | — | युवकों का समाज में स्थान |
| 3. वासुदेव शरण अग्रवाल | — | मातृभूमि                 |
| 4. हरि ठाकुर           | — | डॉ. खूबचंद बघेल          |
| 5. पं. माधवराव सप्रे   | — | सम्भाषण-कुशलता           |

खण्ड-ख हिन्दी भाषा और उसके विविध रूप

अंक-16

1. कार्यालयीन भाषा
2. मीडिया की भाषा
3. वित्त एवं वाणिज्य की भाषा
4. मशीनी भाषा

खण्ड-ग हिन्दी की व्याकरणिक कोटियाँ

अंक-24

संज्ञा, सर्वनाम, विशेषण, क्रिया विशेषण,  
समास, संधि एवं संक्षिप्तियाँ  
अनुवाद व्यवहार : अंग्रेजी से हिन्दी में अनुवाद

इकाई विभाजन-

- |         |   |
|---------|---|
| इकाई- 1 | चोरी और प्रायश्चित : महात्मा गांधी / कार्यालयीन भाषा, मीडिया की भाषा                        |
| इकाई- 2 | युवकों का समाज में स्थान : आचार्य नरेन्द्र देव / वित्त एवं वाणिज्य की भाषा, मशीनी भाषा      |
| इकाई- 3 | मातृभूमि: वासुदेवशरण अग्रवाल / संज्ञा सर्वनाम, विशेषण, क्रिया विशेषण                        |
| इकाई- 4 | डॉ. खूबचंद बघेल : हरि ठाकुर/समास, संधि,   |
| इकाई- 5 | सम्भाषण-कुशलता : पं. माधवराव सप्रे, / अनुवाद - अंग्रेजी से हिन्दी में अनुवाद, संक्षिप्तियाँ |

मूल्यांकन योजना -

प्रत्येक इकाई से एक-एक प्रश्न पूछे जाएंगे। प्रत्येक प्रश्न में आंतरिक विकल्प होगा। प्रत्येक प्रश्न के 15 अंक होंगे। प्रत्येक इकाई को दो-दो खण्डों (क्रमशः 'क' और 'ख' में) विभक्त करते हुए निर्धारित पाठ से 8 एवं शेष पाठ्य सामग्री से 7 अंक के प्रश्न होंगे। इस प्रकार पूरे प्रश्न-पत्र के पूर्णांक 75 होंगे।

**पाठ्यक्रम संशोधन का औचित्य :** विद्यार्थी चर्चित एवं सुप्रसिद्ध व्यक्तियों के लेख के माध्यम से समाज एवं राष्ट्रहित के साथ-साथ व्यक्तित्व विकास विषयक मुद्दों से परिचित हो सकें तथा व्याकरणक एवं भाषा विषयक प्रस्तावित पाठ्यक्रम के माध्यम से हिन्दी भाषा संबंधित प्रयोग पक्ष से परिचित होते हुए प्रतियोगी परीक्षाओं की दृष्टि से ज्ञानार्जन कर सकें।

ENGLISH LANGUAGE (Paper Code-1132)

B.A. / B.Sc. /B.COM. /B.H. Sc. - II

M.M.75

The question paper for B.A. /B.Sc./B.Com./B.H.Sc., English Language and cultural values shall comprise the following units:

UNIT-I Short answer questions to be passed by (Five short answer questions of three marks each) 15 Marks

UNIT-II (a) Reading comprehension of an unseen passage 05 Marks  
(b) Vocabulary

UNIT-III Report-Writing 10 Marks

UNIT-IV Expansion of an idea 10 Marks

UNIT-V Grammar and Vocabulary based on the prescribed text book. 20+15Marks

Note: Question on all the units shall asked from the prescribed text which will  
Comprise Specimens of popular creative/writing and the following it any

a Matter & technology

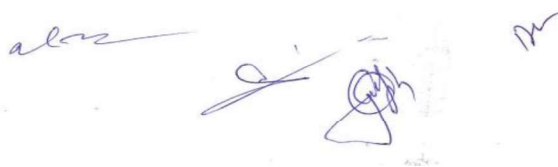
- i. State of matter and its structure
- ii. Technology (Electronics Communication, Space Science)

b Our Scientists & Institutions

- I. Life & work of our eminent scientist Arya Bhatt. Kaard  
Charak Shusruta, Nagarjuna, J.C. Bose and C.V. Raman, S.  
Rmanujam, Homi J. Babha Birbal Sahani.
- II. Indian Scientific Institutions (Ancient & Modern)

Books Prescribed:

Foundation English for U.G. Second Year - Published by M.P. Hindi Granth  
Academy, Bhopal.



संशोधित  
बी. ए. भाग-2  
हिन्दी साहित्य  
प्रथम प्रश्न पत्र

अर्वाचीन हिन्दी काव्य (पेपर कोड- 0173)

पूर्णांक- 75

प्रस्तावना- आधुनिक काव्य आधुनिकता की समस्त विशेषताओं को समेटे हुए है। स्वतंत्रता प्राप्ति के पूर्व की भाव-भाषा, शिल्प, अन्तर्वस्तु सम्बन्धी समस्त विकास धारा यहां सजीव रूप में देखी जा सकती है। इसे अनदेखा करना मनुष्य की विकास यात्रा को नजर अंदाज करना है। इस यात्रा के साक्षात्कार के लिए आधुनिक काव्य का अध्ययन अपेक्षित ही नहीं अपितु अनिवार्य हैं।

पाठ्य विषय-

1. मैथिलीशरण गुप्त
  2. सूर्यकान्त त्रिपाठी निराला
  3. सुमित्रानंदन पंत
  4. माखन लाल चतुर्वेदी
  5. स. ही. वात्स्यायन अज्ञेय
- भारत- भारती की कविताएँ
  - (1) सखि बसन्त आया।
  - (2) वर दे, वीणा वादिनी वर दे।
  - (3) हिन्दी के सुमनों के प्रति पत्र।
  - (4) तोड़ती- पत्थर।
  - (5) राजे ने अपनी रखवाली की।
  - (1) बादल।
  - (2) परिवर्तन 2 पद (1. खोलता इधर जन्मलोचन
  2. आज का दुख कल का आल्हाद)
  - (3) ताज।
  - (4) झंझा में नीम।
  - (5) भारत माता।
  - (1) बलि पंथी से।
  - (2) साँझ और ढोलक की थापें।
  - (3) मैं बेच रही हूँ, दही।
  - (4) उलाहना।
  - (5) निः शस्त्र सेनानी।
  - (1) सबेरे उठा तो धूप खिली थी।
  - (2) साम्राज्ञी का नैवेद्य दान।
  - (3) घर।
  - (4) चांदनी जी लो।
  - (5) दूर्वाचल।

द्रुतपाठ हेतु निम्न कवियों का अध्ययन किया जाएगा, जिन पर लघुउत्तरीय प्रश्न पूछे जायेंगे-

5  
R.L. 11/06/2019  
A.H.

संशोधित  
बी. ए. भाग-2  
हिन्दी साहित्य  
द्वितीय प्रश्न पत्र

हिन्दी निबंध तथा अन्य गद्य विधाएँ (पेपर कोड- 0174)

पूर्णांक- 75

पाठ्य विषय-

व्याख्या एवं आलोचनात्मक प्रश्नों के लिए एक नाटक, पांच प्रतिनिधि निबंध और पाँच एकांकी का निर्धारण किया गया है।

नाटक- अंधेरी नगरी- भारतेन्दु हरिश्चन्द्र

निबंध-	1. क्रोध	- आचार्य रामचन्द्र शुक्ल।
	2. बसन्त	- डॉ. हजारी प्रसाद द्विवेदी।
	3. उस अमराई ने राम- राम कही है	- डॉ. विद्यानिवास मिश्र।
	4. काव्येषु नाट्यम् रम्यम्	- बाबू गुलाब राय।
	5. बेईमानी की परत	- हरिशंकर परसाई
एकांकी-	1. औरंगजेब की आखिरी रात	- डॉ. रामकुमार वर्मा
	2. स्ट्राईक	- भुनेश्वर
	3. एक दिन	- लक्ष्मीनारायण मिश्र
	4. दस हजार	- उदयशंकर भट्ट
	5. मम्मी ठकुराईन	- डॉ. लक्ष्मीनारायण लाल

द्रुत पाठ के लिए तीन गद्यकारों का अध्ययन किया जायेगा, जिन पर लघुउत्तरीय प्रश्न पूछे जायेंगे।

1. राहुल सांकृत्यायन      2. महादेवी वर्मा      3. हबीब तनवीर

अंक विभाजन- व्याख्याएं (3)	- 21 अंक
आलोचनात्मक प्रश्न (2)	- 24 अंक
लघुउत्तरीय प्रश्न (5)	- 15 अंक
वस्तुनिष्ठ (15)	- 15 अंक
कुल अंक	75 अंक

इकाई विभाजन-

इकाई- 1 व्याख्या

इकाई- 2 अंधेरी नगरी एवं क्रोध, वसन्त, उस अमराई ने राम- राम कही हैं।

इकाई- 3 औरंगजेब की आखिरी रात, स्ट्राईक, एक दिन, दस हजार, मम्मी ठकुराईन

इकाई- 4 द्रुतपाठ के गद्यकार- राहुल सांकृत्यायन, महादेवी वर्मा, हबीब तनवीर।

इकाई- 5 वस्तुनिष्ठ (समग्र पाठ्य विषय से )

*Ram Kumar*  
11/10/06  
*At*

**ENGLISH LITERATURE**  
**PAPER-I**  
**MODERN ENGLISH LITERATURES (Paper Code-0175)**

**M.M. 75**

**All Questions are compulsory.**

- Note :
1. Unit-I is compulsory. Two passages from each of the units I to V to be set and three to be attempted. (3 x 5 = 15)
  2. Short answer questions from unit VII, seven to be set and five to be attempted. (5 x 2 = 10)
  3. Long answer questions from unit II to VI. Five questions from each unit with internal choice to be set. (5 x 2 = 10)  
(Words limit for each answer is 300-400 words)

**UNIT-I** Annotations

**UNIT-II (Poetry)**

W.B. Yeats - 'A Prayer for My Daughter, The Second Coming'  
T.S. Eliot - 'Love Song of J. Alfred Prufrock'

**UNIT-III (Poetry)**

Dylan Thomas - 'Lament, 'A Refusal to Mourn the Death  
Larkin - 'Toads', At Grass'

**UNIT-IV (Prose)**

Bertrand Russell - On the Value of Scepticism  
Oscar Wilde - Happy Prince

**UNIT-V (Drama)**

G.B. Shaw - Pygmalion

**UNIT-VI (Fiction and short-stories)**

Rudyard Kipling-Kim  
Short-Stories  
Katherine mansfield - A Cup of Tea

- UNIT-VII**
1. Elegy,
  2. Sonnet,
  3. Ode,
  4. Morality & Miracle Play,
  5. One Act Play,
  6. Interlude

**BOOKS RECOMMENDED :**

1. An Introduction to the study of English Lit. B. prasad
2. A Glossart of Literary Terms - M.H. Abrahamas
3. Prose of Today - M. Millan Pub
4. Short stories of Yesterday and To day - M. Millan

*Dr. M. C. Chakraborty*

*Dr. S. Gupta*

*DR. MERILY ROY*

**PAPER - II**  
**MODERN ENGLISH LITERATURES (Paper Code-0176)**

**M.M. 75**

**All question are compulsory.**

- Note :** 1. Unit I is compulsory. Two passages from each of the units II to V to be set and three to be attempted. (3x5 = 15)
2. Short answer questions from unit VII, seven to be set and five to be attempted. (5x2 = 10)
3. Long-answer questions from unit II to VI. Five questions from each unit with internal choice to be set. (5x2 = 10)  
(Words limit for each answer is 300-400 words)

**UNIT-I** Annotation

**UNIT-II (Poetry)**

Sassoon - At the Grove of Henry Vaughan.

Owen, W.H. - Strange Meeting

**UNIT-III (Poetry)**

Auden - Seascape

Ted Hughes - The Howling of Wolves

**UNIT-IV (Prose)**

Robert Lynd - Forgetting

H. Belloc - A conversation with A Reader

**UNIT-V (Drama)**

John Galsworthy - Strife

**O R** J.M. Synge - Riders of the Sea

**UNIT-VI** William Golding - Lord of the Flies (Fiction)

**UNIT-VII** 1. Simile 2. Metaphor 3. Alliteration 4. Onomatopoeia 5. Ballad 6. Epic 7. Dramatic Monologue.

**BOOK RECOMMENDED -**

1. Golden Treasury - Palgrave
2. A Glossary of Literary Terms - M.H. Abrams
3. An Introduction to the study of English literature - B.Prasad

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Dr. M. C. Chakraborty

Dr. S. Gupta

DR. MERILY ROY



# हेमचंद यादव विश्वविद्यालय, दुर्ग (छ.ग.)

## नवीन संशोधित पाठ्यक्रम

### दर्शन शास्त्र

बी.ए. भाग-दो, दर्शन शास्त्र में दो प्रश्न पत्र (75 अंक) के होंगे

1. नीति शास्त्र – भारतीय एवं पाश्चात्य

2. धर्म दर्शन

प्रत्येक प्रश्न पत्र पांच इकाईयों में विभाजित है । प्रत्येक इकाई में से एक प्रश्न हल करना अनिवार्य होगा ।

बी.ए. भाग – दो

दर्शन शास्त्र

प्रश्न पत्र – प्रथम

नीतिशास्त्र – भारतीय एवं पाश्चात्य

(कुल 75 अंक)

इकाई-1

1. नीतिशास्त्र : परिभाषा, स्वरूप एवं उपयोगिता
2. मूल्य : नैतिक मूल्य एवं अन्य मूल्यों में अंतर
3. कर्म का सिद्धांत

इकाई-2

1. पुरुषार्थ : पुरुषार्थों का आपस में सम्बन्ध, पुरुषार्थ- साधना
2. बौद्ध नीति : चार आर्य सत्य
3. जैन नीति : अणुव्रत एवं महाव्रत

इकाई-3

1. संकल्प की स्वतंत्रता एवं उत्तरदायित्व
2. दण्ड का सिद्धांत
3. सद्गुण : सुकरात , प्लेटो एवं अरस्तू के अनुसार

इकाई -4

1. सुखवाद : बेंथम एवं मिल
2. चार्वाक का सुखवाद
3. कांट : कर्तव्य के लिए कर्तव्य

इकाई -5

1. अंतः प्रज्ञावाद
2. पूर्णतावाद
3. गीता का निष्काम कर्मयोग

उपरोक्त समस्त संशोधन विषय की स्पष्टता व ज्ञानवर्धन को ध्यान में रखकर समिति के सभी सदस्यों की सहमति से किया गया ।

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29/6/19

# हेमचंद यादव विश्वविद्यालय, दुर्ग (छ.ग.)

नवीन संशोधित पाठ्यक्रम

बी.ए. भाग – दो

दर्शन शास्त्र

प्रश्न पत्र द्वितीय – धर्म दर्शन

(कुल अंक –75)

- इकाई—1
1. धर्म : धर्म एवं रिलिजन में अंतर
  2. धर्म—दर्शन : अर्थ, स्वरूप
  3. धर्म एवं धर्म—दर्शन में अंतर
  4. धर्म की उत्पत्ति के सिद्धांत
- इकाई—2
1. धार्मिक अनुभव : ब्रह्मानुभव एवं रहस्यवाद
  2. बुद्धि, विश्वास एवं अंतः प्रज्ञा
  3. धार्मिक विश्वास एवं अन्य विश्वास
- इकाई—3
1. ईश्वर : ईश्वर के गुण
  2. ईश्वर के अस्तित्व के प्रमाण : भारतीय एवं पाश्चात्य
  3. प्रार्थना एवं भक्ति
- इकाई—4
1. अनीश्वरवाद
  2. ईश्वर के बिना धर्म
  3. धर्म— निरपेक्षता
- इकाई—5
1. आत्मा की अमरता
  2. पुनर्जन्म एवं कर्म का सिद्धांत
  3. अशुभ की समस्या

उपरोक्त समस्त संशोधन विषय की स्पष्टता व ज्ञानवर्धन को ध्यान में रखकर समिति के सभी सदस्यों की सहमति से किया गया ।

—HSA  
29/6/19

## बी. ए. भाग 2 B. A. Part II

राजनीति विज्ञान Political Science

प्रथम प्रश्नपत्र : राजनीतिक चिन्तन Paper I : Political Thought

- इकाई 1 : प्लेटो : आदर्श राज्य – न्याय, शिक्षा, साम्यवाद, दार्शनिक शासक ।  
अरस्तू : राज्य, दासप्रथा, नागरिकता , क्रान्ति ।
- Unit 1 : Plato : Ideal State : Justice, Education, Communism , Philosopher King.  
Aristotle : State, Slavery, Citizenship , Revolution.
- इकाई 2 : मैकियावेली : युग का शिशु, धर्म व नैतिकता, राजा के कर्तव्य और आचरण ।  
हॉब्स : सामाजिक समझौता सिद्धान्त – लेवियाथन । लॉक : सामाजिक समझौता सिद्धान्त ।  
रुसो : सामाजिक समझौता सिद्धान्त , सामान्य इच्छा ।
- Unit 2 : Machiavelli : Child of his times, Religion and Morality, Duties and Conduct of King. Hobbes : Social Contract Theory: Leviathan. Locke : Social Contract Theory. Rousseau : Social Contract Theory and General Will.
- इकाई 3 : बेंथम : उपयोगितावाद । मिल : उपयोगितावाद में संशोधन, स्वतंत्रता और प्रतिनिधि शासन ।  
ग्रीन : राजनीतिक विचार । मार्क्स : राजनीतिक विचार ।
- Unit 4 : Bentham : Utilitarianism. Mill : Amendment in Utilitarianism. Liberty and Representative Government. Green : Political Thoughts. Marx : Political Thoughts.
- इकाई 4 : आदर्शवाद, व्यक्तिवाद, उदारवाद, समाजवाद, फासीवाद : विशेषताएं और आलोचना ।
- Unit 4 : Idealism, Individualism, Liberalism, Socialism, Fascism : Features and Criticism.
- इकाई 5 : मनु और कौटिल्य : सप्तांग सिद्धान्त, राजा और राजपद, प्रशासकीय व्यवस्था, राज्यमण्डल ।  
गांधी : सत्य, अहिंसा, सत्याग्रह एवं राजनीतिक विचार । अम्बेडकर : राजनीतिक एवं सामाजिक विचार  
दीनदयाल उपाध्याय : एकात्ममानववाद ।
- Unit 5 : Manu and Kautilya : Saptang Theory, King and Kingship, Administrative System, Rajyamandal.  
Gandhi : Truth , Non violence , Satyagrah and Political thoughts.  
Ambedkar : Political and Social thoughts.  
Deen Dayal Upadhyay : Akatmamanavvad.

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बी.ए.— द्वितीय वर्ष  
प्रथम प्रश्न पत्र – राजनीतिक चिन्तन

संदर्भ पुस्तक

क्र	पुस्तक का नाम	लेखक का नाम
1.	राजनीतिक चिन्तन की रूपरेखा	ओ.पी. गावा
2.	राजनीतिक चिन्तन का इतिहास	जीवन मेहता
3.	राजनीतिक चिन्तन का इतिहास	बी.एल. फाडिया
4.	पाश्चात्य एवं आधुनिक राजनीतिक चिन्तन का इतिहास	प्रभु दत्त शर्मा
5.	पाश्चात्य राजनीतिक चिन्तन	जे.पी. सूद
6.	भारतीय राजनीतिक चिन्तन	वी.पी. वर्मा
7.	भारतीय राजनीतिक चिन्तन	अवस्था एव अवस्था
8.	भारतीय राजनीतिक चिन्तन	आ.पी. गावा
9.	पलाटकल थाट	सा.एल. बपर
10.	हिस्ट्री आफ पलाटकल थियरी	जाज एच सबाइन
11.	रिसन्ट पलाटकल थाट	फ्रान्सास डब्लू काकर
12.	मास्टर आफ पलाटकल थाट	माइकल बा. फास्टर
13.	ग्रंट पलाटकल थाट	वाटयम इवस्टान

**Reference:-**

- W.A. Dunning: **A History of Political Theories**, (Vols. I, II & III), New York: Mcmillan, 1930
- G.H. Sabine: **A History of Political Theory** (English & Hindi), New Delhi: Oxford & IBH Publishing Co., 1963
- C.L. Wayper: **Political Thought** (English & Hindi), Bombay: B.I. Publications Pvt. Ltd., 1974
- E. Barker: **Greek Political Theory: Plato and His Predecessors**, London: Methuen & Co. Ltd., 1918
- Political Thought in England**, London: Thornton Butterworth Ltd., 1928
- Gettell: **History of Political Thought** (English & Hindi)
- K.P. Jaiswal: **Hindu Polity** (English & Hindi), Bangalore: Bangalore Printing & Publishing Co., 1955
- V.P. Verma: **Modern Social and Political Thought of India**, Agra: L.N. Agrawal Educational Publishers, 1961
- N.C. Bandopadhyaya: **Development of Hindu Polity and Political Theory**, New Delhi: Munshiram & Manoharlal, 1980
- Arvind Sharma, **Modern Hindu Thought: The Essential Texts**, New Delhi: OUP, 2002
- John Dunn, **Western Political Theory in the Face of the Future**, New York: Cambridge University Press, 1993
- Jonathan Wolff, **An Introduction to Political Philosophy**, Revised Edition, Oxford: OUP, 2006
- J.E. Parsons Jr., **Essays in Political Philosophy**, Washington D.C., University Press of America, 1982
- Mark N. Hagopian, **Ideals and Ideologies of Modern Politics**, New York & London: Longman, 1985
- John Elster (Ed.) **Karl Marx: A Reader**, New York: OUP, 1977
- Thomas Sowell, **Marxism: Philosophy and Economics**, New York: Quill, 1985
- Brian R. Nelson, **Western Political Thought**, Delhi NCR: Pearson Education Ltd., 1996
- Vishwanath Mishra, **Rajavidya evam Rajanitishashtra**, Sagar: Vishwavidyalaya Prakashan, 2007
- Brian R. Nelson, **Western Political Thought**, Delhi NCR: Pearson Education Ltd., 1996

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बी. ए. भाग 2 B. A. Part II  
राजनीति विज्ञान Political Science

द्वितीय प्रश्नपत्र : तुलनात्मक शासन एवं राजनीति

Paper II : Comparative Government and Politics

- इकाई 1 : ब्रिटिश संविधान : विकास, विशेषताएं, कार्यपालिका, व्यवस्थापिका, न्यायपालिका ।
- Unit 1 : British Constitution : Evolution , Salient Features, Executive, Legislature and Judiciary.
- इकाई 2 : संयुक्त राज्य अमेरिका का संविधान : विशेषताएं, कार्यपालिका, व्यवस्थापिका, न्यायपालिका, शक्ति पृथक्करण व नियंत्रण संतुलन का सिद्धान्त ।
- Unit 2 : Constitution of United States of America : Salient Features, Executive, Legislature and Judiciary. Theory of Separation of Powers and checks and balances.
- इकाई 3 : स्विटजरलैण्ड का संविधान : विशेषताएं, कार्यपालिका, व्यवस्थापिका, न्यायपालिका, प्रत्यक्ष प्रजातन्त्र । Unit 3 : Constitution of Switzerland : Salient Features, Executive, Legislature and Judiciary. Direct Democracy.
- इकाई 4 : चीन का संविधान : विशेषताएं, कार्यपालिका, व्यवस्थापिका, न्यायपालिका, साम्यवादी दल ।
- Unit 4 : Constitution of China : Salient Features, Executive, Legislature and Judiciary. Communist Party.
- इकाई 5 : तुलनात्मक राजनीति : अर्थ, परिभाषा, । ईस्टन का व्यवस्था सिद्धान्त, आमण्ड का संरचनात्मक—प्रकार्यात्मक उपागम । राजनीतिक विकास, राजनीतिक समाजीकरण, राजनीतिक संस्कृति की अवधारणा ।
- Unit 5 : Comparative Politics : meaning , Definition. System Theory of David Easton, Structural -functional Approach of Almond. Concept of Political Development, Political Socialisation, Political Culture

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बी.ए. द्वितीय वर्ष  
द्वितीय प्रश्न पत्र  
तुलनात्मक शासन एवं राजनीति

संदर्भ पुस्तक

क्र	पुस्तक का नाम	लेखक का नाम
1.	तुलनात्मक राजनीति एवं राजनीतिक संस्थाएं	सी बी गेना
2.	तुलनात्मक राजनीति	जे.सी. जौहरी
3.	तुलनात्मक राजनीति	पी.डी. शर्मा
4.	तुलनात्मक राजनीति	एस.आर. महेष्वरी
5.	तुलनात्मक राजनीति संस्थाएं और प्रक्रियाएं	तपन बिस्वाल
6.	कम्परेटीव गर्वनेमेंट	एस.ई. फाईनर

**Reference :-**

- Anup Chand Kapur, K.K. Mishra **Select Constitutions** (U.K., U.S.A., France, Canada, Switzerland, Japan, China, India), S. Chand & Company Ltd., New Delhi, 2001.
- B.C. Rai, **The World Constitution: A Comparative Study** (U.S.A., U.K., Soviet Union, Switzerland, Japan, France, Australia, Canada, India, Pakistan), Prakashan Kendra, Lucknow, 2001
- G. Almond et.al., **Comparative Politics Today : A World View**, 7<sup>th</sup> Edition, New York/London, Harper Collins, 2000
- R. Hague & M. Harrop, **Comparative Government and Politics: An Introduction**, 5<sup>th</sup> Edition, New York, Palgrave, 2001
- A Bobler and J. Seroka (eds.); **Contemporary Political System: Classification and Typologies**, Boulder Colorado, Lynne Rienner Publishers, 1990.
- Richa Sakma, **Russian Politics and Society**, London: Routledge, 1996.
- Anuradha Chenoy, **The Making of New Russia**, New Delhi, Har-Anand Publications, 2000
- Shashi Kant Jha & Bhaswati Sarkar (eds.) **Amidst Turbulence & Hope, Transition Russia and Eastern Europe**, New Delhi, 2002
- Thomas F. Remington, **The Russian Parliament: Institutional Evolution in a Transitional Regime**, 1989-1999, Yale University Press, 2002
- Gabriel A. Almond and G. Bingham Powell (eds.) **Comparative Politics Today: A World view**, Harper Collins Publishers, 2002
- **The Russian Constitution**, Text as adopted in 1993
- J. C. Johri, **'New Comparative Government'**, Lotus Press Publisher, 2008.
- Vidya Bhushan and Vishnu Bhagwan, **World Constitutions**, New Delhi

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**Revised syllabus**  
**SOCIOLOGY**     **2019-2020**

B.A. PART-II  
PAPER – I  
SOCIOLOGY OF TRIBAL SOCIETY  
(Paper Code-0185)

- UNIT-I    **Tribes:** Concepts, Characteristics, Tribes and Schedule Tribes, Distinction between Tribe and Caste.
- UNIT-II    **Classification of Tribal people:** Food gatherers and hunters, Shifting cultivates, Nomads, Peasant settled Agriculturists and Artisans.
- UNIT-III    **Socio-cultural Profile:** Kinship, Marriage, Family, Religion and belief cultural traditions.
- UNIT-IV    **Tribal sensitization:** Tribal Mobility, Schemes of Tribal Development, Various Tribal Movements.
- UNIT-V    **Problems of Tribal People:** Poverty, Illiteracy, Indebtedness, Agrarian issues, Exploitation study of tribal communities in Chhattisgarh with special reform to Particularly Venerable Tribal Groups (PVTG).

**ESSENTIAL READINGS :-**

- 1 Vidyarthi, L.P. 1965. Cultural Counters of Tribal Bihar, Punthi Pustak, Culcutta.
- 2 Bose, N.K. 1971. Tribal Life in India, National Book Trust, New Delhi.
- 3 Das, R.K. 1988. The Tribal Social Structure, Inter India Publications, New Delhi.
- 4 Dubey, S.C.. 1977. Tribal Heritage of India, Ethnicity, Identity and Interaction, Vol.1, Vikash Publishing House, Delhi.
- 5 Elwin, Varrier. 1989. The Tribal World of Verrier Elwin: An Autobiography, Oxford, New Delhi.
- 6 Russell, R.V. and Hira Lal. 1916. The Tribes and Castes of Central Province of India, 4 Vols. Cosmo Publications, New Delhi.

Shabhu Sh  
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10.06.2019

M. S. S. S.  
10-6-19

**Revised syllabus**  
**SOCIOLOGY**      **2019 - 2020**

B.A. PART-II.

PAPER-II

**CRIME AND SOCIETY**

(Paper Code-0186)

- UNIT-I      **Concept of Crime:** Meaning, Characteristics and Types.  
                 **School of Crime:** Classical, Sociological and Psychological.
- UNIT-II      **Structure of Crime:** Anomie, Criminality and Suicide , Organized Crime ,  
                 White Collar Crime and Cyber Crime
- UNIT-III      **Social Evils and Crime:** Alcoholism, Drug Addiction, Dowry and Beggary.
- UNIT-IV      **Punishment:** Meaning, Characteristics, Objectives and Types,  
                 Major Theories of Punishment.
- UNIT-V      **Correctional Process:** Role of Police and Judiciary in India, Development of Jail  
                 reforms in India and Modern correctional concepts- Probation , Parole and after  
                 care Programme.

**ESSENTIAL READINGS :-**

1. Mike, & Maguire. (2007). *The Oxford Hand Book of Criminology*. London: Oxford University Press.
2. Haster, S., & Eglin, P. (1992). *A Sociology of Crime*. London: Routledge Publishers.
3. Mead, G. H. (1934). *Mind Self and Society*. Chicago: Chicago University Press
4. Gottfredson, Michael, R., Hirschi, & Travis. (1990). *A General Theory of Crime*. London: Stanford University Press.
5. Sutherland, & Edwin, H. (1924). *Principles of Criminology*. Chicago: Chicago University Press.
6. Sutherland, Edward, H., & White, C. (1949). *Crime*. New York, Holt, Rinehart: Winston Press, New York.

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M. Dwivedi  
10-6-19



# **HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**

## **REVISED SYLLBUS**

### **B.A. Part- II (Economics)**

#### **Subject : Macro Economics, Paper-I (Code: 0181)**

##### **UNIT 1**

National Income: Concept and measurement of national income, Economic welfare and national income, Social accounting. Circular flow of income, National income accounting, Green accounting Classical theory of employment, Say's law of market Keynesean theory of employment.

##### **UNIT 2**

Consumption Function - Average and marginal propensity to consume, Keynes's psychological law of consumption. Determinants of the consumption function. The saving function. The investments multiplier and its effectiveness, The investment Function - marginal efficiency of capital, Autonomous and induced investment. Saving and investment equality.

##### **UNIT 3**

Nature and Characteristics of trade cycle, Theories of trade cycle: Hawtrey's monetary theory, Hayek's over investment theory, Keynes's view on trade cycles, Schumpeter's theory of innovation, Samuelson and Hicks multiplier accelerator model, Control of trade cycle.

##### **UNIT 4**

International Trade - Inter-regional and international trade, Comparative advantage cost theory, Opportunity cost theory and Heckscher Ohlin theory, International trade and economic development, Tariffs & import quotas, Concept of optimum tariff. Balance of trade & balance of payment., Concept & components of BOP, Equilibrium & disequilibrium in BOP, Relative merits & demerits of devaluation, Foreign trade multiplier.

##### **UNIT 5**

Functions and objectives of international monetary fund, World Bank and World Trade Organization, International monetary reforms and India, Foreign trade in



India recent change in the composition and direction of foreign trade, India's balance of payment, Export promotion and import substitution in India. Multinational Corporation and India.

### **BASIC READING LIST -**

- Ackley, G. (1976) – “ Macro Economics; Theory and Policy,” Mcmillan Publishing Company, Newyork.
  - Day, A.C.L. (1960) – “Outline of Monetary Economics,” Oxford University Press Oxford.
  - Gupta, S.B. (1994)- “Monetary Economics,” S. Chand and Co., Delhi
  - Heijdra, B.J. and F.V. Ploeg (2001) – “Foundations of Modern Macro-economics,” Oxford University Press, Oxford.
  - Lewis, M.K. and P.D. Mizan (2000) –“ Monetary Economics, “ Oxford University Press, New Delhi.
  - Shapiro, E. (1996) – “Macroeconomic Analysis,” Galgotia Publications, New Delhi .
- READING LIST -** - Ackley, G. (1976),” Macroeconomics : Theory and Policy”, Macmillan Publishing Company, New York. -
- Day, A.C.L. (1960) –“ Outline of Monetary Economics,” Oxford University Press Oxford.
- Gupta, S.B. (1994)- “Monetary Economics,” S. Chand and Co., Delhi
  - Heijdra, B.J. and F.V. Ploeg (2001) –“ Foundations of Modern Macro-economics, “ Oxford University Press, Oxford.
  - Lewis, M.K. and P.D. Mizan (2000) - Monetary Economics, Oxford University Press, New Delhi.
  - Shapiro, E. (1996) – “Macroeconomic Analysis,” Galgotia Publications, New Delhi.
  - Dillard, D. (1960)- “The Economics of John Mayanand Keynes, “Crossby Lockwood and Sons, London.
  - Hanson, A.H. (1953), “A Guide to Keynes, “ McGraw Hill, New York.
  - Higgins, B. (1963), “Economic Development; Principles, Problems and Policies, “ Central Book Depot, Allahbad.
  - Keynes, J.M. (1936), “The General Theory of Employment, Interest and Money,” Macmillan, London.
  - Kindleberger, C.P. (1958), “Economic Development,” McGraw Hill Book company, New York.
- Powelson, J.P.C. (1960), “ National Income and Flow of Funds Analysis,” McGraw Hill, New York.



# **HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**

## **REVISED SYLLBUS**

### **B.A. Part- II (Economics)**

**Subject : Money, Banking and Public Finance, Paper-II (Code: 0182)**

#### **UNIT 1**

Basic concepts : Money - meaning and functions, Gresham's law; Quantity theory of money- Cash transaction and cash balance approaches; Value of Money, Inflation, deflation and reflation, types, causes and effects on different sectors of the economy; Demand pull and cost push inflation; Measures to control inflation. Phillips curve, Concept of demonetization.

#### **UNIT 2**

Commercial banking- meaning and types; Functions of commercial banks, The process of credit creation, purpose and limitations; Liabilities and assets of banks; Evolution of commercial banking in India after independence; A critical appraisal of the progress of commercial banking after Nationalization, Functions of a central bank; Quantitative and qualitative methods of credit control; Bank rate policy; Open market operations; Variable reserve ratio and selective methods. Role and functions of the Reserve bank of India; Objectives and limitations of monetary policy with special reference to India.

#### **UNIT 3**

Meaning and scope of public finance; Distinction between private and public finance; public goods v/s private goods; The Principle of maximum social advantage; Role of the government in economic activities ; Public expenditure - Meaning, classification and principles of public expenditure; Trends in public expenditure and causes of growth of public expenditure in India.

#### **UNIT 4**

Sources of Public revenue; taxation - Meaning, Canons and classification of taxes; Division of tax burden. The benefit and ability to pay approaches; Impact and incidence of taxes; Taxable capacity; Effects of taxation; Characteristics of a good tax



system; Equity and Justice in Taxation, Major trends in tax revenue of the Central and State Government in India.

## UNIT 5

Public debt and financial administration: Sources of public borrowing, Effects of public debt. Methods of debt redemption. The public budget- Kinds of budget, Economic and functional classification of the budget; Preparation and passing of budget in India.

### READING LIST -

- Ackley G. (1978), "Macroeconomics : Theory and Policy," Macmillan Publishing Co., New York.
  - Bhargavas B.H. (1981), "The Theory and Working of Union Finance in India," Chaitanya Publishing House Allaybad.
  - Gupta, S.B. (1994), "Monetary Economics", S. Chand & Company, New Delhi.
  - Houghton. E.W. (Ed.) (1988), "Public Finance." Pengum, Battinore - Jha R. (1998), Modern Public Economics. Routledge, London.
  - Mithani, D.M. (1981), "Modern Public Finance," Himalaya Publishing House, Mumbai.
  - Musgrave, R.A. and P.B. Musgrave (1976), "Public Finance in Theory and Practice", McGraw Hill, Kogakusha, Tokyo.
  - Shapiro, E. (1996), "Macroeconomics Analysis," Galgotia Publications, New Delhi.
- ADDITIONAL READING LIST

- Day, A.C.L. (1960), "Outline of Monetary Economics, " Oxford University Press, Oxford.
- De Kock, M.H. (1960), "Central Banking." Staples Press, London.
- Due, J.E. (1963), "Government Finance," Irwin, Homewood.
- Government of India, "Economic Survey" (Annual), New Delhi
- Halm, G.N. (1955), "Monetary Theory," Asia Publishing House, New Delhi



# हेमचंद यादव विश्वविद्यालय, दुर्ग (छ.ग.)

बी.ए. द्वितीय वर्ष

इतिहास

प्रश्न पत्र – प्रथम

प्रश्न पत्र का नाम – भारत का इतिहास 1206 ई. से 1761 ई. तक

इकाई-1

1. सल्तनतकालीन एवं मुगलकालीन इतिहास के स्रोत
2. दास वंश- ऐबक, इल्तुतमिश, बलबन
3. खिलजी वंश- अलाउद्दीन खिलजी-सैनिक उपलब्धियां, राजस्व व्यवस्था एवं बाजार नियंत्रण
4. तुगलक वंश- मोहम्मद बिन तुगलक,

इकाई-2

1. मुगल साम्राज्य की स्थापना – बाबर एवं हुमायूँ
2. शेरशाह सूरी का प्रशासन
3. अकबर की राजपूत नीति
4. मुगल शासकों की धार्मिक नीति – अकबर से औरंगजेब तक

इकाई-3


1. मुगल प्रशासन
2. मध्यकालीन सामाजिक एवं आर्थिक दशा
3. भक्ति आंदोलन
4. सूफीवाद


इकाई-4

1. मध्यकालीन साहित्य, कला एवं स्थापत्य
2. विजयनगर राज्य
3. बहमनी राज्य
4. शिवाजी का प्रशासन

इकाई-5

1. पेशवा- बालाजी विश्वनाथ, बालाजी बाजीराव
2. पानीपत का तृतीय युद्ध- कारण एवं परिणाम
3. मराठों के अधीन छत्तीसगढ़ – बिम्बाजी भोसले
4. छत्तीसगढ़ में मराठा प्रशासन


  
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## संदर्भ ग्रन्थ सूची:-

1. श्रीवास्तव ए.एल
  2. श्रीवास्तव ए.एल
  3. श्रीवास्तव ए.एल
  4. हबीबुल्लाह
  5. मजूमदार, राय चौधरी एवं दत्त
  6. पंजाबी बी. के.
  7. हबीब एवं निजामी
  8. वर्मा हरिश्चंद्र
  9. शर्मा कालूराम एवं व्यास प्रकाश
  10. सक्सेना आर.के.
  11. राधेशरण
  12. पाण्डेय ए.बी.
  13. पांडेय ए.बी.
  14. ईश्वरी प्रसाद
  15. श्रीवास्तव एच.एस.
  16. सरदेसाई जी.एस.
  17. सरकार जे.एन.
  18. त्रिपाठी आर.पी.
  19. मित्तल ए.के.
  20. मित्तल ए.के.
  21. Dey, U.N.
  23. Habib & Nizami
  24. Majumdar, R. C. & Dutt
  25. Mehta
  26. Pandey A.B.
  27. Pandey A.B
  28. Prasad Ishwari
  29. Sarkar, J.N.
  30. Satish Chandra
  31. Niraj Shrivastav
  32. पी.एल. मिश्र
  33. भगवान सिंह वर्मा
- भारत का इतिहास ( अंग्रेजी अनुवाद )  
दिल्ली सल्तनत ( अंग्रेजी अनुवाद )  
मुगलकालीन भारत ( अंग्रेजी अनुवाद )  
भारत में मुस्लिम शासन की बुनियाद  
भारत का वृहत् इतिहास खंड-2  
भारत का इतिहास ( 1206-1761 )  
दिल्ली सल्तनत  
मध्यकालीन भारत ( 750-1540 )  
मध्यकालीन भारतीय संस्कृति  
दिल्ली सल्तनत  
भारत की सामाजिक एवं आर्थिक संरचना और संस्कृति के मूल तत्व  
(आदिकाल से 1950 ईस्वी तक)  
पूर्व मध्यकालीन भारत  
उत्तर मध्यकालीन  
मुगलकालीन भारत  
मुगलकालीन शासन व्यवस्था  
मराठों का नवीन इतिहास खंड-2  
शिवाजी और उनका युग  
मुगल साम्राज्य का इतिहास और पतन  
यूनिफाइड इतिहास ( प्रारंभ से 1761 ई. )  
यूनिफाइड इतिहास प्राचीन काल से 1950 ईस्वी तक  
Mughal Government  
Comprehensive History of India  
An Advanced History of India Vol-II  
Advanced Study in the Medieval History of India  
Early Medieval India  
Medieval India  
Medieval India  
Shivaji and his Time  
Madhyakalin Bharat  
Madhyakalin Bharat Prashasan, Samaj, Sanskriti  
मराठाकालीन छत्तीसगढ़  
छत्तीसगढ़ का इतिहास

  
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# हेमचंद यादव विश्वविद्यालय, दुर्ग (छ.ग.)

बी.ए. द्वितीय वर्ष

इतिहास

प्रश्न पत्र — द्वितीय

विश्व का इतिहास 1890 ई. से 1964 ई. तक

इकाई—1

1. विलियम द्वितीय की विश्व राजनीति
2. अफ्रीका का विभाजन
3. जापान का आधुनिकीकरण— मेईजी पुनर्स्थापना एवं जापान का आधुनिकीकरण

इकाई—2

4. रूस—जापान युद्ध : कारण एवं परिणाम
5. चीन अफीम युद्ध एवं चीन की क्रांति, साम्यवाद
6. पूर्वी समस्या —बर्लिन कांग्रेस, युवा तुर्क आंदोलन
7. बाल्कन युद्ध : कारण एवं परिणाम

इकाई—3

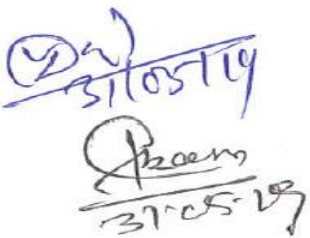
1. प्रथम विश्व युद्ध : कारण एवं परिणाम
2. वर्साय की संधि
3. रूस की क्रांति 1917 ई.
4. फासीवाद — मुसोलिनी

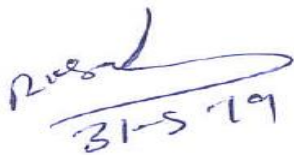
इकाई—4

1. नाजीवाद —हिटलर
2. जापान का सैन्यवाद
3. राष्ट्रसंघ : स्थापना एवं विल्सन के 14 सूत्र
4. द्वितीय विश्वयुद्ध : कारण एवं परिणाम

इकाई—5

1. संयुक्त राष्ट्र संघ — स्थापना एवं संगठन, उपलब्धियां
2. शीत युद्ध
3. गुट निरपेक्ष आंदोलन एवं पंचशील सिद्धान्त
4. विश्व शांति की चुनौती— कोरिया एवं फिलीस्तीन समस्या
5. एक ध्रुवीय विश्व

  
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संदर्भ ग्रन्थ सूची:-

- |                                   |  |
|-----------------------------------|--|
| 1. हेजन                           | आधुनिक यूरोप का इतिहास   |
| 2. बी.आई. पाल                     | आधुनिक यूरोप का इतिहास   |
| 3. HAL Fisher                     | A History of Europe  |
| 4. Christopher                    | From Reformation to Industrial Revolution                                      |
| 5. A.J.P. Taylor                  | The origins of the second war  |
| 6. David Thompson                 | Europe, Nepelean   |
| 7. सत्यकेतु विद्यालंकार           | एशिया का इतिहास  |
| 8. दीनानाथ वर्मा                  | आधुनिक यूरोप का इतिहास   |
| 9. Grant and Temperley            | Europe in the 19 <sup>th</sup> and 20 <sup>th</sup> Century ( also Hi—Version) |
| 10. Kettelby                      | History of the Modern Times  |
| 11. Moon                          | Imperialism In World Politics  |
| 12. Plamor & Parkins              | International Politics   |
| 13. Parks, Hengy Bamford          | The United States of America A History   |
| 14. Panikkar K.M.                 | Asia and Western Dominance   |
| 15. Schuman                       | International Politics   |
| 16. Taylor, A.J.P.                | Struggle for Mastery over Europe   |
| 17. Vinacke, H.M.                 | A History of Far East In Modern Times  |
| 18. Fay                           | Origins of the World War   |
| 19. के.एल.खुराना एवं शर्मा        | विश्व का इतिहास  |
| 20. देवेन्द्र सिंह चौहान          | समकालीन यूरोप  |
| 21 S.P. Nanda                     | History of Modern World  |
| 22. सुरेश चंद्र एवं शिवकुमार      | आधुनिक विश्व का इतिहास   |
| 23. कालू राम शर्मा                | आधुनिक विश्व   |
| 24. ई.एच.कार                      | दो विश्व युद्ध के बीच  |
| 25. जैन एवं माथुर                 | विश्व का इतिहास  |
| 26. अर्जुन देव, इंदिरा अर्जुन देव | समकालीन विश्व का इतिहास (1890—2008)  |
| 27. बी.एन.लुणिया                  | आधुनिक पाश्चात्य इतिहास की प्रमुख धाराएं (भाग—2)                               |
| 28. कौलेश्वर राय                  | आधुनिक यूरोप (1789—1945)   |

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# **Syllabus of Geography**

**(B.A./B. Sc. II Year)**

**Session**

**2019-2020**

**2020-2021**

*[Signature]*  
27.5.19  
(Dr. S. K. Das)

*[Signature]*  
27.5.19

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27.05.19  
DR. R. Chakraborty

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27/05/19

## Brief Summary

### 3 Year Integrated UG Courses (B.A./ B.Sc.) in Geography

#### B.A. /B.Sc. Part I

The B.A. /B.Sc. Part-I Examination in Geography will be 150 marks. There will be two theory papers and one Practical each of 50 marks as follows:

- |             |                     |
|-------------|---------------------|
| Paper - I   | Physical Geography  |
| Paper - II  | Human Geography.    |
| Paper - III | Practical Geography |

#### B.A. /B.Sc. Part-II

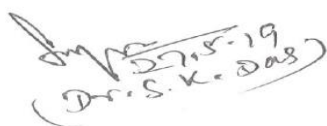
The B.A./B.Sc. Part-II Examination in Geography will be 150 marks. There will be two theory papers and one Practical each of 50 marks as follows:

- |           |                                  |
|-----------|----------------------------------|
| Paper-I   | Economic and Resources Geography |
| Paper-II  | Regional Geography of India      |
| Paper-III | Practical Geography              |

#### B.A. /B.Sc. Part III

The B.A. /B.Sc. Part III Examination in Geography will be 150 marks. There will be two theory papers and one Practical each of 50 marks as follows

- |             |                           |
|-------------|---------------------------|
| Paper – I   | Remote Sensing and GIS    |
| Paper - II  | Geography of Chhattisgarh |
| Paper - III | Practical Geography       |

  
(Dr. S. K. Das)  
27.5.19

  
27.5.19

  
27.05.19  
DR. R. Sharma

  
27/05/19

## B.A. /B.Sc. Part II

### PAPER - I

### ECONOMIC AND RESOURCES GEOGRAPHY

Max. Marks: 50

(Paper Code-0187)

- Unit I** Meaning, scope and approaches to economic geography; Main concepts of economic geography; Resource: concept and classification; Natural resources: soil, forest and water.
- Unit II** Mineral resources: iron ore and bauxite; Power resources: coal, petroleum and hydro electricity; Resource conservation; Principal crops: wheat, rice, sugarcane and tea
- Unit III** Agricultural regions of the world (Derwent Whittlesey); Theory of agricultural location (Von Thunen); Theory of industrial location (Weber); Major industries: iron and steel, textiles, petrochemical and sugar; industrial regions of the world.
- Unit IV** World transportation: major trans-continental railways, sea and air routes; International trade: patterns and trends; Major trade blocks: LAFTA, EEC, ASEAN; Effect of globalization on developing countries.
- Unit V** Conservation of resources; evolution of the concept, principles, philosophy, and approach to conservation, resources conservation and practices. Policy making and sustainable development.

#### Books Recommended:

1. Alexander, J. W. (1988): Economic Geography. Prentice-Hall, New Delhi,.
2. Bryson, J., Henry, N., Keeble, D. and Martin, R. (eds.) (1999): The Economic Geography Reader: Producing and Consuming Global Capitalism. John Wiley and Sons, Inc, New York.
3. Clark, G. L., Gertler, M. S. and Feldman, M. P. (eds.) (2000): The Oxford Handbook of Economic Geography. Oxford University Press, USA.
4. Coe, N. (2007): Economic Geography: A Contemporary Introduction. Blackwell Publishers, Inc., Massachusetts.
5. Gautam, A. (2006): *Aarthik Bhugol Ke Mool Tattava*, Sharda Pustak Bhawan, Allahabad.
6. Guha, J. S. and Chattoraj, P.R. (2002): A New Approach to Economic Geography: A Study of Resources. The World Press Private Limited, Kolkata.
7. Hanink, D. M. (1997): Principles and Applications of Economic Geography: Economy, Policy, Environment. John Wiley and Sons, Inc, New York.
8. Hartshorne, T. A. and Alexander, J. W. (1988): Economic Geography (3rd revised edition) Englewood Cliff, New Jersey, Prentice Hall
9. Hudson, R. (2005): Economic Geographies: Circuits, Flows and Spaces. Sage Publications, London.
10. Knowles, R, Wareing, J. (2000): Economic and Social Geography Made Simple, Rupa and Company, New Delhi.

*(Dr. S. K. Das)*  
27.5.19

*Ashad Shah*  
27.5.19

*VS*  
27/05/19  
*DR. R. Sharma*

**B.A. /B.Sc. Part II**  
**PAPER - II**  
**GEOGRAPHY OF INDIA**  
**Max. Marks: 50**  
**(Paper Code-0188)**

- Unit I** Physical Features: Structure, Relief, Climate, Physiographic Regions, Drainage, Climate-origin and mechanism of monsoon, and regional and Seasonal variation.
- Unit II** Natural Resources: Soils - types, their distribution and characteristics. Water Resources (major irrigation and hydel power projects); Forests-types, distribution, economic significance and conservation. Mineral and Power resources-Iron-ore, Manganese, Copper, Coal, Petroleum and Natural gas, Non conventional sources of energy.
- Unit III** Cultural Features : Population - Growth, Density and Distribution. Agriculture - Major crops, impact of Green Revolution and Agricultural regions.
- Unit IV** Industries Localization, Development & Production - Iron and steel, Cotton Textile, Cement, Sugar, Transport, Foreign Trade. Industrial Region.
- Unit V** Detailed Study of the following regions of India : Kashmir Valley, North- East Region, Chhota Nagpur Plateau, Thar Desert, Islands of India.

**Books Recommended:**

1. Chauhan, P.R. and Prasad, M. (2003): *Bharat Ka Vrihad Bhugol*, Vasundhara Prakashan, Gorakhpur.
2. Farmer, B.H. (1983): *An Introduction to South Asia*. Methuen, London
3. Gautam, A. (2006): *Advanced Geography of India*, Sharda Pustak Bhawan, Allahabad
4. Johnson, B.L.C. (1963): *Development in South Asia*. Penguin Books, Harmondsworth
5. Krishnan, M.S. (1982): *Geology of India and Burma*, CAS Publishers and Distributors, Delhi.
6. Khullar, D.R. ( 2007): *India: A Comprehensive Geography*, Kalyani Publishers, New Delhi
7. Nag, P. and Gupta, S. S. (1992): *Geography of India*, Concept Publishing Company, New Delhi.
8. Rao, B.P. ( 2007): *Bharat ke Bhaugolik Sameeksha*, Vasundhara Prakashan, Gorakhpur.
9. Sharma, T.C. and Coutinho, O. (2003): *Economic and Commercial Geography of India*, Vikas Publishing House Private Ltd. New Delhi.
10. Singh, J. (2003): *India: A Comprehensive Systematic Geography*. Gyanodaya Prakashan, Gorakhpur
11. Singh, J. (2001): *Bharat: Bhaugolik Aadhar Avam Ayam*, Gyanodaya Prakashan, Gorakhpur.
12. Singh, R.L. (ed.) (1971): *India: A Regional Geography*. National Geographical Society of India, Varanasi.
13. Spate, O.H. K., Learmonth A. T. A. and Farmer, B. H. (1996): *India, Pakistan and Sri Lanka*. Methuen, London, 7<sup>th</sup> edition.
14. Sukhwai, B.L. (1987): *India: Economic Resource Base and Contemporary Political Patterns*. Sterling Publication, New Delhi
15. Tiwari, R.C. (2007): *Geography of India*, Prayag Pustak Bhawan, Allahabad.
16. Wadia, D. N. (1959): *Geology of India*. Mac-Millan and Company, London and student edition, Madras.

*(Dr. S. K. Das)*  
27.5.19

*Ashtadash*  
27.5.19

*VS*  
27/05/19  
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**B.A. /B.Sc. Part II**  
**PAPER - III**  
**PRACTICAL GEOGRAPHY**  
**Max. Marks: 50**

**SECTION A**

MAP INTERPRETATION, PROJECTIONS AND STATISTICAL METHODS (M.M. 25)

**Unit I** Distribution Maps: Dot Map, Choropleth Map and Isopleth Map.

**Unit II** Map Projections: Definition and classification; Conical, Zenithal, and Cylindrical Projections.

**Unit III** Interpretation of Weather Maps: Use of Meteorological Instruments.

**Unit IV** Statistical Methods: Quartile: Mean Deviation, Standard Deviation and Quartile Deviation; Relative Variability and Co-efficient of Variation.

**SECTION B**

SURVEYING (M.M. 15)

**Unit V** Surveying: Whole Circle Bearing and Reduced Bearing, Methods of Prismatic Compass Survey.

PRACTICAL RECORD AND VIVA VOCE (M.M. 10)

**Books Recommended:**

1. Alvi, Z. 1995 : Statistical Geography: Methods and Applications, Rawat Pub. New Delhi: .
2. Davis, R.E. and Foote, F.S. (1953): Surveying, 4<sup>th</sup> edition, McGraw Hill Publication, New York
3. Kanetkar, T.P. and Kulkarni, S.V.(1967): Surveying and Levelling, Vol I and II V.G. Prakashan, Poona.
4. Natrajan, V. (1976): Advanced Surveying, B.I. Publications., Mumbai.
5. Pal, S.K. 1999 : Statistics for Geoscientists, Concept publishing Company, New Delhi
6. Punmia, B.C.(1994): Surveying, Vol I, Laxmi Publications Private Ltd, New Delhi.
7. Raisz, E. (1962): General Cartography. John Wiley and Sons, New York. 5<sup>th</sup> edition
8. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
9. Sharma, J. P. (2001): *Prayogik Bhugol.*, Rastogi Publication, Meerut 3<sup>rd</sup>. edition.
10. Silk, J. 1979 : Statistical techniques in Geography, George Allen and Unwin, London
11. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi.,
12. Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.
13. Venkatramaiah, C. (1997): A Text Book of Surveying, Universities Press, Hyderabad.

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बी.ए./बी.एस.सी. –द्वितीय वर्ष  
प्रश्न पत्र–प्रथम  
आर्थिक एवं संसाधन भूगोल

(कोड क्रमांक 0187)

अधिकतम अंक: 50

- इकाई—1 :** आर्थिक भूगोल का अर्थ, विषय क्षेत्र एवं उपागम; आर्थिक भूगोल की आधारभूत संकल्पनाये; संसाधन : संकल्पनायें एवं वर्गीकरण; प्राकृतिक संसाधन : मिट्टी, वन एवं जल ।
- इकाई—2 :** खनिज संसाधन : लौह अयस्क एवं बाक्ससाईट; शक्ति संसाधन कोयला, पेट्रोलियम एवं जल विद्युत; संसाधन संरक्षण ; प्रमुख फसले: गेहूँ, चावल, गन्ना, एवं चाय ।
- इकाई—3 :** विश्व के कृषि प्रदेश (व्हिटलसी के अनुसार); कृषि अवस्थिति के सिद्धान्त (वॉन थ्यूनेन); औद्योगिक स्थानीयकरण का सिद्धान्त (वेबर); प्रमुख उद्योग : लौह एवं इस्पात, वस्त्र उद्योग, शैलरासायनिक एवं शक्कर; विश्व के औद्योगिक प्रदेश ।
- इकाई—4 :** विश्व परिवहन : प्रमुख ट्रांस महाद्वीपीय रेलवे, समुद्र एवं वायु मार्ग; अंतर्राष्ट्रीय व्यापार प्रतिरूप एवं प्रवृत्तियाँ; प्रमुख व्यापार संघ : लैटिन अमेरिकी स्वतंत्र व्यापार संघ (LAFTA), यूरोपीय साझा बाजार (EEC), दक्षिणी-पूर्वी एशियाई राष्ट्रों का संघ (ASEAN), विकासशील देशों पर भूमण्डलीकरण का प्रभाव ।
- इकाई—5 :** संसाधनों का संरक्षण; संकल्पनाओं का उद्भव, सिद्धांत, दर्शन एवं संरक्षण के उपागम, संसाधन संरक्षण एवं प्रवृत्तियाँ, अक्षय विकास एवं नीति निर्माण ।

**Books Recommended:**

1. Alexander, J. W. (1988): Economic Geography. Prentice-Hall, New Delhi,.
2. Bryson, J., Henry, N., Keeble, D. and Martin, R. (eds.) (1999): The Economic Geography Reader: Producing and Consuming Global Capitalism. John Wiley and Sons, Inc, New York.
3. Clark, G. L., Gertler, M. S. and Feldman, M. P. (eds.) (2000): The Oxford Handbook of Economic Geography. Oxford University Press, USA.
4. Coe, N. (2007): Economic Geography: A Contemporary Introduction. Blackwell Publishers, Inc., Massachusetts.
5. Gautam, A. (2006): *Aarthik Bhugol Ke Mool Tattava*, Sharda Pustak Bhawan, Allahabad.
6. Guha, J. S. and Chattoraj, P.R. (2002): A New Approach to Economic Geography: A Study of Resources. The World Press Private Limited, Kolkata.
7. Hanink, D. M. (1997): Principles and Applications of Economic Geography: Economy, Policy, Environment. John Wiley and Sons, Inc, New York.
8. Hartshorne, T. A. and Alexander, J. W. (1988): Economic Geography (3rd revised edition) Englewood Cliff, New Jersey, Prentice Hall
9. Hudson, R. (2005): Economic Geographies: Circuits, Flows and Spaces. Sage Publications, London.
10. Knowles, R, Wareing, J. (2000): Economic and Social Geography Made Simple, Rupa and Company, New Delhi.

*(Dr. S. K. Das)*  
27.5.19

*Ashtadash*  
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बी.ए./बी.एस.सी. द्वितीय वर्ष  
प्रश्न पत्र— द्वितीय  
भारत का भूगोल

(कोड क्रमांक 0188)

अधिकतम अंक: 50

- इकाई -1** भौगोलिक स्वरूप – संरचना, उच्चावच जलवायु, भू-आकृतिक प्रदेश, अपवाह, जलवायु-मानसून की उत्पत्ति एवं विकास प्रक्रिया तथा पादेशिक एवं मौसमी विविधता।
- इकाई -2** प्राकृतिक संसाधन – मिट्टियाँ, प्रकार, वितरण एवं विशेषताएँ, जल संसाधन, सिंचाई और बहुउद्देशीय परियोजनाएँ, वन-प्रकार, वितरण आर्थिक महत्व एवं संरक्षण। खनिज एवं शक्ति के संसाधन – लौह अयस्क, मैग्नीज, तांबा, कोयला, पेट्रोलियम और प्राकृतिक गैस, गैर पारंपरिक उर्जा, (सौर उर्जा, पवन उर्जा ज्वारीय उर्जा, भूतापीय उर्जा)।
- इकाई -3** सांस्कृतिक तत्व, जनसंख्या वृद्धि, घनत्व और वितरण, कृषि प्रमुख खाद्य फसलें, हरित क्रांति का प्रभाव, कृषि प्रदेश,।
- इकाई -4** उद्योग-स्थानीकरण, औद्योगिक विकास और उत्पादन – लौहा और इस्पात उद्योग, सूती वस्त्र उद्योग, सीमेंट, चीनी, यातायात और व्यापार, औद्योगिक प्रदेश।
- इकाई -5** भारत के निम्न प्रदेशों का विस्तृत अध्ययन कश्मीर घाटी, उत्तर पूर्वी प्रदेश, छोटा नागपुर का पठार, थार मरुस्थल भारत के द्वीप समूह।

**Books Recommended:**

1. Chauhan, P.R. and Prasad, M. (2003): *Bharat Ka Vrihad Bhugol*, Vasundhara Prakashan, Gorakhpur.
2. Farmer, B.H. (1983): *An Introduction to South Asia*. Methuen, London
3. Gautam, A. (2006): *Advanced Geography of India*, Sharda Pustak Bhawan, Allahabad
4. Johnson, B.L.C. (1963): *Development in South Asia*. Penguin Books, Harmondsworth
5. Krishnan, M.S. (1982): *Geology of India and Burma*, CAS Publishers and Distributors, Delhi.
6. Khullar, D.R. (2007): *India: A Comprehensive Geography*, Kalyani Publishers, New Delhi
7. Nag, P. and Gupta, S. S. (1992): *Geography of India*, Concept Publishing Company, New Delhi.
8. Rao, B.P. (2007): *Bharat ke Bhaugolik Sameeksha*, Vasundhara Prakashan, Gorakhpur.
9. Sharma, T.C. and Coutinho, O. (2003): *Economic and Commercial Geography of India*, Vikas Publishing House Private Ltd. New Delhi.
10. Singh, J. (2003): *India: A Comprehensive Systematic Geography*. Gyanodaya Prakashan, Gorakhpur
11. Singh, J. (2001): *Bharat: Bhaugolik Aadhar Avam Ayam*, Gyanodaya Prakashan, Gorakhpur.
12. Singh, R.L. (ed.) (1971): *India: A Regional Geography*. National Geographical Society of India, Varanasi.
13. Spate, O.H. K., Learmonth A. T. A. and Farmer, B. H. (1996): *India, Pakistan and Sri Lanka*. Methuen, London, 7<sup>th</sup> edition.
14. Sukhwai, B.L. (1987): *India: Economic Resource Base and Contemporary Political Patterns*. Sterling Publication, New Delhi
15. Tiwari, R.C. (2007): *Geography of India*, Prayag Pustak Bhawan, Allahabad.
16. Wadia, D. N. (1959): *Geology of India*. Mac-Millan and Company, London and student edition, Madras.

Dr. S. K. Das  
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बी.ए./बी.एस.सी. द्वितीय वर्ष  
प्रश्न पत्र-तृतीय  
प्रायोगिक भूगोल

अधिकतम अंक : 50

खण्ड-अ. मानचित्र की व्याख्या, प्रक्षेप और सांख्यिकीय विधियां ।

(25 अंक)

इकाई -1 मानचित्र - बिन्दु विधि, छाया विधि, सममान रेखा मानचित्र (मानचित्र निर्माण)

इकाई -2 प्रक्षेप - परिभाषा एवं प्रकार शंकवाकार, खमध्य बेलनाकार प्रक्षेप.

इकाई -3 मौसम मानचित्र की व्याख्या एवं मौसम संबंधी उपकरणों का उपयोग.

इकाई -4 सांख्यिकीय विधियां - विचलन- चतुर्थांश माध्य विचलन, मानक विचलन, चतुर्थक विचलन, सापेक्षिक परिवर्तनशीलता, प्रसरण गुणंक ।

खण्ड-ब. सर्वेक्षण

(15 अंक)

इकाई -5 प्रिज्मीय सर्वेक्षण- पूर्णवृत्त दिक्मान, समानीत दिक्मान एवं प्रिज्मीय कम्पास सर्वेक्षण की विधियाँ ।

प्रायोगिक पुस्तिका और मौखिक परीक्षा

(10 अंक)

**Books Recommended:**

1. Alvi, Z. 1995 : Statistical Geography: Methods and Applications, Rawat Pub. New Delhi: .
2. Davis, R.E. and Foote, F.S. (1953): Surveying, 4<sup>th</sup> edition, McGraw Hill Publication, New York
3. Kanetkar, T.P. and Kulkarni, S.V.(1967): Surveying and Levelling, Vol I and II V.G. Prakashan, Poona.
4. Natrajan, V. (1976): Advanced Surveying, B.I. Publications., Mumbai.
5. Pal, S.K. 1999 : Statistics for Geoscientists, Concept publishing Company, New Delhi
6. Punmia, B.C.(1994): Surveying, Vol I, Laxmi Publications Private Ltd, New Delhi.
7. Raisz, E. (1962): General Cartography. John Wiley and Sons, New York. 5<sup>th</sup> edition
8. Sarkar, A. K. (1997): Practical Geography: A Systematic Approach. Orient Longman, Kolkata.
9. Sharma, J. P. (2001): *Prayogik Bhugol*., Rastogi Publication, Meerut 3<sup>rd</sup> edition.
10. Silk, J. 1979 : Statistical techniques in Geography, George Allen and Unwin, London
11. Singh, R.L. and Singh, Rana P.B. (1993): Elements of Practical Geography. (Hindi and English editions). Kalyani Publishers, New Delhi.,
12. Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad.
13. Venkatramaiah, C. (1997): A Text Book of Surveying, Universities Press, Hyderabad.

Dr. S.K. Das  
27.5.19

Dr. S.K. Das  
27.5.19

Dr. R. Sharma  
27.5.19  
DR. R. Sharma



# Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

## B.A. – II PSYCHOLOGY

Paper	Name of the Paper	Max. Marks	Duration
I	Social Psychology	50	3 hrs.
II.	Psychological Assessment	50	3 hrs.
III.	Practicum	50	4 Hrs.

### PAPER - I

#### SOCIAL PSYCHOLOGY (Paper Code-0189)

M.M.:50

**Note:** This paper consists of five units. From each unit a minimum of two questions would be set and the candidates would be required to attempt one from the each unit.

**UNIT-1** Nature, Goal and Scope of Social Psychology; Methods of Social Psychology: Experimental, Survey, Interview, Observation, and Sociometric. Approaches to the study of social behavior: Psychoanalytic, Cognitive, and Behavioral.

**UNIT-2** Social Perception: Perception of Self and Others, Impression Formation and its Determinant, Prosocial Behavior: Co-operation and Helping- Personal, Situational and Socio-cultural Determinants.

**UNIT-3** Stereotypes: Nature and Determinants; Prejudice: Nature and Determinants; Attitudes: Nature and Measurement; Interpersonal Attraction and Determinants.

**UNIT-4** Group Structure and Function: Social Facilitation, Conformity, Cohesiveness; Group Norms; Leadership: Nature, Types, Characteristics and Functions.

**UNIT-5** Social Issues: Aggression- Determinants, Prevention and Control; Population Explosion- Nature and Consequences (Socio-cultural); Pollution; Corruption; Mob Behavior; Gender Discrimination and Child Labour.

### References

- 1- सिंह, अरू । कुमार। समाज मनविज्ञान की रूपरेखा। मातृलाल बनारसदास प्रकाशन।
- 2- मिश्रा एव जन। समाज मनविज्ञान के मूल आधार। म.प्र. हिन्दी ग्रंथ अकादमी।
- 3- त्रिपाठी, लालबचन। समाज मनविज्ञान की रूपरेखा। हरप्रसाद नागव प्रकाशन।
- 4- Baron, R.A. & Byrne, D. Social Psychology. New Delhi: Prentice Hall Pub.
- 5- Secord, P.F. & Backman, C.W. (1994). Social Psychology. McGraw-Hill.

**B. A. - II**  
**PSYCHOLOGY PAPER- II**

**PSYCHOLOGICAL ASSESSMENT (Paper Code-0190)**

**M.M.:50**

**Note:** This paper consists of five units. From each unit a minimum of two questions would be set and the candidates would be required to attempt one from the each unit.

**UNIT-1** Psychological Assessment: Concept, Difference between Physical and Psychological Assessment, Levels of Assessment, Barriers in Psychological Assessment, Unidimensional and Multidimensional Assessment.

**UNIT-2** Psychological Tests: Concept, Characteristics, and Types- Standardized and Non-standardised, Group, Performance and Verbal; Uses of Psychological Tests.

**UNIT-3** Test Construction: Steps in Test Construction, Reliability- Test-retest, Split-half; Factors affecting Reliability; Validity: Content and Predictive; Factors affecting Validity; Norms- Age and Grade.

**UNIT-4** Cognitive and Non-cognitive Tests: Cognitive- Introduction to Intelligence, Aptitude, and Achievement Testing; Non-Cognitive: Introduction to Personality, Interest, and Value Testing.

**UNIT-5** Psychological Testing in Applied aspects of Life: Education, Occupation, Social, Health and Organization; Socio-Cultural factors in Psychological Assessment.

**References**

- 1- Anastasi (1997) Psychological Testing, New York: McGraw-Hill.
- 2- Ciminero, A.R. (1986) Handbook of Behavioral Assessment, New York: John Wiley.
- 3- Gupta, S.P. (2001). Manovigyanik Mapan evam Moolyankan. Agra: Sharda Prakashan.

**B. A. - II**  
**PSYCHOLOGY PAPER- III**  
**PRACTICUM**

**M.M.:50**

**Note:** This paper consists of two parts:

**Part-A**

- (a) Comprises of Laboratory **Experiments**.  
(b) Comprises of Psychological **Testing** and understanding of self and others.

(a) **Experiments** (Any five of the following):-

1. Effect of Group on Decision Making.
2. Social Facilitation.
3. Effect of Social setting on Sociometry.
4. Stereotypes.
5. Effect of Order of Information on Person-Perception.
6. Effect of Leadership on Performance.
7. Effect of Cognitive Dissonance on Attitude Change.
8. Effect of Communicator's Credibility on Suggestibility.

(b) **Psychological Tests** (Any four of the following):-

1. Aggression.
2. Deprivation.
3. Self-concept.
4. Dependence Proneness Scale.
5. Value.
6. Vocational Interest.
7. Attitude Scale.
8. Creativity.
9. Personality Test.

**Part-B**  
**Field Work**


Each student will be required to visit a hospital/ industrial organisation/ educational institution etc. under departmental supervision and shall be preparing his/her observation report, revealing his/her psychological insight about group dynamics that is operational in the unit. This record constitutes a part of assessment of field visit. Measures of central tendency in group data and correlation- Rank order.

**Distribution of Marks**

A.	Conduction of Psychological Experiment and Reporting	15 marks.
B.	Administration of one Psychological Test and Reporting	15 marks.
C.	Evaluation of Practical note book of the Field-Work	10 marks.
D.	Viva-Voce	10 marks.

**References** Sharma, R. (2018) - Psycho-laboratory- Experiment and Test. Raipur: Vaibhav Prakshan.

U. Mohan  
22.6.19

  
22.06.2019

प्राचीन भारतीय इतिहास, संस्कृति तथा पुरातत्व  
Ancient India History, Culture and Archaeology

बी.ए. द्वितीय वर्ष

B.A. Part II Year

पाठ्यक्रम  
Syllabus

सत्र : 2019–20

Session 2019-20

Dr. 31/05/19  
Prasen  
31.05.19

Prasen  
31-5-19

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**बी.ए. द्वितीय वर्ष**  
**B.A. Part II Paper I**

प्रथम : प्रश्न-पत्र

प्राचीन भारतीय सामाजिक तथा आर्थिक संस्थाएं (पेपर कोड 0134)  
Ancient Indian Social and Economic Institution

पूर्णांक : 75


उद्देश्य : इस पाठ्यक्रम का उद्देश्य प्राचीन भारत की सामाजिक तथा आर्थिक संस्थाओं का सामान्य ज्ञान कराना है।

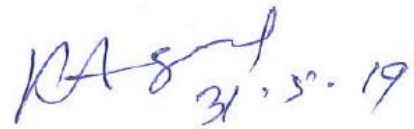
- इकाई- 1 (1) वर्णाश्रम व्यवस्था (Varna System)  
(2) आश्रम व्यवस्था (Ashramas)  
(3) पुरुषार्थ चतुष्टय (Purushartha Chatushtaya)  
(4) पंचमहायज्ञ (Pancha mahayagya)
- इकाई- 2 (1) संस्कार (Sanskaras)  
(2) विवाह तथा उसके प्रकार (Marriage and their types)  
(3) परिवार की उत्पत्ति तथा महत्व, संयुक्त परिवार, पिता,माता, तथा पुत्र की स्थिति, पुत्रों के प्रकार (Origin of Family and its Significance, Joint Family, position of Father, Mother and Sons; Types of Son)
- इकाई- 3 (1) नारियों की स्थिति (Position of Women)  
(2) शिक्षा-उद्देश्य, आदर्श, उपलब्धियाँ तथा प्रमुख शिक्षा केन्द्र (Objectives of Education, Model, Achievements and Important education Centres)
- इकाई- 4 (1) वैदिक काल से 600 ई.पू. तक प्राचीन भारत की आर्थिक दशा (Economic Condition of Ancient India from Vedic age to 600 B.C.)  
(2) श्रेणियों का संगठन और कार्य (Organisation and working of Guilds)  
(3) 600 ई.पू. से 319 ई. तक प्राचीन भारत की आर्थिक दशा (Economic Condition of Ancient India from 600 B.C. to 319 A.D.)
- इकाई- 5 (1) 319 ई. से 1200 ई. तक प्राचीन भारत की आर्थिक दशा (Economic Condition of Ancient India from 319A.D. to 1200 A.D.)  
(2) आंतरिक और बाह्य व्यापारिक मार्ग (Domestic and International trade routes)

सहायक ग्रंथ :

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|---|---|
| 1. मनोरमा जौहरी                               | - प्राचीन भारतीय वर्णाश्रम व्यवस्था                         |
| 2. जयशंकर मिश्र                               | - भारत की सामाजिक इतिहास                                    |
| 3. के.सी.जैन                                  | - प्राचीन भारतीय सामाजिक तथा आर्थिक संस्थाएं                |
| 4. राजबली पाण्डेय                             | - हिन्दू संस्कार  |
| 5. हरिदत्त वेदालंकार                          | - हिन्दू परिवार मीमांसा                                     |
| 6. ए.एस.अल्तेकर                               | - प्राचीन भारत में नारियों की स्थिति                        |
| 7. आर.एस.शर्मा                                | - प्राचीन भारत में शूद्रों की स्थिति                        |
| 8. ए.एस.अल्तेकर                               | - प्राचीन भारतीय शिक्षण पद्धति                              |
| 9. रमेशचन्द्र मजुमदार (अनु.कृष्णदत्त बाजपेयी) | - प्राचीन भारत में संगठित जीवन                              |
| 10. मोतीचन्द्र                                | - सार्थवाह  |
| 11. कृष्णदत्त बाजपेयी                         | - भारतीय व्यापार का इतिहास                                  |
| 12. कृष्णदत्त बाजपेयी                         | - प्राचीन भारत का विदेशों में संबंध                         |
| 13. आर.एस.शर्मा                               | - पूर्व मध्यकालीन भारत में सामाजिक परिवर्तन                 |
| 14. डॉ. चन्द्रदेव सिंह                        | - प्राचीन भारतीय समाज और चिन्तन                             |
| 15. सुस्मिता पाण्डेय                          | - समाज, आर्थिक व्यवस्था एवम् धर्म                           |
| 16. P.N. Prabhu                               | - Hindu Social Organization                                 |
| 17. S.K. Maity                                | - The Economics life of Northern India in the Gupta Period. |
| 18. L.Gopal                                   | - Economic life of Northern Indian                          |
| 19. D.R. Das                                  | - Economics History of the Deccan                           |
| 20. शिव स्वरूप सहसा                           | - प्राचीन भारतीय सामाजिक, आर्थिक संस्थाएं                   |

  
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**बी.ए. द्वितीय वर्ष**  
**द्वितीय : प्रश्न-पत्र**  
**B.A. Part II Paper II**  
**प्राचीन भारतीय राजनय तथा प्रशासन (पेपर कोड 0205)**  
**Ancient Indian Polity and Administration**

पूर्णांक : 75


- इकाई— 1 राज्य की उत्पत्ति, प्रकार, स्वरूप तथा कार्य।  
(Origin, types, form, and function of State)
- इकाई— 2 राजपद, मंत्रिपरिषद्—संगठन एवं कार्य, सप्तांग सिद्धांत।  
(Kingship; organisation and working of Council of Ministers; Theory of Saptanga)
- इकाई— 3 गणराज्य : संगठन, शासन, पद्धति, गुण—दोष  
(Republics: organisation, government, system, Pros & Cons)
- इकाई— 4 अंतर्राष्ट्रीय संबंध, मण्डल सिद्धांत, षाडगुण्य सिद्धांत, दूत व्यवस्था, गुप्तचर व्यवस्था।  
(International Relation, Principle of Mandala, Principle of Shadgunya, Ambassadors, Espionage)
- इकाई— 5 विभिन्न राजवंशों की प्रशासन व्यवस्था :  
मौर्य, गुप्त, हर्ष कालीन वंश की प्रशासन, राष्ट्रकूट एवं चोलवंश।  
(Administrative system of various Dynasties: Mauryas, Guptas, period of Harsha, Rashtrakutas and Cholas )

अनुशंसित पुस्तकें :

- |                            |  |
|----------------------------|--|
| 1. अनंत सदाशिव अल्तेकर     | — प्राचीन भारतीय शासन पद्धति (Ancient Indian Administration) |
| 2. काशी प्रसाद जायसवाल     | — हिन्दू राजतंत्र, भाग 1, 2 (Hindu Polity)                   |
| 3. डॉ. रवीन्द्रनाथ अग्रवाल | — मध्यप्रदेश क्षेत्र के अंतर्राज्यीय संबंधों का अध्ययन       |
| 4. सत्यकेतु विद्यालंकर     | — प्राचीन भारतीय शासन व्यवस्था एवं राज्य शास्त्र             |
| 5. मनोरमा जौहरी            | — प्राचीन भारत में राज्य और शासन व्यवस्था                    |
| 6. हरिश्चन्द्र शर्मा       | — प्राचीन भारतीय राजनीतिक विचारक एवं संस्थाएं                |
| 7. राधाकृष्ण चौधरी         | — प्राचीन भारतीय राजनीति एवं शासन व्यवस्था                   |

  
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सत्र 2019-20 से प्रस्तावित

बी.ए. द्वितीय वर्ष

संस्कृत साहित्य

टीप – बी.ए. द्वितीय वर्ष में संस्कृत साहित्य के दो प्रश्न-पत्र होंगे एवं दोनों प्रश्न-पत्र 75- 75 अंकों के होंगे ।

**प्रथम प्रश्नपत्र**

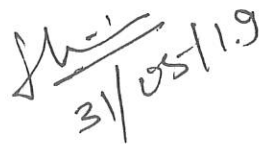
नाटक, व्याकरण तथा रचना

पूर्णांक – 75

- |         |  |          |
|---------|--|----------|
| इकाई –1 | नागानन्द, नाटकम् (हर्षवर्धनकृत)                              | अंक – 15 |
|         | 1. एक ससन्दर्भ व्याख्या                                      |          |
|         | 2. दो सूक्तियों की व्याख्या                                  |          |
| इकाई –2 | नागानन्द नाटकम् – समीक्षात्मक प्रश्न                         | अंक – 15 |
| इकाई –3 | व्याकरण (लघुसिद्धान्तकौमुदी)                                 | अंक – 15 |
|         | कर्तृवाच्य, कर्मवाच्य, भाववाच्य                              |          |
| इकाई –4 | व्याकरण (लघुसिद्धान्तकौमुदी)                                 | अंक – 15 |
|         | समास प्रकरण  |          |
| इकाई –5 | वाक्यरचना  | अंक – 15 |
|         | व्याकरण के अधीत अंश पर आधारित छह संस्कृत शब्दों से वाक्यरचना |          |

अनुशंसित ग्रन्थ –

1. नागानन्द नाटक – हर्षवर्धन, प्रकाशक – चौखम्बा विद्याभवन, वाराणसी
2. रचनानुवाद कौमुदी – डा. कपिलदेव द्विवेदी
3. संस्कृत में अनुवाद कैसे करें – उमाकान्त मिश्र शास्त्री, प्रकाशक – भारती भवन
4. लघु सिद्धान्त कौमुदी – श्रीधरानन्द शास्त्री
5. लघु सिद्धान्त कौमुदी – श्री महेश सिंह कुशवाहा, प्रकाशक – चौखम्बा विद्याभवन, वाराणसी
6. शीघ्रबोधव्याकरणम् – डा. पुष्पा दीक्षित, पाणिनीय शोध संस्थान, तेलीपारा, बिलासपुर

  
31/05/19

सत्र 2019-20 से प्रस्तावित

बी.ए. द्वितीय वर्ष

संस्कृत साहित्य

द्वितीय प्रश्नपत्र

नाटक, व्याकरण और अनुवाद

पूर्णांक — 75

- इकाई —1 रघुवंशमहाकाव्यम् (द्वितीय सर्गः) अंक — 15  
दो श्लोकों की व्याख्या
- इकाई —2 रघुवंशमहाकाव्य के समीक्षात्मक प्रश्न अंक — 15
- इकाई —3 नीतिशतकम् (भर्तृहरिकृत) अंक — 15  
दो श्लोकों की व्याख्या
- इकाई —4 साहित्येतिहासः अंक — 15  
नाटक, महाकाव्य तथा गद्यकाव्य —  
अभिज्ञानशाकुन्तल, उत्तररामचरित, वेणीसंहार, मुद्राराक्षस, मृच्छकटिक,  
रघुवंश, कुमारसंभव, बुद्धचरित, सौन्दरनन्द, पद्मचूडामणि, सुग्रीववध,  
किरातार्जुनीय, भट्टिकाव्य, जानकीहरण, शिशुपालवध, नैषधीयचरित,  
हरविजय, नवसाहसांकचरित, विक्रमांकदेवचरित, राजतरंगिणी ।  
वासवदत्ता, दशकुमारचरित, कादम्बरी, हर्षचरित, तिलकमंजरी, गद्यचिन्तामणि,  
शिवराजविजय ।
- इकाई —5 साहित्येतिहासः अंक — 15  
गीतिकाव्य, मुक्तक तथा कथा साहित्य —  
शतकत्रय (भर्तृहरि), ऋतुसंहार, मेघदूत, अमरुकशतक, गीतगोविन्द,  
भामिनीविलास, पंचलहरी, नलचम्पू, रामायणचम्पू, भारतचम्पू,  
वरदाम्बिकापरिणय, पंचतंत्र, हितोपदेश, बेतालपंचविंशति, शुकसप्तति,  
कथासरित्सागर, बृहत्कथामंजरी, कथामुक्तावली, इक्षुगन्धा ।  
(उल्लिखित रचनाओं एवं रचनाकारों का सामान्य परिचय अपेक्षित है ।)

अनुशासित ग्रन्थ —

1. रघुवंशमहाकाव्य — कालिदास, प्रकाशक — मोतीलाल बनारसीदास
2. नीतिशतकम् — भर्तृहरि, प्रकाशक — चौखम्बा विद्याभवन, वाराणसी
3. संस्कृत साहित्य का इतिहास — आचार्य बलदेव उपाध्याय
4. संस्कृत साहित्य का अभिनव इतिहास — डा. राधावल्लभ त्रिपाठी, वि.वि. प्रकाशन, सागर, म.प्र.

31/05/19



**भाषाविज्ञान**  
**प्रथम प्रश्न-पत्र**  
**वाक्य- अभिरचनाएं**  
**(पेपर कोड - 0177)**

1. हिन्दी की व्याकरणिक कोटियां—शब्दवर्ग, पुरुष, लिंग, वचन, कारक, काल, वृत्ति—परिभाषा तथा सोदाहरण विवेचना।
2. भाषित रूप — अर्थ—तत्त्व व संबंध—तत्त्व । संबंध—तत्त्व के प्रकार एवं कार्य । रूपिम के प्रकार, रूपिम—निर्धारण—व्यतिरेकी विवरण, परिपूरक वितरण।
3. भाषित संकेत — समाजभाषाविज्ञान के संदर्भ में, 'लांग' तथा 'पैरोल' । भाषा के अध्ययन के प्रकार — एककालिक, बहुकालिक, तुलनात्मक, व्यतिरेकी तथा अनूप्रयुक्त।
4. पदबंध उपवाक्य तथा वाक्य — पदबंध का वर्गीकरण — संज्ञा—पदबंध, सर्वनाम — पदबंध, विशेषण—पदबंध, क्रिया — पदबंध, क्रियाविशेषण — पदबंध आदि।  
उपवाक्य का वर्गीकरण — संज्ञा—उपवाक्य, विशेषण — उपवाक्य, क्रियाविशेषण, उपवाक्य आदि । वाक्यों का वर्गीकरण—विभिन्न आधार।
5. कारक — कर्ता, कर्म, करण, आदि अन्वय । काल, पक्ष, भाव, वाच्य, पदक्रम, — वाक्य—विन्यास — निकटस्थ अवयव विश्लेषण, रूपान्तरण—प्रजनक व्याकरण । हिन्दी के वाक्यों में होने वाली अशुद्धियों का संशोधन।

**निर्धारित पुस्तकें —**

1. भाषाविज्ञान — भोलानाथ तिवारी (किताब महल, इलाहाबाद)
2. भाषाविज्ञान एवं भाषाशास्त्र — डॉ. कपिलदेव द्विवेदी (विश्वविद्यालय प्रकाशन, वाराणसी)
3. भाषाविज्ञान सैध्दांतिक चिंतन — रविन्दनाथ श्रीवास्तव
4. आधुनिक हिन्दी व्याकरण और रचना 'वासुदेवनंदल प्रसाद
5. अच्छी हिंदी — रामचंद्र वर्मा
6. भाषाशास्त्र की रूपरेखा — उदानारायण तिवारी

**भाषाविज्ञान**  
**द्वितीय प्रश्न पत्र**  
**कोशविज्ञान एवं अर्थविज्ञान**  
**(पेपर कोड – 0178)**

1. कोशविज्ञान – परिभाषा, उद्देश्य, विषय-क्षेत्र, विज्ञान है या कला, कोशविज्ञान का अन्य विषयों से संबंध, कोशों के अध्ससन के आधार – ऐतिहासिक, तुलनात्मक आदि।
2. कोश – निर्माण की विधियां, शब्द- संकलन के आधार, प्रविष्टियों का चयन, क्रम-विन्यास, कोश-निर्माण में होने वाली समस्याएं।
3. शब्दाकोश के प्रकार – भाषा के आधार पर – एकभाषिक, द्विभाषिक, त्रिभाषिक, बहुभाषिक आदि : काल के आधार पर – समकालिक, ऐतिहासिक आदि। कोशीय अर्थ का निर्धारण-पर्यायवाची, अनेकार्थी, अनेकार्थ, लक्षणार्थ, समध्वनि, विलोमार्थ, संदर्भपरक, अर्थ आदि। शब्दकोश की विशेषताएं।
4. अर्थीय संबंध – शब्द और अर्थ के बीच संबंध, अर्थ के प्रकार अर्थ परिवर्तन की दिशाएं- अर्थ-विस्तार, अर्थसंकोच, अर्थादेश आदि। अर्थ-परिवर्तन के विभिन्न कारण।
5. हिन्दी शब्दों का प्रयोग और अर्थ –ऊनार्थक (लघुतावाची) शुद्ध, पर्यायवाची शब्द, समूहवाची शब्द, ध्वनिमूलक शब्द (सजीव तथा निर्जीव से संबंधित) समध्वनि मूलकशब्द, मुहावरें तथा लाकोक्तियों का अर्थ और प्रयोग।

**निर्धारित पुस्तकें-**

1. कोशविज्ञान – भोलानाथ तिवारी
2. आधुनिक हिन्दी व्याकरण और रचना – वासुदेवनंदन प्रसाद
3. अच्छी हिन्दी – रामचंद्र वर्मा
4. शुद्ध हिन्दी – हरदेव बाहरी

**B.A. II<sup>nd</sup> Year**  
**MUSIC**  
**PAPER – I**  
**SESSION – 2019-20**

**THEORY OF INDIAN MUSIC-VOCAL / INSTRUMENTAL**

**(Paper Code-0201)**

- UNIT-I** (a) Definitions and study of the following terms : Graha, Ansha, Nayas Swara, Paryayansha Swara, Alpatva-Bahutva, Aavirbhava-Tirobhava, Gandharva-Gan, Nibaddha-Anibaddha Gan, Jamjama, Ghaseet, Krintan, Shuddha, Chayalag, Sankirna Raga.
- (b) Swasthan Niyam, Ragalap, Aalapti, Akshiptika, Samvadatva.
- UNIT-II** Short Biographics and contributions of the Musicians :- Sharangdeva, Acharya Bharat, Ahobal, Vyankatmakhi, Sadarang-Adarang. Aalauddin Khan, Faiyaz Khan, Imdad Khan, Pt. Ravi Shankar.
- UNIT-III** Notation of Talas with Dugun and Chaugun Layakaries :-  
Roopak, Teevra, Sultal, Deepchandi, Jhumra, Adachautal, Dhamar, Tilwara.
- UNIT-IV** (a) Study of Karnatak Taal System,
- (b) Comparative study of Karnatak and Hindustani Taal System.
- UNIT-V** Definition of Vaggeyakar, Uttam Vaggeykar, Adham Vaggeykar.  
Classification of Instruments :- Tat, Vitat, Ghan, Shushir vadya.



## PAPER - II

THEORY OF INDIAN MUSIC VOCAL/INSTRUMENTAL M.M. : 50

(Paper Code-0202)

SESSION – 2019-20

**UNIT-I** Elementry of Medium-Sound, Musical Sound and Noice, Vibratory motions, Frequency, Pitch, Magnitude and Timber, Major Tone, Minor Tone, Semi Tone.

**UNIT-II** Study of Melas or Thatas as follows :

- (a) 72 Melas of Vyankatmakhi
- (b) 32 Thatas of V.N. Bhatkhande

**UNIT-III** History of Indian Music as follows :

- (a) Origin of Music
- (b) Vedic, Pauranik and Gupta Period a short survey

**UNIT-IV(a)** Explanation of the following terms :

Kajari, Chaiti, Rabindra Sangeet, Tribal Music, Lawani, Garba, Baul, Bhatiyali, Mand.

- (b) Merits of a good listener, Qualities of a good listener to make any music programme a success.

**UNIT-V (a)** Study of theoritical details of Ragas prescribed for practical course : Bihag, Kedar, Desh, Bageshwari, Malkauns, Jaunpuri, Bhairavi, Hameer, Kalingda, Kamod, Chhayanat.

- (b) Writing in notation of songs (Bandish) or gats prescribed in practical course of Second year.
- (c) Writing of a critical appreciation of Radio or T.V. Music (Classical) Programme.



**PRACTICAL**  
**VOCAL/INSTRUMENT**

**M.M. : 50**

1. Study of the following Ragas : Bihag, Kedar, Desh, Bageshwari, Malkauns, Jaunpuri, Bhairavi, Hameer, Kalingda, Kamod, Chhayanaat .
2. Two Vilambit Khayalas/Maseet Khani Gat, with Alap and Tanas or Todas. One Choice of the candidate and one vilambit asked by the examiner. 10 marks
3. Sargam geet and Lakshan geet in all the above Ragas. Playing of a Gat in Jhaptal and Rupak Tal. 3 + 3 = 6
4. Drut Khayal or Raza Khani Gat with Tanas or Todas in any five of the above mentioned Ragas. 4 + 4 = 8
5. Singing of a Dhrupad Dhamar with Layakaris or playing a Gat in other than Teen Tal. 8 marks
6. Study of the following Talas :

Roopak, Teevra, Sooltaal, Deepchandi, Jhumra, Adachautal, Dhamar, Tilwara.  
Demonstration of Talas with Dugun Chaugun. 4 marks  
Singing of Tarana/Playing of Bol or Jhala 4 marks

**SESSIONAL WORK**

**M.M. : 10**

1. Keeping up to date Practical and Theory note books. Attendance in Class and performance in college classes.
2. Ten descriptions of Music Programmes in Radio, T.V. or Personally attended. Participation in Departmental activities.



14/06/19

**BOOKS RECOMMENDED: -**

1. Hindustani Sangeet Paddhati Kramik Pustak Malika (Part-1-4) By V.N. Bhatkhande.
2. Sangeet Visharad, by Vasant.
3. Sangeet Bodh, by S.S. Paranjape.
4. Sangeet Shastra Darpan, By Shanti Govardhan Part I + II
5. Rag Bodh, By B.R. Deodher Part I, II, III
6. Bharatiya Sangeet, Ka Itihass by Umesh Joshi. By Dr. S.S. Paranjape.
7. Sangeet Shastra 1 + 2 + 3 by Mahesh Narayan Saxena.
8. Sangeet Shastra 1, 2, 3 by V.N. Bhatkhande.
9. Sangeetanjali, by Pt. Omkar Nath Thakur.
10. Sitar Malika, by Bhagwat Sharan Sharma.
11. Taal Prakash by Bhagwat Saran.
12. Dhvani Aur Sangeet by Lalit Kishore Singh.

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## **EDUCATION**

### **PAPER - I**

#### **EDUCATION & INDIAN HERITAGE (Paper Code-0193)**

**M.M. 75**

- UNIT-I** Education in India during (a) Vedic (b) Budhastic and (c) Medival Periods.
- UNIT-II** Macavleys Minutes & Bentinik Resolution (1835), Adam's Report and its recommendation wood's despatch (1854).  
Lord Curzon's educational policy, Growth of national consciousness, National education movement.
- UNIT-III** Report of Hunter Commission, its influence in the subsequent development of education. Ghokhle's Bill.Sadler Commission's recommendation.
- UNIT-IV** Wardha Scheme of education 1937. RadhaKrishanan Commission 1948, Mudaliar Commission (1952-53).
- UNIT-V** Kothari Commission 1964-66, New education policy 1986 and its revised formulation of 1992, Gujrat Vidya Peeth, Basic education, Visva Bharti.

### **PAPER - II**

#### **EDUCATION AND HUMAN DEVELOPMENT (Paper Code-0194) MM. 75**

#### **COURSE OBJECTIVES**

To make the students understand about -

1. The meaning, scope and uses of psychology in education.
2. Human growth and development upto the stage of adolescence.
3. Meaning and purpose of learning and factors influencing learning.
4. The concept of intelligence, its meaning and measurement.
5. Heredity and environment and their roles in causing individual differences.

#### **COURSE CONTENTS**

- UNIT-I** Pshchology- Its meaning, nature and scope. Relationship between education and psychology. Distinction between psychology and educational psychology.
- UNIT-II** Stages of human development : infancy, Childhood, latency and adolescence- their needs, significance and problems. Human development and education, role of educational psychology in understanding the individual.
- UNIT-III** Learing : Learning and maturation, Essential aspects of different theories and laws of learning, motivation in learning, transfer of learning.  
Attention and Interest. Nature and conditions for attention, their educational implications.Emotions - their meening, characteristics and place of emotions in education.
- UNIT-IV** Personality Meanining & Factors. Intelligence - concept, definition and measurement.Habits, meaning of habit and its role and implications in education's.
- UNIT-V** Heredity and invironment and their implications for education.  
Individual differences - causes of individual differences, significance of individual differences and educational implications.

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**HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**  
**Syllabus for B.A. / B.Sc. Course, 2019-20**  
**Subject: Statistics**

Each year of B.A. /B.Sc. I, II, III shall have two theories and one practical course. All the Theory as well as Practical Examinations will be of 3 hours duration. In each practical examination 10% marks shall be fixed for viva –voce and 20% marks for practical record.

**Scheme of Examination**

	<b>Title of the paper</b>	<b>MAX. Marks</b>
<b>B.A./B.Sc. I</b>	<b>Paper-I</b> (Code No. 0803): <b>Probability I</b>	50
	<b>Paper-II</b> (Code No. 0804): <b>Descriptive Statistics I</b>	50
	<b>Paper III: Practical-</b> Based on Theory Papers I & II	50
	<b>Total</b>	<b>150</b>
<b>B.A./B.Sc. II</b>	<b>Paper-I</b> (Code No. 0853): <b>Statistical Methods</b>	50
	<b>Paper-II</b> (Code No. 0854): <b>Sampling Theory and Design of Experiments</b>	50
	<b>Paper III: Practical-</b> Based on Theory Papers I & II	50
	<b>Total</b>	<b>150</b>
<b>B.A./B.Sc. III</b>	<b>Paper I</b> (Code No. 0907): <b>Applied Statistics</b>	50
	<b>Paper II</b> ( Code No. 0908): <b>Statistical Quality Control and Computational Techniques</b>	50
	<b>Paper III: Practical-</b> Based on Theory Papers I & II	50
	<b>Total</b>	<b>150</b>



**B.A./B.Sc. –II**  
**Subject: Statistics**  
**Paper-I( Paper Code-0853)**  
**Statistical Methods**

**Unit I**

Sampling from a distribution: Definition of a random sample, simulating random sample from standard distributions (uniform, Normal, Exponential), concept of derived distributions of a functions of random variables, concept of a statistics and its sampling distribution. Point estimate of a parameter. Properties of a good estimator, Concept of bias and standard error of an estimate .Standard errors of sample mean, sample proportion. Sampling distribution of sum of Binomial, Poisson and mean of Normal distributions. Independence of sample mean and variance in random sampling from a Normal distribution (without derivation).

**Unit II**

Statistical tests and interval estimation: Null and alternative hypothesis. Types of errors, level of significance, p values, one and two tailed tests, Procedure for testing of hypothesis. Statement of chi-squares, Student's t and F statistics. Testing for the single mean and variance of a univariate normal distribution, testing the equality of two means and testing for the equality of two variances of two univariate normal distributions. Related confidence intervals. Testing for the significance of sample correlation in sampling from bi-variate normal distribution and for equality of means and equality of variances in sampling from bivariate normal populations.

**Unit III**

Large sample tests: use of central limit theorem for testing and interval estimation of a single mean and a single proportion and difference of two means and two proportions, Fisher's Z transformation and its uses. Pearson's chi-square test for goodness of fit and for homogeneity for standard distributions. Contingency table and test of independence in a contingency table.

**Unit IV**

Nonparametric tests: Definition of order statistics and their distributions, Non-parametric tests, Sign test for univariate and bivariate distributions, Wilcoxon test, Mann-Whitney test, Run test, median test and Spearman's rank correlation test.

**Unit V**

Four short notes, one from each unit will be asked. Students have to answer any two.

**REFERENCES**

1. Frund J.E. (2001) Mathematical Statistics, Prentice Hall of India.
2. Goon A.M., Gupta M.K., Das Gupta.B. (1991): Fundamentals of Statistics, Vol.I, World Press, Culcutta.
3. Gupta and Kapoor: Fundamentals of Mathematical Statistics S.Chand & Sons.
4. Hodges, J.L. and Lehman E.L. (1964): Basic Concepts of Probability and Statistics, Holden Day.
5. Mood A.M, Graybill F.A and Boes D.C. (1974): Introduction to the Theory of Statistics, McGraw Hill.

## **ADDITIONAL REFERENCES**

- 1..Bhat B.R., Shrivenkatramana T and Rao Madhava K.S. (1997): A Beginner's Text, Vol. II, New age International (P) Ltd.
2. Rohatgi, V.K. (1967): An Introduction to Probability Theory and Mathematical Statistics, John Wiley & Sons.
3. Snedecor, G.W. and Cochran W.G. (1967): Statistical Methods. Iowa State University Press.

**Paper-II** (Paper Code-0854)  
**Sampling Theory and Design of Experiments**

**Unit I**

Concepts of population and sample, need for sampling, Census and sample survey, Basic concepts in sampling, organizational aspects of survey sampling, sample selection and sample size.  
Some basic sampling methods – simple random sampling (SRS) with and without replacement.

**Unit II**

Stratified random sampling, Systematic sampling, Allocation problems, ratio and regression methods of estimation under SRS.

Non-sampling errors, acquaintance of working (questionnaires, sampling design, methods followed in field investigation, principal findings, etc) of NSSO and other agencies undertaking sample surveys.

**Unit III**

Analysis of variance for one way and two-way classifications. Need for design of experiments, fundamental principal of design, basic designs- CRD, RBD, LSD and their analysis.

**Unit IV**

Missing plot technique. Analysis of co-variance. Factorial experiments :  $2^2$ ,  $2^3$  factorial experiments, illustrations, main effects and interactions, confounding and illustrations. Yates method of finding treatment totals.

**Unit V**

Four short notes, one from each unit will be asked. Students have to answer any two.

**REFERENCES**

1. Cochran W.G. (1977): Sampling Techniques, John Wiley and Sons.
2. Des Raj (2000): Sample Survey Theory, Narosa Publishing House.
3. Murthy M.N.(1967): Sampling Theory and Methods, Statistical Publishing Society, Calcutta.
4. Singh, D. and Chaudhary, F.S. (1986): Theory and analysis of Sample Survey Designs. New Age International Publisher.
5. Sukhatme P.V., Sukhatme B.V., Sukhatme S. and Ashok C.(1984), : Sample Survey Methods and Its Applications, Indian Society of Agricultural Statistics, New Delhi.
6. Das M.N. and Giri (1986) : Design and analysis of experiments, Springer Verlag.
7. Goon A.M., Gupta M.K., Das Gupta B. (1986): Fundamentals of Statistics, Vol.II, World Press, Calcutta.
8. Joshi, D.D.(1987): Linear Estimation and Design of Experiments, Wiley Eastern.
9. Kempthorne O.(1965) : The Design and Analysis of Experiments, Wiley Eastern.

### **Paper III:**

#### **Practical : Practicals Based on Paper I & II**

1. drawing random samples from standard univariate discrete and continuous distributions such as Binomial, Poission, Normal, Cauichy and Exponential.
2. Tests of significance based on Student's t, Chi-square, F. Test of significance of sample correlation coefficient. Use of Z Transformation. Testing of equality of means and equality of variance in sampling from bivariate normal.
3. Large sample tests for means and proportions, tests of goodness of fit and independence of attributes in contingency tables.
4. Nonparametric tests: Sign, Run, Median, Wilcoxon, Mann-Whitney tests.
5. Selection of samples and determination of sample size. Simple random sampling, Statified and systematic sampling. Allocation problem in stratified sampling. Ratio and regression methods of estimation.
6. Analysis of variance for one way and two way classifications. Analysis of CRD, RBD and LSD. Analysis of  $2^2$  and  $2^3$  experiments.

## MATHEMATICS

There shall be three compulsory papers. Each paper of 50 marks is divided into five units and each unit carry equal marks.

### **B.A. Part-II**

#### **Paper-I**

#### **ADVANCED CALCULUS**

- UNIT-I Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion. Series of non-negative terms. Comparison tests, Cauchy's integral test, Ratio tests, Raabe's, Logarithmic, De Morgan and Bertrand's tests. Alternating series, Leibnitz's theorem. Absolute and conditional convergence.
- UNIT-II Continuity, Sequential continuity, Properties of continuous functions, Uniform continuity, Chain rule of differentiability, Mean value theorems and their geometrical interpretations. Darboux's intermediate value theorem for derivatives, Taylor's theorem with various forms of remainders.
- UNIT-III Limit and continuity of functions of two variables. Partial differentiation. Change of variables. Euler's theorem on homogeneous functions. Taylor's theorem for functions of two variables. Jacobians.
- UNIT-IV Envelopes, evolutes. Maxima, minima and saddle points of functions of two variables. Lagrange's multiplier method.
- UNIT-V Beta and Gamma functions, Double and triple integrals, Dirichlet's integrals, Change of order of integration in double integrals.

#### REFERENCES :

1. Gabriel Klaumber, Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975.
2. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
3. R.R. Goldberg, Real Analysis, Oxford & I.B.H. Publishing Co., New Delhi, 1970.
4. D. Soma Sundaram and B. Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997.
5. P.K. Jain and S.K. Kaushik, An introduction to Real Analysis, S. Chand & Co., New Delhi, 2000.
6. Gorakh Prasad, Differential Calculus, Pothishala Pvt. Ltd., Allahabad.
7. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Co., New York.
8. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd., Allahabad.
9. S.C. Malik, Mathematical Analysis, Wiley Eastern Ltd., New Delhi.
10. O.E. Stanaitis, An Introduction to Sequences, Series and Improper Integrals, Holden-Dey, Inc., San Francisco, California.
11. Earl D. Rainville, Infinite Series, The Macmillan Company, New York.
12. Chandrika Prasad, Text Book on Algebra and Theory of Equations, Pothishala Pvt. Ltd., Allahabad.
13. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
14. Shanti Narayan, A Course of Mathematical Analysis, S.Chand and Company, New Delhi.

**B.A. Part-II**  
**Paper-II**  
**DIFFERENTIAL EQUATIONS**

- UNIT-I Series solutions of differential equations- Power series method, Bessel and Legendre functions and their properties-convergence, recurrence and generating relations, Orthogonality of functions, Sturm-Liouville problem, Orthogonality of eigen-functions, Reality of eigen values, Orthogonality of Bessel functions and Legendre polynomials.
- UNIT-II Laplace Transformation- Linearity of the Laplace transformation, Existence theorem for Laplace transforms, Laplace transforms of derivatives and integrals, Shifting theorems. Differentiation and integration of transforms. Convolution theorem. Solution of integral equations and systems of differential equations using the Laplace transformation.
- UNIT-III Partial differential equations of the first order. Lagrange's solution, Some special types of equations which can be solved easily by methods other than the general method, Charpit's general method of solution.
- UNIT-IV Partial differential equations of second and higher orders, Classification of linear partial differential equations of second order, Homogeneous and non-homogeneous equations with constant coefficients, Partial differential equations reducible to equations with constant coefficients, Monge's methods.
- UNIT-V Calculus of Variations- Variational problems with fixed boundaries- Euler's equation for functionals containing first order derivative and one independent variable, Extremals, Functionals dependent on higher order derivatives, Functionals dependent on more than one independent variable, Variational problems in parametric form, invariance of Euler's equation under coordinates transformation.
- Variational Problems with Moving Boundaries- Functionals dependent on one and two functions, One sided variations.
- Sufficient conditions for an Extremum- Jacobi and Legendre conditions, Second Variation. Variational principle of least action.

**REFERENCES :**

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, Inc., New York, 1999.
2. D.A. Murray, Introductory Course on Differential Equations, Orient Longman, (India), 1967.
3. A.R. Forsyth, A Treatise on Differential Equations, Macmillan and Co. Ltd., London.
4. Lan N. Sneddon, Elements of Partial Differential Equations, McGraw-Hill Book Company, 1988.
5. Francis B. Hilderbrand, Advanced Calculus for Applications, Prentice Hall of India Pvt. Ltd., New Delhi, 1977.
6. Jane Cronin, Differential equations, Marcel Dekkar, 1994.
7. Frank Ayres, Theory and Problems of Differential Equations, McGraw-Hill Book Company, 1972.
8. Richard Bronson, Theory and Problems of Differential Equations, McGraw-Hill, Inc., 1973.
9. A.S. Gupta, Calculus of variations with-Applications, Prentice-Hall of India, 1997.
10. R. Courant and D. Hilbert, Methods of Mathematical Physics, Vols. I & II, Wiley-Interscience, 1953.
11. I.M. Gelfand and S.V. Fomin, Calculus of Variations, Prentice-Hill, Englewood Cliffs (New Jersey), 1963.
12. A.M. Arthurs, Complementary Variational Principles, Clarendon Press, Oxford, 1970.
13. V. Kornkov, Variational Principles of Continuum Mechanics with Engineering Applications, Vol. I, Reidel Publ. : Dordrecht, Holland, 1985.
14. T. Oden and J.N. Reddy, Variational Methods in Theoretical Mechanics, Springer-Verlag, 1976.



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**B.A. Part-II**  
**Paper-III**  
**MECHANICS**

**STATICS**

UNIT-I Analytical conditions of Equilibrium, Stable and unstable equilibrium. Virtual work, Catenary.

UNIT-II Forces in three dimensions, Poinsot's central axis, Null lines and planes.

**DYNAMICS**

UNIT-III Simple harmonic motion. Elastic strings. Velocities and accelerations along radial and transverse directions, Projectile, Central orbits.

UNIT-IV Kepler's laws of motion, velocities and acceleration in tangential and normal directions, motion on smooth and rough plane curves.

UNIT-V Motion in a resisting medium, motion of particles of varying mass, motion of a particle in three dimensions, acceleration in terms of different co-ordinate systems.

**REFERENCES :**

1. S.L. Loney, Statics, Macmillan and Company, London.
2. R.S. Verma, A Text Book on Statics, Pothishala Pvt. Ltd., Allahabad.
3. S.L. Loney, An Elementary Treatise on the Dynamics of a particle and of rigid bodies, Cambridge University Press, 1956.



## **B.A./B.Sc. – Second Year**

**Session : 2019-20**


Name of the Subject :- Anthropology  
Paper :- First  
Name of the Paper :- ARCHAEOLOGICAL ANTHROPOLOGY

Total Marks : 50

Pass Marks : 17

### **Syllabus**

- UNIT – I Meaning and scope of Archaeological Anthropology, branches of Archaeology: Classical Archaeology, Historical Archaeology, Prehistoric Archaeology and Protohistoric Archaeology. Anthropology as Archaeology. Differences between the Old world and new world Archaeological Traditions. Absolute and Relative Dating.
- UNIT – II Geological time scale. The Great Ice Age  
Stratigraphy and other evidences of Ice Age: River terraces. Moraines etc. Pluvial and interpluvials  
Stone Age tools: Types and Technology.
- UNIT – III Age of Paleolithic savagery:  
European lower Paleolithic period: Stone tools and cultures  
Indian lower Paleolithic period: Sohan Culture & Madrasian Culture.  
European Middle Paleolithic Period: Tools & culture; Flake tool complex in India  
European Upper Paleolithic period; Tools and Culture, main characteristics of the European Paleolithic Home and Cave art and its significance.
- UNIT – IV Mesolithic complex in North Europe. Mesolithic complex in Western Europe, Mesolithic Culture in India. Chief feature of Neolithic revolution. Neolithic complex in India.
- UNIT – V Metal Age: Copper, Bronze and Iron Age  
Urban revolution: General Features  
Indus valley civilization: Main Features, Town Planning, Economic activities, origin and decay

  
20/06/19



## **B.A. /B.Sc. – Second Year**

**Session: 2019-20**

Name of the Subject :- Anthropology  
Paper :- Second  
Name of the Paper :- TRIBAL CULTURE OF INDIA  
Total Marks : 50

Pass Marks : 17

### **Syllabus**

- UNIT-I** Define tribe and scheduled tribe. Geographical distribution of Indian tribes and their racial and linguistic classification. Contribution of Anthropology in the study of Indian tribes.  
Sacred complex, Universalisation and parochialisation, Sanskritisation, westernization, dominant caste.  
Tribes and caste, Difference between S.C. and S.T.  
Particularly Vulnerable Tribes Group (PVTG) of Chhattisgarh (Kamar, Birhor, Hill Korwa, Abujmariya, Baiga)
- UNIT-II** Primitive economy:-  
Stages of tribal economy: Hunting, food gathering, fishing, shifting and settled agriculture.  
Concept of Property and ownership in tribal societies  
Problems of tribal people: land alienation, bonded labour, indebtedness, shifting cultivation, irrigation, Unemployment, agricultural labour; Forest and Tribals  
New economic anthropology: Exchange- Gifts, barter, trade, ceremonial exchange and market economy
- UNIT-III** The problems of culture contact: Problems due to urbanization and industrialization, Regionalism  
Tribal religion: origin & function, animism, totemism.  
Concept and practices of Magic and witchcraft, shamanism, head hunting.
- UNIT-IV** Political organisation of Indian tribes: Distinction between state and stateless society, law in primitive society  
Social organization of Indian Tribes: Matriarchal and patriarchal family,. Lineage and clan, Ways of acquiring mates in tribal societies.  
Youth dormitories: Type, organisation and functions.
- UNIT-V** Tribal development: History of tribal development, the constitutional safeguards for the scheduled tribes.  
Tribal problem: isolation, migration, acculturation, detribalization.  
Policies, plans and programmes of tribal development and their implementation. Tribal revolts in India.  
Contributions of anthropology to tribal development.  
Response of the tribal people for development programs of government and NGO

*Sumit*  
20/06/19

Recommended Readings:

1. Chaudhary, Bhudadeb (Ed.). Tribal Development in India.
2. Elwin, V.A. Philosophy for NEFA.
3. Haimendorf. The Tribes of India: Struggle for survival.
4. Shara B.D. Basic Issues in tribal Development.

Singh  
20/06/19

## **B.A./B.Sc. – Second Year**

**Session : 2019-20**

Name of the Subject :- Anthropology  
Paper :- Practical  
Name of the Paper :- MATERIAL CULTURE AND RESEARCH TOOLS

Total Marks : 50


Pass Marks : 17

### **OBJECTIVES :**

The objective of this practical course is to introduce the student with the primitive material culture and technology used by primitive man and the student will be introduced with various techniques commonly used by social Anthropology.

### **MATERIAL CULTURE :**

- Part – I. Identification and technological descriptions of the following.
1. Implements for food gathering, hunting, fishing and agriculture
  2. Fire making implements
  3. Types of habitations
  4. Land and water transport
- Part-II Sketching, identification and the description of Paleolithic, Mesolithic and Neolithic tools
- ( It is essential that students should draw at least five tools of each age )
- Part- III Construction of schedule, Geneology and Questionnaire
- Each student should collect information through above tools from 10 Respondents.
- The Student will be required to maintain practical records of all work done in the practical class.

  
20/06/19

पाठ्यक्रम उर्दू अदब  
बी.ए. भाग – 2

नोट— इस इस्तेमाल में दो पर्चे होंगे । हर पर्चा 75 का होगा ।

1. नस
2. शायरी

पहला पर्चा नस  
(पेपर कोड – 0199)  
(खत निगारी, तन्जोमिजाह, तन्कीद)

निसाब :

खत निगारी:

1. खुतूते गालिब : ऊर्दूए मोअल्ला और ऊदे हिन्दी से तीन खत
- 2- खुतूते मेहदी इफादी : सहीकए मुहब्बत से तीन खते
3. मुतूते अबुल कलाम आजाद : गुबारे खातिर से तीन खते

तन्जो पिजाह:

1. खाजो का किरदार : फसानए आजाद से अज पं. रतननाथ सरशार
2. औरत जात से : अज मुल्ला रमूजी
3. गफूर मियां से इफतेताब : तखल्लूस भोपाल
4. हिमाकते : शफीरकुरेहयान

तककीद :

1. मजमून अज शिब्लि मजस्माने शिब्लि
2. गालिब शख्सो शायर से : मंजूर गौरखपूरी
3. इकबाल की अजमत : आले अहमद सुरूर
4. चकबस्त बहैहियत पयोम्बरे दौरे जदीद : अहतेशाम हुसैन
5. कसीदे सिन्फे सूखुन की हैसियत से : ऊर्दू में कसीदा निगारी से डॉ. अबु मुहम्मद सहर

इकाईयां:

पहली इकाई : शामिले निसाब अफनाफ पर सवालात	नं. 15
दुसरी इकाई : खत निमारों पर तनकीदी सवालात	नं. 15
तीसरी इकाई : तन्जो मिजाह निगारों पर सवालात	नं. 15
चौथी इकाई : तन्कीद निगारों पर सवालात	नं. 15
पांचवी इकाई : शामिले निसाब खुतुत और तन्कीदी गमामी के इक्बेबासात की तशरीह	नं. 15

निसाब उर्दू अदब  
पर्चा- 2 (शामरी)  
(पेपर कोड - 0200)  
(मसनवियात ब - मन्जूमात)

नं. : 75

निसाब :

मसनवियात :

1. आदबी नामा : अज नजीर अकबर आबादी
2. बरसात की बहारे : अज नजीर अकबर आबादी
3. चुण की दाद : अज अल्ताफ हुसैन हाली
4. हुब्बे वतन : अज अल्तास हुसैन हाली
5. रामायण का एक सीन : अज बृजमोहन चकबस्त
6. जिब्रील और इब्लीस : डॉ. इकबाल
7. शुभाए उम्मीद : डॉ. इकबाल
8. अल्बेली सुबह : जोश मलीहाबादी
9. तन्हाई : फैज अहमद उल ईमान
10. आवारा : मजाज लखनवी
11. चांद तारो का बन : मखदमू मुहीउद्दीन
12. सुबहे परदा : सरदार जाफरी

इकाईयां :

इकाई

1. शामिले निसाब असनाफ पर सवालात नं. 15
2. मसनबी निगारो पर सवालात नं. 15
3. नज्म निगारों पर सवालात और मन्जूमात का खुलासा या जायजा नं. 15
4. तशरीह मसनवियात से नं. 15
5. तशरीह मन्जूमात नं. 15

गृह विज्ञान  
प्रश्न पत्र - 1  
तंतु एवं वस्त्र विज्ञान  
(पेपर कोड - 0191)

इस परीक्षा में दो प्रश्न पत्र होंगे । जिसमें से प्रत्येक तीन घंटे की अवधि तथा 50 अंकों का होगा । एक प्रायोगिक परीक्षा 50 अंकों की होगी । जिसमें से 10 अंक सत्रीय कार्य के लिये सुरक्षित रहेंगे । कुल अंक 150 होंगे । परीक्षार्थियों को लिखित एवं प्रायोगिक परीक्षा में पृथक-पृथक उत्तीर्ण होना अनिवार्य -

- इकाई - 1 तंतु विज्ञान का परिचय - तंतुओं का वर्गीकरण, विशेषतायें, भौतिक एवं रासायनिक परीक्षण ।  
वस्त्र बुनाई (Weaver) : के प्रकार - सादी ट्विल सेटिन जैकार्ड, पाइल ।  
इकाई - 2 आधारभूत परिसज्जाएँ, विशेष पिसज्जाएँ । रंगों का वर्गीकरण एवं विभिन्न तंतुओं के लिये उनकी उपयुक्तता ।  
इकाई - 3 छपाई-प्रकार, ब्लाक, स्टेन्सिल, स्क्रीन, डिस्चार्ज रोलर । प्रत्येक प्रकार की छपाई की विधियाँ । टाई एंड डाई-विशेषता, विधि ।  
इकाई - 4 धुलाई : जल, साबुन, शुष्क धुलाई, कलफ तथा नील । धब्बे छुड़ाना, विभिन्न प्रकार के वस्त्र धोना ।  
इकाई - 5 परिधान - परिधान एवं व्यक्तित्व, परिधान का चुनाव, ड्रापिंग की विधि, सीवर (प्रकार) परिधान में पूर्णता (डार्ट, प्लीट्स, टक्स, गोदर्स) प्लैक्ट ओपनिंग, फासनर ।

स्वीकृत पुस्तकें -

1. वस्त्र विज्ञान एवं परिधान : छॉ. प्रमिला
2. वस्त्र विज्ञान के मूल सिद्धांत : डॉ. जी.पी. शैरी
3. हाउसहोल्ड फिसिक्स : डॉ. कुल श्रेष्ठ
4. गृह व्यवस्था एवं गृह सज्जा : श्रीमती के. बक्शी
5. गृह व्यवस्था एवं गृह सज्जा : चन्द्रकांता मांडलिक
6. गृह व्यवस्था एवं गृह कला : जी.पी. शैरी
7. गृह व्यवस्था एवं गृह कला : श्रीमति कांति पांडेय
8. पारिवारिक परिधान एवं व्यवस्था - मंजु पाटनी व सपना हेनरी
9. गृह व्यवस्था : छॉ. करुणा शर्मा

RJ  
13/6/19  
Rough  
13/6/19  
A. Singh  
13.06.19

**गृह विज्ञान**  
**प्रश्न पत्र - 2**  
**पारिवारिक संसाधन प्रबंधन**  
**(पेपर कोड - 0192)**

पूर्णांक - 50

- इकाई - 1** गृह प्रबंध : गृह प्रबंध की परिभाषा, गृह प्रबंध प्रक्रिया, परिवार में गृहणी के कर्तव्य एवं उत्तरदायित्व - मूल्य, लक्ष्य स्तर-अर्थ विशेषता वर्गीकरण एवं विकाय, निर्णय प्रक्रिया।
- इकाई -2** गृह सज्जा : कला के सिद्धांत एवं कला के तत्व । नमूना-रचनात्मक एवं अलंकारमय नमूना, नमूने के सिद्धांत।  
रंग-रंग के महत्व एवं प्रभाव, फर्नीचर का चुनाव एवं महत्व, गृह सज्जा के उपसाधन । पुष्प सज्जा, प्रकार सिद्धांत, उपयोग।
- इकाई - 3** पारिवारिक साधन : पारिवारिक साधन, वर्गीकरण, विशेषतायें, उपयोग को प्रभावित करने वाले तत्व, समय-अवधारणा, समय, व्यवस्थापन के साधन । समय व्यवस्थापन की प्रक्रिया ।  
शक्ति- अवधारणा, विभिन्न घेरलू कार्यों में शक्ति व्यवस्थापन की प्रक्रिया ।  
आय के साधन एवं प्रकार, पारिवारिक बजट, व्यय बचत, रहन सहन का स्तर , आय व्यय का लेखा जोखा (एकाउंट कीपिंग)
- इकाई - 4** रसोई घर : आधुनिक रसोई घर, प्रकार, रसोई-घर के कार्यक्षेत्र, ईंधन के गैर परम्परागत स्रोत, सौर ऊर्जा, जल वितरण प्रणाली, वायुबीजन, प्रकाश की व्यवस्था, संग्रह व्यवस्था।
- इकाई - 5** कार्य का सरलीकरण - अर्थ, कार्य, विधियां एवं आदतों में सुधार की तकनीक, प्रोसेस चार्ट, पाथवे चार्ट, परिवर्तन की श्रेणियां । समय शक्ति एवं श्रम बचत के उपकरण।

**प्रायोगिक कार्य :**

1. सिलाई - ब्लारुज, बेबी फ्राक, झबला, बाबा सूट, पंजाबी कुरता, सलवार, पेटीकोट, पुष्प सज्जा।
2. धुलाई- विभिन्न वस्त्रों की धुलाई, धब्बे छुड़ाना, बांधनी का कार्य ।
3. पुष्प सज्जा।

**अंक वितरण -**

सत्रीय : 10  
सिलाई : 20  
धुलाई : 15 (धुलाई कार्य, बांधनी - 10 , धब्बा छुड़ाना 5)  
पुष्प सज्जा : 5

**स्वीकृत पुस्तकें :**

- |                                   |   |                          |
|-----------------------------------|---|--------------------------|
| 1. वस्त्र विज्ञान एवं परिधान      | : | डॉ. प्रमिला              |
| 2. वस्त्र विज्ञान के मूल सिद्धांत | : | डॉ. जी.पी. शैरी          |
| 3. हाउसहोल्ड फिजिक्स              | : | डॉ. कुलश्रेष्ठ           |
| 4. प्रारंभिक कृषि विज्ञान         | : | राजेन्द्र प्रसाद         |
| 5. उद्यान विज्ञान                 | : | डॉ. एस.एस. श्रीवास्तव    |
| 6. गृह व्यवस्था एवं गृह सज्जा     | : | श्रीमती के. बक्शी        |
| 7. गृह व्यवस्था एवं गृह सज्जा     | : | चन्द्रकांता मांडलिक      |
| 8. गृह व्यवस्था एवं गृह कला       | : | जी.पी. शैरी              |
| 9. गृह व्यवस्था एवं गृह कला       | : | श्रीमति कांति पांडेय     |
| 10. कृषि विज्ञान                  | : | कृपाल सिंह भिंडर         |
| 11. उद्यान शास्त्र                | : | बसंत इंगाले              |
| 12. पारिवारिक परिधान एवं व्यवस्था | : | मंजु पाटनी व सपना हेनरी। |

  
Rough 13/6/19 ASHGO/13.06.19

**DEFENCE-STUDIES**  
**PAPER - I**  
**WESTERN MILITARY HISTORY**  
**(Paper Code-0214)**

**Note :** The aim of this paper is to give a historical, political & social back ground of the state engaged in the conflicts under study and the factors influencing the development of different forms of warfare and weapons system.

**Note :** Question will be set from each unit there will be only Internal choice.

**UNIT-I Age of Valour**

1. Military System of Greek; Tactics of Phalanx.
2. Alexander the Great and his reforms.
3. Military system of Roman; Tactics of Legion, Jullius Caesar.
4. Battle of Arbela 311 B.C.
5. Battle of cannae 216 B.C.

**UNIT-II Age of chivalry**

1. Emergence and decline of cavalry.
2. Battle of Adrianopole 378 A.D.
3. Battle of Hastings 1066 A.D.
4. Cavalry tactics of Zenghiz Khan.
5. Battle of Cracee 1346 A.D.

**UNIT-III Age of Gun Powder & Steam**

1. Impact of Gun Powder in war.
2. Contribution of Gustavas adolphus & Fredrik the Great.
3. The Revolution in tactics - Causes of war of american Independence 1775-83.
4. The Revolution in tactics - Causes of French Revolution.
5. Nepoleanic art of warfare and his military reforms.

**UNIT-IV World War - I & II**

1. First World War - Causes of W.W., Policies and Strategic plans of the powers.
2. Role of Air Force with reference to theory of Douhet.
3. Role of Navy with reference of theory of Mahan.
4. Second World War - Causes of W.W., Objective and Strategy of Allied and Axis forces.
5. Personalities of Rommel.



#### **UNIT-V World War - II**

1. Armament and Mechanical warfare with reference to the theories of J.F.C. Fuller and Liddell Hart.
2. Role of air power, weapons, doctrines, tactics.
3. Role of naval power, weapons, doctrine tactics.
4. Tactics of Second World War.
5. Advent of Nuclear weapons and their impact on warfare.

#### **SELECTED READING :**

1. Harkabi Y. : Nuclear war and Nuclear peace
2. Earl E.M. : Makers of Modern strategy.

**DEFENCE STUDIES**  
**PAPER-II**  
**THEORY AND PRACTICE OF WAR**  
**(Paper Code-0215)**

**Aim :** The aim of this paper is to acquaint the students with the concepts of theory and practice of war.

**Note :** Questions will be set from each unit and there will be only internal choice.

- UNIT-I**
1. Sun Tzu - Founder of Military Theory and philosophy.
  2. Clausewitz - War and its relationship with politics.
  3. Machiavelli - Renaissance of Art of war.
  4. Jomini - Concept of mass armies.

- UNIT-II**
1. Churchill.
  2. Mahatma Gandhi.
  3. Kautilya.
  4. A. Hitler.

- UNIT-III**
1. Mao Tse Tung.
  2. Che Guevara.
  3. Economic and Psychological war.
  4. Collective Security.

- UNIT-IV**
1. Indo-China War - 1962 Causes of war, political & military lesson.
  2. Indo - Pak War - 1965 Causes of war, political & military lesson.
  3. Indo - Pak War - 1971 Causes of war, political & military lesson.
  4. Kargil Conflict.

- UNIT-V**
1. Internal & External threats of National Security.
  2. Insurgency and Counter-Insurgency.
  3. Terrorism-Problem and Solution.
  4. Naxalism - Problem and solution.

**REFERENCE BOOKS :**

1. Howard M. : Theory and Practice of war
2. ---,--- : Clausewitz
3. Mao Tse Tung : Guerilla warfare
4. Palit, D.k. : The lightning War Tadit Yudh
5. Manekar : War of 1971
6. आर .सी. जाहरी : पाश्चात्य सैन्य विचारक
7. शर्मा व निगम : सैन्य विचारक

## **DEFENCE STUDIES**

### **PRACTICAL**

There shall be a practical examination of 3.5 hours duration carrying 50 Marks. The division of marks shall be as follow :

- |                                     |           |
|-------------------------------------|-----------|
| (a) Exercise based on Map-reading : | 15 marks  |
| (b) T.W.E.S.T. :                    | 15 marks  |
| (c) Sessional work :                | 10 marks  |
| (d) Viva-Voce :                     | 10 markss |

#### **PART - A**

##### **Map-reading :**

1. Scales - Definition, method of expressing, construction of simple, time, diagonal and comparative.
2. Relief and its representation.
3. Slopes and Gradient.
4. Visibility and inter-visibility by Gradient, proportionate and section method.
5. Re-section and inter-section.
6. Grid system-Map reference, Index to map. Four figure and Six figure.

#### **PART - B**

7. Organisation and equipment of infantry Platoon and Section.
8. Section Formation.
9. Indication of Target by various methods.
10. Fire control order.
11. Patrols.
12. Battle Procedures (ROFT).
13. Verbal Order.
14. Message-Writing.

#### **BOOKS RECOMMENDED :**

- 1- Manual of Map Reading : London Her
- 2- युद्ध स्थल कला : चौ. नरेन्द्र सिंह
- 3- एन. सी. सी. परिचय — विष्णु कान्त शर्मा

**MANAGEMENT**  
**PAPER - I**  
**MANAGEMENT STUDIES : PERSONNEL MANAGEMENT**  
**(Paper Code-0206)**

**Max. Marks: 75**

**UNIT-I** Evolution of the personnel function:

1. Various concepts of labour.
2. Old and new definitions of personnel management.
3. Development of personnel management in India.
4. Organisation & function of the personnel division.
5. Personnel Management as a co-ordinating function.
6. Personnel Policies.

**UNIT -II Procurement :**

1. Job analysis & Man power requirements.
2. Recruitment and Hiring.
3. Test and interviews.
4. Executive manpower planning.

**UNIT - III Development:**

1. Training operative Personnel
2. Executive Development.
3. Advancement through promotion
4. Performance appraisal.

**UNIT - IV Compensation:**

1. Base compensation for the job.
2. Incentive compensation for the man.
3. Supplementary Compensation for the group.

**UNIT - V Integration:**

1. Man in business organisation.
2. Motivation.
3. Man in conflict.
4. Human relations.
5. Collective bargaining.

**UNIT - VI Maintenance:**

1. Safety and Health.
2. Employees service programme.
3. Personnel research.



**BOOKS RECOMMENDED:**

1. Scott. Clothier&Spriegal : Personnel Management
2. Pigores&Myers : Personnel Administration
3. YoderDale : Personnel Management and IndustrialRelations
4. Flippo,Edwin : Principles of Management
5. Maroria, C.B. : Personnel Management
6. Ahuja,K.K. : Personnel Management
7. Dayat : Management Training Organisation.
8. Dinesh,K.N. : Structure of Medium Scale Industries inBhilai.

Handwritten signatures and initials in blue ink, including a long horizontal signature on the left, a stylized signature in the center, and a small 'M' on the right.

## MANAGEMENT

### PAPER - II

### STATISTICS

**Max. Marks : 75**

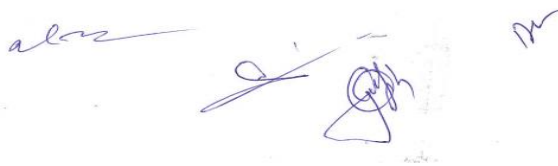
**(Paper Code-0207)**

- UNIT-I** Meaning definition, origin and growth of statistics importance, limitations and function of statistics collection of data primary data and methods of collections samples and its types.
- UNIT-II** Measure central tendency, mean, Median, mode, Quartiles, Deciles and Percentiles, Merits & Demerits of different measures, Methods of calculation.
- UNIT-III** Measures of dispersion- Mean deviation standard deviation its merits and demerits Methods of calculation. Coefficient of variation.
- UNIT-IV** Correlation : Meaning, Kari Pearson's Coefficient of correlation, Direct and shortcut methods of calculation. Regression Equation & its Co-efficient.
- UNIT-V** Index numbers and growth of statistics, Types of Index numbers and construction of index numbers. Population Statistics Statistical agencies central & state agencies, National sample survey.

#### BOOKS RECOMMENDED:

- |   |               |   |                            |
|---|---------------|---|----------------------------|
| 1 | Ethance       | : | Fundamental of Statistics. |
| 2 | S.P.Gupta     | : | Statistics                 |
| 3 | K.C. Nagar    | : | सांख्यिकी के मूल तत्व      |
| 4 | Shukla&Sahani | : | सांख्यिकी                  |

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## **EDUCATION**

There shall be two theory paper, each carrying 60 marks and Three hours duration and Viva-voce examination of 30 marks. The Viva-voce examination will be based on two theory papers. It will be for both regular and private candidates. There will be an internal choice in question.

## **INSURANCE PRINCIPLES & PRACTICE**

### **PAPER- I**

### **FIRE AND MARINE INSURANCE M.M. : 50**

#### **(Paper Code-0193)**

#### **UNIT -I FIRE INSURANCE CONTRACT:**

Origin of fire insurance its nature, risks, hazards and indemnity; Legal basis; Stipulation and conditions; contracts; Full disclosure of material facts; Inspection and termination of coverage.

#### **UNIT -II FIRE INSURANCE POLICIES :**

Issue and renewal of policies; Different kinds; Risks covered; recovery of claims-insurer's option : Ex-gratia payment and subrogation. policy conditions; Hazards not covered, contribution and average; Reinsurance. double insurance and excess insurance. Types of fire protection policies issued by the General Insurance corporation of India.

#### **UNIT -III MARINE INSURANCE CONTRACT :**

Origin and growth; History of lloyds; Evaluation of Marine insurance business in India. Basic elements Insurable interest Utmost Good Faith Implied warranties: Policy document.

**UNIT-IV** Types of marine insurance contract-freight, Cargo and vessel. Procedure for obtaining marine protection policy; Marine policies and conditions. Nature of coastal marine insurance; Perils covered, protection available; Procedure for preparation, and presentation of claim; Payment of compensation by insurer.

#### **UNIT -V MARINE LOSSES**

Total loss, Partial loss, particular average loss and general average loss; Preparation of loss statement, Payment of Marine losses-requirement of the insured documents needed procedure for presentation of claim; Valuation of loss salvage; limits of liability; Attachment and termination of risk.

**INSURANCE PRINCIPLES & PRACTICE**  
**PAPER - II**  
**INSURANCE FINANCE & LEGISLATION**  
**(Paper Code-0194)**

**UNIT - I INTRODUCTION :**

Laws of probability; Forecast of future events; Construction of mortality tables; Mortality tables for annuities.

**UNIT - II PREMIUM DETERMINATION :**

Basic factors; Use of mortality tables in premium determination; Interest, compound interest functions. Net and gross premium: Mode and periodicity of premium payment; Mode of claim payment; benefits to be provided; Mode of loading for expenses.

**UNIT - III Gross premium-general considerations, insurer's expenses; Margin adjusting;**

Premium for term insurance; Temporary insurance; Endowment insurance; Level and natural premium plan; Premium calculation for study of actuarial valuation.

**UNIT - IV RESERVES AND SURPLUS :**

Nature, origin and importance of reserves and funds in life and property insurance. Retrospective and prospective reserve Computation. Statutory regulation of reserves. Nature of surrender value; concept and calculation of surrender value, reduced paid up values; Settlement options; Automatic premium loan. Nature and Sources of insurance surplus; special form of surplus; Distribution of surpluses-extra dividend, residuary dividend; Investments of surplus and reserves-basic principles.

Investment policy of L.I.C. and GIC in India.

**UNIT - V LEGISLATION :**

A-Brief study of Indian Insurance Act, 1938.

Detailed study of Life Insurance Corporation of India.

Act, 1956, General Insurance Corporation of India.

Act, 1976, Export Credit and Guarantee Corporation Act.

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**FUNCTIONAL ENGLISH**

**PAPER - I**

**Mark: 50**

**(Paper Code-0208)**

<b>UNIT - I</b>	(i)	Nouns, Gender, Number,	15
	(ii)	Modal Verbs and Auxiliaries.	
	(iii)	Synonyms and Antonyms	
<b>UNIT - II</b>	(i)	Active and Passive Voice.	15
	(ii)	Direct and Indirect Speech.	
	(iii)	Sentence Connectors.	
<b>UNIT - III</b>	(i)	Transformation of Sentences	10
	(ii)	Errors in Individual Sentences.	
<b>UNIT - IV</b>	(i)	Idioms and phrases.	
	(ii)	Use of Foreign words in English.	

**FUNCTIONAL ENGLISH**

**PAPER - II**

**Mark:50**

**(Paper Code-0209)**

- (i) Precis writing
- (i) Report writing
- (i) Expansion of Ideas.
- (iv) Drafting Telegrams.
- (v) Letter-Writing (Personal, Business, General)
- (vi) English in Situations :-
  - (a) Greetings.
  - (b) Buying a Dress.
  - (c) Making a Telephone call.
  - (d) In the Post office.
  - (e) At the Doctor's
  - (f) At the Restaurant.
  - (g) At the Chemist.
  - (h) Booking a room At a Hotel.
  - (i) At the Airport.
  - (j) At the Bank
  - (k) At the Book Shop.
  - (l) In the Library.
  - (m) Receiving and Seeing off a Guest.

Dr. M. Chakrabarty

Dr. S. Ghosh

DR. MERILY ROY

## B.A. II<sup>nd</sup> Year

### HISTORY OF INDIAN PAINTING

Marks : 50

(Paper Code-0219)

SESSION – 2019-20

- (1) The time of theory paper is three hours.

pre-historic to Middle age.

**\* Pre-Historic Painting :**

Mirjapur - (U.P.)  
Shinghanpur - (M.P.)  
Housangabad - (M.P.)  
Vimbatka - (M.P.)

**\* Proto Historic Painting :**

Jogimara  
Bagha  
Ajanta

**\* Middle age : Rajthani Painting -**

Mewad Style Kishan garh Bundi  
Mugal Painting  
Akbar  
Jahangir  
Sahajahan

**\* Pahadi Painting :**

Basholi  
Kangda  
Chamba

**LIST OF THE BOOK RECOMENDED FOR THEORY :**

- |                                  |                          |
|----------------------------------|--------------------------|
| * Bharatiya Kala Ka Itihas       | : Shayam Bihari Aggrawal |
| * Bharatiya Chitra Kala Ka Vikas | : C.L.Jha                |
| * Kala Vilas                     | : R.A.Aggrawal           |

### PRACTICAL

There will be two practical paper evaluation will be made by the external and the internal examiner. Together and sessional marking is made by the class Teacher.

The time of each paper is four hour's and there will be a half hour's recess in between.

  
14/06/19

# PORTRAIT FROM HEAD

## PAPER – I

SESSION – 2019-20

Scheme of Examination.  
Time - Four Hour's  
Size - 1/2 Imp. paper  
Medium - Pencil or pastel

Total Mark - 50  
Examination-40  
Sessional - 10

**Class work-** Minimum work to be submitted Five painting size 1/2 Imp Paper portrait from plaster or cement head will be drawn with light and shadow.

# COMPOSITION

## PAPER – II

Scheme of Examination  
Time - Four hour's  
Size - 1/4 Imp Paper  
Medium - Poster colour

Total Mark -  
Examination -  
Sessional-

50  
40  
10

### Class work-

Minimum work to be submitted. Five painting size 1/4 Imp.

### Composition-

Minimum two human figure and Maximum four human figure will be composed.

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14/06/19

# हेमचंद यादव विश्वविद्यालय, दुर्ग (छ.ग.)

संशोधित पाठ्यक्रम – बी.ए. द्वितीय वर्ष के अंतर्गत

सत्र 2019 – 20

विषय – नृत्य (भरत नाट्यम)

बी.ए. भाग (2) के लिये इस विषय में प्रायोगिक और सैद्धांतिक दो भाग होंगे। प्रायोगिक 50 अंक एवं सैद्धांतिक 100 अंक का होगा। इस हेतु 50-50 अंक के दो प्रश्नपत्र होंगे। प्रत्येक वर्ष के पूर्णांक कुल मिलाकर 150 अंक के होंगे।

क्र	विवरण	पूर्णांक	उत्तीर्णांक
1	सैद्धांतिक प्रथम प्रश्न पत्र	50	17
2	सैद्धांतिक द्वितीय प्रश्न पत्र	50	17
3	प्रायोगिक	50	17
योग		150	51

सैद्धांतिक (विस्तृत पाठ्यक्रम)

सत्र 2019 – 20

प्रथम प्रश्न पत्र

शीर्षक – नृत्य का इतिहास एवं सामान्य जानकारी  
(पेपर कोड – 0220)

- नृत्य का इतिहास – 1. जैन एवं बौद्ध अभ्युदय काल 2. पूर्व मध्यकाल  
(पाणिनी काल से गुप्त काल तक नृत्य का इतिहास) 3. शुंग एवं कनिष्क काल 4. गुप्तकाल
- अभिनयभेद – आंगिक, वाचिक, आहार्य एवं सात्विक
- विभिन्न शास्त्रीय नृत्य प्रणालियाँ (संक्षिप्त परिचय) – 1. भरत नाट्यम 2. कथक 3. कथकलि 4. ओडिसी
- संगीत की व्याख्या और नृत्य का उसमें स्थान
- लोकधर्मी नाट्य परंपरा – लोकनाट्य  
संक्षिप्त जानकारी 1. जात्रा 2. तमाशा  
3. कीर्तनिया 4. डांडिया रास  
लोक नृत्य – गरबा, सरहुल

  
14/06/19

  
14/06/19

  
14/06/19

# हेमचंद यादव विश्वविद्यालय, दुर्ग (छ.ग.)

सैद्धांतिक (विस्तृत पाठ्यक्रम)

सत्र 2019 – 20

द्वितीय प्रश्न पत्र

शीर्षक – शास्त्रीय नृत्य सिद्धान्त

(पेपर कोड – 0221)

1. दक्षिण भारतीय ताल पद्धति
2. संक्षिप्त टिप्पणियाँ – 1. मंगलाचरण 2. पुष्पांजलि 3. नाट्य  
4. नृत्त 5. नृत्य
3. नृत्य कलाकार के आवश्यक गुण एवं दोष
4. भरतनाट्यम पद्धति के क्रमों (मार्गम का संक्षिप्त विवरण)  
1. अलारिपु 2. जतिस्वरम् 3. शब्दम् 4. अष्टपदी 5. पदम्
5. वरिष्ठ नृत्य कलाकार की संक्षिप्त जीवनी  
1. श्रीमती गौरी अम्मा 2. श्री मीनाक्षी सुंदरम् पिल्लई

## प्रायोगिक

1. मौखिक मुद्रा प्रदर्शन –  
(1) असंयुक्त हस्त की प्रथम पंद्रह मुद्राओं (पताक से पद्मकोष तक) का विनियोग (श्लोक सहित)  
(2) देव हस्त, (3) बंधु – बांधव हस्त
2. कार्यक्रम विभाग  
(1) शारीरिक अभ्यास  
(2) दस अङ्गु (अंगसंचालन चार काल में)  
(3) जतिस्तरम्  
(4) शब्दम् या श्लोकम्

  
14/06/19

  
14/06/19

  
14/06/19

# दुर्ग विश्वविद्यालय, दुर्ग (छ.ग.)



पाठ्यक्रम

परीक्षा – 2017–18

बी.एससी. भाग-3  
**B.Sc. Part-3**

(Approved by Board of Studies)  
Effective from July 2017

## **REVISED ORDINANCE NO. 21**

### **BACHELOR OF SCIENCE**

1. The three year course has been broken up into three Parts. Part-I known as B.Sc. Part-I examination at the end of the first year, Part-II known as B.Sc. Part-II examination at the end of the second year and Part-III known as B.Sc. Part-III examination at the end of the third year.
2. A candidate who after passing (10+2) Higher Secondary or Intermediate examination of C.G. Board of Secondary Education Bhopal or any other Examination recognised by the University or C.G. Board of Secondary Education as equivalent thereto, has attended a regular course of study in an affiliated College or in the Teaching Department of the University for one academic year shall be eligible for appearing at the B.Sc. Part-I examination.
3. A candidate who, after passing the B.Sc.-I examination of the University or any other examination recognised by the University as equivalent thereto, has attended a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.Sc. Part-II examination.
4. A candidate who, after passing the B.Sc. Part-I examination of the University, has completed a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.Sc. Part-III examination.
5. Besides regular students, subject to their compliance with this Ordinance ex-student and non-collegiate candidates shall be permitted to offer only such subjects/papers as are taught to the regular student at any of the University Teaching Department or College.
6. Every candidate appearing in B.Sc. Part-I, Part-II and Part-III examination shall be examined in-
  - (i) Foundation Course:
  - (ii) Any one of the following combinations of three subjects:-
    1. Physics, Chemistry & Mathematics.
    2. Chemistry, Botany & Zoology.
    3. Chemistry, Physics & Geology.
    4. Chemistry, Botany & Geology.
    5. Chemistry, Zoology & Geology.
    6. Geology, Physics & Mathematics.
    7. Chemistry, Mathematics & Geology.
    8. Chemistry, Botany & Defence Studies.
    9. Chemistry, Zoology & Defence Studies.
    10. Physics, Mathematics & Defence Studies.
    11. Chemistry, Geology & Defence Studies.
    12. Physics, Mathematics & Statistics.
    13. Physics, Chemistry & Statistics.
    14. Chemistry, Mathematics & Statistics.
    15. Chemistry, Zoology & Anthropology.
    16. Chemistry, Botany & Anthropology.
    17. Chemistry, Geology & Anthropology.
    18. Chemistry, Mathematics & Statistics.

19. Chemistry, Anthropology & Defence Studies.
20. Geology, Mathematics & Statistics.
21. Mathematics, Defence Studies & Statistics
22. Anthropology, Mathematics & Statistics
23. Chemistry, Anthropology & Applied Statistics
24. Zoology, Botany & Anthropology
25. Physics, Mathematics & Electronics.
26. Physics, Mathematics & Computer Application
27. Chemistry, Mathematics & Computer Application
28. Chemistry, Bio-Chemistry & Pharmacy
29. Chemistry, Zoology & Fisheries.
30. Chemistry, Zoology & Agriculture
31. Chemistry, Zoology & Sericulture
32. Chemistry, Botany & Environmental Biology
33. Chemistry, Botany & Microbiology
34. Chemistry, Zoology & Microbiology
35. Chemistry, Industrial Chemistry & Mathematics
36. Chemistry, Industrial Chemistry & Zoology
37. Chemistry, Biochemistry, Botany
38. Chemistry, Biochemistry, Zoology
39. Chemistry, Biochemistry, Microbiology
40. Chemistry, Biotechnology, Botany
41. Chemistry, Biotechnology, Zoology
42. Geology, Chemistry & Geography
43. Geology, Mathematics & Geography
44. Mathematics, Physics & Geography
45. Chemistry, Botany & Geography

(iii) Practical in case prescribed for core subjects.

7. Any candidate who has passed the B.Sc. examination of the University shall be allowed to present himself for examination in any of the additional subjects prescribed for the B.Sc. examination and not taken by him at the degree examination. Such candidate will have to first appear and pass the B.Sc. Part-I examination in the subjects which he proposes to offer and then the B.Sc. Part-II and Part-III examination in the same subject. Successful candidates will be given a certificate to that effect.
8. In order to pass at any part of the three year degree course examination an examinee must obtain not less than 33% of the total marks in each subject/ group of subjects. In subject/ group of subjects where both theory and practical examination are provided an examinee must pass in both theory and practical parts of the examination separately.
9. Candidate will have to pass separately at the Part-I, Part-II and Part-III examinations. No division shall be assigned on the result of the Part-I and Part-II examination. In determining the division of the final examination, total marks obtained by the examinees in their Part-I, Part-II and Part-III examination in the aggregate shall be taken into account. Provided in case of candidate who has passed the examination through supplementary examination having failed in one subject/ group only, the total aggregate marks being carried over for determining the division shall include actual marks obtained in the subject/ group in which he appeared at the supplementary examination.
10. Successful examinee at the Part-III examination obtaining 60% or more marks shall be placed in the First Division, those obtaining less than 60% but not less than 45% marks in the Second Division and other successful examinees in the Third Division.



## B.Sc.Part-III

### विषय-सूची

1.	Revised Ordinance No. 21	3
2.	Scheme of Examination	5
3.	Foundation Course: आधार पाठ्यक्रम	7
4.	Chemistry : रसायन शास्त्र	9
5.	Physics : (भौतिक शास्त्र)	15
6.	Mathematics	19
7.	Botany (वनस्पति शास्त्र)	26
8.	Zoology (प्राणी शास्त्र)	29
9.	Microbiology(सूक्ष्म जीव विज्ञान)	32
10.	Geology(भूविज्ञान )	35
11.	Statistics(सांख्यिकी)	38
12.	Defence Studies(रक्षा अध्ययन)	41
13.	Industrial Chemistry(औद्योगिक रसायन)	44
14.	Computer Science	48
15.	Information Technology	53
16.	Industrial Microbiology	55
17.	Electronics(इलेक्ट्रॉनिक्स)	57
18.	Anthropology (मानव विज्ञान)	60
19.	Electronic Equipment maintenance	63
20.	Biotechnology	60
21.	Biochemistry	68

### SCHEME OF EXAMINATION

Subject	Paper	Max. Mark	Total Mark	Min. Mark
(A) Compulsory Subject				
1) Hindi Language	I	75	-	26
2) English Language	I	75	-	26
(B) Three Elective Subject :				
2. Chemistry	I	33		
	II	33	100	33
	III	34		
	Practical		50	17
1. Physics	I	50		
	II	50	100	33
	Practical		50	17
3. Mathematics	I	50		
	II	50	150	50
	III	50		
4. Botany	I	50		
	II	50	100	33
	Practical		50	17
5. Zoology	I	50		
	II	50	100	33
	Practical		50	17
6. Geology	I	50		
	II	50	100	33
	Practical		50	17
7. Statistics	I	50		
	II	50	100	33
	Practical		50	17
8. Anthropology	I	50		
	II	50	100	33
	Practical		50	17
9. Inde. chemistry	I	34		
	II	33	100	33
	III	33		
	Practical		50	17

<b>Subject</b>	<b>Paper</b>	<b>Max. Marks</b>		<b>Min. Marks</b>
10. Defence Studies	I	50		
	II	50	100	33
	Practical		50	17
11. Micro Biology	I	50		
	II	50	100	33
	Practical		50	17
12. Electronics	I	50		
	II	50	100	33
	Practical		50	17
13. I.T.	I	50		
	II	50	100	33
	Practical		50	17
14. Computer Science	I	50		
	II	50	100	33
	Practical		50	17
15. Biochemistry	I	50		
	II	50	100	33
	Practical	50		

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### **USE OF CALCULATORS**

The Students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986.

1. Student will bring their own Calculators.
2. Calculators will not be provided either by the University or examination centres.
3. Calculators with, memory and following variables be permitted +, -, x, ÷, square, reciprocal, exponentials log, square root, trigonometric functions, sine, cosine, tangent etc. factorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.

**आधार पाठ्यक्रम  
हिन्दी भाषा  
(पेपर कोड – 0891)**

**प्रथम प्रश्न पत्र**

**पूर्णांक – 75**

(बी.ए., बी.एच.सी., बी.एच.एस-सी., बी.कॉम., तृतीय वर्ष के पुनरीक्षित एकीकृत आधार पाठ्यक्रम एवं पाठ्य सामग्री का संयोजन 2000-2001 से लागू है )

**।। सम्प्रेषण कौशल, हिन्दी भाषा और सामान्य ज्ञान ।।**

आधार पाठ्यक्रम की संरचना और अनिवार्य पाठ्य पुस्तकें—हिन्दी भाषा एवं समसामयिकी— का संयोजन इस तरह किया गया है कि सामान्य ज्ञान की विषय वस्तु — विकासशील देशों की समस्याओं के माध्यम और साथ-साथ हिन्दी भाषा का ज्ञान और उसमें सम्प्रेषण कौशल अर्जित किया जा सके । इसी प्रयोजन से व्याकरण की अन्तर्वस्तु को विविध विधाओं की संकलित रचनाओं और सामान्य ज्ञान की पाठ्य सामग्री के साथ अन्तर्गुम्फित किया गया है । अध्ययन अध्यापन के लिए परी पुस्तक की पाठ्य सामग्री है और अभ्यास के लिये विस्तृत प्रश्नावली है । यह प्रश्नपत्र भाषा का है अतः पाठ्य सामग्री का व्याख्यत्मक या आलोचनात्मक अध्ययन अनेक्षित नहीं है । पाठ्यक्रम और पाठ्य सामग्री का संयोजन निम्नलिखित पांच इकाईयों में किया जाता है । प्रत्येक इकाई को दो भागों में विभक्त किया गया है ।

**इकाई— 1**

1. भारत माता : सुमित्रानंद पंत, परशुराम की प्रतीज्ञा : रामधारी सिंह दिनकर, बहुत बड़ा सवाल : मोहन राकेश, संस्कृति और राष्ट्रीय एकीकरण : योगेश अटल ।
2. कथन की शैलियां : रचनागत उदाहरण और प्रयोग ।

**इकाई— 2**

1. विकासशील देशों की समस्याएँ, विकासात्मक पुनर्विचार, और प्रौद्योगिक एवं नगरीकरण ।
2. विभिन्न संरचनाएं ।

**इकाई— 3**

1. आधुनिक तकनीकी सभ्यता, पर्यावरण प्रदूषण तथा धारणीय विकास ।
2. कार्यालयीन पत्र और आलेख ।

**इकाई— 4**

1. जनसंख्या : भारत के संदर्भ में और गरीबी तथा बेरोजगारी ।
2. अनुवाद ।

**इकाई— 5**

1. उर्जा और शक्तिमानता का अर्थशास्त्र ।
2. घटानाओं , समारोहों आदि का प्रतिवेदन और विभिन्न प्रकार के निमंत्रण-पत्र ।

**मुल्यांकन योजना :** प्रत्येक इकाई से एक-एक प्रश्न पूछा जायेगा । प्रत्येक प्रश्न में आंतरिक विकल्प होगा। प्रत्येक प्रश्न के 15 अंक होंगे । प्रत्येक दो-दो खंड (क्रमशः 'क' और 'ख' में ) विभक्त है, इसलिए प्रत्येक प्रश्न के भी दो भाग, कौशल से संबद्ध प्रश्न के अंक 7 होंगे। इस प्रकार पूरे प्रश्न पत्र के पूर्णांक 75 होंगे ।



## PART - II

(Paper Code-0892)

ENGLISH LANGUAGE

M.M. 75

The question paper for B.A./B.Sc./B.Com./B.H.Sc. III Foundation course, English Language and General Answers shall comprise the following items :

Five question to be attempted, each carrying 3 marks.

<b>UNIT-I</b>	Essay type answer in about 200 words. 5 essay type question to be asked three to be attempted.	15
<b>UNIT-II</b>	Essay writing	10
<b>UNIT-III</b>	Precis writing	10
<b>UNIT-IV</b>	(a) Reading comprehension of an unseen passage	05
	(b) Vocabulary based on text	10
<b>UNIT-V</b>	Grammar Advanced Exercises	25

**Note :**

Question on unit I and IV (b) shall be asked from the prescribed text. Which will comprise of popular create writing and the following items. Minimum needs housing and transport Geo-economic profile of M.P. communication Educate and culture. Women and Worm in Empowerment Development, management of change, physical quality of life. War and human survival, the question of human social value survival, the question of human social value, new Economic Philosophy Recent Diberlialiation Method) Demoration docontralisation (with reference to 73, 74 constitutional Amendment.

**Books Prescribed:**

Aspects of English Language And Development - Published by M.P. Hindi Granth Academy, Bhopal.

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Dr. M. Chakraborty

Dr. S. Gupta

DR. MERILY ROY

## CHEMISTRY

The new curriculum will comprise of Three papers of 33,33, & 34 marks each and Practical work of 50 marks. The curriculum is to be completed in 180 working days as per the UGC norms & conforming to the directives of the Govt. of Chhattisgarh. The theory papers are of 60 hrs. each duration & the practical work of 180 hrs. duration.

### PAPER - I

(Paper Code-0895)

#### INORGANIC CHEMISTRY

M.M. 33

#### UNIT-I METAL-LIGAND BONDING IN TRANSITION METAL COMPLEXES

Limitations of valence bond theory, an elementary idea of crystal field theory, crystal field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal field parameters.

Thermodynamic and kinetic aspects of metal complexes.

A brief outline of thermodynamic stability of metal complexes and factors affecting the stability, substitution reactions of square planar complexes.

#### UNIT-II MAGNETIC PROPERTIES OF TRANSITION METAL COMPLEXES

Types of magnetic behaviour, methods of determining magnetic susceptibility, spin only formula, L-S coupling, correlation of  $\mu_s$  and  $\mu_{eff}$  values, orbital contribution to magnetic moments, application of magnetic moment data for 3d metal complexes. Electronic spectra of Transition Metal Complexes. Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, spectro-chemical series. Orgel-energy level diagram for d1 and d2 states, discussion of the electronic spectrum of complex ion.

#### UNIT-III ORGANOMETALLIC CHEMISTRY

Definition, nomenclature and classification of organo metallic compounds. Preparation, properties, bonding and applications of alkyls and aryls of Li, Al, Hg, Sn, & Ti, A brief account of metal-ethylenic complexes and homogeneous hydrogenation, mononuclear carbonyls and nature of bonding in metal carbonyls.

#### UNIT-IV BIOINORGANIC CHEMISTRY

Essential and trace elements in biological processes, metalloporphyrins with special reference to hemoglobin and myoglobin. Biological role of alkali and alkaline earth metals with special reference to  $Ca^{2+}$ , nitrogen fixation.

#### UNIT-V HARD AND SOFT ACIDS AND BASES (HSAB)

07 HRS.

Classification of acids and bases as hard and soft. Pearson's HSAB concept, acid-base strength and hardness and softness. Silanes and Silicones and Phosphazenes Silicons and phosphazenes as examples of inorganic polymers, nature of bonding in triphosphazenes.



### REFERENCE BOOKS:

1. Basic Inorganic Chemistry, F.A. Cotton, G. Wilkinson and P.L. Gaus, Wiley
2. Concise Inorganic Chemistry, J.D. Lee, ELBS.
3. Concepts of models of Inorganic Chemistry, B. Douglas, D. McDaniel and J. Alexander, John Wiley
4. Inorganic Chemistry, D.E. Shriver, P.W. Atkins and C.H. Langford, Oxford.
5. Inorganic Chemistry, W.W. Porterfield, Addison-Wesley.
6. Inorganic Chemistry, A.G. Sharp, ELBS.
7. Inorganic Chemistry, G.L. Miessler and D.A. Tarr, Prentice Hall.
8. Advanced Inorganic Chemistry, Satyas Prakash.
9. Advanced Inorganic Chemistry, Agarwal & Agarwal.
10. Advanced Inorganic Chemistry, Puri & Sharma, S. Naginchand
11. Inorganic Chemistry, Madan, S. Chand & Co.
12. Adhunik Akarbanic Rasayan, A.K. Shrivastav & P.C. Jain, Goel Pub.
13. Uchhattar Akarbanic Rasayan, Satya Prakash & G.D. Tuli, Shyamlal Prakashan
14. Uchhattar Akarbanic Rasayan, Puri & Sharma.

The image shows six handwritten signatures, each with a date '24.7.17' written below it. The signatures are in blue ink and are arranged horizontally. The first signature is 'A. B. Singh', the second is 'A. K. Singh', the third is 'B. S. Singh', the fourth is 'D. S. Singh', the fifth is 'S. P. Singh', and the sixth is 'S. Singh'.

**PAPER - II**  
**(Paper Code-0896)**

**ORGANIC CHEMISTRY**

**M.M. 33**

**UNIT-I A. ORGANOMETALLIC COMPOUNDS**

Organomagnesium compounds : Grignard reagents-formation, structure and chemical reactions. Organozinc compounds: formation and chemical reactions.

Organolithium compounds : formation and chemical reactions.

**B. Organosulphur Compounds**

Nomenclature, structural features, methods of formation and chemical reactions of thiols, thioethers, sulphonic acids, sulphonamides and sulphaguanidine.

**Organic Synthesis via Enolates**

Active methylene group alkylation of diethylmalonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate : the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate.

**UNIT-II BIOMOLECULES**

**A. Carbohydrates :**

Configuration of monosaccharides, threo and erythro diastereomers. Formation of glycosides ethers and esters Determination of ring size of monosaccharides. Cyclic structure of D(+) glucose. Structure of ribose and deoxyribose. An introduction to disaccharides (maltose, sucrose and lactose) and polysaccharides (starch and cellulose) without involving structure determination.

**B. Proteins and Nucleic acids**

Classification and structure of protein levels of protein structure, protein Denaturation / renaturation, Constituents of amino acids Ribonucleosides and ribonucleotides, double helical structure of DNA.

**UNIT-III A. Synthetic Polymers**

Addition or chain growth polymerization. Free radical vinyl polymerization, Ziegler-Natta polymerization, Condensation or Step growth polymerization, Polyesters, polyamides, phenols- formaldehyde resins, urea- formaldehyde resins, epoxy resins and polyurethanes, natural and synthetic rubbers.

The bottom of the page contains six handwritten signatures and dates, likely from examiners. From left to right: 1. Signature 'Abhinav' with date '24.7.2017'. 2. Signature 'Anshu' with date '24.7.17'. 3. Signature 'Bis' with date '24/7/17'. 4. Signature 'Dinesh' with date '24/7/17'. 5. Signature 'Sparsh' with date '24.7.17'. 6. A signature that appears to be 'K' with a date that is partially obscured but likely '24.7.17'.



## B. Synthetic Dyes

Colour and constitution (Electronic Concept). Classification of Dyes. Chemistry of dyes. Chemistry and synthesis of Methyl Orange, Congo Red, Malachite Green, Crystal Violet, Phenolphthalein, fluorescein, Alizarine and Indigo.

## UNIT-IV SPECTROSCOPY

A. **Mass spectroscopy:** mass spectrum fragmentation of functional groups.

B. **InfraRed Spectroscopy:** IR absorption Band their position and intensity, Identification of IR spectra.

C. **UV-Visible Spectroscopy:** Beer Lambert's law, effect of Conjugation max Visible spectrum and colour.

D. Anthocyanin as natural colouring matter (Introduction only)

E. Application of Mass, IR, UV-Visible Spectroscopy to organic molecules.

**UNIT-V** A. **NMR Spectroscopy:** Introduction to NMR. Shielding and Number of signal in PMR, Chemical shift and characteristic values, splitting of Signals and Coupling constant. Application to organic molecules.

B. **<sup>13</sup>CMR Spectroscopy:** Principal & Application.

C. **Magnetic Resonance Imaging (MRI)-** Introductory idea.

## REFERENCE BOOKS:

1. Organic Chemistry, Morrison and Boyd, Prentice-Hall
2. Organic Chemistry, L.G. Wade Jr., Prentice-Hall
3. Fundamentals of Organic Chemistry, Solomons, John Wiley
4. Organic Chemistry, Vol.I, II, III, S.M. Mukherjee, S.P. Singh and R.P. Kapoor, Wiley-Eastern (New-Age)
5. Organic Chemistry, F.A. Carey, McGraw Hill
6. Introduction to Organic Chemistry, Streiweisser, Heathcock and Kosover, Macmillan
7. Organic Chemistry, P.L. Soni
8. Organic Chemistry, Bahi & Bahl
9. Organic Chemistry, Joginder Singh
10. Carbanic Rasayan, Bashi & Bahi
11. Carbanic Rasayan, R.N. Singh, S.M.I. Gupta, M.M. Bakodia & S.K. Wadhwa
12. Carbanic Rasayan, Joginder Singh.
13. Carbanic Resayan, P.L., Soni.
14. Corbanic Rasayan, Bhagchandani, Sahitya Bhawan Publication.
15. Rasayan Vigyan, Bhatnagar, Arun Prakashan.



**PAPER - III**  
**(Paper Code-0897)**  
**PHYSICAL CHEMISTRY**

**M.M. 34**

**UNIT-I QUANTUM MECHANICS**

Black body radiation, Plank's radiation law, photoelectric effect, Compton effect. DeBroglie's idea of matter waves, experimental verification Heisenberg's uncertainty principle, Sinusoidal wave equation, Operators : Hamiltonian operator, angular momentum operator, laplacian operators postulate of quantum mechanics Eigen values, Eigen function. Schrodinger time indepedended wave equation physical Significance of and . Applications of Schrodinger wave equation: particle in one dimensional box Hydrogenation (separation into three equation's) radial wave function and angular wave function.

**UNIT-II QUANTUM MECHANICS-II**

Quantum mechanical approach of molecular orbit theory; basic idea criteria for forming M.O and A.O, LCAO approximation, formation of  $H^{2+}$  ion, calculation of energy levels from wave functions bonding and antibonding wave functions concept of and orbitals and their characteristics, Hybrid orbital :  $SP$ ,  $SP^2$ ,  $SP^3$ , Calculation of coefficients  $A_d^s$  used in these hybrid orbitals.

Introduction to valence bond model of  $H^2$ , Comparison of M.O. and V.B. model, Huckle theory, application of huckel theory to ethane propene etc.

**UNIT-III SPECTROSCOPY-I**

- A. Introduction, characterization of electromagenetic radiation, regions of the spectrum, representation of spectra width and intensity of spectral transition, rotational spectra of calculated diatomic molecules, energy level of rigid rotator, selection rule, determination of bond length qualitative description of non - rigid rotator isotopic effect.
- B. Vibrational spectra - Fundamental vibrational and their symmetry, vibrating diatomic molecules, enegy levels of simple harmonic oscillator. Selection Rule, Pure vibrational Spectrum, determination of force constant, diatomic vibrating operator. Anhormonic Oscillator.
- C. Raman Spectra : Concept of polarizability, quantum theory of Raman spectra stokes and anti stokes lines pure rotational and vibrational Raman spectra,

Application of Raman spectra stokes and anti stokes lines, pure rotational and vibrational Raman apectra, Applications of Raman spectra.

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## UNIT-IV SPECTROSCOPY-II

- A. Electronic Spectra: Electronic Spectra of diatomic molecule, Frank London principle, types of electronic transitions. Applications of electronic spectra.
- B. Photo-chemistry: Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry. Grothus-Draper law, Stark-Einstein law, Jablonski diagram depicting various process occurring in the excited state, qualitative description of fluorescence, occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield photosensitized reactions energy transfer processes (simple examples).

## UNIT-V A. Thermodynamics

Energy referred to absolute zero, third law of thermodynamics Test of III law of thermodynamics Nerst heat theorem application and limitation of Nerst heat theorem.

- B. Physical properties and molecular structure : polarization of molecules, {Classius-Mosotti equation. orientation of dipoles in an electric field. Dipole moment, induced dipole moment, measurement of dipole moment. Temperature methods and refractivity methods. Dipole moment and molecular structure.
- C. Magnetic Properties: Paramagnetism diamagnetism, ferromagnetism. Determination of magnetic susceptibility, elucidation of molecular structure.

## REFERENCE BOOKS:

1. Physical Chemistry, G.M. Barrow, International student edition, McGraw Hill
2. Basic programming with application, V.K. Jain, Tata McGraw-Hill
3. Computers & Common sense, R. Hunt & Shelly, Prentice-Hall
4. University general chemistry, C.N.R. Rao, Macmillan.
5. Physical Chemistry, R.A. Alberty, Wiley Eastern
6. The elements of Physical Chemistry, P.W. Atkins, Oxford
7. Physical Chemistry through problems, S.K. Dogra & S. Dogra, Wiley Eastern
8. Physical Chemistry, B.D. Khosla
9. Physical Chemistry, Puri & Sharma
10. Bhoutic Rasayan, Puri & Sharma
11. Bhoutic Rasayan, P.L. Soni
12. Bhoutic Rasayan, Bahl & Tuli



**PAPER-IV**  
**LABORATORY COURSE**

**180 Hrs.**

**Inorganic Chemistry**

**Synthesis Analysis**

- (a) Preparation of Sodium trioxalato ferrate (III),  $\text{Na}_3[\text{Fe}(\text{C}_2\text{O}_4)_3]$  and determination of its composition by permanganometry.
- (b) Preparation of Ni-DMG complex,  $[\text{Ni}(\text{DMG})_2]$
- (c) Preparation of copper tetraammine complex,  $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4$ .
- (d) Preparation of cis-and trans-bioxalato diaqua chromate (III) ion.

**Gravimetric Analysis**

Analysis of Cu as  $\text{CuSCN}$  or  $\text{CuO}$ , Ni as  $\text{Ni}(\text{DMG})_2$ , Ba as  $\text{BaSO}_4$  and Fe as  $\text{Fe}_2\text{O}_3$

**Organic Chemistry**

**Laboratory Techniques**

**A Steam Distillation**

Napthalene from its suspension in water Clove oil from cloves

Separation of ortho and para-nitrophenols.

**B Column Chromatography**

Separation of fluorescein and methylene blue Separation of

leaf pigments from spinach leaves

Resolution of racemic mixture of (+,-) mandelic acid.

**Qualitative Analysis**

Analysis of an organic mixture containing two solid components using water,  $\text{NaHCO}_3$ ,  $\text{NaOH}$  for separation and preparation of suitable derivatives.

**Synthesis of Organic Compounds**

- (a) Acetylation of salicylic acid, aniline, glucose and hydroquinone. Benzoylation of aniline and phenol.
- (b) Aliphatic electrophilic substitution- Preparation of iodoform from ethanol and acetone.
- (c) Aromatic electrophilic substitution-Nitration-  
Preparation of m-dinitrobenzene, p-nitroacetanilide  
Halogenation- Preparation of p-bromoacetanilide, 2,4,6 tribromophenol
- (d) Diazotization/Coupling- Preparation of methyl orange and methyl red
- (e) Oxidation- Preparation of benzoic acid from toluene
- (f) Reduction- Preparation of aniline from nitrobenzene, m-nitroaniline from m-dinitrobenzene.



## Physical Chemistry

### Electrochemistry

- (a) To determine strength of given acid conductometrically using standard alkali solution.
- (b) To determine solubility and solubility product of a sparingly soluble electrolyte conductometrically.
- (c) To study saponification of ethyl acetate conductometrically.
- (d) Determine the ionization constant of a weak acid conductometrically.
- (e) To titrate potentiometrically the given ferrous ammonium sulphate using  $\text{KMnO}_4/\text{K}_2\text{Cr}_2\text{O}_7$  as titrant and calculate the redox potential of  $\text{Fe}^{2+}/\text{Fe}^{3+}$  system on the hydrogen scale.

### Refractometry and Polarimetry

- (a) To verify law of refraction of mixtures (e.g. of glycerol and water) using Abbe's refractometer.
- (b) To determine the specific rotation of a given optically active compound.

### Molecular Weight Determination

- (a) Determination of molecular weight of a non-volatile solute by Rast method/Beckmann freezing point method.
- (b) Determination of the apparent degree of dissociation of an electrolyte (e.g., NaCl) in aqueous solution at different concentrations by ebullioscopy.

### Colorimetry

To verify Beer-Lambert law for  $\text{KMnO}_4/\text{K}_2\text{Cr}_2\text{O}_7$  and determine the concentration of the given solution of the substance.

### REFERENCE BOOKS :

1. Vogel's qualitative Analysis, revised, Svehla, Orient Longman
2. Standard methods of chemical analysis, W.W. Scott, The Technical Press
3. Experimental Organic Chemistry, Vol. I & II, P.R. Singh, D.S. Gupta and K.S. Bajpai, tata McGraw Hill.
4. Laboratory Manual in Organic Chemistry, R.K. Bansal, Wiley Eastern
5. Vogel's Text Book of Practical Organic Chemistry, B.S. Furnis, A.J. Hannaford, V. Rogers, P.W.G. Smith and A.R. Tatchel, ELBS
6. Experiments in general chemistry, C.N.R. Rao & U.C. Agrawal
7. Experiments in Physical Chemistry, R.C. Das & Behra, Tata McGraw Hill
8. Advanced Practical Physical Chemistry, J.B. Yadav, Goel Publishing House.



**8 Hrs.**

**PRACTICAL EXAMINATION**

**M.M.50.**

**Five experiments are to be performed.**

1. Inorganic - Two experiments to be performed.  
Gravimetric estimation compulsory carrying 08 marks. (Manipulation 3 marks).  
Anyone experiment from synthesis and analysis carrying 04 marks.
2. Organic-Two experiments to be performed.  
Qualitative analysis of organic mixture containing two solid components.  
compulsory carrying 08 marks (03 marks for each compound and two marks for separation).  
One experiment from synthesis of organic compound (Single step) carrying 04 marks.
3. Physical-One physical experiment carrying 12 marks.
4. Sessional 04 marks.
5. Viva Voce 10 marks.

In case of Ex-Students one mark each will be added to Gravimetric analysis and Qualitative analysis of organic mixture and two marks in Physical experiment.

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The image shows a row of six handwritten signatures and dates. From left to right: 1. Signature 'A. B. Srinivas' with date '24.7.2017'. 2. Signature 'A. S. Srinivas' with date '24.7.17'. 3. Signature 'S. S. Srinivas' with date '24/7/17'. 4. Signature 'D. S. Srinivas' with date '24/7/17'. 5. Signature 'S. S. Srinivas' with date '24.7.17'. 6. A signature that appears to be 'K. S. Srinivas' with a date that is partially obscured but likely '24.7.17'.

## PHYSICS

### Objectives :

Present course is aimed to provide ample knowledge of basics of Physics which are relevant to the understanding of modern trends in higher physics.

The first paper is aimed at preparing the back ground of modern physics which includes the relativistic and quantum ideas mainly concerned with atomic, molecular and nuclear physics. It constitutes an essential pre-requisite for better understanding of any branch of physics.

The second paper is mainly concerned with Solid State Physics, Solid State Devices and Electronics. This course is quite important from the applicational aspects of modern electronic devices. It also forms the basis of advance electronics including communication technology to be covered at higher level.

The experiments are based mostly on the contents of the theory papers so as to provide comprehensive insight of the subject.

### Scheme of Examination :

1. There shall be two theory papers of 3 hours duration each and one practical paper of 4 hours duration. Such paper shall carry 50 marks.
2. Each theory paper will comprise of 5 units. Two questions will be in each unit and the student will have the choice to answer one out of the two.
3. Numerical problems of about 30 percent will compulsorily be asked in each theory paper.
4. In practical paper each student has to perform two experiments during examination.
5. Practical examination will be of 4 hours duration. The distribution of practical marks will be as follows.

Experiments :  $15 + 15 = 30$ , Viva-voce

:10 Internal Assessment - 10.



**PAPER - I (Paper Code-0893)**  
**RELATIVITY, QUANTUM MECHANICS, ATOMIC MOLECULAR**  
**AND NUCLEAR PHYSICS.**

- UNIT-I** Reference systems, inertial frames, Galilean invariance and conservation laws, propagation of light, Michelson-Morley experiment, search for ether. Postulates for the special theory of relativity, Lorentz transformations, length contraction, time dilation, velocity addition theorem, variation of mass with velocity, mass-energy equivalence, particle with zero rest mass, Compton effect.
- UNIT-II** Origin of the quantum theory : Failure of classical physics to explain the phenomena such as black-body spectrum, photoelectric effect. Wave-particle duality and uncertainty principle : de Broglie's hypothesis for matter waves : the concept of wave and group velocities, evidence for diffraction & interference of particles, experimental demonstration of matter waves. Davisson and Germer's experiment. Consequence of de Broglie's concepts, quantisation in hydrogen atom, energies of a particle in a box, wave packets. Consequence of the uncertainty relation : gamma ray microscope, diffraction at a slit.
- UNIT-III** Quantum Mechanics : Schrodinger's equation. Postulatory basis of quantum mechanics, operators, expectation values, transition probabilities, applications to particle in a one- and three dimensional boxes, harmonic oscillator in one dimension, reflection at a step potential, transmission across a potential barrier. Hydrogen atom : natural occurrence of  $n$ , and  $m$  quantum numbers, the related physical quantities.
- UNIT-IV** Spectra of hydrogen, deuterium and alkali atoms spectral terms, doublet fine structure, screening constants for alkali spectra for  $s, p, d$  and  $f$  states, selection rules. Discrete set of electronic energies of molecules, quantisation of vibrational and rotational energies, determination of internuclear distance, pure rotational and rotation vibration spectra. Dissociation limit for the ground and other electronic states, transition rules for pure vibration and electronic vibration spectra. Raman effect, Stokes and anti-Stokes lines, complementary character of Raman and infrared spectra, experimental arrangements for Raman spectroscopy.
- UNIT-V** Interaction of charged particles and neutrons with matter, working of nuclear detectors, G-M counter, proportional counter and scintillation counter, cloud chambers, spark chamber, emulsions. Structure of nuclei, basic properties ( $Z, A, \mu, Q$  and binding energy), deuteron binding energy,  $p-p$  and  $n-p$  scattering and general concepts of nuclear forces, Beta decay, range of alpha particle Geiger-Nuttall law. Gamow's explanation of beta decay, alpha decay and continuous and discrete spectra. Nuclear reactions, channels, compound nucleus, direct reaction (concepts). Shell model & liquid drop model, fission and fusion (concepts), energy production in stars by  $p-p$  and carbon cycles (concepts).



### TEXT AND REFERENCE BOOKS :

1. H.S. Mani and G.K. Metha : "Introduction to Modern Physics"" (Affiliated East-West Press, 1989)
2. A Beiser, "Prospective of Modern Physics"
3. H.E. White, Introduction to Atomic Physic"
4. Barrow, "Introduction to Molecular Physics!"
5. R.P. Feynman, R.B. Leighton and M Sands, "The Feynman Lectures on Physics", Vol.III (B.I. Publications, Bombay, Delhi, Calcutta, Madras).
6. T.A. Littlefield and N Thorley, "Atomic and Nuclear Physics" (Engineering Language Book Society)
7. H.A. Enge, "Introduction to Nuclear Physics", (Addision-Wesly)
8. Eisenberg and Resnik, "Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles" (John Wiley)
9. D.P. Khandelwal, "Optics and Atomic Physics", (Himalaya Publishing House, Bombay, 1988).



**PAPER-II (Paper Code-0894)**

**SOLID STATE PHYSICS, SOLID STATE DEVICES AND ELECTRONICS**

**UNIT-I** Amorphous and crystalline solids, Elements of symmetry, seven crystal system, Cubic lattices, Crystal planes, Miller indices, Laue's equation for X-ray diffraction, Bragg's Law. Bonding in solids, classification. Cohesive energy of solid.

Madelung constant, evaluation of Parameters.

Specific heat of solids, classical theory (Dulong-Petit's law). Einstein and Debye theories. Vibrational modes of one dimensional monoatomic lattice, Dispersion relation, Brillouin Zone.

**UNIT-II** Free electron model of a metal, Solution of one dimensional Schrodinger equation in a constant potential. Density of states. Fermi Energy, Energy bands in a solid (Kronig-Penny model without mathematical details). Metals, Insulator and Semiconductors. Hall effect.

Dia, Para and Ferromagnetism. Langevin's theory of dia and para-magnetism. Curie-Weiss's Law. Qualitative description of Ferromagnetism (Magnetic domains), B-H. curve and Hysteresis loss.

**UNIT-III** Intrinsic semiconductors, carrier concentration in thermal equilibrium, Fermi level, Impurity semiconductor, donor and acceptor levels, Diode equation, junctions, junction breakdown, Depletion width and junction capacitance, abrupt junction, Tunnel diode, Zener diode. Light emitting diode, solar cell, Bipolar transistors, pnp and npn transistors, characteristics of transistors, different configurations, current amplification factor, FET.

**UNIT-IV** Half and full wave rectifier, rectifier efficiency ripple factor, Bridge rectifier, Filters, Inductor filter, T and N filters, Zener diode, regulated power supply. Applications of transistors. Bipolar Transistor as amplifier.

Single stage and CE small signal amplifiers, Emitter followers, Transistor as power amplifier, Transistor as oscillator, Wein-Bridge Oscillator and Hartley oscillator.

**UNIT-V** Introduction to computer organisation, time sharing and multi programming systems, window based word processing packages, MS Word.

Introduction to C programming and application to simple problems of arranging numbers in ascending / descending orders : sorting a given data in an array, solution of simultaneous equation.

**BOOKS RECOMMENDED :**

1. Introduction to solid state physics : C.Kittel
2. Solid State Physics : A.J. Dekkar
3. Electronic Circuits : Mottershead
4. Electronic Circuits : Millman and Halkias
5. Semiconductor Devices : S.M. Sze
6. Computer fundamental : balaguara Swami

**PRACTICALS**

MINIMUM 16 (Sixteen) Out of the following or similar experiment of equal standard :

1. Determination of Planck's constant
2. Determination of  $e/m$  by using Thomson's tube
3. Determination of  $e$  by Millikan's method
4. Study of spectra of hydrogen and deuterium (Rydberg constant and ratio of masses of electron proton)
5. Absorption spectrum of iodine vapour
6. Study of alkali or alkaline earth spectra using a concave grating
7. Study of Zeeman effect for determination of Lande  $g$ -factor.
8. Analysis of a given band spectrum.
9. Study of Raman spectrum using laser as an excitation source.
10. Study of absorption of alpha and beta rays.
11. Study of statistics in radioactive measurement.
12. Colorimetric study of crystal faces.
13. Determination of dielectric constant
14. Hysteresis curve of transformer core
15. Hall-probe method for measurement of magnetic field
16. Specific resistance and energy gap of a semiconductor
17. Characteristics of transistor
18. Characteristics of a tunnel diode
19. Study of voltage regulation system
20. Study of a regulated power supply

21. Study of lissajous figures using a CRO
22. Study of VTVM
23. Study of RC and TC coupled amplifiers
24. Study of AF and RF oscillators
25. Find roots of  $f(x)=0$  by using Newton-Raphson method
26. Find roots of  $F(x)=0$  by using secant method
27. Integration by Simpson rule
28. To find the value of V at
31. String manipulations
32. Towers of Hanoi (Nonrecursive)
33. Finding first four perfect numbers
34. Quadratic interpolation using Newton's forward-difference formula of degree two.

**TEXT AND REFERENCE BOOKS :**

1. B.G. Strechman ; "Solid State Electronic Devices". II Edition (Prentice-Hall of India, New Delhi, 1986)
2. W.D. Stanley ; "Electronic Devices, Circuits and Applications" (Prentice Hall, New Jersey, USA, 1988)
3. S. Lipschutz and A Poe ; "Schaum's Outline of Theory and Problems of Programming with Fortran" (McGraw-Hill Book Co. Singapore, 1986)
4. C Dixon ; "Numerical Analysis"

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Three handwritten signatures in blue ink are visible at the bottom of the page. The first signature on the left is partially obscured and appears to be 'Rishu'. The middle signature is 'M. G. B.' with a large 'B'. The signature on the right is 'S. K. S.' with a large 'S'.

## MATHEMATIS

There shall be three theory papers. Two compulsory and one optional Each paper carrying 50 marks is divided into five units and each unit carry equal marks.

### PAPER - I (Paper Code-0898)

#### ANALYSIS

##### REAL ANALYSIS

**UNIT-I** Series of arbitrary terms. Convergence, divergence and Oscillation. Abel's and Dirichlet's test. Multiplication of series. Double series. Partial derivation and differentiability of real-valued functions of two variables. Schwarz and Young's theorem. Implicit function theorem. Fourier series. Fourier expansion of piecewise monotonic functions.

**UNIT-II** Riemann integral. Integrability of continuous and monotonic functions. The fundamental theorem of integral calculus. Mean value theorems of integral calculus.

Improper integrals and their convergence, Comparison tests. Abel's and Dirichlet's tests. Frullani's integral. Integral as a function of a parameter. Continuity, derivability and integrability of an integral of a function of a parameter.

##### COMPLEX ANALYSIS

**UNIT-III** Complex numbers as ordered pairs. Geometric representation of Complex numbers. Stereographic projection. Continuity and differentiability of Complex functions. Analytic functions. Cauchy-Riemann equations. Harmonic functions. Elementary functions. Mapping by elementary functions. Mobius transformations. Fixed points, Cross ratio. Inverse points and critical mappings. Conformal mappings.

##### METRIC SPACES

**UNIT-IV** Definition and examples of metric spaces. Neighbourhoods, Limit points, Interior points, Open and closed sets, Closure and interior. Boundary points, Sub-space of a metric space. Cauchy sequences, Completeness, Cantor's intersection theorem. Contraction principle, Construction of real numbers as the completion of the incomplete metric space of rationals. Real numbers as a complete ordered field.

**UNIT-V** Dense subsets. Baire Category theorem. Separable, second countable and first countable spaces. Continuous functions. Extension theorem. Uniform continuity, Isometry and homeomorphism. Equivalent metrics. Compactness, Sequential compactness. Totally bounded spaces. Finite intersection property. Continuous functions and compact sets, Connectedness, Components, Continuous functions and connected sets.



## REFERENCES :

1. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
2. R.R. Goldberg, Real Analysis, Oxford & IBH publishing Co., New Delhi, 1970.
3. S. Lang, Undergraduate Analysis, Springer-Verlag, New York, 1983.
4. D. Somasundaram and B. Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997.
5. Shanti Narayan, A Course of Mathematical Analysis, S. Chand & Co. New Delhi.
6. P.K. Jain and S.K. Kaushik, An introduction to Real Analysis, S. Chand & Co., New Delhi, 2000.
7. R.v. Churchill & J.W. Brown, Complex Variables and Applications, 5<sup>th</sup> Edition, McGraw-Hill, New York, 1990.
8. MarkJ. Ablowitz & A.S.Fokas, Complex Variables : Introduction and Applications, Cambridge University Press, South Asian Edition, 1998.
9. Shanti Narayan, Theory of Functions of a Complex Variable, S. Chand & Co., New Delhi.
10. E.t. Copson, Metric Spaces, Cambridge University Press, 1968.
11. P.K. Jain and K. Ahmad, Metric Spaces, Narosa Publishing House, New Delhi, 1996.
12. G.F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill, 1963.



**PART - II (Paper Code-0899)**

**ABSTRACT ALGEBRA**

**UNIT-I** Group-Automorphisms, inner automorphism. Automorphism groups and their computations, Conjugacy relation, Normaliser, Counting principle and the class equation of a finite group. Center for Group of prime-order, Abelianizing of a group and its universal property. Sylow's theorems, Sylow subgroup, Structure theorem for finite Abelian groups.

**UNIT-II** Ring theory-Ring homomorphism. Ideals and Quotient Rings. Field of Quotients of an Integral Domain, Euclidean Rings, Polynomial Rings, Polynomials over the Rational Field. The Eisenstien Criterion, Polynomial Rings over Commutative Rings, Unique factorization domain.  $R$  unique factorisation domain implies so is  $R[x_1, x_2, \dots, x_n]$  Modules, Submodules, Quotient modules, Homomorphism and Isomorphism theorems.

**UNIT-III** Definition and examples of vector spaces. Subspaces. Sum and direct sum of subspaces, Linear span. Linear dependence, independence and their basic properties.

Basis. Finite dimensional vector spaces. Existence theorem for bases. Invariance of the number of elements of a basis set. Dimension. Existence of complementary subspace of a subspace of a finite dimensional vector space. Dimension of sums of subspaces. Quotient space and its dimension.

**UNIT-IV** Linear transformations and their representation as matrices. The Algebra of linear transformations. The rank nullity theorem. Change of basis. Dual space. Bidual space and natural isomorphism. Adjoint of a linear transformation. Eigenvalues and eigenvectors of a linear transformation. Diagonalisation. Annihilator of a subspace. Bilinear, Quadratic and Hermitian forms.

**UNIT-V** Inner Product Spaces-Cauchy-Schwarz inequality. Orthogonal vectors. Orthogonal Complements. Orthonormal sets and bases. Bessel's inequality for finite dimensional spaces. Gram-Schmidt Orthogonalization process.



## REFERENCES :

1. I.N. Herstein, Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975.
2. N. Jacobson, Basic Algebra, Vols. I & II. W.H. Freeman, 1980 (also published by Hindustan Publishing Company).
3. Shanti Narayan, A Text Book of Modern Abstract Algebra, S.Chand & Co. New Delhi.
4. K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
5. P.B. Bhattacharya, S.K. Jain and S.R. Nagpal, Basic Abstract Algebra (2<sup>nd</sup> Edition) Cambridge University Press, Indian Edition, 1997.
6. K. Hoffman and R. Kunze, Linear Algebra, 2<sup>nd</sup> Edition, Prentice Hall. Englewood Cliffs, New Jersey, 1971.
7. S.K. Jain, A. Gunawardena & P.B. Bhattacharya, Basic Linear Algebra with MATLAB. Key College Publishing (Springer-Verlag) 2001.
8. S. Kumaresan, Linear Algebra, A Geometric Approach, Prentice-Hall of India, 2000.
9. Vivek Sahai and Vikas Bist, Algebra, Norosa Publishing House, 1997.
10. I.S. Luther and I.B.S. Passi, Algebra, Vol. I-Groups, Vol. II-Rings. Narosa Publishing House (Vol. I-1996, Vol. II-1999)
11. D.S. Malik, J.N. Mordeson, and M.K. Sen, Fundamentals of Abstract Algebra, McGraw-Hill International Edition, 1997.





### **PAPER - III - (OPTIONAL)**

#### **(I) PRINCIPLES OF COMPUTER SCIENCE (Paper Code-0900)**

**UNIT-I Data Storage** - Storage of bits. Main Memory. Mass Storage. Coding Information of Storage. The Binary System. Storing integers, storing fractions, communication errors. **Data Manipulation** - The Central Processing Unit. The Stored-Program Concept. Programme Execution. Other Architectures. Arithmetic/Logic Instructions. Computer-Peripheral Communication.

**UNIT-II Operating System and Networks** - The Evolution of Operating System. Operating System Architecture. Coordinating the Machine's Activities. Handling Competition Among Process. Networks. Networks Protocol.

**Software Engineering** - The Software Engineering Discipline. The Software Life Cycle. Modularity. Development Tools and Techniques. Documentation. Software Ownership and Liability.

**UNIT-III Algorithms** - The Concept of an Algorithm, Algorithm Representation. Algorithm

Discovery. Iterative Structures. Recursive Structures. Efficiency and Correctness.

(Algorithms to be implemented in C++).

**Programming Languages** - Historical Perspective. Traditional Programming Concepts, Program Units. Language Implementation. Parallel Computing. Declarative Computing.

**UNIT-IV Data Structures** - Arrays. Lists. Stacks. Queues. Trees. Customised Data Types. Object Oriented Programming.

**File Structure** - Sequential Files. Text Files. Indexed Files. Hashed Files. The Role of The Operating System.

**Database Structure** - General Issues. The Layered Approach to Database Implementation. The Relational Model. Object-Oriented Database. Maintaining Database Integrity. E-R models.

**UNIT-V Artificial Intelligence** - Some Philosophical Issues. Image Analysis. Reasoning, Control System Activities. Using Heuristics. Artificial Neural Networks. Application of Artificial Intelligence.

**Theory of Computation** - Turning Machines. Computable functions. A Non computable Function. Complexity and its Measures. Problem Classification.

#### **REFERENCES :**

1. J. Glen Brookshear, Computer Science : An Overview, Addison -Wesley.
2. Stanley B. Lippman, Josee Lojoe, C++ Primer (3rd Edition), Addison-Wesley.



**PAPER - III - (OPTIONAL)**

**(II) DISCRETE MATHEMATICS (Paper Code-0901)**

**UNIT-I Sets and Propositions** - Cardinality. Mathematical Induction, Principle of Inclusion and exclusion.

Computability and Formal Languages - Ordered Sets. Languages. Phrase Structure Grammars. Types of Grammars and Languages. Permutations. Combinations and Discrete Probability.

**UNIT-II Relations and Functions** - Binary Relations, Equivalence Relations and Partitions. Partial Order Relations and Lattices. Chains and Antichains. Pigeon Hole Principle. **Graphs and Planar Graphs** - Basic Terminology. Multigraphs. Weighted Graphs. Paths and Circuits. Shortest Paths. Eulerian Paths and Circuits. Travelling Salesman Problem. Planner Graphs.

**TREES.**

**UNIT-III Finite State Machines** - Equivalent Machines. Finite State Machines as Language Recognizers. Analysis of Algorithms - Time Complexity. Complexity of Problems. Discrete Numeric Functions and Generating Functions.

**UNIT-IV1 Recurrence Relations and Recursive Algorithms** - Linear Recurrence Relations with Constant Coefficients. Homogeneous Solutions. Particular Solution. Total Solution. Solution by the Method of Generating Functions. Brief review of Groups and Rings.

**UNIT-V Boolean Algebras** - Lattices and Algebraic Structures. Duality, Distributive and Complemented Lattices. Boolean Lattices and Boolean Algebras. Boolean Functions and Expressions. Propositional Calculus. Design and Implementation of Digital Networks. Switching Circuits.

**REFERENCES :**

C.L. Liu, Elements of Discrete Mathematics, (Second Edition), McGraw Hill, International Edition, Computer Science Series, 1986.



**PAPER - III - (OPTIONAL)**

**(III) APPLICATION OF MATHEMATICS IN FINANCE AND INSURANCE**

**(Paper Code-0902)**

**Application of Mathematics in Finance :**

**UNIT-I Financial Management** - An overview. Nature and Scope of Financial Management.

Goals of Financial Management and main decisions of financial management.

Difference between risk, speculation and gambling.

Time value of Money-Interest rate and discount rate. Present value and future value discrete case as well as continuous compounding case. Annuities and its kinds.

**UNIT-II** Meaning of return. Return as Internal Rate of Return (IRR). Numerical

Methods like Newton Raphson Method to calculate IRR. Measurement of returns under uncertainty situations. Meaning of risk. Difference between risk and uncertainty. Types of risks. Measurement of risk. Calculation of security and Portfolio Risk and Return-Markowitz Model. Sharpe's Single Index Model Systematic Risk and Unsystematic Risk.

**UNIT-III** Taylor series and Bond Valuation. Calculation of Duration and Convexity of bonds. Financial Derivatives - Futures. Forward. Swaps and Options. Call and Put Option. Call and Put Parity Theorem. Pricing of contingent claims through Arbitrage and Arbitrage Theorem.

**Application of Mathematics in Insurance**

**UNIT-IV** Insurance Fundamentals - Insurance defined. Meaning of loss. Chances of loss, peril, hazard, and proximate cause in insurance. Costs and benefits of insurance to the society and branches of insurance-life insurance and various types of general insurance. Insurable loss exposures feature of a loss that is ideal for insurance. Life Insurance Mathematics - Construction of Mortality Tables. Computation of Premium of Life Insurance for a fixed duration and for the whole life.

**UNIT-V** Determination of claims for General Insurance - Using Poisson Distribution and Negative Binomial Distribution-the Poly Case.

Determination of the amount of Claims in General Insurance - Compound Aggregate claim model and its properties, and claims of reinsurance. Calculation of a compound claim density function. F-recursive and approximate formulae for F.

**REFERENCES :**

1. Aswath Damodaran, Corporate Finance - Theory and Practice, John Wiley & Sons Inc.
2. John C. Hull, Options, Futures, and Other Derivatives, Prentice-Hall of Indian Private Limited.
3. Sheldon M. Ross, An Introduction to Mathematical Finance, Cambridge University Press.
4. Mark S. Dorfman, Introduction to Risk Management and Insurance, Prentice Hall, Englewood Cliffs, New Jersey.
5. C.D. Daykin, T. Pentikainen and M. Pesonen, Practical Risk Theory for Actuaries, Chapman & Hall.



### **PAPER - III - (OPTIONAL)**

**Theory component will have maximum marks 30.**

**Practical component will have maximum marks 20.**

#### **(IV) PROGRAMMING IN C AND NUMERICAL ANALYSIS (Theory & Practical)**

**(Paper Code-0903)**

**UNIT-I** Programmer's model of a computer. Algorithms. Flow Charts. Data Types. Arithmetic and input/output instructions. Decisions control structures. Decision statements. Logical and Conditional operators. Loop. Case control structures. Functions. Recursions. Preprocessors. Arrays. Puppeting of strings. Structures. Pointers. File formatting.

#### **Numerical Analysis**

**UNIT-II** Solution of Equations : Bisection, Secant, Regula Falsi, Newton's Method, Roots of Polynomials : Interpolation : Lagrange and Hermite Interpolation, Divided Differences, Difference Schemes, Interpolation Formulas using Differences. Numerical Differentiation. Numerical Quadrature : Newton-Cote's Formulas. Gauss Quadrature Formulas, Chebychev's Formulas.

**UNIT-III** Linear Equations : Direct Methods for Solving. Systems of Linear Equations (Guass Elimination, LU Decomposition, Cholesky Decomposition), Iterative Methods (Jacobi, GaussSeidel, Relaxation Methods).

The Algebraic Eigenvalue problem : Jacobi's Method, Givens' Method, Householder's Method, Power Method, QR Method, Lanezos' Method.

**UNIT-IV** Ordinary Differential Equations : Euler Method, Single-step Methods, Runge-Kutta's Method, Multi-step Methods, Milne-Simpson Method, Methods Based on Numerical Integration, Methods Based on Numerical Differentiation, Boundary Value Problems, Eigenvalue Problems.

Approximation : Different Types of Approximation, Least Square Polynomial Approximation, Polynomial Approximation using Orthogonal Polynomials, Approximation with Trigonometric Functions, Exponential Functions, Chebychev Polynomials, Rational Functions.

**Unit-V** Monte Carlo Methods Random number generation, congruential generators, statistical tests of pseudo-random numbers.

Random variate generation, inverse tranform method, composition method, acceptancerejection method, generation of exponential, normal variates, binomial and Poisson variates.

Monte Carlo integration, hit or miss Monte Carlo integration, Monte Carlo integration for improper integrals, error analysis for Monte Carlo intergration.

## REFERENCES :

1. Henry Mullish & Herbert L. Cooper, Spirit of C : An Introduction to Modern Programming, Jaico Publishers, Bombay.
2. B.W. Kernighan and D.M. Ritchie. The C Programming Language 2<sup>nd</sup> Edition, (ANSI features) Prentice Hall, 1989.
3. Peter A Darnel and Philip E. Margolis, C : A Software Engineering Approach, Narosa Publishing House, 1993.
4. Robert C. Hutcheson and Steven B. Just, Programming using C Language, McGraw Hill, 1988.
5. Les Hancock and Morris Krieger, The C Primer, McGraw Hill, 1988.
6. V. Rajaraman, Programming in C, Prentice Hall of India, 1994.
7. Byron S. Gottfried, Theory and Problems of Programming with C, tata McGraw-Hill Publishing Co. Ltd., 1998.
8. C.E. Froberg, Introduction to Numerical Analysis, (Second Edition), Addison-Wesley, 1979.
9. James B. Scarborough, Numerical Mathematical Analysis, Oxford and IBH Publishing Co. Pvt. Ltd. 1966.
10. Melvin J. Maron, Numerical Analysis A Practical Approach, Macmillan publishing Co., Inc. New York, 1982.
11. M.K. Jain, S.R.K. Iyengar, R.K. Jain, Numerical Methods Problems and Solutions, New Age International (P) Ltd., 1996.
12. M.K. Jain, S.R.K. Iyengar, R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International (P) Ltd., 1999.
13. R.Y. Rubinstein, Simulation and the Monte Carlo Methods, John Wiley, 1981.
14. D.J. Yakowitz Computational Probability and Simulation, Addison-Wesley, 1977.



**PAPER - III - (OPTIONAL)**

**(IV) PRACTICAL**

**PROGRAMMING IN C AND NUMERICAL ANALYSIS  
LIST OF PRACTICAL TO BE CONDUCTED...**

1. Write a program in C to find out the largest number of three integer numbers.
2. Write a program in C to accept monthly salary from the user, find and display income tax with the help of following rules :

Monthly Salary	Income Tax
9000 or more	40% of monthly salary
7500 or more	30% of monthly salary
7499 or less	20% of monthly salary
3. Write a program in C that reads a year and determine whether it is a leap year or not.
4. Write a program in C to calculate and print the first n terms of fibonacci series using looping statement.
5. Write a program in C that reads in a number and single digit. It determines whether the first number contains the digit or not.
6. Write a program in C to computes the roots of a quadratic equation using case statement.
7. Write a program in C to find out the largest number of four numbers using function.
8. Write a program in C to find the sum of all the digits of a given number using recursion.
9. Write a program in C to calculate the factorial of a given number using recursion.
10. Write a program in C to calculate and print the multiplication of given 2D matrices.
11. Write a program in C to check that whether given string palindrome or not.
12. Write a C function seriesum () to calculate the sum of series  
:  $1+X+1/2! X^2+1/3! X^3+..... 1/n! X^n$
13. Write a program in C to determine the grade of all students in the class using Structure. Where structure having following members - name, age, roll, sub 1, sub2, sub3, sub4 and total.
14. Write a program in C to copy one string to another using pointers. (Without using standard library functions).
15. Write a program in C to store the data of five students permanently in a data file using file handling.



**PAPER - III - (OPTIONAL)**

**(V) MATHEMATICAL MODELLING**

**(Paper Code-0904) The Process of Applied mathematics.**

**UNIT-I** Setting up first-order differential equations - Qualitative solution sketching.  
Difference and differential equation growth models.

**UNIT-II** Single-species population models. Population growth-An age structure model. The spread of Technological innovation.

**UNIT-III** Higher-order linear models- A model for the detection of diabetes. Combat modes.

Traffic models - Car-following models. Equilibrium speed distributions.

**UNIT-IV** Nonlinear population growth models. Prey-Predator models. Epidemic growth models. Models from political science - Proportional representation-cumulative voting, comparison voting.

**UNIT-V** Applications in Ecological and Environmental subject areas- Urban waste water management planning.

**REFERENCES :**

1. Differential equation models, Eds. Martin Braun, C.S. Coleman, D.A. Drew.
  2. Political and Related Models, Steven. J. Brams, W.F. Lucas, P.D. Straffin (Eds.)
  3. Discrete and System models, W.F. Lucas, F.S. Roberts, R.M. Thrall.
  4. Life Science Models, H.M. Roberts & M. Thompson.
- All volumes published as modules in applied Mathematics, Springer-Verlag, 1982.
5. Mathematical Modelling by J.N. Kapur, New Age International, New Delhi.





**BOTANY**  
**PAPER-I (Paper Code-0915)**  
**PLANT PHYSIOLOGY, BIOCHEMISTRY AND BIOTECHNOLOGY**

**M.M. : 50**

**UNIT-I** Plant-water relations : Importance of water to plant life ; physical properties of water; diffusion and osmosis; absorption, transport of water and transpiration ; physiology of stomata.  
Mineral nutrition : Essential macro and micro-elements and their role ; mineral uptake; deficiency and toxicity symptoms.

**UNIT-II** Transport of organic substances : Mechanism of phloem transport ; source-sink relationship ; factors affecting translocation.  
Basic of enzymology : Discovery and nomenclature ; characteristics of enzymes ; concept of holoenzyme apoenzyme, coenzyme and cofactors ; regulation of enzyme activity, mechanism of action.  
Photosynthesis : Significance ; historical aspects ; photosynthetic pigments ; action spectra and enhancement effects ; concept of two photosystems; Z-scheme ; photo-phosphorylation ; Calvin cycle ; C<sub>4</sub> pathway ; CAM plants ; photorespiration.

**UNIT-III** Respiration : ATP - the biological energy currency ; aerobic and anaerobic respiration; Kreb's cycle, electron transport mechanism (chemi-osmotic theory) ; redox potential; oxidative phosphorylation ; pentose phosphate pathway.  
Nitrogen and lipid metabolism : Biology of nitrogen fixation ; importance of nitrate reductase and its regulations ; ammonium assimilation ; structure and function of lipids; fatty acid biosynthesis ; Beta-oxidation ; saturated and unsaturated fatty acids; storage and mobilization of fatty acids.

**UNIT-IV** Growth and development : Definitions ; phases of growth and development ; kinetics of growth, seed dormancy, seed germination and factors of their regulation ; plant movements ; the concept of photoperiodism ; physiology of flowering ; florigen concept; biological clocks ; physiology of senescence, fruit ripening ; plant hormones auxins, gibberellins, cytokinins, abscisic acid and ethylene, history of their discovery, biosynthesis and mechanism of action; photomorphogenesis ; phytochromes and cryptochromes, their discovery, physiological role and mechanism of action.

**UNIT-IV** Genetic engineering : Tools and techniques of recombinant DNA technology ; cloning vectors ; genomic and cDNA library ; transposable elements ; techniques of gene mapping and chromosome walking.  
Biotechnology : Functional definition ; basic aspects of plant tissue culture ; cellular totipotency, differentiation and morphogenesis ; biology of Agrobacterium ; vectors for gene delivery and marker genes ; salient achievements in crop biotechnology.



**PAPER-II**  
**(Paper Code-0916)**  
**ECOLOGY AND UTILIZATION OF PLANTS M.M. : 50**

**UNIT-I** Plants and environment : Atmosphere (gaseous composition), water (properties of water cycle), light (global radiation, photosynthetically active radiation), temperature, soil (development, soil profiles, physico-chemical properties), and biota.

Morphological, anatomical and physiological responses of plants to water (hydro-phytes and xerophytes), temperature (thermoperiodicity), light (photoperiodism, heliophytes and sciophytes) and salinity.

**UNIT-II** Community Ecology : Community characteristics, frequency, density, cover, life forms biological spectrum ; ecological succession.  
Ecosystems : Structure, abiotic and biotic components ; food chain, food web, ecological pyramids, energy flow ; biogeochemical cycles of carbon, nitrogen and phosphorus.

**UNIT-III** Population ecology : Growth curves ; ecotypes ; ecads.  
Biogeographical regions of India.  
Vegetation types of India : Forests and grasslands.

**UNIT-IV** Utilization of Plants  
Food plants : Rice, wheat, maize, potato, sugarcane.  
Fibres : Cotton and jute.  
Vegetable oils : Groundnut, mustard and coconut  
General account of sources of firewood, timber and bamboos.

**UNIT-V** Spices : General account.  
Medicinal plants : General account  
Beverages : Tea and coffee.  
Rubber.

<b>PRACTICAL SCHEME</b>	<b>M.M. 50</b>
01. Physiology	08
02. Ecology	08
03. Utilization of Plants	05
04. Biochemistry / Biotechnology	05
05. Spotting (1-5 spots)	10
06. Project work	04
07. Viva V.	05
08. Sessional	05
	<b>50</b>



### **Suggested Laboratory Exercises**

1. To study the permeability of plasma membrane using different concentrations of organic solvents.
2. To study the effect of temperature on permeability of plasma membrane.
3. To prepare the standard curve of protein and determine the protein content in unknown samples.
4. To study the enzyme activity of catalase and peroxidase as influenced by pH and temperature.
5. Comparison of the rate of respiration of various plant parts.
6. Separation of chloroplast pigment by solvents method.
7. Determining the osmotic potential of vacuolar sap by plasmolytic method.
8. Determining the water potential of any tuber.
9. Separation of amino acids in a mixture by paper chromatography and their identification by comparison with standards.
10. Bioassay of auxin, cytokinin, GA, ABA and ethylene using appropriate plant material.
11. Demonstration of the technique of micropropagation by using different explants, e.g. axillary buds, shoot meristems.
12. Demonstration of the technique of anther culture.
13. Isolation of protoplasts from different tissues using commercially available enzymes.
14. Demonstration of root and shoot formation from the apical and basal portion of stem segments in liquid medium containing different hormones.

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### **Suggested Laboratory Exercises (Ecology)**

1. To determine minimum number of quadrats required for reliable estimate of biomass in grasslands.
2. To study the frequency of herbaceous species in grassland and to compare the frequency distribution with Raunkair's Standard Frequency Diagram.
3. To estimate importance Value Index for grassland species on the basis of relative frequency, relative density and relative biomass in protected and grazed grassland.
4. To measure the vegetation cover of grassland through point frame method.
5. To measure the aboveground plant biomass in a grassland.
6. To determine Kemp's constant for dicot and monocot leaves and to estimate the leaf area index of a grassland community.
7. To determine diversity indices (richness, Simpson, Shannon-Wiener) in grazed and protected grassland.
8. To estimate bulk density and porosity of grassland and woodland soils.
9. To determine moisture content and water holding capacity of grassland and woodland soil.
10. To study the vegetation structure through profile diagram.
11. To estimate transparency, pH and temperature of different water bodies.
12. To measure dissolved oxygen content in polluted and unpolluted water samples.
13. To estimate salinity of different water samples.
14. To determine the percent leaf area injury of different leaf samples collected around polluted sites.
15. To estimate dust holding capacity of the leaves of different plant species.

### **PRACTICAL**

#### **Suggested Laboratory Exercises (for Utilization of Plants)**

1. Food Plants : Study of the morphology, structure and simple microchemical tests of the food storing tissues in rice, wheat, maize, potato and sugarcane, Microscopic examination of starch in these plants (excepting sugarcane)
2. Fibres : Study of cotton flowers, sectioning of the cotton ovules/developing seeds to trace the origin and development of cotton fibres. Microscopic study of cotton and test for cellulose, Sectioning and staining of jute stem to show the location and development of fibres. Microscopic structure. Test for lignocellulose.
3. Vegetable oils : Study of hand sections of groundnut, mustard and coconut and staining of oil droplets by Sudan III and Sudan Black.

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4. Field visits : To study sources of firewood (10 plants), timber-yielding trees (10 trees) and bamboos. A list to be prepared mentioning special features.
5. Spices : Examine black pepper, cloves, cinnamon (hand sections) and opened fruits of cardamom and describe them briefly.
6. Preparation of an illustrated inventory of 10 medicinal plants used in indigenous systems of medicine or allopathy : Write their botanical and common names, parts used and disease/disorders for which they are prescribed.
7. Beverages : Cut Sections of boiled coffee beans and tea leaves to study the characteristic structural features.
8. Rubber : Collect illustrative materials of *Hevea brasiliensis* ; morphology of the plant and tapping practices, history of rubber. List the many uses of rubber.

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## **ZOOLOGY**

### **Paper-I (Paper Code-0917)**

**Ecology, Environmental-biology ; Toxicology ; Microbiology and Medical Zology.**

**2. Attempting one question from each unit will be compulsory. 100% chice be given.**

#### **UNIT-I (ECOLOGY)**

1. Aims and scopes of Ecology.
2. Major ecosystems of the world-Brief intruduction
3. Population- Characteristics and regualtion of densities.
4. Communities and Ecosystems.
5. Biogeochemical cycles
6. Air and water pollution
7. Ecological succession

#### **UNIT-II (ENVIRONMENTAL BIOLOGY)**

1. Laws of limiting factors
2. Food chain in a freshwater ecosystem.
3. Energy flow in ecosystem-Trophic levels
4. Conservation of Natural resources
5. Environmental impact Assessment

#### **UNIT-III (TOXICOLOGY)**


1. Definition of Toxicity
2. Classification of toxicants
3. Principle of systematic toxicology
4. Toxic agents and their action- Metallic and inorganic agents
5. Animal poisons - Snake-venom, Scorpion and bee poisoning
6. Food pisoning

#### **UNIT-IV (MICROBIOLOGY)**

1. General and Applied microbiology.
2. Microbiology of Domestic water and sewage.
3. Microbiology of milk and milk products.
4. Industrial microbiology.

#### **UNIT-V (MEDICAL MICROBIOLOGY)**

1. Brief introduction to pathogenic micro-organisurs, Rickettsia, Spirochaetes and Bacteria.
2. Brief account of life-history and pathogenicity of the following pathogens with reference to man ; Prophylaxis and treatment -
  - (a) Pathogenic Protozoans - Entamoeba, Trypanosoma, and Giardia
  - (b) Pathogenic helminths - Schistosoma
  - (c) Nematode Pathogenic parasites of man
3. Vector insects

  
28-7-17

  
28-7-17



  
28/7

## PAPER-II

(Paper Code-0918)

### (GENETIC'S, CELL PHYSIOLOGY, BIOCHEMISTRY, BIOTECHNOLOGY AND BIOTECHNIQUES)

**Note :** Attempting one question from each unit will be compulsory, 100% choice be given.

#### UNIT-I (GENETIC'S)

1. Linkage and Linkage maps
2. Varieties of gene expression - Multiple alleles ; lithogenesis ; Pleiotropic genes; gene interaction ; epistasis.
3. Sexchromosome systems, and sex-linkage.
4. Mutation and chromosomal alterations ; meiotic consequences.
5. Human genetics - chromosomal and single gene disorders (somatic cell genetics)

#### UNIT-II(CELL PHYSIOLOGY)

1. General idea about pH and Buffer.
2. Transport across membrane - cell membrane; Mitochondria and Endoplasmic reticulum.
3. Active transport and its mechanism; Active transport in Mitochondria and Endoplasmic reticulum.
4. Hydrolytic enzymes - Their chemical nature, Activation and specificity.

#### UNIT-III (BIOCHEMISTRY)

1. Amino acids and Peptides - Basic structure and biological function.
2. Carbohydrate and its metabolism - Glycogenesis; Gluconeogenesis; glycolysis, Glycogenolysis; Cose-cycle.
3. Lipid metabolism - Oxidation of glycerol; oxidation of fatty acid.
4. Protein metabolism - Deamination, Transamination, Transmethylation; Biosynthesis of Protein;

#### UNIT-IV (BIOTECHNOLOGY)

1. Biotechnology - Scope and importance.
2. Recombinant DNA and Gene cloning.
3. Cloned genes and other tools of biotechnology.
4. Applications of biotechnology in (i) Pharmaceutical industry, and (ii) Food processing industry.

#### UNIT-V(BIOTECHNIQUE)

Principles and techniques about the following

1. pH meter
2. Colorimeter
3. Microscopy-Light microscopes, Phase contrast and Electron microscopes.
4. Centrifugation
5. Separation of biomolecules by chromatography, and Electrophoresis
6. Histochemical methods for determination of Protein, Lipids, and carbohydrate

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## PRACTICAL WORK

The Practical work in general shall be based on syllabus prescribed in theory.

The candidates will be required to show knowledge of the following :

1. Estimation of population density, Percentage frequency, Relative density.
2. Analysis of Producers and consumers in grassland.
3. Detection of gram-negative and gram-positive bacteria.
4. Blood group detection (A,B, AB & O).
6. R.B.C., W.B.C. count.
6. Blood coagulation time.
7. Preparation of Hematin crystals from blood of rat.
8. Observation of Drosophila, wild and mutant.
9. Chromatography-Paper or gel.
10. Colorimetric estimation of hemoglobin.
11. Mitosis in onion root tip.
12. Biochemical detection of Carbohydrate, Protein and Lipid.
13. Study of Permanent slides of Parasites, based on theory paper.
14. Working Principles of pH meter, Colorimeter, centrifuge and microscopes.

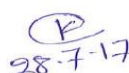
## SCHEDULE FOR PRACTICALEXAMINATION

**Duration : 4 Hrs.**

**Max Marks : 50**

1.	Haematological Experiment : (R.B.Cs./W.B.Cs. Counting/Blood group detection)	08	marks
2.	Ecological Experiment : (Estimation of Population Density/Frequency/relative Density)	06	marks
3.	Staining of Gram +ve and Gram -ve Bacteria/cytological experiment : Mitosis in onion root tip	05	marks
4.	Biochemical Experiment : (biochemical detection of carbohydrate/protein lipid)	06	marks
5.	Chromatography	05	marks
6.	Spotting : Study of permanent slides of Parasites : 3 Comments on working Principles of pH meter / Calorimeter / centrifuge and Microscope :	10	marks
7.	Viva Voce	05	marks
8.	Sessional :	05	marks

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**MICRO-BIOLOGY**  
**SCHEME OF PRACTICAL**

**Duration : 4 Hrs.**

**Max Marks : 50**

1. Characterization and Identification of micro-organism from any given source	15
2. Biochemical identification of some biodegraded organic molecules	10
3. Spots (1 to 5)	10
4. Viva voce	05
5. Sessional	10
<b>Total -</b>	<b>50</b>

**(PRACTICAL SYLLABUS)**

**MOLECULAR BIOLOGY AND GENETIC ENGINEERING**

Characterization of genetic markers of known bacterial strains.

Phage growth curve.

Isolation of DNA from bacteria.

Isolation of plasmid DNA and restriction analysis.

Simple cloning using plasmid DNA as vector and transformation of competent E. coli cells.

Electrophoretic analysis of proteins.

Isolation of Bacteria from air and soil (crop fields)

Isolation of Fungi from air and soil

Study of rhizospheric & Phyllospheric microbes of some economically important plants

Biodegradation study of some organic molecules


microbial assessment of potable water

Analysis of sewage waste

Analysis of Garbages (soild wastes)

**REFERENCE :**

Philipp Gorhardt, manual of Methods for general Bacteriology. ASM. 536pp.

**PAPER-I (Paper Code-0923)**

**MOLECULAR BIOLOGY AND GENETIC ENGINEERING M.M.50**

**UNIT-I** History of molecular biology, model systems, concepts of molecular biology, Early history of genetic engineering, genetic engineering concepts, ethical issue.

**UNIT-II** Mutation; spontaneous and induced, base pair change, frame shift, deletion, inversion, random duplication, insertion, useful phenotypes (auxotrophs, conditional lethal, resistance). Reversion vs suppression, Ames's test.

**UNIT-III** Function of macromolecules; early observation on the mechanism of heredity, DNA as genetic material; basic mechanism of replication, enzymes involved in replication, Enzymes involved in transcription translation, genetic code, regulation of gene expression-transcription, translation and control of gene expression in microbes.

**UNIT-IV** DNA repair and restriction, types of repair systems, restriction modification systems, types of restriction enzymes, properties and uses, methylation. Biology of plasmids. Bacteriophages, lytic vs lysogenic phages, single standard DNA phages, M 13, restriction modification systems, restriction enzymes.

**UNIT-V** Plasmid and phage vectors, restriction and ligation of vector and passenger DNA, transformation of host cells, selection vs. screening of recombinant colonies, analysis of recombinant clones, DNA sequencing, protein separation and identification methods.

**TEXT BOOKS :**

1. Essentials of Molecular Biology by GM Malacinski.
2. Genes IX by Benjamin Lewin
3. Molecular Biology by TA Brown.

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**PAPER - II (Paper Code-0924)**  
**ENVIRONMENTAL AND MEDICAL MICROBIOLOGY**

**M.M.50**

**UNIT-I** Aerobiology; definition, droplet nuclei, aerosol assessment of air quality, some important air borne diseases caused by bacteria (Diphtheria, Pneumonia, Meningitis), virus (Influenza, Chicken pox, Measels) and fungi (mycosis); their symptoms and preventive measures.

**UNIT-II** Soil microbiology : Physical and chemical characteristics and micro flora of various soil types, rhizosphere, phyllosphere. Brief account of microbial interactions: symbiosis, mutualism, commensalism, competition, amensalism, synergism, parasitism, and predation.

Biofertilizers - biological nitrogen fixation, nitrogenase enzyme, nif genes, symbiotic nitrogen fixation, and non-symbiotic nitrogen fixation (Azotobacter, Azospirillum), VAM-ecto-endo-ectendomycorrhizae.

**UNIT-III** Aquatic microbiology; ecosystem, fresh water (ponds, lakes, stream) and marine, Water zonation : upwelling, entrophication.

Potability of water - microbial assessment of water quality.

Brief account of water borne diseases (Typhoid, Dysentery, Cholera, Hepatitis) and preventive measures.

**UNIT-IV** Food spoilage and food borne infections.

A brief mention about biodegradation, xenobiotics, bioaccumulation, biopesticides and deterioration.

General concept of industrial microbiology and their applications.

**UNIT-V** Waste Treatment : types of wastes, characterization of solid and liquid waste, waste treatment solid saccharification, gasification, composting.

Liquid waste treatment - aerobic, anaerobic primary, secondary and tertiary methods.

Useful byproducts, mushroom, fuel, fertilizer, Biodegradation of industrial waste.

**REFERENCES :**

1. Food Microbiology by WC Frazier and D Westhoff.
2. Agricultural Microbiology by Bhagyaraj and Rangaswamy.
3. Bioremediation by KH Baker and DS Herson.
4. Scott's Diagnostic Microbiology by EJ Baron.

  
Two handwritten signatures in purple ink. The first signature is dated 29/7/12 and the second is dated 29/7/12.

## PRACTICAL FOR B.SC. PART III (MICROBIOLOGY)

Characterization of genetic markers of known bacterial strain  
Isolation of DNA from bacteria  
Isolation of plasmid DNA  
Simple cloning using plasmid DNA as vector and transformation of competent E. coli  
Electrophoresis of protein / DNA.  
Isolation of microorganisms from air, soil and water.  
Isolation of pathogenic microorganisms.  
Study of rhizospheric and phyllospheric microbes from economically important plants.  
Biodegradation of some organic molecules.  
Microbial assessment of potable water.  
Analysis of sewage waste, solid waste (garbage).  
Isolation of aquatic fungi (zoosporic) by baiting technique.  
Isolation of keratinophilic fungi soil by baiting technique  
Demonstration of bacterial antagonism.  
Microscopic observation of root colonization by VAM fungi.

### SCHEME FOR PRACTICAL EXAMINATION

**Time : 4 hours**

**M.M. : 50**

1. Characterization and identification of microorganism from given source/ Isolation of plasmid DNA/Genomic DNA	15
2. Biochemical identification of some biodegraded organic molecules/ Microbial assessment of potable water/BOD/COD	10
3. Spotting (1-5)	10
4. Viva-Voce	05
5. Sessional	10
<b>Total</b>	<b>150</b>



**विषय—भू-विज्ञान**  
**सैद्धांतिक प्रश्न पत्र — प्रश्न**  
**(पेपर कोड — 0905)**

पुर्णांक — 50

**इकाई—1**

1. खनिज उपलब्धता के नियामक तथ्य । वैश्विक खनिज नियम एवं संसाधन
2. दिक्काल में खनिज निक्षेपों का वितरण, पारम्परिक एवं गैर पारम्परिक ऊर्जा संसाधन ' सूर्य —आतय, जल, वायु उष्ण झरने, समुद्र तरंगे ।
3. अयस्क निर्माणकारी खनिज: धात्विक एवं अधात्विक । अयस्क निर्माण की मैग्नीय सांद्रगण विधि ।
4. उष्ण जलीय — प्रक्रियायें, स्कान ।
5. उपक्षय उत्पाद एवं अवशिष्ट निक्षेप । आक्सीकरण एवं सल्फाइड समृद्धि प्रक्रम ।

**इकाई— 2**

1. अयस्क निर्माण की अवसादी प्रक्रिया ।
2. प्रतिस्थापन एवं जीवाश्विक अवक्षेपण, कोलायडल निक्षेपण, लवणीजल का वाष्पोत्सर्जन ।
3. अयस्क निर्माण की कायान्मरणी प्रक्रिया ।
4. भू-वैज्ञानिक कालों में वैश्विक वर्तनिकी एवं धातुनिर्मिती ।
5. भू-वैज्ञानिक वितरण, खनिजकीय विशेषता तथा भारत में निम्न धातु निक्षेपों का वितरण लौह—मैग्नीज—क्रोमियम ।

**इकाई— 3**

1. भू-वैज्ञानिक वितरण, खनिजकीय विशेषता एवं भारत में निम्न धातु निक्षेपों का वितरण: ताम्र—सीसा—जस्ता ।
2. भू-वैज्ञानिक वितरण, खनिजकीय विशेषता एवं भारत में निम्न धातु निक्षेपों का वितरण: तापसह एवं उर्वरक खनिज ।
3. भू-वैज्ञानिक वितरण, खनिजकीय विशेषता एवं भारत में निम्न धातु निक्षेपों का वितरण: तापसह एवं उर्वरक खनिज ।
4. भू-वैज्ञानिक वितरण, खनिजकीय विशेषता एवं भारत में निम्न धातु निक्षेपों का वितरण: सीमेंट एवं केमिकल उद्योग में प्रयुक्त खनिज एवं वास्तुप्रास्तर ।
5. भू-वैज्ञानिक वितरण, खनिजकीय विशेषता एवं भारत में निम्न धातु निक्षेपों का वितरण: रत्न ।

**इकाई— 4**

1. धातु सांद्रण की प्रमुख विधियां : ताम्र एवं मैग्नीज ।
2. खनिज दोहन के पर्यावरणीय प्रभाव ।
3. कोयला निक्षेपों की उत्पत्ति, परिभाषा एवं संस्तर विज्ञान ।
4. कोल—शैलिकी के मूलभूत तथ्य पीठ, लिग्राइट, विटूमिनस, एंथ्रासाइट ।
5. भारतीस कोयला निक्षेप : विशेष संदर्भ में छत्तीसगढ़ ।

**इकाई— 5**

1. प्राकृतिक हाइड्रोकार्बन की उत्पत्ति, स्थानांतरण एवं स्थानबद्धता, स्रोत एवं संचयकारी ।
2. आयलट्रेप के प्रकार — संरचनात्मक, स्तरविज्ञानी एवं मिश्रित ।
3. भारत के तटीय एवं अपतटीय पेट्रोलियम निक्षेप ।
4. रेडियोधर्मी खनिज : खनिजकीय, भू-रसायन, पूर्वक्षण तकनीक ।
5. भारत वर्ष में रेडियोधर्मी खनिज का वितरण ।

**विषय—भू-विज्ञान**  
**सैद्धांतिक प्रश्न पत्र—द्वितीय**  
(पेपर कोड – 0906) पूर्णांक : 50  
(प्राकृतिक पर्यावरण, दूर संवेदन, भू-जल एवं खनिज—अन्वेषण)

**इकाई—1**

1. तिक पर्यावरण भू-विज्ञान की अवधारणायें एवं परिभाषा।
2. मुदानिर्माण – मृदा प्रकार।
3. पृथ्वी की प्राकृतिक—पारिस्थितिकी तंत्र की अवधारणायें – उनकी अंतर्क्रियाएं एवं अन्तर्म्बन्ध।
4. प्राकृतिक पर्यावरण पर मानव का पर्यावरण।
5. नदी मार्ग का अंतरण : मार्ग अंतरण का मृदा अपरदन पर प्रभाव : भूस्खलन एवं बाढ़।

**इकाई—2**

1. वृहत्त बांध, जलाशय, सुरंगें आदि के निर्माण में स्थल चयन एवं पर्यावरणीय प्रभावों का अध्ययन।
2. हवाई—छायाचित्रों एवं उपग्रह इमेजियरी का प्रारंभिक अध्ययन।
3. शहरी विकास एवं वृहद्आभियांत्रिकी संरचनाओं की आयोजना में दूर—संवेदन तकनीकों की अनुप्रयोग।
4. फोटो जियोलॉजिकल मानचित्रों का निर्माण।
5. जल चक्र।

**इकाई—3भूजलसंचयी शैल**

1. शैल एवं उनका वर्गीकरण
2. जलमृतशैलों का वर्गीकरण : डार्सि का नियम एवं उसकी उपयुक्ता।
3. भारत का भूजल—प्रदेश।
4. जलग्रहण प्रबंधन की अवधारणायें।
5. सतही एवं अधो सतही निष्कर्षण विधियां।

**इकाई—4**

1. आर्थिक खनिजों के लिये पूर्वक्षण विधियां : ड्रीलिंग, प्रतिनयन एवं आमापन।
2. खनिज पूर्वक्षण की गुरुत्वी, विद्युतीय एवं चुम्बकीय विधियां।
3. पूर्वक्षण की हवाई एवं भूकम्पीय विधियां।
4. पूर्वक्षण की भू-पादकीय विधियां।
5. पूर्वक्षण की भू-रासायनिक विधियां।

**इकाई—5**

1. बोरहोललांगिंग एवं विचलन सांख्यिकी।
2. खनिज खपत का परिवर्तनशील स्वरूप।
3. राष्ट्रीय खनिज नीति।
4. खनिज—कन्शेसन—नियम।
5. समुद्री खनिज संसाधन एवं तत्संबंधित नियम।

1. अयस्क निर्माणकारी खनिजों के भौतिक एवं प्रकाशीय गुणों का अध्ययन।
2. भारत के मानचित्र में अयस्क निक्षेप एवं आर्थिक महत्व को खनिजों का वितरण।
3. कोयला एवं उसके विभिन्न प्रकारों के नमूनों का स्थूलदर्शी अध्ययन।
4. रेडियोधर्मी खनिज एवं उसके आतिथेय शैलो का स्थूलदर्शी अध्ययन।
5. खनिज एवं संबंधित प्रयोगशाला अभ्यास कार्य, निक्षेप आंकलन, टनेज फेक्टर आंकलन, टनेज फेक्टर आंकलन, ड्रिलिंग आदि से संबंधित।
6. स्टिरियोस्कोप के द्वारा ऐरियल छाया चित्रों का अध्ससन एवं विवेचना।
7. उपग्रह इमेजियरी का अध्ययन एवं विवेचना।

**भू-वैज्ञानिक – क्षेत्रीय अध्ययन–**

15 दिवसीय भू-वैज्ञानिक क्षेत्रीय अध्ययन कार्य, जिसमें संरचनात्मक दृष्टि से जटिल क्षेत्रों में भू-वैज्ञानिक मानचित्र एवं शैल नमूनों का संग्रहण तथा प्रयोगशाला कार्य एवं रिपोर्ट का अनुलेखन।

**BOOK RECOMMENDED FOR PAPER-I**

Evans, A.M. 1993.	-	Ore Geology and Industrial Minerals
Sawkins, F.J. 1984	-	Metal Deposits in relation in plate Tecto. Springer.
Stanton, R.L. 1972	-	Ore Petrology. Mcgraw Hill
Mookherjee A. 2000	-	Ore Geniois - a helistic Approach Allied Publisher
Chandra 2000	-	Text book of coal (Indian context) Tara book Agency, Varanashi
Selley, R.C.1998	-	Elements of Petroleum Geology. Academic Press
Torling D.H. 1981	-	Economic Geology and Geofectericks Blackwell
Melustry, H.E. 1962	-	Mining Geology 2nd Ed., Asia Pub. House
Arogya Swamy, RPN 1996	-	Gourses in rining Geology IV Ed. Oxford IBH
Dahl Kamp F.J. 1993	-	Uranium Ore Deposits Springer

**BOOK RECOMMENDED FOR PAPER-II**

Valdiya K.S. 1987 Environmental Geology-Tata MacgrawHill

Keller, E.A. 1978	-	Environmental Geology-Bell & Hewell
Subramaniam V. 2001	-	Textbook in Environmental Science, Narosa International
Bell, F.G. 1999	-	Geological Hazards, Routledge, London
Drury, S.A. 1987	-	Image Interpretation in Geology
Siegal, B.S. and Gillespie A.R.1980	-	Remote Sensing in Geology, John Wiley
Pandey, S.N.	-	Principles and Application of Photology. Wiley Eastern, New Delhi
Todd. D.K. 1980	-	Groundwater Hydrology, John Wiley
Raghunath, N.M. 1982	-	Ground Water, Wiley Eastern
Karanth, K.R. 1987	-	Groundwater Assessment Development and Management, Tata Macgraw Hill
Subramaniam, V.2000	-	Water, KingstonPubl. London
Sharma P.V. 1986	-	Geophysical Methods in Geology Mcgraw Hill
Krynine, D.H. & Juddwr 1998-	-	Principles of Engineering G. CBS Edition

**STATISTICS**  
**PAPER-I**  
**(Paper Code-0907)**  
**APPLIED STATISTICS**

**UNIT-I** Indian Applied Statistical System : Present official statistical system in India, Methods of collection of official statistics, their reliability and limitations, and the principal publications containing such statistics on the topics- population agriculture, industry, trade, price, labour and employment, transport and communications, banking and finance. (15L)

**UNIT-II** Demographic Methods : Sources of demographic data - census, register, adhoc survey, hospital records, demographic profiles of Indian census. Measurement of mortality and life tables- crude, death rates, infant mortality rates, death date by cause, standardized death rate, complete life table - its main features, mortality rate and probability of dying, use of survival tables. Measurement of fertility - crude birth rate, general fertility rate, total fertility rate, gross reproduction rate, net reproduction rate. (25L)

**UNIT-III** Economic Statistics : Index number - its definition, applications of index numbers. price relatives and quantity or volume relatives, link and chain relatives, problems involved in computation of index numbers, use of averages, simple aggregative and weighted average methods, Laspeyre's, Paasche's and Fisher's index numbers, time and factor reversal tests of index numbers. Consumer Price Index. (20L)

**UNIT-IV** Static laws of demand and supply, price elasticity of demand, analysis of income and allied size distribution - Pareto distribution, graphical test, fitting of Pareto's law, log normal distribution and its properties, Lorenz curve and estimation of elasticity from time series data. Gini's coefficient.

**UNIT-V** Time Series Analysis : Economic time series, its different components, Illustrations, additive and multiplicative models, determination of trend, growth curves, analysis of seasonal fluctuations construction of seasonal indices. (15L)

**REFERENCES :**

1. Croxton F.E. and Cowden D.J. (1969) : Applied General Statistics, Prentice Hall of India.
2. Goon, A.M., Gupta, M.K., Das gupta, B (1986) : Fundamentals of statistics, vol.-II, World Press, Calcutta.
3. Guide to Current Indian Official Statistics : Central Statistical Organization, Govt. of India, New Delhi.
4. Saluja M.P. ( ) Indian Official statistical Systems, Statistical Publishing Society, Calcutta.
5. Srivastava, O.S. (1983) : A textbook of Demography, Vikas Publishing.

**ADDITIONAL REFERENCES :**

1. Gupta and Mukhopadhyay P.P. ( ) Aplied Statistics, Central Book Agency.
2. Pressat R. (1978) : Statistical Demography, Methuen and Co. Ltd.



**PAPER-II**  
**(Paper Code-0908)**

**STATISTICAL QUALITY CONTROL AND COMPUTATIONAL TECHNIQUES**

**UNIT-I** Importance of statistical methods in industrial research and practice, specification of items and lot qualities corresponding to visual gauging, count and measurements, types of inspection, determination of tolerance limits. General theory of control charts, causes of variation in quality, control limits, sub-grouping, summary of out-of control criteria, charts for attributes, np chart, p-chart, c-chart, u-chart, Charts for variables- X- and R charts, design of X and R charts versus p-charts, process capability studies.

**(30L)**

**UNIT-II** Principle of acceptance sampling- problem of lot acceptance, stipulation of good and bad lots, producer's and consumers risks, single and double sampling plans, their OC functions, concepts of AQL, LTPD, AOQL, average amount of inspection and ASN function, rectifying inspection plans, Sampling inspection plans, Indian Standards Tables Part-I (including applications), IS 2500 Part I. (15L)

**UNIT-III** Computational techniques : Difference tables and methods of interpolation, Newton's and Lagrange's methods of interpolation, Divided differences, numerical differentiation and integration, Trapezoidal rule, Simpson's one-third formula, iterative solution of non-linear equations. **(15L)**

**UNIT-IV** Linear Programming : Elementary theory of convex sets, definition of general linear programming problems (LPP), formulation problems of LPP, examples of LPP, Problems occurring in various fields, graphical and Simplex method of solving an LPP, artificial variables, duality of LPP. Transportation Problem (non-degenerate and balanced cases only), Assignment Problem. (30L)

**UNIT-V** Four short notes, one from each unit. Student has to answer any two.

**REFERENCES :**

1. Brownless K.A. (1960) : Statistical theory and Methodology in Science and Engineering. John Wiley and Sons.
2. Grant E.L. (1964) : Statistical Quality Control, McGraw Hill.
3. Duncan A.J. (1974) : Quality Control and Industrial Statistics, Traporewala and Sons.
4. Gass S.I. (1975) : Linear Programming Methods and Applications, McGraw Hill.
5. Rajaraman, V. (1981) : Computer Oriented Numerical Methods, Prentice Hall.
6. Sastry S.S. (1987) : Introductory Methods of Numerical Analysis, Prentice Hall.
7. Taha H.A. (1989) : Operations Research : An Introduction, Macmillan Publishing Company.

### **ADDITIONAL REFERENCES :**

1. Bowker H.A. and Liberman G.T. (1962) : Engineering Statistics, Prentice Hall.
2. Cowden D.J. (1960) : Statistical Methods in Quality Control, Asia Publishing Society.
3. Garvin W.W. (1960) : Introduction to Linear Programming, McGraw Hill.
4. Mahajan M. (2001) : Statistical Quality Control, Dhanpat Rai & Co. (P) Ltd.
5. Rao S.S. (1984) : Optimization Theory and Applications, Wiley Eastern.
6. Krishnamurthy E.V. and Sen S.K. (1976) : Computer Based Numerical Algorithms, Affiliated East-West Press.

### **PRACTICAL**

1. Computing measures of mortality & fertility, Construction of life tables and examples involving use of life tables, Graduation of mortality rates by Gompertz curve, fitting of a logistic curve.
2. Construction of Index Numbers by Laspeyre's, Paasche's, Fisher's method.
3. Determination of trend in a time series, construction of seasonal indices.
4. Fitting of Pareto curve to income data, Lorenz curve of concentration, Estimation of price elasticity of demand from time series data.
5. Drawing of X-R, np, p and c- charts. Drawing of OC curve for single and double sampling plans for attributes, AOQ and ATI curves.
6. Construction of difference tables, use of Newton's Lagrange's methods of interpolation and divided difference formulae, numerical evaluation of integrals using Trapezoidal and Simpson's one-third formulae, solution of non-linear equation by Newton-Raphson iterative method.
7. Formulation of LPP's and their duals. Solving LPPs by graphical and simplex methods, transportation and assignment problems.

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## **DEFENCE STUDIES**

### **PAPER-I**

#### **PROBLEMS OF WAR AND PEACE (Paper Code-0921)**

**Aim :** The objective of this paper is to acquaint the students about the multidimensional problems of war and peace and humanitarian laws.

**Note :** Question will be set from each unit, there will be only internal choice.

#### **Unit-I U.N.O. AND WORLD PEACE**

1. Organs and its role.
2. Main specialized agencies of U.N.O.
3. Role of U.N.O. in world peace.
4. Peace keeping forces of the U.N.O.
5. Veto power and Security Council.

#### **Unit-II WAR AND PEACE**

1. Settlement of International Disputes.
2. Diplomatic agents and Consuls.
3. War Crimes.
4. Neutrality.
5. Intervention.

#### **Unit-III HUMANITARIAN LAW**

1. Basic concepts and development of Humanitarian law.
2. UN General Assembly declaration of human rights on Dec. 10, 1948.
3. Protection of Victims and defenceless in armed conflict, POWs, wounded and civilians in Armed Forces.
4. Central Human Right Commission : Organisation and Function.
5. State Human Right Commission : Organisation and Function.

#### **Unit-IV REFUGEE LAW**

1. Meaning, Concept and causes of Refugee.
2. Refugee and IDPs.
3. Refugee law in India.
4. Refugee Problem in South Asia.
5. Role of International Committee of Red Cross and UNO in Refugee Problems.

#### **Unit-V LAWS OF WAR**

1. Law of Land war.
2. Law of Sea war.
3. Law of Air war.
4. Space law.
5. The International Court of Justice.

#### **SELECTED READINGS :**

- |                           |   |  |
|---------------------------|---|--|
| 1. Maunce clark, J        | : | Readings in the Economics of War.              |
| 2. International Security | : | Modern political Science series.               |
| 3. Rajani Kothari         | : | Word order.                                    |
| 4. Openhem, I             | : | Use of Forces by states and International law. |

**PAPER - II**  
**MODERN WARFARE**  
**(Paper Code-922)**

**Aim :** To enable students to appreciate the impact of Political, economic and technological developments on the patterns of conflicts between nations.

**Note :** Question will be set from each unit, there will be only internal choice.

**UNIT-I** 1. Development of Nuclear weapons.

2. Effects of Nuclear Explosion.
3. Spread of Nuclear Weapons.
4. Missile and their characteristics.
5. Type of Missiles.

**UNIT-II** 1. Trends in Science and Technology and their impact on war.

2. Role of Research and Development.
3. Development of Weapons and their impact on tactics
4. Command, Control, Communication and Intelligence (C<sup>3</sup>I) in Modern Warfare.
5. Elements of National Power.

**UNIT-III** 1. Military Satellites.

2. Explosive Bombs.
3. War Gases.
4. Micro Organs : as a weapons.
5. Smart Weapons.

**UNIT-IV** 1. Rocket Technology and India.

2. Missile Technology and India.
3. Nuclear Technology and India.
4. Atomic Minerals and India.
5. Space Technology and India.

**UNIT-V** 1. New world order - Political, Social and Economical.

2. Alliance and Regional co-operation.
3. Mobilisation of resources for war.
4. War time economics.
5. New trends.

**SELECTED READINGS :**

- |                      |   |                                 |
|----------------------|---|---------------------------------|
| 1. Halailan Morton   | : | Coutemporary Military strategy  |
| 2. Brodue, Y.        | : | Strategy in the Missile Age.    |
| 3. Markabi, Y.       | : | Nuclear war and Nuclear peace   |
| 4. Osanka. F.M.      | : | Modern Guerilla warfare         |
| 5. Gerald. J.        | : | Defence Psychology              |
| 6. Know Kalus        | : | Science and Defence             |
| 7. Pandey Girishkant | : | Yudh mein vigyan aven Tachniki. |

## **PRACTICALS**

**50 marks**

There shall be practical examination of 3.5 hours duration carrying.

The division of marks shall be as follows :

(1) Plain Table Survey	: 15 Marks.
(2) Experimental Military Psychology	: 15 Marks.
(3) Group Discussion & Lectring	: 05 Marks.
(4) Viva-Voce	: 05 Marks
(5) Sessional work & Record	: 10 Marks.

### **Section - A**

Plain table Survey by inters section methods. (Atleast ten exercises in a session).

### **Section - B**

Military - Psychology Experiment :

- (1) Muller-Layer-Illusion test.
- (2) Koh's Block Design Test.
- (3) Allexander Pass Along Test.

### **Section - C**

Group Discussion and Lectures based on current topic on any international & national Problems.

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## INDUSTRIAL CHEMISTRY

### PAPER - I

(Paper Code-0925)

#### CHEMICAL PROCESS ECONOMICS

M.M. 34

- UNIT-I** 1. Factors involved in project cost estimation, methods employed for the estimation of capital investment. 06L  
2. Capital formation, elements of cost accounting. 05L
- UNIT-II** 1. Interest & investment cost, time value of money equivalence. 03L  
2. Depreciation, method of determining depreciation, taxes. 04L  
3. Some aspects of marketing, pricing policy. 04L
- UNIT-III** 1. Profitability criteria, economics of selecting alternatives. 03L  
2. Variation of costs with capacity, Break-even point, optimum batch sizes, Production, scheduling etc. 05L  
3. Sampling of Bulk materials, techniques of sampling of solids, liquids and gasses.  
4. Collection & Processing data. 02L  
5. Particle size determination. 02L  
6. Rheological properties of liquids, plastics and their analysis. 03L

#### INDUSTRIAL ORGANIZATION

- UNIT-IV** 1. Concept of scientific management in industry. 04L  
2. Functions of management, decision making, planning, organising. directing & control. 09L  
3. Location of industry. 03L
- UNIT-V** 1. Materials management. 05L  
2. Inventory control. 04L  
3. Management of human resources-selection, incentives, welfare & safety. 05L

#### BOOKS :

1. Economics of Chemical industry, Hempel, E.H.
2. Plant Design & Economics for Chemical Engineers, Peter Time Rhaus, McGraw Hill.
3. I.C.M.A. Booklets-9 & 10.
4. Industrial Organization & Management, Bethel, L.L.
5. Industrial Organization & Management, Tarachand, Vol. I & II.
6. Book on Management, O.P. Khandelwal.
7. Rheology theory & application, Vol. 5, Elrich, R.F.

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**PAPER - II**  
(Paper Code-0926)  
**PHARMACEUTICALS**

**M.M. 33**

- UNIT-I** 1. Historical Background & development of pharmaceutical industry in India in brief. 02L
2. Pharmacopoeias - Development of Indian pharmacopoeia & introduction of B.P., U.S.P., E.P., N.F. & other Important Pharmacopoeias. 02L
3. Introduction to various types of formulations & routes of administration. 02L
4. Aseptic conditions, need for sterilisation, various methods of sterilisation. 02L
- UNIT-II** 1. Various types of pharmaceutical excipients their chemistry, process of manufacture & quality, specifications Glidants, lubricants, diluants, preservatives, antioxidants, emulsifying agents, coating agents, binders, coloring agents, flavouring agents gelatin & other additives, sorbitol, mannitol, viscosity builders etc. 12L
2. Surgical dressing, sutures, ligatures with respect to the process, equipments used for manufacture, method of sterilization and quality control. 05L
- UNIT-III** 1. Pharmaceutical packaging introduction, package selection, packaging materials, ancillary materials, packaging machinery, quality control of packaging materials. 05L
2. F.D.A., Important schedules & some legal aspects of drugs. 03L
3. Pharmaceutical quality control (other than the analytical methods covered under core-subject) - sterility testing, pyrogenic testing, glass testing, bulk density of powders, etc. 06L
- UNIT-IV** 1. Evaluation of crude drugs-Moisture content, extractive value, volatile oil content, foreign organic matter, quantitative microscopic exercises, including starch, leaf content, (palisade ratio, stomatal number & index vein, islet number & vein termination number), crude fiber content, introduction to chromatographic method of identification of crude drugs. 06L
2. Chromatography, Paper chromatography, TLC, HPLC, GLC. 04L
3. Ion chromatography. 01L
- INSTRUMENTATION**
- UNIT-V** 1. UV-Visible spectroscopy. 03L
2. IR-Spectroscopy non-dispersive IR. 03L
3. NMR Spectroscopy. 03L
4. Atomic Absorption & Flame photometry. 03L
5. Neutron diffraction. 01L
6. X-Ray Fluorescence. 01L
7. Ion Selective Electrodes. 01L

**BOOKS :**

1. Instrumental methods of analysis, Willard, Merit, Dean.
2. Introduction to instrumental methods of analysis, Braun, R.D., McGraw Hill.
3. Analytical chemistry, J.B. Dick, McGraw Hill.
4. Quantitative Inorganic analysis, A. Vogel.
5. Instrumental methods of Analysis, Skoog & West.
6. Instrumental Methods of Analysis, B.K. Sharma.

**PAPER -III****(Paper Code-0927)****D R U G S****M.M. 33**

- UNIT-I**
1. Phyto-chemicals-Introduction to plant classification & crude drugs, cultivation, collection, preparations for the market & storage of medicinal plants.
  2. Classification of various types of drugs with examples.
  3. Raw materials, process of manufacture, effluent handling, etc. of the following bulk drugs :-  
(i) Sulpha drugs-sulphaguandine, sulphamethoxazole.
- UNIT-II**
1. Chemical constitution of plants including carbohydrates, amino acids, proteins, fats, waxes, volatile oils, terpenoids, steroids, saponins flavonoids, tanins, glycosides, alkaloids.
  2. Various isolation procedures for active ingredients with examples for alkaloids, reserpine one for steroids sapogenin, diosgenin, diogron.
- UNIT-III**
1. Antimicrobial :- Chloramphenicol, Furazolidne, Mercurochrome, Isoniazid, Na-PAS.
  2. Analgesic-AntiInflammatory :- Salicylic acid and its derivatives, Ibuprofen, Mefenamic acid.
  3. Steroidal Harmones :- Progesterone, Testosterone, Methyl testosterne.
- UNIT-IV**
1. Vitamins :- Vit.-A, Vit.-B6, Vit.-C.
  2. Barbiturates :- Pentobarbital.
  3. Blockers :- Propranolol, Atenolol.
  4. Cardiovascular Agent :- Methyl dopa.
  5. Antihistamins :- Chloropheneramine Maleate.
- UNIT-V**
1. Products based of fermentation processes :- Brief idea of micro-organisma, their structure, growth & usefulness. Enzyme systems useful for transformation, microbial products.
  2. General principles of fermentation processes & product processing.
  3. Manufacture of antibiotics - Pencillin-G & semi synthetic pencillines, Rifamycin, Vitamin-B12.
  4. Bio-transformation process for prednisolone, 11-hydroxylation in steroids.
  5. Enzyme catalysed transformation, manufacture of ephidrine.

  
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## BOOKS :-

1. Practical Pharmacognosy, T.B. Willis.
2. Practical Pharmacognosy, T.N. Vasudevan.
3. Modern Pharmacognosy, Remstad, McGraw Hill.
4. Indian Pharmacopoea, 1985.
5. British Pharmacopoea, 1990.
6. Hand Book of Drugs & Cosmetic Act, Mehrotra.
7. Pharmaceutical excipients.
8. Pharmaceutical Dosage forms.
9. Principles of Medicinal Chemistry, W.O. Foye, Lea & Febigen, Publication Philadelphia.
10. Text Book of Organic Medicinal & Pharmaceutical Chemistry, Willson, Gisvold, Derge; Lippinett-Toppan.
11. Essentials of Medicinal Chemistry, Korolkovas & Burkhatner, Wiley Interscience.

## PRACTICAL

**Marks : 50**

The Practical examination will be of 08 Hrs. Duration spread over two days carrying 50 Marks.

Two experiments have to be performed.

1. Synthesis of common industrial compounds involving two step reactions. 4-Bromoaniline, 3-Nitroaniline, Sulphanilamide, 4-Aminobenzoic acid, 4-Nitrobenzoic acid, dihalobenzenes, Nitrohalobenzenes.
2. Industrial analysis of common raw materials as per industrial specification :- Phenol, Aniline, Formaldehyde, Hydrogen peroxide, Acetone, Epoxide, Olefins, Oils etc.
3. Demonstration of various pharmaceutical packaging materials, quality control tests of some materials, -Al Strips, Cartons, Glass bottles.
4. Limit tests for chlorine, heavy metals, arsenic, etc. of two representative bulk drugs.
5. Demonstration of various pharmaceutical products.
6. Active ingredient analysis of few types of formulations representing different methods of analysis-acidimetry, alkalimetry, non-aqueous.
7. Determination of sulphate ash, loss on drying & other tests of bulk drugs, complete I.P. monograph of three drugs representing variety of testing methods.
8. Evaluation of crude drugs-macroscopic examination-determination & identification of starch granules, calcium oxalate.
9. Palisade ratio, stomatal index-determination & Identification of few drugs. TLC method for identification.
10. Microbiological testing-determination of MIC of some antibacterial drugs by zone/cup plate method.

## DISTRIBUTION OF MARKS :

1. Experiment No. 1.	20
2. Experiment No. 2.	10
3. Viva	05
4. Sessional	05
5. Project Work	10
<b>Total</b>	<b>50</b>



**COMPUTER SCIENCE**  
**PAPER - I**  
**(Paper Code-0909)**  
**COMPUTER HARDWARE PART-C**

**AIM :** The emphasis is on the design concepts & organisational details of the common PC, leaving the complicated Electronics of the system to the computer engineers.

**Objective of the Course :**

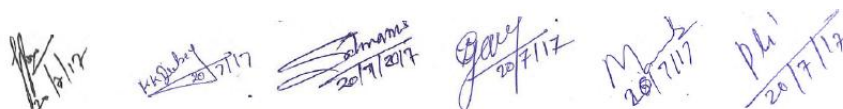
1. To introduce the overall organisation of the microcomputers and operating systems.
2. To introduce the interaction of common devices used with computers with operating softwares, excluding the Assembly languages, with special reference to DOS/WINDOWS.
3. To introduce the working of hardware components, Micro-Processor and various chips used in micro-computers by operating system, without the use of electronic circuitry.
4. To introduce the use of operating systems architecture with IBM-PC & clones, excluding Assembly language, with forms an important part of hardwares.

**N.B. :** Since the computer organisation study is very vast & complicated, so the study is restricted only to the description and understanding part, hence the paper-setter is requested to keep this important factor in mind.

**UNIT-1 : ORGANISATION OF Micro-Processor & MICRO-COMPUTER :-**

**1. Introduction & organisation of Micro-Computer :**

- (a) Basic Components of Micro-computer : Basic Block; Prom ram memory; Data memory; I/O Ports; Clock generator; Integration of functional blocks.
- (b) Interconnecting Components in a Micro-computer : Necessary functional block; Bussed architecture for microcomputer; memory addressing; Addressing I/O ports; comparison of I/O mapped and memory mapped I/O.
- (c) Input Output Techniques : Non-CPU devices, Program & interrupt controlled I/O; Hardware controlled I/O or DMA.

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## 2. An Introduction to the various as :

- (a) General understanding of different  $\mu$  P or CPU :  
Intel 8088, 286, 386, 486, 586 Pentium, P54C, MMX P55C;  
Motorola 6800 & 88100 series; CYRIX & AMD CPUs.
- (b) The Registers of CPU : (Give Example of P-8088) Register organisation of 8088, Scratch pad segment, pointer, Index and Flag, Registers.
- (c) Memory addressing modes of P-8088 : Segment offset; Data addressing modes; Addressing for branch instructions.
- (d) I/O Addressing with P-8088 : Memory mapped I/O & I/O mapped I/O.

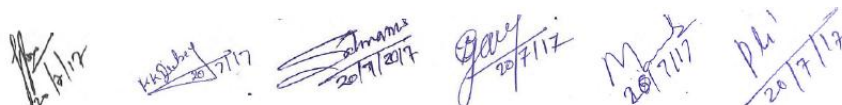
## UNIT-2 : SYSTEM HARDWARE ORGANISATION OF COMPUTERS :

### 1. Hardware Organisation of the Personal Computer :

- (a) Block diagram with various parts of PC.
- (b) The Mother Board of General P.C. : 8088 CPU; ROM & RAM; Keyboard & its interface; System timer/counters; Hardware interrupt vectoring; DMA controller & channels; Interfacing to audio speaker; Bus slots & feature cards.
- (c) The Serial I/O ports, COM-1 & COM-2.
- (d) The parallel Port for Printer.
- (e) Expansion Slots for RAM.
- (f) Disk Controllers : For floppy, Hard disk, CD-ROM & Cassetts drives.

### 2. The Video Display of PCs :

- (a) Video Monitors; Monochrome and colour.
- (b) Video Display Adapters & Their Video Modes; Monochrome & colour graphics adapters.
- (c) Video Control Through ANSI-SYS.
- (d) Video Control Through ROM-BIOS : INT 10H.
- (e) Direct Video Control; Monochrome & colour graphics adapters.
- (f) Installing Customized Character Sets.

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### **UNIT-3 : ORGANISATION OF OPERATING SYSTEM WITH SYSTEM HARDWARE :**

#### **1. The ROM-BIOS Services :**

- (a) Introduction to UNIX, ENIX, SUN, solaris, DOS & MAC with special reference to DOS & Windows, its ver., as DOS becomes more popular than others in PCs.
- (b) The ROM-BIOS Diskette Services, INT 13H.
- (c) The ROM-BIOS Serial Port Services, INT 14H.
- (d) The ROM-BIOS Keyboard Services, INT 16H.
- (e) The ROM-BIOS Printer Services, INT 17H.
- (f) Miscellaneous Service Provided by the ROM-BIOS : INT 05H, INT 11H, INT 12H, INT 18H, INT 19H, INT 1AH.

#### **2. The fundamental of Operating System viz. DOS/WINDOWS :**

- (a) The loading of DOS & Its Basic Structure ; ROM bootstrap, IO.SYS, DOS.SYS & Command.COM.
- (b) The Execution of the programs under DOS ; EXEC functions, program segment prefix; Features of COM & EXE program files.
- (c) Device Handling by Dos ; FDD, HDD, CON, Keyboard, PRN, AUX, CLOCK and NUL devices; Block devices; Character devices; Driver installation sequence.
- (d) File Structures of DOS ;
- (e) The DOS Interrupts : INT 20H-2FH
- (f) The DOS functions through INT 21H; Discuss only the understanding part of various other DOS function to handle hard & softwares.
- (g) Installation of windows : Important system files in windows.

### **UNIT-4 : ORGANIZATION & HANDLING BY OPERATING SYSTEMS :**

#### **1. Disk and Files under DOS :**

- (a) Logical Structure of a Disk : Organisation of disk for use; Boot record ; FAT files; disk or root directory.
- (b) File Organisation on a DOS disk : Logical volumes ; Sub directories; Volume labels.
- (c) Manipulating Files under DOS : File attributes ; date and time, file Access; FCB functions.

#### **2. Memory Allocation, Program Loading and Execution :**

- (a) Memory Management under DOS : EXEC loader; Memory Management & its functions; Modifying a Program's memory allocation.

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(b) Loading and Executing Programs under DOS : The EXEC function ;  
Memory considerations; parameter blocks; calling & returning from  
EXEC.

(c) Loading the program overlays through EXEC.

## **UNIT-5 : ORGANISATION OF HARDWARE BY OPERATING SYSTEM :**

### **1. Interrupt Handling through DOS :**

- (a) Types of interrupts.
- (b) Interrupt Vector Table in PC.
- (c) Interrupt Service Routines.
- (d) Special Interrupts in PC : Clock Interrupt; The -C or Break Interrupt  
; DOS reserved interrupt INT 28H ; Patching memory resident  
routines.

### **2. Filters for DOS :**

- (a) Filters in operating systems.
- (b) Redirection of I/O under DOS.
- (c) The Filters Supplied with DOS.
- (d) Writing Filters to run under DOS.

### **3. Handling of Various Versions of Windows O.S. :**

- (a) Setup Installation
- (b) Trouble shooting
- (c) Networking features

### **Text Book :**

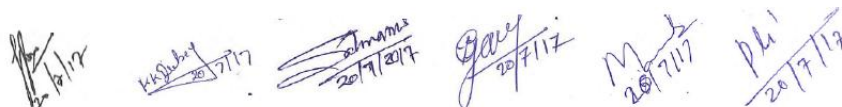
- 1. Hardware and Software of Personal Computers.  
By Sanjay K. Bose. (Wiley Eastern Ltd. New Delhi).

### **Supporting Text Books :**

- 1. Digital System from Gates to Microprocessor.  
By Sanjay K. Bose. (Wiley Eastern Ltd. New Delhi).
- 2. Computer Fundamentals : Architecture & Organisation.  
By B. Ram.. (Wiley Eastern Ltd. New Delhi).

### **Reference Books :**

- 1. IBM PC-XT and Clones : By Govinda Rajalu.
- 2. Microprocessor and interfacing : By Douglas Hall.
- 3. Insight the IBM-PC : Peter Norton.
- 4. Microprocessor System : 8086/8088 family architecture, programming &  
design : By Liu and Gibson.

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**PAPER - II**  
**(Paper Code-0910)**

**Atm** : To introduce DBMS and RDBMS using Back-end tool and Front-end tool.

**Object of the Course :**

1. To introduce Data Base Management System concepts.
2. To introduce the Relational Database Management System and Relational Database Design.
3. To introduce the RDBMS software and utility of query language.
4. To introduce basic concept of GUI Programming and database connectivity using Visual Basic.

**UNIT-1 : CONCEPT OF D.B.M.S. AND DATA MODELS**

- (a) Introduction to DBMS :- Purpose of Data base systems, views of data, Data Modeling Database Languages, Transaction management, Storage Management, Database Administrator and User, Database System Structure.
- (b) E-R Model : Basic concepts, Constraints, Keys, Mapping Constraint, E-R Diagram, Weak and Strong Entity sets, E-R Database Schema, Reduction of an E-R Schema to Table.

**UNIT-2. : RELATIONAL DATABASE MANAGEMENT SYSTEM**

- (a) Relational Model : Structure of Relational Database, Relational Algebra, Domain Relational Calculus, Extended Relational- Algebra Operation, Modification of database, Views.
- (b) Relational Database Design : Pitfalls in Relational Database Design, Decomposition Functional Dependencies, Normalization : 1NF, 2NF, BCNF, 3NF, 4NF, 5NF.

**UNIT-3 : INTRODUCTION TO RDBMS SOFTWARE - ORACLE**

- (a) Introduction : Introduction to personal and Enterprises Oracle, Data Types, Commercial Query Language, SQL, SQL\*PLUS.
- (b) DDL and DML : Creating Table, Specifying Integrity Constraint, Modifying Existing Table, Dropping Table, Inserting Deleting and Updating Rows in as Table, Where Clause, Operators, ORDER BY, GROUP Function, SQL Function, JOIN, Set Operation, SQL Sub Queries. Views : What is Views, Create, Drop and Retrieving data from views.

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- (c) Security : Management of Roles, Changing Password, Granting Roles & Privilege, with drawing privileges.
- (d) PL/SQL : Block Structure in PL/SQL, Variable and constants, Running PL/SQL in the SQL\*PLUS, Data base Access with PL/SQL, Exception Handling, Record Data type in PL/SQL, Triggers in PL/SQL.

#### **UNIT-4 : G.U.I. PROGRAMMING**

- (a) Introduction to Visual Basic : Event Driven Programming, IDE, Introduction to Object, Controlling Objects, Models and Events, Working with Forms, MDI Form Working with standard Controls.
- (b) Overview of Variables, Declaring, Scope, Arrays, User defined data types, Constants, Working with procedures : Function, Subroutine, and Property. Working with Data, Time, Format, String, and Math's Function. Controlling Program Execution: Comparison and Logical Operators, If...Then statements, Select Case Statement, Looping Structures, Exiting a loop. Error Trapping and Debugging.
- (c) File Organization : Saving data to file, Sequential and Random access file, the desing and coding.

#### **UNIT-5 : V DATA BASE PROGRAMMING IN VB**

- (a) Introduction :- Concept of DAO, RDO, ADO, input validation : field & form level validation, ADO object model : the ADO object Hierarchy, the connection object, the command object, record set object, parameter object, field object, record object, stream object, Error object, parameter object.
- (b) Using Bound control to Present ADO data : Using the ADO data control, ADO data control properties, binding simple controls : Data list, data combo, Data Grid, Data Form Wizard : single form wizard, Grid form, master/Detail form.  
  
Programming the ADO data control : Refresh method, Event, Hierarchical flex Grid control.
- (c) Data Environment & Data Report : Creating connection, Using command object in the data Environment, Data Environment option and operation, Binding Form to the data Environment, ADO Events in the Data report, Print Preview, Print, Export, Data report in code : Data reports Events, Binding data reports Directly.


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**REFERENCE BOOKS :**

1. Data Base System Concept : By Hery F. Korth, Tata McGraw Hill
2. Fundamental of Data Base : Nawathe & Elmasri (Pearson educations)  
System Concept
3. Oracle Complete Reference : By Oracle Press
4. Introduction to OOPS & VB : By V.K. Jain, Vikas Publishing House
5. Database Programming VB 6 : By B.P.B. Publication

**PRACTICALS :****1. Practicals on Oracle :**

At least 20 practicals covering the SQL, PL/SQL, Triggers, Views.

**2. Practicals on Visual Basic :**

At least 20 practicals on VB that covering basic and data controls components.

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## INFORMATION TECHNOLOGIES

### PAPER - I

(Paper Code-0928)

#### AMPLIFIERS AND OSCILLATORS

**UNIT-I POWER AMPLIFIER :** Classification of power amplifiers, requirement of power amplifiers, single ended class A power amplifier, and its efficiency, transformer coupled power amplifier, power dissipation curve, harmonic dissipation curve, harmonic distortion in pushpull power amplifier, power and efficiency calculation for pushpull for pushpull power amplifier, Distortion in pushpull power amplifier, Advantages of pushpull power amplifier.

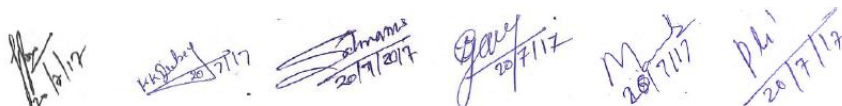
**UNIT-II FEEDBACK AMPLIFIERS AND OSCILLATORS :** Feedback in amplifiers, types of feedback positive, and negative feedback. Derivation of input and output impedance in voltage and current series feedback. Advantages of negative feedback. Positive feedback. Barkhausen criteria for sustained oscillator. RF oscillators-Hartley oscillator, Colpitts oscillators (Qualitative study) relaxation oscillators, Multivibrators-Astable, Monostable.

**UNIT-III OPERATIONAL AMPLIFIER AND POWER CONTROL DEVICES :** Differential amplifier, operational amplifier, Characteristics of an ideal OPAMP, definition of input bias current input offset current, current drift, input offset, common mode rejection ratio, slew rate, universal biasing technique, Application of OP-Amp, as inverting, non-inverting amplifiers, differentiation, Integrator, voltage follower and voltage follower, Silicon controlled rectifier (SCR), Diac, Triac and UJT (Only qualitative study).

**UNIT-IV THE INTEL 8080/8085 MICROPROCESSOR :** Introduction, the 8085 pin diagram and functions, The 8085 architecture, addressing modes, the 8080/8085 instruction set, the 8080/8085 data transfer instructions, the 8080/8085 arithmetic instructions, the 8080/8085 logical instructions the 8080/8085 stack, I/O and machine controlled instructions.

**UNIT-V PROGRAMMING THE MICROPROCESSOR :** Machine and assembly languages simplified instruction set, Instruction set, arithmetic operation, Instructions set logical operations, instruction set data transfer operations, instruction set branch operations, instruction set-subroutine call and return operations, instruction set miscellaneous operations, writing a program, addressing modes, program branching, program looping using subroutines.

Programming the 8080/8085 microprocessor : Introduction straight-line programs looping programs, mathematical programs.

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**PAPER - II**  
**(Paper Code-0929)**

**FUNDAMENTAL DATA STRUCTURE**

**UNIT-I Introduction to Data Structure :** The concept of data structure, Abstract data structure, Analysis of Algorithm, The concept of list.

**Stacks and Queues :** Introduction to stack & primitive operation on stack, Stack as an abstract data type, Multiple Stack, Stacks application : infix, post fix, and Recursion, Introduction to queues, Primitive Operations on the Queues, Queue as an abstract data type, Circular Queue, Dequeue, Priority Queue.

**UNIT-II Linked List :** Introduction to the linked list of stacks, The linked list of queues, Header nodes, Doubly linked list, Circular linked list, Stacks & Queues as a Circular linked list, Application of linked list.

**UNIT-III Trees:** Basic Terminology, Binary Trees, Tree Representations as Array & Linked list, Binary tree representation, Traversal of binary trees : In order, Preorder & post order.

Application of Binary tree, Threaded binary tree, B-Tree & Height balanced tree, representation of  $B^+$  &  $B^*$  trees, Binary tree representation of trees, Counting binary trees, 2-3 Trees algorithm or manipulating 2-3 Trees.

**UNIT-IV** Searching & Sorting : Sequential Searching, Binary search, Insertion sort, Selection sort, Quick sort, Bubble sort, Heap sort, Comparison of sorting methods.

**UNIT-V** Tables & Graphs : Hash Table, Collision resolution Techniques, Introduction to graphs, Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs. Graph Traversal Depth first & Breadth first search, Spanning Trees, minimum spanning Tree, The basic, Greedy Strategy for computing Algorithm of Kruskal and prims.

**TEXT & REFERENCE BOOK :**

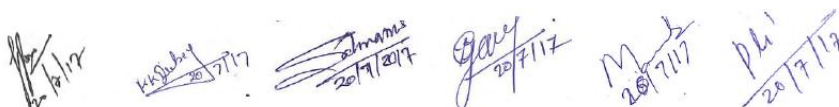
Fundamentals of Data structure : By S. Sawhney & Horowitz

Data Structure : By Trembley & Sorrenson.

Data Structure Using Pascal : By Tannenbaum & Alugenstein

Data Structure : By lipschuists (Schaume's Outline Series McGraw Hill Publication)

Fundamentals of Computer Algorithm : By Ellis Horowitz and Sartaj Sawhney.

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## PRACTICAL WORK

1. The sufficient practical work should be done for understanding the data structure with C++.
2. The sufficient practical work must be performed on stacks queues linked list, trees etc.
3. All practical works should prepared in form of print outs and voluated while practical examination.

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## **INDUSTRIAL MICROBIOLOGY**

Paper	Title	Time	Marks
First	Agriculture and Food Microbiology	3 hrs.	50
Second	Fermentation Technology & Government Regulations	3 hrs.	50
	<b>PRACTICAL</b> Examination (including sessionals)	4 hrs.	(20+5) 25
	Viva-Voce Exam. based on "Summer Job-Training Report"		25

### **PAPER-I**

**(Paper Code-0930)**

### **AGRICULTURE AND FOOD MICROBIOLOGY M.M. : 50**

- UNIT-I** Soil fertility and management of agricultural soils. Influence of available nitrogen on soil-fertility. Importance of crop-rotation. Soil management. Management practices : Pesticides and their impact and effect on soil fertility.
- UNIT-II** Microbial diseases of crop plants with special reference to Wheat, Rice, Maize, Groundnut, Mustard, Grapes, Potato and Papaya.
- UNIT-III** Control of plant diseases. Chemical control of plant diseases. Biological Control- its mechanism and importance. Biopesticides. Concept of integrated pest management (IPM). Bacterial insecticides.
- UNIT-IV** Food spoilage mechanism, Spoilage of stored products, fruits and vegetables. Microbial spoilage of milk and meat. Food borne diseases.
- UNIT-V** Food preservation methods - Asepsis, Pasteurisation canning, dessication, low temperature, Anaerobiosis, filtration.  
Chemical preservation of food - salt and sugar, organic acids. Use of SO<sub>2</sub>, ethylene and propylene oxides, wood smoke.

### **PRACTICALS**

1. Study of microbial diseases of crop plants.
2. Study of effect of fungicides and insecticides on microorganisms.
3. Study of antagonistic activities amongst microorganisms.
4. Study of fungal contaminants from stored agricultural products.
5. Study of food spoilage microorganisms from sweets and bakery products.
6. Study of effect of the preservatives on the growth of microorganisms.
7. Study of UV radiations on microorganisms.
8. Study of the effect of agrochemicals on soil inhabiting microorganisms.

### **RECOMMENDED BOOKS :**

1. Modern Plant Pathology by Bilgramy and Dubey.
2. Food Microbiology by Frazier.
3. Microbiology by S.S. Purohit.
4. Microbiology by P.D. Sharma.
5. Agricultural Microbiology by Rangaswami.
6. Plant Pathology by R.S. Mehrotra.

  
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**PAPER-II**  
**(Paper Code-0931)**

**FERMENTATION TECHNOLOGY AND GOVERNMENT REGULATIONS**

**M.M. : 50**

**UNIT-I** Fermentation equipments and production process. Principal types of fermenters - The batch fermenters, continuous stirred tank fermenters, Tubular fermenter, The fluidised bed fermenter, Solid State fermenters. Computer control of fermentation process. Strain improvement process.

**UNIT-II** Industrial production of organic acids - Lactic and citric acid.  
Enzymes - amylase, protease and amino acids - L-lysine and glutamic acid.

**UNIT-III** Production of alcohol, wine, beer and acetic acid.  
Production of antibiotics - Penicillin and Streptomycine.  
Industrial production of vitamins - Vitamin B12 and Riboflavin.

**UNIT-IV** Importance of microorganisms in dairy industries. Production of cheese, Butter milk; and in bakery industries - leavening of bread, Indian fermented foods. Fungi and bacteria as a source of single cell proteins (SCP) and proteins.

**UNIT-V** Role of international organisation in biotechnology. Government programmes for biotechnology development. Government regulations of recombinant DNA research. Hazardous industrial wastes, Mycotoxin hazards in the production of fungal products. Regulations for disposal of biohazardous materials. Patenting of the products in Industries.

**PRACTICALS**

1. Measurement of production of citric acid by *Aspergillus niger*.
2. Measurement and production of alcohol by yeast.
3. Demonstration of Transformation of steroids.
4. Demonstration of IAA production by microbes.
5. Demonstration of enzyme production by microorganisms.  
(a) Amylase (b) Cellulase
6. Demonstration of mushroom cultivation.

**RECOMMENDED BOOKS :**

1. Industrial Microbiology by L.E. Casida.
2. Fermentation Technology by Whittakar.
3. General Microbiology, Vol. II, by Powar and Daginawala.
4. Molecular Biology and Biotechnology by H.D. Kumar.
5. Elements of Biotechnology by P.K. Gupta.



## **ELECTRONICS**

	<b>Max.M.</b>	<b>Min.M</b>
Paper-I Power Electronics, Microprocessors and IT Fundamental's	50	33
Paper-II Communication Systems	50	
Paper-III Practicals and Project	50	17

### **PAPER - I**

**(Paper Code-0911)**

#### **POWER ELECTRONICS, MICROPROCESSORS AND IT FUNDAMENTAL'S**

**UNIT-I** Comparative study of semiconductor power Devices : Power Diodes, Power Transistors, Unijunction Transistor, Silicon controlled Rectifier, Diac and Triac. Structural Description and working of Unijunction Transistor (UJT), Characteristic curve, Use of a UJT as a Relaxation oscillator.

Description and working of a DIAC, Characteristic curve.

Description and working of a Triac, Characteristic curve, Triac as a switch.

Silicon controlled Rectifier : Description of the structure and idea of doping profiles of different layers, Two Transistor model analysis of SCR, Voltage current Characteristics, Forward and Reverse Blocking states; Triggering mechanisms and methods of turn on, turn off mechanism.

**UNIT-II** 8085 up Instruction Sets and Programing of 8085 microprocessor : Logic 8 bit Instructions of 8085 Data Transfer (copy) Instructions, MOV, Arithmetic Instructions (ADD, ADI, SUB, SUI, INR, DCR), Logic operations : ANA,

ANI, ORA, ORI, XRA, XRI, Branch Operations : Unconditional and Conditional Jump Instruction, Rotate Operations : RLC, RAL, RRC, RAR, 16 Bit Arithmetic and Logical operations.

Use of Instruction set to make following programs.

(i) Data Block Transfer.

(i) To Arrange a Series in Assending and Decending Order.

(i) Largest Number Finding.

(iv) To Carry out simple arithmetic operations : Addition, Division Multiplication, Subtraction.

**UNIT-III** Programmable Interface Devices : Internal Architecture and pin out diagram of the 8155/8156 and 8355/8755 Multipurpose Programmable Devices, The 8279 Programable keyboard/display interface.

Interfacing Data Converters : Digital to Analog (D/A) converter, Analog to Digital (A/ D) converter.

#### **UNIT-IV Information Technology :**

Information theory - Introduction information in communication system, measurement of information, the binary digit (bit).

Data sets and their connection requirements, Modem : Classification, modes of modem operation, modem interconnection, modem data transmission speed. Internet basics : Basic information about Http, WWW, HTML, shell and TCP/IP account, Browsers - Netscape and Internet explorer, e-mail.

#### **UNIT-V Communication Technology :**

LAN, WAN and MAN, wireless network, Internetwork, network topology, OSI and TCP/ IP reference models, comparison between them and their criticism. Details about Physical layer : magnetic media, twisted pair (UTP and STP), coaxial cable, fiber-optic cable Basic idea about ISDN.

#### **REFERENCES :**

1. Power Electronics : M.H. Rashid Prentice Hall of India, New Delhi.
2. Microprocessor Architecture : R.S. Gaonkar Penram Publication, Mumbai.  
Program and Applications
3. Computer Network : A.S. Tanenbaum, Second Edition Prentice Hall of India Pvt. Ltd.
4. Introduction to Microprocessors: A.P. Godse, VTU Publishers, Pune.
5. Power Electronics : Alok Jain Penram Publishers, Mumbai.
6. Microprocessors & Interfacing : Douglas V. Hall Tata Mcgraw Hill.

**PAPER - II**  
**(Paper Code-0912)**

**COMMUNICATION SYSTEMS**

**UNIT-I** Analysis of passive filters (low pass, band pass and high pass), elementary idea of active filters-Butterworth and Cbevyshev response) Noise : Thermal noise, shot noise, Partition noise, low frequency and transit time noise, Generation and recombination noise, equivalent noise resistance, signal to noise ratio, noise factor, noise temperature.

**UNIT-II Modulation** : Principle of modulation, wave spectra and effect of filtering an complex wave : Amplitude modulation; frequency spectrum of AM, average power average voltage, modulation index for multiple sine waves, linear and square modulators, collector modulator, balance modulator, single side band (SSB) generation/method, diode detector, advantages and disadvantages of SSB over DSB AM : SSB detection, Transmitters and Receivers : Superheterodyne receiver, AM Transmitters.

**UNIT-III Angle Modulation** : Elements of frequency and phase modulation frequency spectrum of FM waves, inter system comparisions (FM and AM); Generation of FM, direct and indirect methods; Angle - Modulator circuits, varactor diode and FET modulators; Foster Seelay discriminator and ratio detector.

**UNIT-IV Pulse Modulation** : Pulse Modulation, pulse transmission, pulse amplitude modulation, time division multiplexing, pulse time modulation, pulse width and pulse position modulation, digital filtering, pulse code modulation; Block diagrams of PCM transmission and receiving circuits.

**UNIT-V Television engineering** : Scanning process, characteristics of human eye, aspect ratio, persistence of vision and flicker, resolution and video bandwidth, interlaced scanning, blanking, synchronizing and equalizing pulses, Vestigial side band signal, standard channel characterstics, TV camera tubes Image orthicon and vidicon; Block diagram of TV transmitter and receiver.

Three colour system, luminance and chrominance signal, colour TV camera, Shadow mask, Trinitron and in line colour picure tubes.

**REFERENCES :**

- |  |  |
|--|--|
| 1. Electronic Communication Systems    | : George Kennedy, Tata Mcgraw Hill.              |
| 2. Principles of Communication Systems | : Taub & Schilling TMH                           |
| 3. Communication Systmems              | : Simon Haykin, Mcgraw Hill.                     |
| 4. Monochrome & Color Television       | : R.L. Gulati, New Age International, New Delhi. |



**PAPER - III**  
**PRACTICALS AND PROJECT**

A student is required to do atleast 12 experiments and a project work in the academic year.

The scheme of practical examination will be as follows :

- (i) One experiment and Working and Demonstration of Project works - 5 :

Marks

Experiment	-	20
Viva	-	05
Project work & Viva	-	15 (10+5)
Sessional	-	10
<b>Total</b>	<b>-</b>	<b>50</b>

1. Study of SCR characteristics.
2. Study of Diac and Triac characteristics.
3. Study of UJT Characteristics.
4. Study of UJT as a relaxation oscillator.
5. Study of AM generation and detection.
6. Radio Receiver measurements.
7. Study of low pass, band pass and high pass filters.
8. Study of FM using voltage controlled oscillators.
9. Study of DC choppers.
10. Study of Pulse code modulation.
11. Study of electronic regulation of D.C. & A.C. Motors.
12. Any four experiments on microprocessors.

**NOTE : Other experiments of equal standard may also be set.**

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## ANTHROPOLOGY

### PAPER-I

(Paper Code-0919)

#### "FUNDAMENTALS OF HUMAN GENETICS & HUMAN GROWTH"

AIM- The aim of this paper is to introduce the students the basics of Human Genetics and Human Growth.

**UNIT-I** Human Genetics : History, aims and scope. and its application to human society Cell division : Mitosis and Meiosis. Mendelism, Chromosomes ; Normal and Abnormal chromosomes. Genes, concept of DNA & RNA. Types of Inheritance : autosomal, (Dominant and Recessive). Sex linked Inheritance.

**UNIT-II** Concept of Race. Formation of Racial groups. Criteria for racial classification. Racial elements in India. Major stocks of the world and their broad sub divisions.

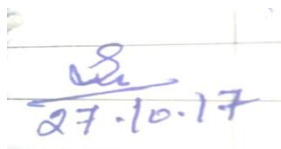
**UNIT-III** Types of twins and their importance in genetic investigation. Inheritance of ABO Blood groups, P.T.C., Colour blindness and dermatoglyphics. Genetic counselling, Eugenics. Population Genetics.

**UNIT-IV** Definition and scope of Human growth. Methods of studying human growth and Development. Ageing, Nutritional requirement for normal growth. Common nutritional disorder (Protein, Fat, Carbohydrates, Mineral, Vitamin).

**UNIT-V** Ecology : definition and scope. Varieties of human ecosystems. Environmental Population. Definition, nature and scope of biological demography. Demographic Profiles : Fertility, Mortality, Morbidity.

#### RECOMMENDED READINGS :

- |    |                             |   |                                     |
|----|-----------------------------|---|-------------------------------------|
| 1  | Agrawal S.N.                | : | India Population Problems           |
| 2  | Bogue                       | : | Principles of Demography            |
| 3  | Bresler                     | : | Human Ecology                       |
| 4  | Granand Shamir              | : | Methods of Research in Human Growth |
| 5  | Hari.I.                     | : | Biochemical Genetics Man            |
| 6  | Harrison.A.E.(editor)       | : | Human Biology                       |
| 7  | Phyllis and Home,P.S.       | : | Basic nutrition in health & disease |
| 8  | Race, R.R. & Sanger R.      | : | Blood Group in Man                  |
| 9  | Stern C.                    | : | Principles of Human Genetics        |
| 10 | Tanner, J.M.                | : | Human Growth                        |
| 11 | Theodarson                  | : | Studies in Human Ecology            |
| 12 | Walson and Lowry            | : | Growth and Development of Children  |
| 13 | Winchester A.W.             | : | Principal of Genetics               |
| 14 | रधुवंशी अरुण एवं चन्द्रलेखा | : | पर्यावरण प्रदूषण ।                  |
| 15 | Sinnot, Dunn & Dozansly     | : | Principal of Grntics                |

  
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**PAPER-II**  
**(Paper Code-0920)**

**THEORIES IN SOCIAL CULTURAL ANTHROPOLOGY**

**AIM :** The main aim of this course is to introduce the student about the basic principles and Theories of Social cultural Anthropology to-provide preliminary understanding of various theoretical models evolved by Social and Cultural Anthropology.

**UNIT-I** The contributions made by the following Anthropologists to Social-Cultural Anthropology.

(I) E.Durkheim, (II) F. Boas, (III) R. Redcfield, (IV) A. L. Kroeber, (V) S.C. Dube, (VI) M.N. Shrinivas, (VII) L.P. Vidyarthi.

**UNIT-II** Evolution: Biological and cultural Evolutionism; classical Evolutionism; E.B. Tylor, L.H. Morgan.

Neo - Evolutionism; jLeslie white, Gordon childe.

Culture traits, Culture Complex, Culture Area, and Culture focus.

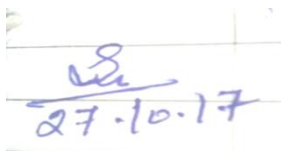
Diffusion of Culture : British diffusionist : Genrman - Austrian diffusionist ( Kuttre kriesse American diffusionist ( Culture Area).

**UNIT-III** Function and structure: Functionalism (Malinowski) and Structure Functionalism ( Redcliffe Brown ) Structuralism ( Levi Strauss).

**UNIT-IV Personality :** Basic personality and Model personality.

Culture pattern : Configurationalism ( Ruth Benedict). Anthropological study of National character.

**UNIT-V** Field work tradition in Anthropology Major tools of Research: Schedule, Questionnaire, Participant observation, interview, case study, Geneological Method. The main bases of Anthropological Methods: Historical Method, Comparative Method and Functional Method.

  
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### **PAPER-III**

### **PRACTICAL**

**Obejctive :** The main of this practical coures is to introduce the student about the tools and Method, analysis & statistical methods used in Human Biology. Laboratory Procedures in blood grouping and dermatoglyphics would give confidence in Dealing with all the applied dimensions they process.

#### **PART-I : Somatometry :**

- (a) Measurements on body :
  - (i) Height vertex, (ii) Height tragus, (iii) Suprasternale height, (iv) Biacromial Breadth, (v) Bi-illioncristal breadth, (vi) Tibial Height, (vii) Upper extremity Length, (viii) Sitting height, (ix) height dactylion, (x) Body weight.
- (b) Head and Face Measurement :
  - (i) Morphological upper facial length.
  - (i) Physiognomic upper facial length.
  - (i) Morphological facial length.
  - (iv) Bizygomatic breadth.
  - (v) Max head length
  - (vi) Max head breadth
  - (vii) Nasal length
  - (viii) Nasal breadth
- (c) Indices :
  - (i) Cephalic Index
  - (i) Nasal Index
  - (i) Facial Index

#### **PART-II Genetic Traits :**

ABO blood group ; colour blindness, PTC taste sensitivity, Dermatoglyphics, Methods of taking finger and palm prints and their analysis.

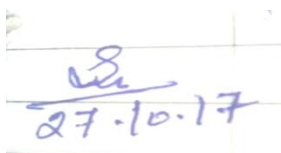
#### **PART-III Statistics**

Mean, Median, Standard deviation,  $X^2$  test.

#### **BOOKS RECOMMENDED :**

- |                              |   |  |
|------------------------------|---|--|
| 1. Basin M.K. and I.P. Singh | : | Anthropometry                            |
| 2. Cummins H. and Midlo C.   | : | An Introduction of Dermatoglyphics       |
| 3. Dunsford and Bowley       | : | Blood Group Techniques                   |
| 4. Fisher R.S.               | : | Statistical methods for Research Workers |
| 5. मित्रा, मिताश्री          | : | प्रायोगिक मानव विज्ञान भाग-02            |
| 6. Olivi                     | : | Practical Anthropology                   |

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## **ELECTRONICS EQUIPMENT MAINTENANCE**

	<b>Max. Marks</b>	<b>Min. pass Marks</b>
Paper - I Trouble shooting and maintenance of audio and video Equipments.	50	17
Practical	50	17
Project	50	17

### **PAPER-I**

**(Paper Code - 0913)**

#### **TROUBLE SHOOTING AND MAINTENANCE OF AUDIO AND VIDEO EQUIPMENTS**

##### **UNIT-I REMOTE CONTROL AND SPECIAL CIRCUITS:**

Remote control, electromechanical control system, electronic touch tuning frequency synthesiser, TV tuner, automatic fine tuning (AFT), booster amplifier, automatic brightness control, instantaneous circuitry, picture tube boosters.

##### **ALIGNMENT AND SERVICING EQUIPMENTS :**

Antistatics and low leakage multimeters, soldering Iron, Vacuum tube voltmeter (VT VM) Cathode Ray Oscilloscope (CRO) single Generation Video pattern Generator Colour Bar Generation Vector Scope, High voltage probe Cable connectors shielding and Grounding.

##### **UNIT-II TELEVISION:**

Trouble shooting procedure, troubles shooting monochrome receivers, servicing of various functional blocks, trouble, shooting colour receivers, servicing circuit models, safety precautions in television servicing.

**TELEVISION CAMERA TUBES :** Basic principles and maintenance recording.

##### **UNIT-III BLOCK DIAGRAM OF VCR :**

Requirement of VCR, retaining video drums, helical scan, guard band, frequency response, servo systems, tape tension regulator, real servo, system control. Different formats, the quadruplex format, type B segmented format, type C format, the U-matic format, the 1/2" V.H.S. format, 3-Max system.

##### **UNIT-IV SIGNAL PROCESSING, CHROME PROCESSING :**

Colour under technique, recovery of down converted chrome signals, luminance processing. frequency modulation, deviation and band width, automatic gain correction, limited, pre-emphasis, replay of luminance signal, Y/C delay, drop out compensator, block diagram of main requirements, zero guard band system, turners and modulators, the modulator. Servo mechanisms and system control : Recording, playback, tracking, capstan servo system control, loading and treading and play mode, record mode, auto stops, counter, audio video muting.

## UNIT-V CARE OF MECHANICAL SYSTEM:

Cleaning of head and tape path. Lubrication, replacement of parts, replacement of audio CTC head, replacement of video drum, dihedral error, table height, tape tension. drive tongue stop brenks.

## ELECTRONIC SYSTEM ALUGNMENTS:

Instruments, fault finding the power supply, free funning speed the servo system, tracking, video system, playback section alignment, amplifier balance and gain, luminance signal adjustment, D.O.C., F.M. demodulator, limited balance, carrier leak, noise canceller, colour processing, up conversion automatic colour correction, autometric face connection recording, luminance, synctip or clamping frequency, deviation set, white clip, chrominance, summary.

## NEW TECHNOLOGIES:

Industrial aspects of consumer electronics, jigs and fixture, quality control/ management, production techniques, business cycle new technologies, compact disc, laser disc.

## PAPER - II

(Paper Code - 0914)

## PRACTICAL

A student is required to do atleast 2 experiments in an acadmic year, and one month summer Training. The scheme of practical examination will be as follows :

(1) On experiment of 3 hours duration and one month summer Training.

(2) The marks for summer training will be awarded by the teachers teaching the students on the basis of the certificate issued by the external supervisor of the summer training.

Marks

Experiment	25	Marks
Sessional	10	Marks
on month summer training	15	Marks
<b>Total</b>	<b>50</b>	<b>Marsk</b>

Orientation and connection to TV antenna. Knowledge of booster connection and replacement. Knowledge of bloon Unit - different types (for different TV sets) and replacement of ballon, Replacement of front end.

Power supply and resistance cold tests. Voltage measurement at different points.

Horizontal and vertical oscilator checking and testing using CRO.

To see and read circuit diagram and to identity (Locate) various block on p/s, H and V deflection, video amplifier, audio, section, chroma section, IF section, tuner, tube and direction yokes (connecting and

adjustment).

Audio section wave form testing step by step-sound separator, sound take off from IF section and tenonwards to detector amplifier, IF alignment and loud speaker. (intercarrier sound take off).

If stage testing : IF alignment, tunner and band select.

Chroma processor : testing singals at various IC's.

Remote control studies-range, direction various, controls, IR transmitter and receiver, coding of signal.

Fault finding: cold testing and voltage testing of various parts. (Revision of parts

## BIOTECHNOLOGY

### PAPER - I

#### GENERAL BIOTECHNOLOGY

##### Plant, Environment and Industrial Biotechnology

**Time : 3 Hrs**

**MM-50**

- UNIT-I** Plant cell and tissue culture : General introduction history, scope.  
Application of tissue culture  
Concept of cellular differentiation.  
Agro bacterium. Ti and Ri plasmid.  
Bt gene. Molecular marker (RFLP, RAPD), edible vaccines.
- UNIT-II** Organogenesis, Embryogenesis. Protoplast isolation and fusion.  
Germplasm storage and Cryopreservation.  
Anther and Ovary culture.
- UNIT-III** General introduction and scope of environmental biotechnology.  
Environmental pollution and its type.  
Control of pollution through biotechnology, Wastewater treatment:- Physical, Chemical, and Biological.
- UNIT-IV** Biofertilizer, Biopesticides, IPR.  
Global environmental problem- General introduction, Ozone depletion. Acid rain.  
Green house effect.
- UNIT-V** Bioreactors and its type.  
Fermentation (Lactic acid, alcohol).  
Maintenance of Industrial microorganisms.  
Food technology- introduction, canning. packing and food preservation.

### PAPER – II

#### IMMUNOLOGY

**Time : 3 Hrs**

**MM-50**

- UNIT-I** Immunology - General Concept, history and Development.  
Immune system and immunity, Organization of Immune system.  
Antigen - Antibody and its type.
- UNIT-II** Cell involved in immune system. Type and cells. Basic structure and function.  
Cytokines.  
Cell mediated immunity Interferons. Hypersensitivity.
- UNIT-III** Antigen - antibody interaction. Principles and types.  
Immunohaematology - General concept. Blood group system. Rh factor. medical application of blood groups.
- UNIT-IV** Origin and diversity in immune system.  
Effectors mechanisms.  
Immunity of infection diseases monoclonal Antibodies.
- UNIT-V** Autoimmune diseases. Hemolytic anemia. Rheumatoid arthritis. Insulin dependent diabetes. Myasthenia gravis. Organ transplantation.  
Immunodeficient diseases. Cancers. AIDS.

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## PRACTICAL

### EXPERIMENTS

#### Plant :

1. Sterilization of plant materials.
2. Preparation of Tissue culture media.
3. Plant tissue culture by plant parts.

#### Environment :

1. Determination of total dissolved solids of water.
2. Determination of DO, BOD, COD of water.
3. MPN Test.

#### Industrial :

1. Food preservation techniques.
2. Application of biopesticides on microorganisms
3. Production of Citric acid by microorganisms.

#### Immunology :

1. Blood grouping in relation to Antigen Antibody interaction.
2. Rh factor determination.
3. Widal Test
4. VDRL Test.
5. Double diffusion experiment
6. ELISA Test

## BIOTECHNOLOGY

Time : 4 HRS

MM-50

#### Scheme

#### Marks

- |   |    |
|---|----|
| 1. Experiment based on Paper - I  |    |
| (i) Plant tissue culture  | 08 |
| (i) Environment / Industrial  | 07 |
| 2. Experiment based on Paper - II                                       | 15 |
| 3. Spots 05 (based on paper I & II, at least two spots from each paper) | 10 |
| 4. Viva-voce  | 05 |
| 5. Sessional  | 05 |

**Total**

**50**

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## BOOKS-

1. A test Book of Biotechnology : Indu Shekher Thakur - I.K. International Pvt. Ltd., New Delhi.
2. Biotechnology (Fundamentals and Applications) : S.S. Purohit - Agrobios (India), Jodhpur.
3. Fundamentals of Microbiology and Immunology : Ajit Kr. Banerjee, Nirmalya Banerjee - New central Book Agency (P) Ltd., Kolkata.
4. Plant Biotechnology : R.S. Chawla - Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
5. Plant Biotechnology : B.D. Singh - Kalyani Publication, New Delhi.
6. Biotechnology : Fundamental & Application : S.S. Purohit
7. Immunology : J. Kubey et al.
8. Immunology : Roitt et al.
9. Fundamental of Immunology : W. Paul.
10. Plant Tissue culture : Rojgov
11. Plant Tissue Culture (Practical) : H.S. Chawla.

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*Sharma*  
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**BIOCHEMISTRY**  
**PAPER - I**  
**MOLECULAR BIOLOGY**

**UNIT-I-BASIC CONCEPTS OF GENETIC INFORMATION**

- a. Nucleic acids as genetic information carriers, experimental evidence e.g. bacterial genetic transformation, Hershey - Chase Experiment, TMV reconstitution experiment.
- b. Central dogma of molecular genetics - current version, reverse transcription and retroviruses.
- c. Primary structure of nucleic acids and their properties, silent features of eukaryotic, prokaryotic and viral genome; highly repetitive, moderately repetitive and unique DNA sequences.
- d. Basic concepts about the secondary structures of nucleic acids, 5' 3' direction antiparallel strands, base composition, base equivalence, base pairing and base stacking in DNA molecule. and buoyant density and there.

**UNIT-II-STRUCTURAL LEVELS OF NUCLEIC ACIDS AND SEQUENCING**

- a. Secondary and tertiary structure of DNA : Watson and Crick model, A.B. and Z types of DNA major and minor grooves, chirality of DNA, tertiary structure of DNA.
- b. Structure and properties of RNA; Classes of RNA secondary and tertiary structures.
- c. Nucleic acid hybridization : Cot value and satellite DNA.
- d. Sequencing : Restriction and modification system; sequencing of DNA and RNA.

**UNIT-III a. DNA REPLICATION**

DNA replication in prokaryotes - conservative, semi conservative and dispersive types, experimental evidence for semi conservative replication. DNA polymerases, other enzymes and protein factors involved in replication. Mechanism of replication. Inhibitors of DNA replication.

The image shows six handwritten signatures, each followed by the date '24.7.17'. The signatures are written in blue ink on a white background. The first signature is 'Arjun', the second is 'Arjun', the third is 'Arjun', the fourth is 'Arjun', the fifth is 'Arjun', and the sixth is 'Arjun'.

## **b. TRANSCRIPTION**

Transcription in prokaryotes RNA polymerase, promoters, initiation, elongation and termination of RNA synthesis, inhibitors of transcription. Reverse tran-scriptase, post transcriptional processing of RNA in eukaryotes.

## **UNIT-IV TRANSLATION AND REGULATION OF GENE EXPRESSION**

- a. Genetic code : Basic feature of genetic code, biological significance of degeneracy. Wobble hypothesis, gene within genes and overlapping genes.
- b. Mechanism of translation : Ribosome tructure, A and P sites, charged tRNA, f-mat-tRNA initiator codon, Shine Dalgarno consensus sequence (AGGA), formation of 70S initiation complex, role of EF-Tu, EF-Ts, EF G and GTP, nonsense codons and release factors RF 1 and RF 2.
- c. Regulation of gene Expression in prokaryotes : Enzyme induction and repression, operon concepts, Lac operon, Trp operon.

## **UNIT-V MUTATION AND REPAIR**

- a. Mutation: Molecular basis of mutation, types of mutation, e.g. transition, transversion frame shift, insertion, deletion, suppresser sensitive, germinal and somatic, backward and forward mutations, true reversion and suppresion, dominant and recessive mutation, spontaneous and induced mutations = Ledergerg's replica plating experiment.
- b. Mutagenecity testing : Correlation of mutagenecity and carcinogenicity : Ames testing, Random and site directed mutagenesis.
- c. DNA Rapair : UV repair system in E.Coli, Significance of thymine in DNA.

## **RECOMBINATION AND TECHNOLOGY**

Restriction endonucleases, brief discussion of steps in DNA cloning. Application of recombinant DNA technology.

### **Books:**

1. Biochemistry J David Rawn, Neil Patterson Publisher, North Carolina.
2. Molecular biology of the gene JD Watson, NH Hopkins, JW Robert, JP Stretz, AM Weiner, Freeman San Francisco.
3. Fundamental of biochemistry by D Voet and CW Pratt, John Wiley & Sons, NY.
4. Text book of biochemistry Thomas M Devin, John Weley & Sons, NY.

Handwritten signatures and dates at the bottom of the page, including "24.7.2017" and "24/7/17".

**PAPER - II**  
**NUTRITIONAL, CLINICAL & ENVIRONMENTAL BIOCHEMISTRY**  
**M.M.-50**

**UNIT-I NUTRITIONAL BIOCHEMISTRY**

**Nutrition and dietary habits**

- a. Introduction and definition of foods and nutritiori. Factors determining food acceptance, physiological, energy, body building (growth and development).  
  
Regulation of body temperature. Physiology and nutrition of carbohydrates, fats, proteins and water. Vitamins A,D,E,K, Vit B-Complex and Vit C and minerals like Ca, Fe and Iodine and their biological functions. Basic food groups : energy giving foods, body building foods and protective foods.
- b. Composition of balanced diet, recommended dietary allowances (RDA) for average indian, locally available foods, inexpensive quality foods and food stuff's rich in mor ethan one nutrients. Balanced vegetarian diet, emphasis on nutritional adequacy.

**UNIT-II NUTRITATIVE AND CALORIFIC VALUES OF FOODS**

- a. Basic concepts of energy expenditure, units of energy, measurement of energy expenditure by direct or indirect calorimetry, calculation of non protein RQ with respect to carbohydrates and lipids. Determination of heat production of the diet. The basal metabolism and method of measuring basal metabolic rate (BMR) energy requirements during growth, pregnancy, lactation and various physiologi-cal activities. Calculation of energy expenditure of average man and women.

The image shows six handwritten signatures, each followed by the date '24.7.17'. The signatures are written in blue ink on a white background. The first signature is 'A. B. S.', the second is 'A. B. S.', the third is 'B. S. S.', the fourth is 'B. S. S.', the fifth is 'B. S. S.', and the sixth is 'B. S. S.'.

- b. Specific dynamic action (SDA) of foods, nutritive value of various kinds of foods generally used by Indian population. Planning of dietary regimes for infants, during pregnancy and old age. Malnutrition, its implications and relationship with dietary habits and prevention of malnutrition specially protein-calories malnutrition (Kwashiorkor and Marasmus) by improvements of diets. Human milk and its virtues, breast vs formulated milk feeding. Food preservation standards, food adulterations and precautions, government regulations on preservation and quality of food.

### UNIT-III CLINICAL BIOCHEMISTRY

#### i) Basic concepts of clinical biochemistry

- a. Definition and scope of clinical biochemistry in diagnosis, a brief review of units and abbreviation used in expression concentration and standard solutions. Quality control. Manual vs automation in clinical laboratory.
- b. Collection and preservation of biological fluids (blood, serum, plasma, urine and CSF) Chemical analysis of blood, urine and CSF. Normal values for important constituents (in SI units) in blood (plasma / serum), CSF and urine, clearance test for urea.

### UNIT-IV (i) CLINICAL ENZYMOLOGY

- a. Definition of functional and non- functional plasma enzymes. Isozymes and diagnostics Tests. Enzymes pattern in health and diseases with special mention of plasma lipase, amylase, cholinesterase, alkaline and acid phosphatase, SGOT, SGPT, LDH and CPK.
- b. Functional tests of kidney, liver and gastric fluids.
- (i) Hypo and hyper-glycemia, glycogen storage diseases, lipid malabsorption and steatorrhea, sphingolipidosis, role of lipoproteins. Inborn errors of amino acid metabolism alkaptonuria, phenyl-ketonuria, albinism, gout and hyper-uricemia.

### UNIT-V ENVIRONMENTAL BIOCHEMISTRY

- (i) **Air pollution** : Particulate matter, compounds of carbon, sulphur, nitrogen and their interactions, methods of their estimation, their effect on atmosphere.
- (ii) **Water pollution** : Types of water bodies and their general characteristic, major pollutants in domestic, agricultural and industrial wastes, methods of their estimation, effects of pollutants on plants and animals, treatment of domestic and industrial wastes, solid-wastes and their treatment.

A series of six handwritten signatures and dates, likely indicating approvals or verifications. The signatures are written in blue ink on a white background. The dates are all 24.7.17.

**Books :**

1. Modern nutrition in health and disease by Whol and Goodhart.
2. Human nutrition and Dietetics-S. Davidson and passmore-ELBS Zurich.
3. Tietz fundamental of clinical Chemistry by Cart A Burits & ER Ashwood Saunders WB Co.
4. Leacture Notes on Clinical Biochemistry-LG Whitby, AF Smith, GJ Beckett.

**PRACTICAL FOR IIIrd YEAR****LABORATORY - III (BCH 305)**

1. Estimation of DNA by diphenylamine method.
2. Effect of temperature on the viscosity of DNA using Ostwald's Viscometer.
3. Extraction of RNA and its estimation by Orcinol method.
4. Estimation of hemoglobin by measuring total iron in blood.
5. Estimation of calcium and phosphorus in serum & urine.
6. Estimation of creatine and creatinine in urine.
7. Estimation of immunoglobulins by precipitation with saturated ammonium sulphate.
8. Denaturation fo enzyme, studies on DNA.
9. a. Separation of proteins by column chromatography. b. Determination of proteins by dye binding assay.
10. Separation of proteins by SDS-polyacrylamide gel electrophoresis.

Abhinav  
24.7.2017

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# हेमचंद यादव विश्वविद्यालय, दुर्ग (छ.ग.)

(पूर्व नाम- दुर्ग विश्वविद्यालय, दुर्ग)

रायपुर नाका दुर्ग (छ.ग.)-491001

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वेब साइट : [www.durguniversity.ac.in](http://www.durguniversity.ac.in)

दूरभाष : 0788-2359400

क्र. 2960/A / अका. / 2020

दुर्ग, दिनांक 10/9/2020

प्रति,

प्राचार्य,  
समस्त संबद्ध महाविद्यालय,  
हेमचंद यादव विश्वविद्यालय,  
दुर्ग (छ.ग.)

विषय:- स्नातक स्तर भाग-दो के पाठ्यक्रम विषयक।

संदर्भ:- संयुक्त संचालक, उच्च शिक्षा विभाग के पत्र क्र. 2456/315/आउशि/सम/2019, दिनांक 16.05.2019।

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विषयांतर्गत लेख है कि संदर्भित पत्र के माध्यम से प्राप्त स्नातक स्तर भाग-दो के निम्नलिखित कक्षा/विषयों के परिवर्तित/संशोधित पाठ्यक्रम शिक्षा सत्र 2020-21 से लागू किये जाते हैं:-

1. बी.ए. — आधार पाठ्यक्रम-हिन्दी भाषा, हिन्दी साहित्य, राजनीतिशास्त्र, अर्थशास्त्र, नृत्य, दर्शनशास्त्र, समाजशास्त्र, इतिहास, मानवविज्ञान, संस्कृत, सांख्यिकी प्राचीन भारतीय इतिहास, भूगोल, मनोविज्ञान
2. बी.एस-सी.- आधार पाठ्यक्रम-हिन्दी भाषा, जीव विज्ञान, मानवविज्ञान, बायोटेक्नोलॉजी, कम्प्यूटर साईंस, गणित, भौतिक शास्त्र, प्राणीशास्त्र, सूक्ष्मजीव विज्ञान, वनस्पतिशास्त्र, भूविज्ञान, इलेक्ट्रॉनिक्स, रसायन शास्त्र, सांख्यिकी, भूगोल।
3. बी.ए./बी.एस.सी (गृह विज्ञान) — आधार पाठ्यक्रम — हिन्दी भाषा एवं गृह विज्ञान।

उपरोक्त विषयों को शिक्षा सत्र 2020-21 से संशोधित रूप में स्नातक स्तर भाग-दो के लिए लागू किया जाता है स्नातक स्तर भाग-एक हेतु सत्र 2019-20 में लागू पाठ्यक्रम मान्य होंगे एवं भाग — तीन के पाठ्यक्रम यथावत रहेंगे।

टीप:- परिवर्तित/संशोधित पाठ्यक्रम विश्वविद्यालय के परीक्षा विभाग एवं वेबसाइट पर प्रकाशित करने हेतु वेबसाइट प्रभारी को उपलब्ध करा दी गई है।

कुलसचिव

क्र. 2961/A / अका. / 2020

दुर्ग, दिनांक 10/9/2020

प्रतिलिपि:-

1. संयुक्त संचालक, उच्च शिक्षा विभाग के पत्र क्र. 2456/315/आउशि/सम/2019, दिनांक 16.05.2019 परिपेक्ष्य में सूचनार्थ।
2. उपकुलसचिव, परीक्षा विभाग एवं उपकुलसचिव, गोपनीय विभाग हेमचंद यादव विश्वविद्यालय, दुर्ग।
3. कुलपति के निज सहायक एवं कुलसचिव के निज सहायक, हेमचंद यादव विश्वविद्यालय, दुर्ग।

सहा. कुलसचिव (अका.)

**REVISED ORDINANCE NO. 21**  
**BACHELOR OF SCIENCE**

1. The three year course has been broken up into three Parts. Part-I known as B.Sc. Part-I examination at the end of the first year, Part-II known as B.Sc. Part-II examination at the end of the second year and Part-III known as B.Sc. Part-III examination at the end of the third year.
2. A candidate who after passing (10+2) Higher Secondary or Intermediate examination of C.G. Board of Secondary Education Bhopal or any other Examination recognised by the University or C.G. Board of Secondary Education as equivalent thereto, has attended a regular course of study in an affiliated College or in the Teaching Department of the University for one academic year shall be eligible for appearing at the B.Sc. Part-I examination.
3. A candidate who, after passing the B.Sc.-I examination of the University or any other examination recognised by the University as equivalent thereto, has attended a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.Sc. Part-II examination.
4. A candidate who, after passing the B.Sc. Part-II examination of the University, has completed a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.Sc. Part-III examination.
5. Besides regular students, subject to their compliance with this Ordinance ex-student and non-collegiate candidates shall be permitted to offer only such subjects/papers as are taught to the regular student at any of the University Teaching Department or College.
6. Every candidate appearing in B.Sc. Part-I, Part-II and Part-III examination shall be examined in-
  - (i) Foundation Course:
  - (ii) Any one of the following combinations of three subjects:-
    1. Physics, Chemistry & Mathematics.
    2. Chemistry, Botany & Zoology.
    3. Chemistry, Physics & Geology.
    4. Chemistry, Botany & Geology.
    5. Chemistry, Zoology & Geology.
    6. Geology, Physics & Mathematics.
    7. Chemistry, Mathematics & Geology.
    8. Chemistry, Botany & Defence Studies.
    9. Chemistry, Zoology & Defence Studies.
    10. Physics, Mathematics & Defence Studies.
    11. Chemistry, Geology & Defence Studies.

12. Physics, Mathematics & Statistics
  13. Physics, Chemistry & Statistics
  14. Chemistry, Mathematics & Statistics.
  15. Chemistry, Zoology & Anthropology.
  16. Chemistry, Botany & Anthropology.
  17. Chemistry, Geology & Anthropology.
  18. Chemistry, Mathematics & Statistics.
  19. Chemistry, Anthropology & Defence Studies.
  20. Geology, Mathematics & Statistics.
  21. Mathematics, Defence Studies & Statistics
  22. Anthropology, Mathematics & Statistics
  23. Chemistry, Anthropology & Applied Statistics
  24. Zoology, Botany & Anthropology
  25. Physics, Mathematics & Electronics.
  26. Physics, Mathematics & Computer Application
  27. Chemistry, Mathematics & Computer Application
  28. Chemistry, Bio-Chemistry & Pharmacy
  29. Chemistry, Zoology & Fisheries.
  30. Chemistry, Zoology & Agriculture
  31. Chemistry, Zoology & Sericulture
  32. Chemistry, Botany & Environmental Biology
  33. Chemistry, Botany & Microbiology
  34. Chemistry, Zoology & Microbiology
  35. Chemistry, Industrial Chemistry & Mathematics
  36. Chemistry, Industrial Chemistry & Zoology
  37. Chemistry, Biochemistry, Botany
  38. Chemistry, Biochemistry, Zoology
  39. Chemistry, Biochemistry, Microbiology
  40. Chemistry, Biotechnology, Botany
  41. Chemistry, Biotechnology, Zoology
  42. Geology, Chemistry & Geography
  43. Geology, Mathematics & Geography
  44. Mathematics, Physics & Geography
  45. Chemistry, Botany & Geography
- (iii) Practical in case prescribed for core subjects.

7. Any candidate who has passed the B.Sc. examination of the University shall be allowed to present himself for examination in any of the additional subjects prescribed for the B.Sc. examination and not taken by him at the degree examination. Such candidate will have to first appear and pass the B.Sc. Part-I examination in the subjects which he proposes to offer and then the B.Sc. Part-II and Part-III examination in the same subject. Successful candidates will be given a certificate to that effect.

8. In order to pass at any part of the three year degree course examination an examinee must obtain not less than 33% of the total marks in each subject/ group of subjects. In subject/ group of subjects where both theory and practical examination are provided an examinee must pass in both theory and practical parts of the examination separately.
9. Candidate will have to pass separately at the Part-I, Part-II and Part-III examinations. No division shall be assigned on the result of the Part-I and Part-II examination. In determining the division of the final examination, total marks obtained by the examinees in their Part-I, Part-II and Part-III examination in the aggregate shall be taken in to account. Provided in case of candidate who has passed the examination through supplementary examination having failed in one subject/ group only, the total aggregate marks being carried over for determining the division shall include actual marks obtained in the subject/ group in which he appeared at the supplementary examination.
10. Successful examinee at the Part-III examination obtaining 60% or more marks shall be placed in the First Division, those obtaining less than 60% but not less than 45% marks in the Second Division and other successful examinees in the Third Division.

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## SCHEME OF EXAMINATION

Subject	Paper	Max. Marks	Total Marks	Min. Marks
C Environmental Studies		75	100	33
Fild Work		25		
<b>Foundation Course</b>				
Hindi Language		75	75	26
English Language		75	75	26

**नोट:-** प्रत्येक में से 02 (दो) प्रश्न करने होंगे । सभी प्रश्न समान अंक के होंगे ।

Three Elective Subject :

1.	Physics	I	50	100	33
		II	50		
2.	Chemistry	Practical		50	17
		I	33		
		II	33	100	33
		III	34		
3.	Mathematics	Practical		50	17
		I	50		
		II	50	150	50
		III	50		
4.	Botany	I	50	100	33
		II	50		
5.	Zoology	Practical		50	17
		I	50	100	33
		II	50		
6.	Geology	Practical		50	17
		I	50	100	33
		II	50		
7.	Statistics	Practical	50		17
		I	50	100	33
		II	50		
8.	Anthropology	Practical		50	17
		I	50	100	50
		II	50		
		Practical		50	17

Subject	Paper	Max. Marks	Total Marks	Min. Marks
Compulsory Subject–Foundation Course:				
9. Defense Studies	I	50	100	33
	II	50		
	Practical		50	17
10. MicroBiology	I	50	100	33
	II	50		
	Practical		50	17
11. Computer Sciences	I	50	100	33
	II	50		
	Practical		50	17
12. Information Technology	I	50	100	33
	II	50		
	Practical		50	17
13. Industrial Chemistry	I	34		
	II	33	100	33
	III	33		
	Practical		50	17
14. BioChemistry	I	50		
	II	50	100	33
15. BioTechnology	Practical	50	50	17
	I			
	II	50	100	33
	Practical		50	17

### USE OF CALCULATORS

The Students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986.

1. Student will bring their own Calculators.
2. Calculators will not be provided either by the University or examination centres.
3. Calculators with, memory and following variables be permitted +, -, x,  $\div$ , square, reciprocal, exponentials log, square root, trigonometric functions, sine, cosine, tangent etc. factorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.

- - - - -

संशोधित पाठ्यक्रम  
बी.ए./बी.एस-सी./बी.कॉम./बी.एच.एस.-सी.  
भाग - दो, आधार पाठ्यक्रम  
प्रश्न पत्र - प्रथम (हिन्दी भाषा) (पेपर कोड - 0171)

पूर्णांक- 75

खण्ड - क निम्नलिखित 5 लेखकों के पाठ शामिल होंगे -

अंक-35

- |                        |   |                          |
|------------------------|---|--------------------------|
| 1. महात्मा गांधी       | — | चोरी और प्रायश्चित       |
| 2. आचार्य नरेंद्र देव  | — | युवकों का समाज में स्थान |
| 3. वासुदेव शरण अग्रवाल | — | मातृभूमि                 |
| 4. हरि ठाकुर           | — | डॉ. खूबचंद बघेल          |
| 5. पं. माधवराव सप्रे   | — | सम्भाषण-कुशलता           |

खण्ड-ख हिन्दी भाषा और उसके विविध रूप

अंक-16

1. कार्यालयीन भाषा
2. मीडिया की भाषा
3. वित्त एवं वाणिज्य की भाषा
4. मशीनी भाषा

खण्ड-ग हिन्दी की व्याकरणिक कोटियाँ

अंक-24

संज्ञा, सर्वनाम, विशेषण, क्रिया विशेषण,  
समास, संधि एवं संक्षिप्तियाँ  
अनुवाद व्यवहार : अंग्रेजी से हिन्दी में अनुवाद

इकाई विभाजन-

- |         |   |
|---------|---|
| इकाई- 1 | चोरी और प्रायश्चित : महात्मा गांधी / कार्यालयीन भाषा, मीडिया की भाषा                        |
| इकाई- 2 | युवकों का समाज में स्थान : आचार्य नरेन्द्र देव / वित्त एवं वाणिज्य की भाषा, मशीनी भाषा      |
| इकाई- 3 | मातृभूमि: वासुदेवशरण अग्रवाल / संज्ञा सर्वनाम, विशेषण, क्रिया विशेषण                        |
| इकाई- 4 | डॉ. खूबचंद बघेल : हरि ठाकुर/समास, संधि,   |
| इकाई- 5 | सम्भाषण-कुशलता : पं. माधवराव सप्रे, / अनुवाद - अंग्रेजी से हिन्दी में अनुवाद, संक्षिप्तियाँ |

मूल्यांकन योजना -

प्रत्येक इकाई से एक-एक प्रश्न पूछे जाएंगे। प्रत्येक प्रश्न में आंतरिक विकल्प होगा। प्रत्येक प्रश्न के 15 अंक होंगे। प्रत्येक इकाई को दो-दो खण्डों (क्रमशः 'क' और 'ख' में) विभक्त करते हुए निर्धारित पाठ से 8 एवं शेष पाठ्य सामग्री से 7 अंक के प्रश्न होंगे। इस प्रकार पूरे प्रश्न-पत्र के पूर्णांक 75 होंगे।

**पाठ्यक्रम संशोधन का औचित्य :** विद्यार्थी चर्चित एवं सुप्रसिद्ध व्यक्तियों के लेख के माध्यम से समाज एवं राष्ट्रहित के साथ-साथ व्यक्तित्व विकास विषयक मुद्दों से परिचित हो सकें तथा व्याकरणक एवं भाषा विषयक प्रस्तावित पाठ्यक्रम के माध्यम से हिन्दी भाषा संबंधित प्रयोग पक्ष से परिचित होते हुए प्रतियोगी परीक्षाओं की दृष्टि से ज्ञानार्जन कर सकें।



ENGLISH LANGUAGE (Paper Code-1132)

B.A. / B.Sc. /B.COM. /B.H. Sc. - II

M.M.75

The question paper for B.A. /B.Sc./B.Com./B.H.Sc., English Language and cultural values shall comprise the following units:

UNIT-I Short answer questions to be passed by (Five short answer questions of three marks each) 15 Marks

UNIT-II (a) Reading comprehension of an unseen passage 05 Marks  
(b) Vocabulary

UNIT-III Report-Writing 10 Marks

UNIT-IV Expansion of an idea 10 Marks

UNIT-V Grammar and Vocabulary based on the prescribed text book. 20+15Marks

Note: Question on all the units shall asked from the prescribed text which will  
Comprise Specimens of popular creative/writing and the following it any

a Matter & technology

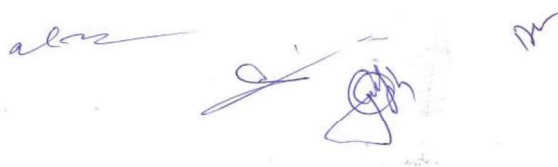
- i. State of matter and its structure
- ii. Technology (Electronics Communication, Space Science)

b Our Scientists & Institutions

- I. Life & work of our eminent scientist Arya Bhatt. Kaard  
Charak Shusruta, Nagarjuna, J.C. Bose and C.V. Raman, S.  
Rmanujam, Homi J. Babha Birbal Sahani.
- II. Indian Scientific Institutions (Ancient & Modern)

Books Prescribed:

Foundation English for U.G. Second Year - Published by M.P. Hindi Granth  
Academy, Bhopal.



**HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**  
**NEW CURRICULUM OF B.Sc. PART II**  
**SESSION 2019-20**  
**CHEMISTRY**

The new curriculum will comprise of three papers of 33, 33 and 34 marks each and practical work of 50 marks. The Curriculum is to be completed in 180 working days as per UGC norms and conforming to the directives of Govt. of Chhattisgarh. The theory papers are of 60 hrs. each duration and practical work of 180 hrs duration.

**Paper – I**  
**INORGANIC CHEMISTRY** **60 Hrs., Max Marks 33**

**UNIT-I**

**CHEMISTRY OF TRANSITION SERIES ELEMENTS**

Transition Elements: Position in periodic table, electronic configuration, General Characteristics, viz., atomic and ionic radii, variable oxidation states, ability to form complexes, formation of coloured ions, magnetic moment  $\mu_{so}$  (spin only) and  $\mu_{eff}$  and catalytic behaviour. General comparative treatment of 4d and 5d elements with their 3d analogues with respect to ionic radii, oxidation states and magnetic properties.

**UNIT-II**

**A. OXIDATION AND REDUCTION:** Redox potential, electrochemical series and its applications, Principles involved in extraction of the elements.

**B. COORDINATION COMPOUNDS:** Werner's theory and its experimental verification, IUPAC nomenclature of coordination compounds, isomerism in coordination compounds. Stereochemistry of complexes with 4 and 6 coordination numbers. Chelates, polynuclear complexes.

**UNIT-III**

**COORDINATION CHEMISTRY**

Valence bond theory (inner and outer orbital complexes), electroneutrality principle and back bonding. Crystal field theory, Crystal field splitting and stabilization energy, measurement of  $10 Dq$  ( $\Delta_o$ ), CFSE in weak and strong fields, pairing energies, factors affecting the magnitude of  $10 Dq$  ( $\Delta_o$ ,  $\Delta_t$ ). Octahedral vs. tetrahedral coordination.

B.Sc.-II

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*24.6.2019*

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## UNIT-IV

### A. CHEMISTRY OF LANTHANIDE ELEMENTS

Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds.

### B. CHEMISTRY OF ACTINIDES

General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from uranium, similarities between the latter actinides and the latter lanthanides

## UNIT-V

**A. ACIDS BASES :** Arrhenius, Bronsted-Lowry, conjugate acids and bases, relative strengths of acids and bases, the Lux-flood, Solvent system and Lewis concepts of acids and bases.

### B. NON-AQUEOUS SOLVENTS

.Physical properties of a solvent, types of solvents and their general characteristics, reaction in non-aqueous solvents with reference to liquid ammonia and liquid sulphur dioxide, HF, H<sub>2</sub>SO<sub>4</sub> , Ionic liquids.

## REFERENCE BOOKS

1. Basic Inorganic Chemistry, F. A. Cotton, G. Wilkinson and P. L. Gaus, Wiley
2. Concise Inorganic Chemistry, J. D. Lee, ELBS
3. Concepts of Models of Inorganic Chemistry, B. Douglas, D. Mc Daniel and J. Alexander, John Wiley.
4. Inorganic Chemistry, D. E. Shriver, P. W. Atkins and C. H. Langford, Oxford.
5. Inorganic Chemistry, W. W. Porterfield, Addison – Wiley.
6. Inorganic Chemistry, A. G. Sharp, ELBS.
7. Inorganic Chemistry, G. L. Miessler and D. A. Tarr, Prentice Hall.
8. Advanced Inorganic Chemistry, Satya Prakash.
9. Advanced Inorganic Chemistry, Agarwal and Agarwal
10. Advanced Inorganic Chemistry, Puri, Sharma, S. Naginchand
11. Inorganic Chemistry, Madan, S. Chand
12. Aadhunik Akarbanic Rasayan, A. K. Shrivastav & P. C. Jain, Goel Pub
13. Uchchattar Akarbanic Rasayan, satya Prakash & G. D. Tuli, Shyamal Prakashan
14. Uchchattar Akarbanic Rasayan, Puri & Sharma
15. Selected topic in Inorganic Chemistry by Madan Malik & Tuli, S. Chand.

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**UNIT-I**

**CHEMISTRY OF ORGANIC HALIDES**

Alkyl halides: Methods of preparation, nucleophilic substitution reactions –  $S_N1$ ,  $S_N2$  and  $S_Ni$  mechanisms with stereochemical aspects and effect of solvent etc.; nucleophilic substitution, elimination reactions.

Aryl halides: Preparation, including preparation from diazonium salts, Nucleophilic Aromatic Substitution;  $S_NAr$ , Benzyne mechanism. Relative reactivity of alkyl, allyl/benzyl, vinyl and aryl halides towards nucleophilic substitution reactions.

**UNIT-II**

**ALCOHOLS**

- A. Alcohols: Nomenclature, preparation, properties and relative reactivity of  $1^\circ$ ,  $2^\circ$ ,  $3^\circ$  alcohols, Bouvaelt-Blanc Reduction for the preparation of alcohols, Dihydric alcohols – methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [ $Pb(OAc)_4$  and  $HIO_4$ ] and pinacol-pinacolone rearrangement.
- B. Trihydric alcohols - Nomenclature, methods of formation, chemical reactions of glycerol.

**PHENOLS**

- A. Structure and bonding in phenols, physical properties and acidic character, Comparative acidic strength of alcohols and phenols, acylation and carboxylation.
- B. Mechanism of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Hauben-Hoesch reaction, Lederer-Manasse reaction and Reimer-Tiemann reaction.

**UNIT-III**

**ALDEHYDES AND KETONES**

- A. Nomenclature, structure and reactivity of carbonyl group. General methods of preparation of aldehydes and ketones.
- Mechanism of nucleophilic addition to carbonyl groups: Benzoin, Aldol, Perkin and Knoevenagel condensation. Condensation with ammonia and its derivatives, Wittig reaction, Mannich reaction, Beckmann and Benzil- Benzilic rearrangement.
- B. Use of acetate as protecting group, Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizzaro reaction, MPV, Clemmensen reduction, Wolf-Kishner reaction,  $LiAlH_4$  and  $NaBH_4$  reduction. Halogenation of enolizable ketones, An introduction to  $\alpha,\beta$ -unsaturated aldehydes and ketones.

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## UNIT-IV

### A. CARBOXYLIC ACIDS

Preparation, Structure and bonding, Physical and chemical properties including, acidity of carboxylic acids, effects of substituents on acid strength, Hell-Volhard Zeilinsky reaction. Reduction of carboxylic groups, Mechanism of decarboxylation.

Di carboxylic acids: Methods of formation and effect of heat and dehydrating agents, Hydroxyacids.

### B. CARBOXYLIC ACID DERIVATIVES

Structure of acid chlorides, esters, amides and acid anhydrides, Relative stability of acyl derivatives.

Physical properties, inter-conversion of acid derivatives by nucleophilic acyl substitution.

Mechanism of acid and base catalyzed esterification and hydrolysis.

## UNIT-V

### ORGANIC COMPOUNDS OF NITROGEN

A. Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanism of nucleophilic substitution in nitroarenes and their reduction in acidic, neutral and alkaline medium.

B. Reactivity, structure and nomenclature of amines, physical properties. Stereochemistry of amines. Separation of mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Preparation of alkyl and aryl amines (reduction of nitro compounds and nitriles), reductive amination of aldehydic and ketonic compounds. Gabriel-Phthalimide reaction, Hofmann-Bromamide reaction, Reactions of amines, electrophilic aromatic substitution of aryl amines, Reaction of amines with nitrous acid. Synthetic transformations of aryl diazonium salts, Azo coupling.

### REFERENCE BOOKS

1. Organic Chemistry, Morrison and Boyd, Prentice-Hall.
2. Organic Chemistry, L. G. Wade Jr. Prentice Hall.
3. Fundamentals of Organic Chemistry, Solomons, John Wiley.
4. Organic Chemistry, Vol I, II, III S. M. Mukherjee, S. P. Singh and R. P. Kapoor, Wiley Easters (New Age).
5. Organic Chemistry, F. A. Carey, McGraw Hill.
6. Introduction to Organic Chemistry, Struieweisser, Heathcock and Kosover, Macmillan.
7. Organic Chemistry, P. L. Soni.
8. Organic Chemistry, Bahl and Bahl.
9. Organic Chemistry, Joginder Singh.
10. Carbanic Rasayan, Bahl and Bahl.
11. Carbanic Rasayan, R. N. Singh, S. M. I. Gupta, M. M. Bakidia & S. K. Wadhwa.
12. Carbanic Rasayan, Joginder Singh.

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## UNIT-I

### A. THERMODYNAMICS-I

Intensive and extensive variables; state and path functions; isolated, closed and open systems; Zeroth law of thermodynamics. First law: Concept of heat, work, internal energy and statement of first law; enthalpy, Relation between heat capacities, calculations of  $q$ ,  $w$ ,  $U$  and  $H$  for reversible, irreversible and free expansion of gases under isothermal and adiabatic conditions. Joule-Thomson expansion, inversion temperature of gases, expansion of ideal gases under isothermal and adiabatic condition

### B. THERMO CHEMISTRY

Thermochemistry, Laws of Thermochemistry, Heats of reactions, standard states; enthalpy of formation of molecules and ions and enthalpy of combustion and its applications; calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data, effect of temperature (Kirchhoff's equations) and pressure on enthalpy of reactions, Adiabatic flame temperature, explosion temperature.

## UNIT-II

### A. THERMODYNAMICS-II

Second Law of Thermodynamics: Spontaneous process, Second law, Statement of Carnot cycle and efficiency of heat engine, Carnot's theorem, thermodynamic state of temperature. Concept of entropy: Entropy change in a reversible and irreversible process, entropy change in isothermal reversible expansion of an ideal gas, entropy change in isothermal mixing of ideal gases, physical signification of entropy, Molecular and statistical interpretation of entropy.

B. Gibbs and Helmholtz free energy, variation of  $G$  and  $A$  with pressure, volume, temperature, Gibbs-Helmholtz equation, Maxwell relations, Elementary idea of Third law of Thermodynamics, concept of residual entropy, calculation of absolute entropy of molecule.

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## UNIT III

### A CHEMICAL EQUILIBRIUM

Criteria of thermodynamic equilibrium, degree of advancement of reaction, chemical equilibria in ideal gases. Concept of Fugacity, Thermodynamic derivation of relation between Gibbs free energy of reaction and reaction quotient. Coupling of exergonic and endergonic reactions. Equilibrium constants and their quantitative dependence on temperature, pressure and concentration. Thermodynamic derivation of relations between the various equilibrium constants  $K_p$ ,  $K_c$  and  $K_x$ . Le Chatelier principle (quantitative treatment). Equilibrium between ideal gas and a pure condensed phase.

### B IONIC EQUILIBRIA

Ionization of weak acids and bases, pH scale, common ion effect; dissociation constants of mono protic acids (exact treatment). Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions; derivation of Henderson equation and its applications. Solubility and solubility product of sparingly soluble salts – applications of solubility product principle.

## UNIT-IV

### PHASE EQUILIBRIUM

A. Phase rule, Phase, component and degree of freedom, derivation of Gibbs phase rule, Clausius-Claperton equation and its applications to Solid-Liquid, Liquid-Vapor and Solid-Vapor, limitation of phase rule, applications of phase rule to one component system: Water system and sulphur system.

Application of phase rule to two component system: Pb-Ag system, desilverization of lead, Zn-Mg system, Ferric chloride-water system, congruent and incongruent melting point and eutectic point.

Three component system: Solid solution liquid pairs.

B. Nernst distribution law, Henry's law, application, solvent extraction

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## UNIT V

### PHOTOCHEMISTRY

Characteristics of electromagnetic radiation, Interaction of radiation with matter, difference between thermal and photochemical processes, Lambert-Beer's law and its limitations, physical significance of absorption coefficients. Laws of photochemistry: Grothus-Draper law, Stark-Einstein law, quantum yield, actinometry, examples of low and high quantum yields, Photochemical equilibrium and the differential rate of photochemical reactions, Quenching, Role of photochemical reaction in biochemical process.

Jablonski diagram depicting various process occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), photosensitized reactions, energy transfer processes {simple examples}, photostationary states, Chemiluminescence.

### REFERENCE BOOKS

1. Physical Chemistry, G. M. Barrow, International student edition, McGraw Hill.
2. University General Chemistry, C. N. R. Rao, Macmillan.
3. Physical Chemistry, R. A. Alberty, Wiley Eastern.
4. The elements of physical chemistry, Wiley Eastern.
5. Physical Chemistry through problems, S. K. Dogra & S. Dogra, Wiley Eastern.
6. Physical Chemistry, B. D. Khosla,.
7. Physical Chemistry, Puri & Sharma.
8. Bhautik Rasayan, Puri, Sharma and Pathania, Vishal Publishing Company.
9. Bhautik Rasayan, P. L. Soni.
10. Bhautik Rasayan, Bahl and Tuli.
11. Physical Chemistry, R. L. Kapoor, Vol I-IV .
12. Chemical kinetics, K. J. Laidler, Pearson Educations, New Delhi (2004).

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## LABORATORY COURSE

### INORGANIC CHEMISTRY

Qualitative semimicro analysis of mixtures containing 5 radicals. Emphasis should be given to the understanding of the chemistry of different reactions. The following radicals are suggested:

$\text{CO}_3^{2-}$ ,  $\text{NO}_2^-$ ,  $\text{S}^{2-}$ ,  $\text{SO}_3^{2-}$ ,  $\text{S}_2\text{O}_3^{2-}$ ,  $\text{CH}_3\text{COO}^-$ ,  $\text{F}^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{NO}_3^-$ ,  $\text{BO}_3^{3-}$ ,  $\text{C}_2\text{O}_4^{2-}$ ,  $\text{PO}_4^{3-}$ ,  $\text{NH}_4^+$ ,  $\text{K}^+$ ,  $\text{Pb}^{2+}$ ,  $\text{Cu}^{2+}$ ,  $\text{Cd}^{2+}$ ,  $\text{Bi}^{3+}$ ,  $\text{Sn}^{2+}$ ,  $\text{Sb}^{3+}$ ,  $\text{Fe}^{3+}$ ,  $\text{Al}^{3+}$ ,  $\text{Cr}^{3+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Mn}^{2+}$ ,  $\text{Co}^{2+}$ ,  $\text{Ni}^{2+}$ ,  $\text{Ba}^{2+}$ ,  $\text{Sr}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ .

Mixtures should preferably contain one interfering anion, or insoluble component ( $\text{BaSO}_4$ ,  $\text{SrSO}_4$ ,  $\text{PbSO}_4$ ,  $\text{CaF}_2$  or  $\text{Al}_2\text{O}_3$ ) or combination of anions e.g.  $\text{CO}_3^{2-}$  and  $\text{SO}_3^{2-}$ ,  $\text{NO}_2^-$  and  $\text{NO}_3^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ , and  $\text{I}^-$ .

#### Volumetric analysis

- Determination of acetic acid in commercial vinegar using NaOH.
  - Determination of alkali content-antacid tablet using HCl.
  - Estimation of calcium content in chalk as calcium oxalate by permanganometry.
  - Estimation of hardness of water by EDTA.
  - Estimation of ferrous & ferric by dichromate method.
  - Estimation of copper using thiosulphate.
- Principles involved in chromatographic separations. Paper chromatographic separation of following metal ions: i. Ni (II) and Co (II) ii. Fe (III) and Al (III)

### ORGANIC CHEMISTRY

- Detection of elements (X, N, S).
- Qualitative analysis of unknown organic compounds containing simple functional groups (alcohols, carboxylic acids, phenols, nitro, amine, amide, and carbonyl compounds, carbohydrates)
- Preparation of Organic Compounds:
  - m-dinitrobenzene, (ii) Acetanilide, (iii) Bromo/Nitro-acetanilide, (iv) Oxidation of primary alcohols-Benzoic acid from benzylalcohol, (v) azo dye.

The bottom of the page contains several handwritten signatures and dates in blue ink. From left to right, there is a date '20.6.2019', a signature 'Divastan' with the date '24.6.13' below it, a signature 'Nels', a signature 'gperforis', and a large, stylized signature on the right.

## PHYSICAL CHEMISTRY

### Transition Temperature

- Determination of the transition temperature of the given substance by thermometric/dilatometric method (e.g.  $\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$  /  $\text{SrBr}_2 \cdot 2\text{H}_2\text{O}$ ).

### Thermochemistry

- Determination of heat capacity of a calorimeter for different volumes using change of enthalpy data of a known system (method of back calculation of heat capacity of calorimeter from known enthalpy of solution or enthalpy of neutralization).
- Determination of heat capacity of the calorimeter and enthalpy of neutralization of hydrochloric acid with sodium hydroxide.
- To determine the solubility of benzoic acid at different temperature and to determine  $\Delta H$  of the dissolution process.
- To determine the enthalpy of neutralization of a weak acid/ weak base versus strong base/ strong acid and determine the enthalpy of ionization of the weak acid/ weak base.
- To determine the enthalpy of solution of solid calcium chloride and calculate the lattice energy of calcium chloride from its enthalpy data using Born Haber cycle.

### Phase Equilibrium

- To study the effect of a solute (e.g.  $\text{NaCl}$ , Succinic acid) on the critical solution temperature of two partially miscible liquids (e.g. phenol-water system) and to determine the concentration of that solute in the given phenol-water system.
- To construct the phase diagram of two component system (e.g. diphenylamine–benzophenone) by cooling curve method.
- Distribution of acetic/ benzoic acid between water and cyclohexane.
- Study the equilibrium of at least one of the following reactions by the distribution method:
  - (i)  $\text{I}_2(\text{aq}) + \text{I}^- \rightarrow \text{I}_3^-(\text{aq})$
  - (ii)  $\text{Cu}^{2+}(\text{aq}) + n\text{NH}_3 \rightarrow \text{Cu}(\text{NH}_3)_n$

### Molecular Weight Determination

Determination of molecular weight by Rast Camphor and Landsburger method.

**Note: Experiments may be added/ deleted subject to availability of time and facilities.**

B.Sc.-II

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## Reference Books

1. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
2. Furniss, B.S., Hannaford, A.J., Smith, P.W.G. & Tatchell, A.R. Practical Organic Chemistry, 5th Ed. Pearson (2012)
3. Ahluwalia, V.K. & Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000). 22
4. Ahluwalia, V.K. & Dhingra, S. Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press (2000).
5. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011). Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. Experiments in Physical Chemistry 8th Ed.; McGraw-Hill: New York (2003).
6. Halpern, A. M. & McBane, G. C. Experimental Physical Chemistry 3rd Ed.; W.H. Freeman & Co.: New York

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Three Experiments are to be performed.

1. Inorganic – Qualitative semimicro analysis of mixtures.

**12 marks**

OR

One experiment from synthesis and analysis by preparing the standard solution.

2. (a) Identification of the given organic compound & determine its M.Pt./B.Pt.

**6 marks**

(b) Determination of R<sub>f</sub> value and identification of organic compounds by paper chromatography.

**6 marks**

3. Any one physical experiment that can be completed in two hours including calculations.

**12 marks**

4. Viva

**10 marks**

5. Sessional

**04 marks**

In case of Ex-Students one marks will be added to each of the experiment.

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Session 2019-20

## PHYSICS

B.Sc. Part-II

Paper-I

### THERMODYNAMICS, KINETIC THEORY AND STATISTICAL PHYSICS

**Unit-1** The laws of thermodynamics : The Zeroth law, first law of thermodynamics, internal energy as a state function, reversible and irreversible change, Carnot's cycle, Carnot theorem, second law of thermodynamics. Clausius theorem inequality. Entropy, Change of entropy in simple cases (i) Isothermal expansion of an ideal gas (ii) Reversible isochoric process (iii) Free adiabatic expansion of an ideal gas. Concept of entropy, Entropy of the universe. Entropy change in reversible and irreversible processes, Entropy of Ideal gas, Entropy as a thermodynamic variable, S-T diagram, Principle of increase of entropy. The thermodynamic scale of temperature, Third law of thermodynamics, Concept of negative temperature.

**Unit-2** Thermodynamic functions, Internal energy, Enthalpy, Helmholtz function and Gibb's free energy, Maxwell's thermodynamical equations and their applications, TdS equations, Energy and heat capacity equations Application of Maxwell's equation in Joule-Thomson cooling, adiabatic cooling of a system, Van der Waals gas, Clausius-Clapeyron heat equation. Blackbody spectrum, Stefan-Boltzmann law, Wien's displacement law, Rayleigh-Jean's law, Planck's quantum theory of radiation.

**Unit-3** Maxwellian distribution of speeds in an ideal gas: Distribution of speeds and velocities, experimental verification, distinction between mean, rms and most probable speed values. Doppler broadening of spectral lines. Transport phenomena in gases: Molecular collisions mean free path and collision cross sections. Estimates of molecular diameter and mean free path. Transport of mass, momentum and energy and interrelationship, dependence on temperature and pressure.  
Behaviour of Real Gases: Deviations from the Ideal Gas Equation. The Virial Equation. Andrew's Experiments on CO<sub>2</sub> Gas. Critical Constants.

**Unit-4** The statistical basis of thermodynamics: Probability and thermodynamic probability, principle of equal a priori probabilities, statistical postulates. Concept of Gibb's ensemble, accessible and inaccessible states. Concept of phase space,  $\gamma$  phase space and  $\mu$  phase space. Equilibrium before two systems in thermal contact, probability and entropy, Boltzmann entropy relation. Boltzmann canonical distribution law and its applications, law of equipartition of energy.

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Transition to quantum statistics: 'h' as a natural constant and its implications, cases of particle in a one-dimensional box and one-dimensional harmonic oscillator.

**Unit-5** Indistinguishability of particles and its consequences, Bose-Einstein & Fermi-Dirac conditions, Concept of partition function, Derivation of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics, Limits of B-E and F-D statistics to M-B statistics. Application of B-E statistics to black body radiation, Application of F-D statistics to free electrons in a metal.

**TEXT AND REFERENCE BOOKS:**

1. B.B. Laud, "Introduction to Statistical Mechanics" (Mcmillan 1981)
2. F. Reif : "Statistical Physics" (Mcgraw-Hill, 1998).
3. K, Haung : "Statatistical Physics" (Wiley Eastern, 1988).
4. Thermal and statistical Physics: R.K. Singh, Y.M. Gupta and S. Sivraman.
5. Statistical Physics: Berkeley Physics Course, Vol. 5
6. Physics (Part-2): Editor, Prof. B.P. Chandra, M.P. Hindi Granth Academy.
7. Heat and Thermodynamics: K.W. Zeemansky.
8. Thermal Physics: B.K. Agarwal.
9. Heat and Thermodynamics: Brij Lal and N. Subramanyam.
10. Heat and Thermodynamics: Dayal, Verma and Pandey.
11. A Treatise on Heat: M.N. Saha and B.N. Srivastava.

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Session 2019-20

PHYSICS

Paper-II

## WAVES, ACOUSTICS AND OPTICS

**Unit-1** Waves in media: Speed of transverse waves on uniform string, speed of longitudinal waves in a fluid, energy density and energy transmission in waves. Waves over liquid surface: gravity waves and ripples. Group velocity and phase velocity and relationship between them. Production and detection of ultrasonic and infrasonic waves and applications.

Reflection, refraction and diffraction of sound : Acoustic impedance of a medium, percentage reflection & refraction at a boundary, impedance matching for transducers, diffraction of sound, principle of a sonar system, sound ranging.

**Unit-2** Fermat's Principle of extremum path, the aplanatic points of a sphere and other applications. Cardinal points of an optical system, thick lens and lens combinations. Lagrange equation of magnification, telescopic combinations, telephoto lenses. Monochromatic aberrations and their reductions; aspherical mirrors and Schmidt corrector plates, aplanatic points, oil immersion objectives, meniscus lens. Optical instruments: Entrance and exit pupils, need for a multiple lens eyepiece, common types of eyepieces. (Ramsdon and Hygen's eyepieces).

**Unit-3** Interference of light: The principle of superpositions, two slit interference, coherence requirement for the sources, optical path retardations, Conditions for sustained interference, Theory of interference, Thin films. Newton's rings and Michelson interferometer and their applications, its application for precision determinations of wavelength, wavelength difference and the width of spectral lines. Multiple beam interference in parallel film and Fabry-Perot interferometer. Rayleigh refractometer, Twyman-Green interferometer and its uses.

**Unit-4** Diffraction, Types of Diffraction, Fresnel's diffraction, half-period zones, phasor diagram and integral calculus methods, the intensity distribution, Zone plates, diffraction due to straight edge, Fraunhofer diffraction due to a single slit and double slit, Diffraction at N-Parallel slit, Plane Diffraction grating, Rayleigh criterion, resolving power of grating, Prism, telescope.

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Polarized light and its mathematical representation, Production of polarized light by reflection, refraction and scattering. Polarization by double refraction and Huygen's theory, Nicol prism, Retardation plates, Production and analysis of circularly and elliptically polarized light. Optical activity and Fresnel's theory, Biquartz polarimeter.

**Unit-5** Laser system: Basic properties of Lasers, coherence length and coherence time, spatial coherence of a source, Einstein's A and B coefficients, Spontaneous and induced emissions, conditions for laser action, population inversion, Types of Laser : Ruby and, He-Ne laser, and, Applications of laser : Application in communication, Holography and Basics of non linear optics and Generation of Harmonic.

**TEXT AND REFERENCE BOOKS:**

1. A.K. Ghatak, 'Physical Optics'
2. D.P. Khandelwal, 'Optical and Atomic Physics' (Himalaya Publishing House, Bombay, 1988)
3. K.D. Moltev; 'Optics' (Oxford University Press)
4. Sears: 'Optics'
5. Jenkins and White: 'Fundamental of Optics' (McGraw-Hill)
6. B.B. Laud: 'Lasers and Non-linear Optics' (Wiley Eastern 1985)
7. Smith and Thomson: 'Optics' (John Wiley and Sons)
8. Berkely Physics Courses: Vol.-III, 'Waves and Oscillations'
9. I.G. Main, 'Vibrations and Waves' (Cambridge University Press)
10. H.J. Pain: 'The Physics of Vibrations and Waves' (MacMillan 1975)
11. Text Book of Optics: B.K. Mathur
12. B.Sc. (Part III) Physics: Editor: B.P. Chandra, M.P. Hindi Granth Academy.
13. F. Smith and J.H. Thomson, Manchester Physics series: optics (John wiley, 1971)
14. Born and Wolf : 'Optics'.
15. Physical Optics: B. K. Mathur and T. P. Pandya.
16. A textbook of Optics: N. Subrahmanyam, Brijlal and M. N. Avadhanulu.
17. Geometrical and Physical Optics: Longhurst.
18. Introduction to Modern Optics: G. R. Fowels.
19. Optics: P. K. Srivastav.




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## PHYSICS

## PRACTICALS

Minimum 16 (Eight from each group)

Experiments out of the following or similar experiments of equal standard

1. Study of Brownian motion.
2. Study of adiabatic expansion of a gas.
3. Study of conversion of mechanical energy into heat.
4. Heating efficiency of electrical kettle with varying voltage.
5. Study of temperature dependence of total radiation.
6. Study of temperature dependence of spectral density of radiation.
7. Resistance thermometry.
8. Thermo emf thermometry.
9. Conduction of heat through poor conductors of different geometries.
10. Experimental study of probability distribution for a two-option system using a coloured dice.
11. Study of statistical distribution on nuclear disintegration data (GM counter used as a black box).
12. Speed of waves on a stretched strings.
13. Studies on torsional waves in a lumped system.
14. Study of interference with two coherent source of sound.
15. Chlandi's figures with varying excitation and loading points.
16. Measurements of sound intensities with different situations.
17. Characteristics of a microphone-loudspeakers system
18. Designing an optical viewing system.
19. Study of monochromatic defects of images.
20. Determining the principle point of a combination of lenses.
21. Study of interference of light (biprism or wedge film).
22. Study of diffraction at a straight edge or a single slit.
23. Study of F-P etalon fringes.
24. Study of diffraction grating and its resolving power.
25. Resolving power of telescope system.
26. Polarization of light by reflection; also cos-squared law.
27. Study of optical rotation for any system.
28. Study of laser as a monochromatic coherent source.
29. Study of a divergence of laser beam.
30. Calculation of days between two dates of a year.
31. To check if triangle exists and the type of a triangles.
32. To find the sum of the sine and cosines series and print out the curve.



33. To solve simultaneous equation by elimination method.
34. To prepare a mark-list of polynomials.
35. Fitting a straight line or a simple curve
36. Convert a given integer into binary and octal systems and vice versa .
37. Inverse of a matrix.
38. Spiral array.

#### TEXT AND REFERENCE BOOKS

1. D.P. Khandelwal, Optics and Atomic physics (Himalaya Publishing house, Bombay 1988).
2. D.P. Khandelwal, A Laboratory Manual for Undergraduate Classes (Vani Publishing House, New Delhi).
3. S. Lipschutz and a Poe, Schaum's outline of theory and Problems of Programming with Fortran (McGraw-hill Book Company 1986).
4. C Dixon, Numerical Analysis .

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## MATHEMATICS

There shall be three compulsory papers. Each paper of 50 marks is divided into five units and each unit carry equal marks.

### B.Sc. Part-II

#### Paper-I

#### ADVANCED CALCULUS

- UNIT-I Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion. Series of non-negative terms. Comparison tests, Cauchy's integral test, Ratio tests, Raabe's, Logarithmic, De Morgan and Bertrand's tests. Alternating series, Leibnitz's theorem. Absolute and conditional convergence.
- UNIT-II Continuity, Sequential continuity, Properties of continuous functions, Uniform continuity, Chain rule of differentiability, Mean value theorems and their geometrical interpretations. Darboux's intermediate value theorem for derivatives, Taylor's theorem with various forms of remainders.
- UNIT-III Limit and continuity of functions of two variables. Partial differentiation. Change of variables. Euler's theorem on homogeneous functions. Taylor's theorem for functions of two variables. Jacobians.
- UNIT-IV Envelopes, evolutes. Maxima, minima and saddle points of functions of two variables. Lagrange's multiplier method.
- UNIT-V Beta and Gamma functions, Double and triple integrals, Dirichlet's integrals, Change of order of integration in double integrals.

#### REFERENCES :

1. Gabriel Klaumber, Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975.
2. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
3. R.R. Goldberg, Real Analysis, Oxford & I.B.H. Publishing Co., New Delhi, 1970.
4. D. Soma Sundaram and B. Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997.
5. P.K. Jain and S.K. Kaushik, An introduction to Real Analysis, S. Chand & Co., New Delhi, 2000.
6. Gorakh Prasad, Differential Calculus, Pothishala Pvt. Ltd., Allahabad.
7. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Co., New York.
8. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd., Allahabad.
9. S.C. Malik, Mathematical Analysis, Wiley Eastern Ltd., New Delhi.
10. O.E. Stanaitis, An Introduction to Sequences, Series and Improper Integrals, Holden-Dey, Inc., San Francisco, California.
11. Earl D. Rainville, Infinite Series, The Macmillan Company, New York.
12. Chandrika Prasad, Text Book on Algebra and Theory of Equations, Pothishala Pvt. Ltd., Allahabad.
13. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
14. Shanti Narayan, A Course of Mathematical Analysis, S.Chand and Company, New Delhi.

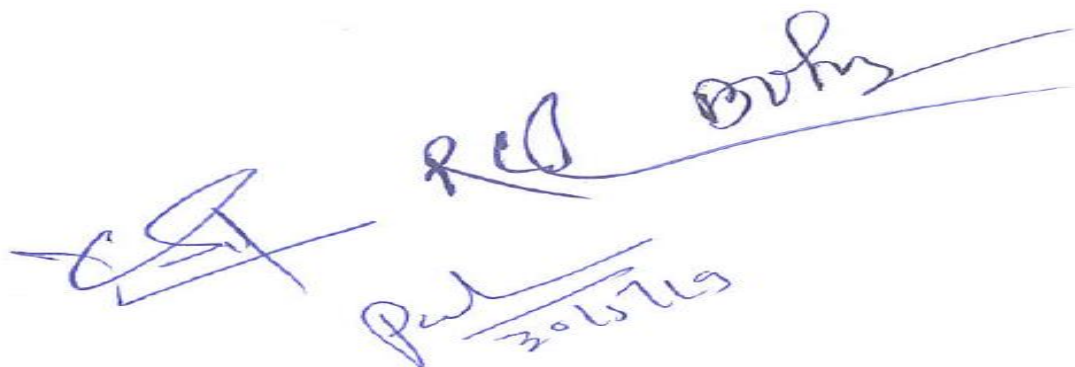
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**B.Sc. Part-II**  
**Paper-II**  
**DIFFERENTIAL EQUATIONS**

- UNIT-I Series solutions of differential equations- Power series method, Bessel and Legendre functions and their properties-convergence, recurrence and generating relations, Orthogonality of functions, Sturm-Liouville problem, Orthogonality of eigen-functions, Reality of eigen values, Orthogonality of Bessel functions and Legendre polynomials.
- UNIT-II Laplace Transformation- Linearity of the Laplace transformation, Existence theorem for Laplace transforms, Laplace transforms of derivatives and integrals, Shifting theorems. Differentiation and integration of transforms. Convolution theorem. Solution of integral equations and systems of differential equations using the Laplace transformation.
- UNIT-III Partial differential equations of the first order. Lagrange's solution, Some special types of equations which can be solved easily by methods other than the general method, Charpit's general method of solution.
- UNIT-IV Partial differential equations of second and higher orders, Classification of linear partial differential equations of second order, Homogeneous and non-homogeneous equations with constant coefficients, Partial differential equations reducible to equations with constant coefficients, Monge's methods.
- UNIT-V Calculus of Variations- Variational problems with fixed boundaries- Euler's equation for functionals containing first order derivative and one independent variable, Extremals, Functionals dependent on higher order derivatives, Functionals dependent on more than one independent variable, Variational problems in parametric form, invariance of Euler's equation under coordinates transformation.
- Variational Problems with Moving Boundaries- Functionals dependent on one and two functions, One sided variations.
- Sufficient conditions for an Extremum- Jacobi and Legendre conditions, Second Variation. Variational principle of least action.

**REFERENCES :**

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, Inc., New York, 1999.
2. D.A. Murray, Introductory Course on Differential Equations, Orient Longman, (India), 1967.
3. A.R. Forsyth, A Treatise on Differential Equations, Macmillan and Co. Ltd., London.
4. Lan N. Sneddon, Elements of Partial Differential Equations, McGraw-Hill Book Company, 1988.
5. Francis B. Hilderbrand, Advanced Calculus for Applications, Prentice Hall of India Pvt. Ltd., New Delhi, 1977.
6. Jane Cronin, Differential equations, Marcel Dekkar, 1994.
7. Frank Ayres, Theory and Problems of Differential Equations, McGraw-Hill Book Company, 1972.
8. Richard Bronson, Theory and Problems of Differential Equations, McGraw-Hill, Inc., 1973.
9. A.S. Gupta, Calculus of variations with-Applications, Prentice-Hall of India, 1997.
10. R. Courant and D. Hilbert, Methods of Mathematical Physics, Vols. I & II, Wiley-Interscience, 1953.
11. I.M. Gelfand and S.V. Fomin, Calculus of Variations, Prentice-Hill, Englewood Cliffs (New Jersey), 1963.
12. A.M. Arthurs, Complementary Variational Principles, Clarendon Press, Oxford, 1970.
13. V. Kornkov, Variational Principles of Continuum Mechanics with Engineering Applications, Vol. I, Reidel Publ. : Dordrecht, Holland, 1985.
14. T. Oden and J.N. Reddy, Variational Methods in Theoretical Mechanics, Springer-Verlag, 1976.

  
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**B.Sc. Part-II**  
**Paper-III**  
**MECHANICS**

**STATICS**

UNIT-I Analytical conditions of Equilibrium, Stable and unstable equilibrium. Virtual work, Catenary.

UNIT-II Forces in three dimensions, Poinsot's central axis, Null lines and planes.

**DYNAMICS**




UNIT-III Simple harmonic motion. Elastic strings. Velocities and accelerations along radial and transverse directions, Projectile, Central orbits.

UNIT-IV Kepler's laws of motion, velocities and acceleration in tangential and normal directions, motion on smooth and rough plane curves.

UNIT-V Motion in a resisting medium, motion of particles of varying mass, motion of a particle in three dimensions, acceleration in terms of different co-ordinate systems.

**REFERENCES :**

1. S.L. Loney, Statics, Macmillan and Company, London.
2. R.S. Verma, A Text Book on Statics, Pothishala Pvt. Ltd., Allahabad.
3. S.L. Loney, An Elementary Treatise on the Dynamics of a particle and of rigid bodies, Cambridge University Press, 1956.



## **B.Sc.-II (BOTANY) PAPER-I**

### **(PLANT TAXONOMY, ECONOMIC BOTANY, PLANT ANATOMY AND EMBRYOLOGY)**

#### **UNIT-I**

Bentham and Hooker system of classification. Binomial Nomenclature, International Code of Nomenclature for Algae, Fungi, and plants (IUCN), Typification, numerical Taxonomy and chemotaxonomy. Preservation of Plant material and Herbarium techniques. Important botanical gardens and herbaria of India, Kew Botanical garden, England.

#### **UNIT-II**

Systematic position, distinguishing characters and economic importance of the following families, Ranunculaceae, Magnoliaceae, Brassicaceae, Rosaceae, Papaveraceae, Caryophyllaceae, Rutaceae, Cucurbitaceae, Apiaceae, Rubiaceae, Apocynaceae, Asclepiadaceae, Solanaceae, Malvaceae, Convolvulaceae, Orchidaceae, Acanthaceae, verbenaceae, Lamiaceae, Asteraceae, Fabaceae, Euphorbiaceae, Poaceae and Liliaceae.

#### **UNIT-III**

Economic Botany: Botanical name, family, part used and uses of the following economically important plants, fiber yielding plants; Cotton, jute, sun, hemp, coir. Timber yielding plants: Sal, Teak, Shisham and Pine. Medicinal plants: Kalmegh, Ashwagandha, Ghritkumari, Giloy, Brahmi, sarpagandha, ---of medicinal plants of C.G. Food plants: Pearl millet, Buck of wheat, Sorghum, Soyabean, gram, Ground nut, Sugarcane and Potato. Fruit plants: Pear, Peach, Litchi. Spices: Cinnamon, Turmeric, Ginger, Asafoetida and Cumin. Beverages : Tea, Coffee Rubber Cultivation of important flowers: Chrysanthemum, Dahelia, Biodiesel plants Jatropha, Pongamia Ethnobotany in context of Chhattisgarh.

#### **UNIT-IV**

Plant Anatomy: Root and shoot apical meristems theories of root and shoot apex organization, permanent tissues, anatomy of root, stem and leaf of dicot and monocot, secondary growth in root and stem, Anatomical anomalies in the primary structure of stems (Nyctanthes, Boerhaavia, Casuarina), Anamolous secondary growth in Dracaena, Bignonia, Laptadenia.

#### **UNIT-V**

Embryology: Flower as a reproductive organ, anther, microsporogenesis, types of ovules, megasporogenesis, development of male and female gametophyte, pollination, mechanisms, self incompatibility, fertilization, endosperm, embryo, polyembryonoy, apomixes and parthenocarpy.

#### **Books Recommended:**

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Singh, Pandey, Jain. *Diversity and Systematics of Seed Plants*, Rastogi Publications Merrut

Sharma OP, *Plant Taxonomy*, Tata Mc Graw Hill, New Delhi

Pandey BP, *Taxonomy of Angiosperms*, S. Chand Publishing, New Delhi

Pandey, BP, *Plant Anatomy*, S.Chand Publishing, New Delhi

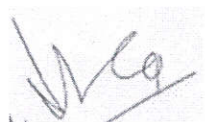
Pandey, BP, *Economic Botany*, S.Chand Publishing, New Delhi

Bhojwani, SS and Bhatanagar SP, *Embryology of Angiosperm*, Vikas Publication House, New Delhi

Singh, Pandey, Jain, *Embryology of Angiosperms*, Rastogi Publication, Meerut

Sharma, V, Alum, A. *Ethnobotany*, Rastogi Publications, Meerut

Tayal, MS *Plant Anatomy*, Rastogi Publication, Meerut



(Dr. J.N. Verma)

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Govt. D.B. Girls PG College

Raipur, (C.G.)




(Dr. Rekha Pimpalgaonkar)

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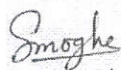


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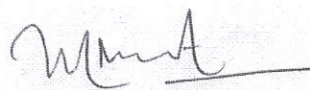
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Raipur, (C.G.)



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Govt. Bilasa Girls College, Bilaspur



(Mr. Shivakant Mishra)

(Mr. Sudheer Tiwari)

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## B.Sc.-II (BOTANY) PAPER-II

### (ECOLOGY AND PLANT PHYSIOLOGY)

#### UNIT-I

Introduction and scope of ecology, environmental and ecological factors, Soil formation and soil profile, Liebig's law of minimum, Shelford's law of tolerance, morphological and anatomical adaptations in hydrophytes, xerophytes and epiphytes.

#### UNIT-II

Population and community characteristics, Raunkiaer's life forms, population interactions (e.g. Symbiosis, Amensalism etc.), succession, ecotone and edge effect, ecological niches, ecotypes, ecads, keystone species

Concept of ecosystem, trophic levels, flow of energy in ecosystem, food chain and food web, concept of ecological pyramids

Biogeochemical cycles: carbon cycle, nitrogen cycle and phosphorus cycle

#### UNIT-III

Plant water relations: Diffusion, permeability, osmosis, imbibitions, plasmolysis, osmotic potential and water potential, Types of soil water, water holding capacity, wilting, Absorption of water, theories of Ascent of sap, Mineral nutrition and absorption, Deficiency symptoms, Transpiration, stomatal movement, significance of transpiration, Factors affecting transpiration, guttation.

#### UNIT-IV

Photosynthesis: Photosynthetic apparatus and pigments, light reaction mechanism of ATP synthesis. C3, C4 CAM pathway of carbon reduction, photorespiration, factors affecting photosynthesis.

Respiration: Aerobic and anaerobic respiration, Glycolysis, Krebs's cycle, factors affecting respiration, R.Q.

#### UNIT-V

Plant growth hormones: Auxin, Gibberellin, Cytokinin, Ethylene and Abscissic acid. Physiology of flowering, Florigen concept, Photoperiodism and Vernalization. Seed dormancy and germination, plant movement.

#### Books Recommended:

Koromondy, E.J. *Concepts of Ecology*, Prentice Hall, USA

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Singh, JS Singh SP and Gupta SR. *Ecology and Environmental Science and Conservation*, S. Chand Publishing, New Delhi

Sharma, PD. *Ecology and Environment*, Rastogi Publications, Meerut

Hopkins, WG and Huner, PA. *Introduction to Plant Physiology*, John Wiley and Sons.

Pandey SN and Sinha BK, *Plant Physiology*, Vikas Publishing, New Delhi

Taiz, L and Zeiger, E. *Plant Physiology*, 5<sup>th</sup> edition, Sinauer Associates Inc. M.A, USA

Srivastava, HS *Plant Physiology and Biotechnology*, Rastogi Publications, Meerut

## B.Sc. II (BOTANY)

### Practical

1. Taxonomy: Detailed description and identification of locally available plants of the families as prescribed in the theory paper.
2. Economic Botany: Identification and comment on the plants and plant products belonging to different economic use categories
3. Preparation of Herbarium of local wild plants.
4. Quantitative vegetation analysis of a grassland ecosystem.
5. Anatomical characteristics of hydrophytes and xerophytes.
6. Demonstration of root pressure.
7. Demonstration of transpiration.
8. Demonstration of evolution of O<sub>2</sub> in photosynthesis, factors affecting of photosynthesis.
9. Comparison of R.Q. of different respiratory substrates.
10. Demonstration of fermentation.
11. Determination of BOD of a water body.
12. Demonstration of mitosis.

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## PRACTICAL SCHEME

TIME: 4 Hrs.

M.M. : 50

1.	Anatomy	08
2.	Economic Botany	04
3.	Physiology	08
4.	Ecology	10
5.	Spotting	10
6.	Viva-Voce	05
7.	Project Work/ Field Study	10

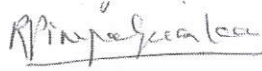


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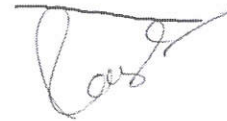


(Dr. Rekha Pimpalgaonkar )

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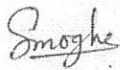


( Dr.Ranjana Shrivastava)

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Govt. VYTPG Science College

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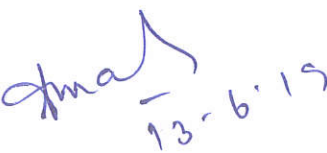
(Mrs. Sanchal Moghe)

Govt. Bilasa Girls College, Bilaspur

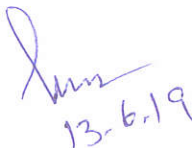


(Mr. Shivakant Mishra)

(Mr Sudheer Tiwari)



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# **Hemchand Yadav Vishwavidyala, Durg (C.G.)**

## **Zoology**

### **B.Sc. Part – II (2019-20)**

#### **Paper – I**

#### **(Anatomy and Physiology)**

Comparative Anatomy of various organ systems of vertebrates:

##### **Unit: I**

- Integument and its derivatives: structure of scales, hair and feathers
- Alimentary canal and digestive glands in vertebrates
- Respiratory organs : Gills and lung , air-sac in birds

##### **Unit: II**

- Endoskeleton: (a) Axial Skeleton- Skull and Vertebrae, (b) Appendicular Skeleton Limbs and girdles
- Circulatory System: Evolution of heart and aortic arches
- Urinogenital System: Kidney and excretory ducts

##### **Unit: III**

- Nervous System: General plan of brain and spinal cord
- Ear and Eye: structure and function
- Gonads and genital ducts

##### **Unit: IV**

- Digestion and absorption of dietary components
- Physiology of heart, cardiac cycle and ECG
- Blood Coagulation
- Respiration: mechanism and control of breathing

##### **Unit: V**

- Excretion: Physiology of excretion, osmoregulation
- Physiology of muscle contraction
- Physiology of nerve impulse, Synaptic transmission

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**Zoology**  
**B.Sc. Part – II (2019-20)**

Paper-II

**VERTEBRATE ENDOCRINOLOGY, REPRODUCTIVE BIOLOGY  
BEHAVIOUR, EVOLUTION AND APPLIED ZOOLOGY**

**Unit: I**

- Structure and function of Endocrine glands
- Hormone receptor
- Biosynthesis and secretion of thyroid, adrenal, ovarian and testicular hormones
- Endocrine disorder of pituitary, thyroid, adrenal and pancreas

**Unit:II**

- Reproductive cycle in vertebrates
- Menstruation, lactation and pregnancy
- Mechanism of parturition
- Hormonal regulation of gametogenesis

**Unit: III**

- Evidences of organic evolution.
- Theories of organic evolution.
- Variation, Mutation, Isolation and Natural selection.
- Evolution of Horse

**Unit:IV**

- Introduction to Ethology: Branches and concept of ethology.
- Patterns of Behaviour, Taxes, Reflexes, Drives and Stereotyped behaviour.
- Reproductive behavioural patterns.
- Drugs and behavior, Hormones and behaviour

**Unit:V**

- Prawn Culture
- Sericulture
- Apiculture
- Pisciculture
- Poultry keeping
- Elements of Pest Control: Chemical & Biological Control

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**Zoology**  
**B.Sc. Part II (2019-20)**  
**Practical**

The practical work in general shall be based on the syllabus prescribed and the students will be required to show the knowledge of the following:

- Study of the representative examples of the different chordates (Classified characters).
- Dissection of various systems of scoliodon-Afferent and Efferent branchial cranial nerves, internal ear.

**Alternative methods: By Clay/Thermacol/ Drawing/ Model etc.)**

- Simple microscopic technique through unstained or stained permanent mount.
- Study of prepared slides histological, as per theory papers.
- Study of limb girdles and vertebrae of Frog, Varanus, Fowl and Rabbit.
- Identification of species and individual of honey bee.
- Life cycle of honey bee and silkworm.
- Exercise based on Evolution and Animal behavior.

**Scheme of Practical Exam**

**Time: 3:30hrs**

• Major dissection (Cranial nerves/efferent branchial vessel)	10
• Exercise based on evolution	05
• Exercise based on applied zoology	05
• Exercise based on animal behavior	04
• Spotting-8 (slides-4,bones-2,specimen-2)	16
• Viva	05
• Sessional marks.	05

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# MICROBIOLOGY

## BSc-2<sup>nd</sup>

### Paper- I: Molecular Biology and Genetic Engineering

#### UNIT-1: FUNDAMENTALS OF MOLECULAR BIOLOGY

History and scope of molecular biology, concept and mechanism of heredity. DNA as genetic material- experimental evidences. DNA replication- mechanism, process and enzymes/proteins involved in replication.

#### UNIT-2: CENTRAL DOGMA OF PROTEIN SYNTHESIS

Transcription- initiation, elongation, termination, RNA polymerases and sigma factor. Transcription inhibitors (antibiotics, drugs). Translation- initiation, elongation and termination. Factors involved in translation. Genetic code.

#### UNIT-3: MUTATION AND DNA REPAIR MECHANISM

Introduction and Types of Gene mutations- Base substitution, frame shift mutation (insertion, deletion, miss-sense, nonsense mutation.) mutagens – physical and chemical. Reverse mutation in bacteria. DNA repair mechanism (mismatch repair, photo-reactivation, excision and SOS repair). Beneficial and harmful effect of mutation.

#### UNIT-4: GENE REGULATION

Concept of gene- Cistron, Recon, Muton. Operon Concept- lac Operon, tryptophan Operon, His Operon. Activator, Co-activator and Repressor. Introduction to Bioinformatics- Elementary genome Database.

#### UNIT-5: GENETIC ENGINEERING

Basic concept of Genetic Engineering, DNA modifying enzymes Restriction endonuclease, DNA ligase, terminal transferase. Vectors- pBR322, pUC19, BAC and YAC. Phage based vectors, expression of vector. Transformation – physical and chemical method. Bacterial Host. Screening of recombinant vector Blue white Screening, Colony Hybridization.

### Text Books Recommended:

1. Gene Cloning by T.A. Brown.
2. General Microbiology by Power and Daganwala.
3. Zinssers Microbiology by KJ Wolfgang, McGraw- HJill Company.
4. Microbial Genetics by RM Stanley, F David and EC John.
5. Bacteriological Techniques by FJ Baker.
6. Molecular Biology of the Cell; 3<sup>rd</sup> Edition; Bruce Alberts ,et.al; Garland Publishing.
7. Cell biology; C.B. Powar; Himalaya Publishing House; Fifth edition
8. Cell & Molecular Biology; Gerald Karp; Fourth edition
9. A Textbook of Microbiology; Dubey&Maheshwari; S.chand& Sons.
10. Cell biology & Genetics; P. K. Gupta
11. Introduction to Bioinformatics; T K Atwood and D J Parry-Smith; Pearson Education Ltd

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## Paper- II: Bioinstrumentation and Biostatistics

### UNIT-1: MICROSCOPY AND CENTRIFUGATION

Simple and compound light microscope, Bright field, Dark field, Phase contrast and Electron microscope. Centrifugation- principle and types of centrifuges (analytical and preparatory), types of centrifugation- differential and rate zonal centrifugation.

### UNIT-2: pH metry and chromatography

Principle of pH meter, types of electrodes, factors affecting pH measurements, and application of pH meter. Chromatography- principle, types- paper, TLC and column chromatography, HPLC.

### UNIT-3: SPECTROPHOTOMETRY

Electromagnetic spectrum, Beers-Lamberts law, Types (Principles, working and application)- colorimeter, UV - Vis Spectrophotometry and IR- Spectrophotometry, Turbidometry.

### UNIT-4: Electrophoresis and X-Ray Diffraction

Principle of electrophoresis, instrumentation and Application, types of Paper, Gel electrophoresis and Immunoelectrophoresis. X-ray diffraction- principle and application.

### UNIT-5: Biostatistics

Data- Types, characteristics, presentation and distribution. Data analysis- central tendency (Mean, Median and Mode), Deviation (variance SD and SE). Concept of probability.

### Text Books Recommended:

1. Introduction to Instrumental analysis by Robert Braun.
2. Instrumental Techniques by Upadhyay and Upadhyay.
3. Instrumental Methods of Chemical Analysis by BK Sharma.
4. Bio statistics; Sunder Rao
5. Statistical Methods; S. P. Gupta; Sultan Chand & Sons

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## PRACTICAL

M. M. 50

Determination of antibiotic resistance by plating method.  
 Assaying of microbial enzymes; Catalase, Proteases, Peroxidases,  
 Cellulase, Cellobioases, Amylase, Diastase.  
 Exercise on paper, thin layer, column chromatography.  
 Exercise on paper and gel electrophoresis.  
 determination of pH of various water and soil sample.  
 testing of lambert beer's law.  
 Determination of lamda max of dye by spectrophotometer  
 Isolation of resistant bacteria from soil and water sample

## Scheme of Practical Examination

Time - 4 hours

M.M. 50

1. Exercise on spectrophotometer/ pH meter	10
2. Exercise on chromatography	10
3. Exercise on genetics	05
4. Spotting (1-5)	10
5. Viva-Voce	05
6. Sessional	10

Total 50

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## Scheme of Examination

कक्षा	प्रश्नपत्र	विषय समूह	सैद्धा. अंक	प्रायो. अंक	योग
BSc. I year	I	भूगतिकी एवं भू-आकृति विज्ञान (Geodynamics & Geomorphology)	50	50	150
	II	खनिज एवं क्रिस्टल विज्ञान (Mineralogy & Crystallography)	50		
BSc. II year	I	शैलिकी (Petrology)	50	50	150
	II	संरचनात्मक भूविज्ञान (Structural Geology)	50		
BSc. III year	I	जीवाश्म विज्ञान एवं संस्तर विज्ञान (Palaeontology & Stratigraphy)	50	50	150
	II	भूसंसाधन एवं व्यावहारिक भूविज्ञान (Earth Resources & Applied Geology)	50		

### -: Note :-

प्रत्येक वर्ष के विद्यार्थियों हेतु पाठ्यक्रम में उल्लेखित भूवैज्ञानिक क्षेत्रीय अध्ययन अनिवार्य होगा।

  
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कक्षा / Class- B.Sc-II  
Paper –I  
शैलिकी  
(PETROLOGY)

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- इकाई—01
- (i) मैग्मा; परिभाषा, उत्पत्ति एवं संगठन
  - (ii) बॉवेन की अभिक्रिया श्रेणी, मैग्मीय विभेदन एवं स्वांगीकरण
  - (iii) तंत्र, प्रावस्था एवं घटक, उष्मागतिकी के सिद्धांत, एकघटकीय (सिलिका) द्विघटकीय ऐल्बर्ट—एनॉर्थाइट तथा डायोप्साइड—एनॉर्थाइट एवं त्रिघटकीय सिलिकेट सिस्टम डायोप्साइड—एल्बर्ट—एनॉर्थाइट क्रिस्टलीकरण, प्रावस्था संतुलन
  - (iv) आग्नेय शैलों का गठन, संरचनायें एवं वर्गीकरण
  - (v) आग्नेय शैलों का रूप
- इकाई—02
- (i) दिक्काल में शैल—संलग्नता, शैल—ग्रंथियों की अवधारणा
  - (ii) अम्लीय आग्नेय शैलों का शिला विवरणात्मक अध्ययन
  - (iii) क्षारीय आग्नेय शैलों का शिला—विवरणात्मक अध्ययन
  - (iv) अल्पसिलिक आग्नेय शैलों का शिलाविवरणात्मक अध्ययन
  - (v) अत्यल्पसिलिक आग्नेय शैलों का शिलाविवरणात्मक अध्ययन
- इकाई—03
- (i) अवसाद की उत्पत्ति, परिवहन एवं निक्षेपण
  - (ii) अवसाद निक्षेपण की वायूढ़, जलोढ़, तटीय, एवं गंभीर समुद्री वातावरण की गतिकी
  - (iii) अवसादी संलक्षणाओं की अवधारणा
  - (iv) डायजिनेसिस की अवधारणा
  - (v) अवसादी शैलों का गठन एवं संरचनायें
- इकाई—04
- (i) अवसादी शैलों का वर्गीकरण
  - (ii) अवसादी शैलों की शैलिकी : रूडेशियस, एरेनेशियस, केल्केरियस अवसादी शैल
  - (iii) कायान्तरण: परिभाषा एवं कारक, संलक्षणा, कायान्तरण श्रेणी
  - (iv) कायान्तरित शैलों का गठन, संरचना एवं वर्गीकरण
  - (v) कायान्तरण प्रक्रियाओं की साम्य एवं असाम्य अभिक्रियायें

  
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- इकाई—05
- (i) पैराजिनेटिक—आरेख: प्रक्षेपीय विश्लेषण, ए.सी.एफ. एवं ए.के.एफ. आरेख
  - (ii) मृण्मय अवसादों का प्रगामी कायान्तरण
  - (iii) अशुद्ध चूना पत्थरों का प्रगामी—उष्मागतिक कायान्तरण
  - (iv) अल्प सिलिक शैलों का प्रगामी उष्मागतिक कायान्तरण
  - (v) भारत का शैलिकीय—प्रादेशिक विभाजन

#### **प्रायोगिक कार्य—**

- (1) आग्नेय, अवसादी एवं कायान्तरित शैलों के विभिन्न रूपों एवं संरचनाओं को रेखाचित्र की सहायता से प्रदर्शित करना।
- (2) विभिन्न आग्नेय शैलों का स्थूलदर्शी अध्ययन एवं सूक्ष्मदर्शी अध्ययन
- (3) विभिन्न अवसादी शैलों का स्थूलदर्शी एवं सूक्ष्मदर्शी अध्ययन
- (4) विभिन्न कायान्तरित शैलों का स्थूलदर्शी एवं सूक्ष्मदर्शी अध्ययन
- (5) भारत के शैलिकीय प्रदेशों का मानचित्र में प्रदर्शन
- (6) नार्म कैलकुलेशन

#### **Suggested Readings:-**

- |  |   |  |
|--|---|--|
| (1) शैलिकी के सिद्धान्त                                | — | डॉ. अंबिका प्रसाद अग्रवाल              |
| (2) शैलिकी के सिद्धान्त                                | — | ए. जी. झिंगरन                          |
| (3) Principles of petrology                            | - | G.W. Tyrell                            |
| (4) Petrology  | - | H. William, F.J. Turner & E.M. Gilbert |
| (5) Petrology of igneous & metamorphic rocks of India- |   | S.C. Chattarjee                        |
| (6) A text book of sedimentary petrology               | - | Verma & Prasad                         |
| (7) Metamorphism & Metamorphic rocks of India-         |   | S. Ray                                 |
| (8) Sedimentary rocks                                  | - | F.J. Pettijohn                         |
| (9) Introduction of sedimentology                      | - | S. Sengupta                            |
| (10) Sedimentary Environment                           | - | H.G. Readings                          |

  
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<b>Unit:1</b>	<ul style="list-style-type: none"> <li>(i) Magma, definition, origin &amp; composition</li> <li>(ii) Bowen's reaction series, magmatic differentiation &amp; assimilation</li> <li>(iii) System, phases &amp; component, principles of thermodynamics, Crystallisation and phase equilibrium of unicomponent magma:(Silica), Bi-component magma: Albite-Anorthite and Diopside-Anorthite Tri-component magma: Diopside-Albite-Anorthite</li> <li>(iv) Textures, structures &amp; classification of igneous rocks</li> <li>(v) Forms of igneous rocks</li> </ul>
<b>Unit:2</b>	<ul style="list-style-type: none"> <li>(i) Rock association in Time &amp; Space, concepts of rock kindreds</li> <li>(ii) Petrographic studies of Acid igneous rocks.</li> <li>(iii) Petrographic studies of Alkaline igneous rocks</li> <li>(iv) Petrographic studies of Basic igneous rock</li> <li>(v) Petrographic studies of Ultrabasic igneous rocks.</li> </ul>
<b>Unit:3</b>	<ul style="list-style-type: none"> <li>(i) Origin, transportation &amp; deposition of sediments</li> <li>(ii) Dynamics of sedimentary depositional environment; Aeolian, fluvial, coastal and abyssal environment.</li> <li>(iii) Concept of sedimentary facies</li> <li>(iv) Concept of diagenesis</li> <li>(v) Textures &amp; structures of sedimentary rocks.</li> </ul>
<b>Unit:4</b>	<ul style="list-style-type: none"> <li>(i) Classification of sedimentary rocks.</li> <li>(ii) Petrography of sedimentary rock; rudaceous, arenaceous, calcareous sedimentary rocks.</li> <li>(iii) Metamorphism; definition, agents, facies &amp; grade</li> <li>(iv) Textures, structures &amp; classification of metamorphic rocks.</li> <li>(v) Equilibrium &amp; non-equilibrium reactions in metamorphism.</li> </ul>
<b>Unit:5</b>	<ul style="list-style-type: none"> <li>(i) Paragenetic diagrams; projective analysis A.C.F &amp; A.K.F. diagrams</li> <li>(ii) Progressive metamorphism of Argillaceous rocks.</li> <li>(iii) Progressive dynamo-thermal metamorphism of impure limestone.</li> <li>(iv) Progressive dynamo-thermal metamorphism of basic igneous rocks.</li> <li>(v) Petrographic provinces of India.</li> </ul>

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**Practical:**

- (1) Diagrammatic representation of various forms & structures of igneous, sedimentary & Metamorphic rocks
- (2) Megascopic studies of various sedimentary, metamorphic & igneous rocks.
- (3) Microscopic studies of various sedimentary, metamorphic & igneous rocks.
- (4) Norm calculation
- (5) Diagrammatic representation of petrographic provinces of India in outline map of India.

**Suggested Readings:-**

- |  |   |  |
|--|---|--|
| (1) शैलिकी के सिद्धान्त                                | — | डॉ. अंबिका प्रसाद अग्रवाल              |
| (2) शैलिकी के सिद्धान्त                                | — | ए. जी. झिंगरन                          |
| (3) Principles of petrology                            | - | G.W. Tyrell                            |
| (4) Petrology  | - | H. William, F.J. Turner & E.M. Gilbert |
| (5) Petrology of igneous & metamorphic rocks of India- |   | S.C. Chattarjee                        |
| (6) A text book of sedimentary petrology               | - | Verma & Prasad                         |
| (7) Metamorphism & Metamorphic rocks of India-         |   | S.Ray                                  |
| (8) Sedimentary rocks                                  | - | F.J. Pettijohn                         |
| (9) Introduction of sedimentology                      | - | S.Sengupta                             |
| (10) Sedimentary environment                           | - | H.G. Readings                          |

  
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कक्षा / Class- B.Sc-II  
Paper –II  
संरचनात्मक भू-विज्ञान  
(STRUCTURAL GEOLOGY)

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- इकाई—01 (1) संरचनात्मक भूविज्ञान की परिभाषा एवं अध्ययन क्षेत्र।  
(2) शैल दृष्यांशों का अध्ययन। दृष्यांशों पर नति तथा ढाल के प्रभाव।  
(3) संस्तरण की पहचान। नति एवं नतिलम्ब की माप।  
(4) क्लाइनोमीटर एवं ब्रन्टन कम्पास।  
(5) संस्तरों के शीर्ष तथा तल की पहचान।  
(6) शैलविरूपण की अवधारणा। प्रतिबल तथा विकृति दीर्घवृत्तज की अवधारणा।
- इकाई—02 (1) वलन की आकारिकी।  
(2) वलन की ज्यामितिक एवं जननिक वर्गीकरण।  
(3) स्थलीय तथा भूवैज्ञानिक मानचित्र में वलन की पहचान।  
(4) दृष्यांशों पर वलन के प्रभाव।  
(5) वलन क्रियाविधि की प्राथमिक अवधारणा।
- इकाई—03 (1) भ्रंश आकारिकी। सर्पण और सेपरेशन।  
(2) भ्रंश का ज्यामितिक एवं जननिक वर्गीकरण।  
(3) स्थलक्षेत्र तथा भूवैज्ञानिक मानचित्र में भ्रंश की पहचान।  
(4) दृष्यांशों पर भ्रंश के प्रभाव।  
(5) भ्रंशन क्रियाविधि की प्राथमिक अवधारणा।
- इकाई—04 (1) संधि; आकारिकी, संधि का ज्यामितिक एवं जननिक वर्गीकरण।  
(2) पत्रण की परिभाषिक शब्दावली, प्रकार, उत्पत्ति एवं विशाल संरचनाओं से संबंध।  
(3) रेखण की परिभाषिक शब्दावली, प्रकार, उत्पत्ति एवं विशाल संरचनाओं से संबंध।  
(4) लवण गुम्बद,  
(5) प्लूटान; विवर्तनिकी एवं अभिस्थापन
- इकाई—05 (1) विषमविन्यास के प्रकार एवं पहचान।  
(2) पुरान्तशायी एवं नवान्तशायी, अतिव्यापन तथा अपव्यापन।  
(3) विवर्तनिकी की अवधारणा।  
(4) प्रायद्वीपीय, सिंधु गंगा के मैदान तथा प्रायद्वीपेत्तर भारत का विवर्तनिकी विन्यास।  
(5) त्रिविमीय प्रक्षेपण का संरचनात्मक भूविज्ञान में अनुप्रयोग।

  
27-5-19

  
27/5/19

## प्रायोगिक कार्य—

- (1) प्राकृतिक संरचनात्मक प्रादर्शों का अध्ययन ।
- (2) विभिन्न संरचनाओं का प्रादर्शों के माध्यम से अध्ययन ।
- (3) मानचित्र में दृश्यांश को पूरा करना ।
- (4) सरल से जटिल संरचनाओं को प्रदर्शित करने वाले मानचित्रों से भूवैज्ञानिक काट बनाना एवं भूवैज्ञानिक इतिहास की विवेचना करना ।
- (5) संरचनात्मक भूविज्ञान में स्टिरियोग्राफिक प्रोजेक्शन का अनुप्रयोग ।
- (6) सात दिवसीय भूवैज्ञानिक क्षेत्रीय अध्ययन ।

  
27-5-19

  
27/5/19

Class- B.Sc - II  
Paper –II  
(STRUCTURAL GEOLOGY)

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- Unit:1**
- (i) Definition and scope of Structural Geology. Study of outcrops. Effects of dip and slope on outcrops.
  - (ii) Identification of bedding. Dip and strike measurement.
  - (iii) Clinometer and Brunton compass.
  - (iv) Recognition of top and bottom of beds.
  - (v) Concept of rock deformation. Concept of stress and strain ellipsoids.
- Unit:2**
- (i) Fold morphology.
  - (ii) Geometric and genetic classification of folds.
  - (iii) Recognition of folds in the field and on geological maps.
  - (iv) Effect of folds on outcrops.
  - (v) Elementary idea of mechanics of folding.
- Unit:3**
- (i) Fault morphology. Slip and separation.
  - (ii) Geometric and genetic classification of faults.
  - (iii) Recognition of faults in the field and on geological maps.
  - (iv) Effect of faults on outcrops.
  - (vi) Elementary idea of mechanics of faulting.
- Unit:4**
- (i) Joint morphology; geometric and genetic classification of joints.
  - (ii) Foliation; terminology, kinds, origin and relation to major structures.
  - (iii) Lineation: terminology, kinds, origin and relation to major structures.
  - (iv) Salt domes.
  - (vii) Plutons; tectonics & emplacement.
- Unit:5**
- (i) Types and recognition of Unconformity.
  - (ii) Outlier and inlier. Overlap & offlap.
  - (iii) Concept of tectonics.
  - (iv) Tectonic framework of Peninsula, Indo-Gangetic Plains and Extra-Peninsular India.
  - (v) Stereographic projection & its use in Structural Geology.

  
27-5-19

  
27/5/19



**Practical-**

- (1) Study of Natural Structures in hand specimens.
- (2) Study of structures with the help of models.
- (3) Completion of outcrops.
- (4) Preparation of geological section from simple to complex geological maps and its interpretation.
- (5) Application of stereographic projection in structural geology.
- (6) Geological excursion for seven days.

**Books recommended:**

- (1) संरचनात्मक भूविज्ञान — डॉ.डी.के. श्रीवास्तव
- (2) भूवैज्ञानिक संरचनाएँ — डॉ. भरत सिंह राठौर
- (3) प्रायोगिक भूविज्ञान (भाग-2) — आर.पी. मांजरेकर
- (4) Structural Geology : M.P. Billings.
- (5) Theory of Structural Geology : Gokhale, N.W.
- (6) Exercises on Geological maps and dip-Strike: Gokhale, N.W.
- (7) Outlines of structural Geology: E.S. Hills.
- (8) Structural Geology : Hobbs, Means and Williams.
- (9) Geological maps : Chiplonkar and Pawar.

  
27-5-19

  
27/5/19

## **B.A./B.Sc. – Second Year**

**Session : 2019-20**

Name of the Subject :- Anthropology  
Paper :- First  
Name of the Paper :- ARCHAEOLOGICAL ANTHROPOLOGY

Total Marks : 50

Pass Marks : 17

### **Syllabus**

- UNIT – I Meaning and scope of Archaeological Anthropology, branches of Archaeology: Classical Archaeology, Historical Archaeology, Prehistoric Archaeology and Protohistoric Archaeology. Anthropology as Archaeology. Differences between the Old world and new world Archaeological Traditions. Absolute and Relative Dating.
- UNIT – II Geological time scale. The Great Ice Age  
Stratigraphy and other evidences of Ice Age: River terraces. Moraines etc. Pluvial and interpluvials  
Stone Age tools: Types and Technology.
- UNIT – III Age of Paleolithic savagery:  
European lower Paleolithic period: Stone tools and cultures  
Indian lower Paleolithic period: Sohan Culture & Madrasian Culture.  
European Middle Paleolithic Period: Tools & culture; Flake tool complex in India  
European Upper Paleolithic period; Tools and Culture, main characteristics of the European Paleolithic Home and Cave art and its significance.
- UNIT – IV Mesolithic complex in North Europe. Mesolithic complex in Western Europe, Mesolithic Culture in India. Chief feature of Neolithic revolution. Neolithic complex in India.
- UNIT – V Metal Age: Copper, Bronze and Iron Age  
Urban revolution: General Features  
Indus valley civilization: Main Features, Town Planning, Economic activities, origin and decay

*Singh*  
20/06/19

## **B.A. /B.Sc. – Second Year**

**Session: 2019-20**

Name of the Subject :- Anthropology  
Paper :- Second  
Name of the Paper :- TRIBAL CULTURE OF INDIA  
Total Marks : 50

Pass Marks : 17

### **Syllabus**

- UNIT-I** Define tribe and scheduled tribe. Geographical distribution of Indian tribes and their racial and linguistic classification. Contribution of Anthropology in the study of Indian tribes.  
Sacred complex, Universalisation and parochialisation, Sanskritisation, westernization, dominant caste.  
Tribes and caste, Difference between S.C. and S.T.  
Particularly Vulnerable Tribes Group (PVTG) of Chhattisgarh (Kamar, Birhor, Hill Korwa, Abujmariya, Baiga)
- UNIT-II** Primitive economy:-  
Stages of tribal economy: Hunting, food gathering, fishing, shifting and settled agriculture.  
Concept of Property and ownership in tribal societies  
Problems of tribal people: land alienation, bonded labour, indebtedness, shifting cultivation, irrigation, Unemployment, agricultural labour; Forest and Tribals  
New economic anthropology: Exchange- Gifts, barter, trade, ceremonial exchange and market economy
- UNIT-III** The problems of culture contact: Problems due to urbanization and industrialization, Regionalism  
Tribal religion: origin & function, animism, totemism.  
Concept and practices of Magic and witchcraft, shamanism, head hunting.
- UNIT-IV** Political organisation of Indian tribes: Distinction between state and stateless society, law in primitive society  
Social organization of Indian Tribes: Matriarchal and patriarchal family,. Lineage and clan, Ways of acquiring mates in tribal societies.  
Youth dormitories: Type, organisation and functions.
- UNIT-V** Tribal development: History of tribal development, the constitutional safeguards for the scheduled tribes.  
Tribal problem: isolation, migration, acculturation, detribalization.  
Policies, plans and programmes of tribal development and their implementation. Tribal revolts in India.  
Contributions of anthropology to tribal development.  
Response of the tribal people for development programs of government and NGO

*Sumit*  
20/06/19

Recommended Readings:

1. Chaudhary, Bhudadeb (Ed.). Tribal Development in India.
2. Elwin, V.A. Philosophy for NEFA.
3. Haimendorf. The Tribes of India: Struggle for survival.
4. Shara B.D. Basic Issues in tribal Development.

Singh  
20/06/19

## **B.A./B.Sc. – Second Year**

**Session : 2019-20**

Name of the Subject :- Anthropology  
Paper :- Practical  
Name of the Paper :- MATERIAL CULTURE AND RESEARCH TOOLS

Total Marks : 50


Pass Marks : 17

### **OBJECTIVES :**

The objective of this practical course is to introduce the student with the primitive material culture and technology used by primitive man and the student will be introduced with various techniques commonly used by social Anthropology.

### **MATERIAL CULTURE :**

- Part – I. Identification and technological descriptions of the following.
1. Implements for food gathering, hunting, fishing and agriculture
  2. Fire making implements
  3. Types of habitations
  4. Land and water transport
- Part-II Sketching, identification and the description of Paleolithic, Mesolithic and Neolithic tools
- ( It is essential that students should draw at least five tools of each age )
- Part- III Construction of schedule, Geneology and Questionnaire
- Each student should collect information through above tools from 10 Respondents.
- The Student will be required to maintain practical records of all work done in the practical class.

  
20/06/19

**HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**  
**Syllabus for B.A. / B.Sc. Course, 2019-20**  
**Subject: Statistics**

Each year of B.A. /B.Sc. I, II, III shall have two theories and one practical course. All the Theory as well as Practical Examinations will be of 3 hours duration. In each practical examination 10% marks shall be fixed for viva –voce and 20% marks for practical record.

**Scheme of Examination**

	<b>Title of the paper</b>	<b>MAX. Marks</b>
<b>B.A./B.Sc. I</b>	<b>Paper-I</b> (Code No. 0803): <b>Probability I</b>	50
	<b>Paper-II</b> (Code No. 0804): <b>Descriptive Statistics I</b>	50
	<b>Paper III: Practical-</b> Based on Theory Papers I & II	50
	<b>Total</b>	<b>150</b>
<b>B.A./B.Sc. II</b>	<b>Paper-I</b> (Code No. 0853): <b>Statistical Methods</b>	50
	<b>Paper-II</b> (Code No. 0854): <b>Sampling Theory and Design of Experiments</b>	50
	<b>Paper III: Practical-</b> Based on Theory Papers I & II	50
	<b>Total</b>	<b>150</b>
<b>B.A./B.Sc. III</b>	<b>Paper I</b> (Code No. 0907): <b>Applied Statistics</b>	50
	<b>Paper II</b> ( Code No. 0908): <b>Statistical Quality Control and Computational Techniques</b>	50
	<b>Paper III: Practical-</b> Based on Theory Papers I & II	50
	<b>Total</b>	<b>150</b>

**B.A./B.Sc. –II**  
**Subject: Statistics**  
**Paper-I( Paper Code-0853)**  
**Statistical Methods**

**Unit I**

Sampling from a distribution: Definition of a random sample, simulating random sample from standard distributions (uniform, Normal, Exponential), concept of derived distributions of a functions of random variables, concept of a statistics and its sampling distribution. Point estimate of a parameter. Properties of a good estimator, Concept of bias and standard error of an estimate .Standard errors of sample mean, sample proportion. Sampling distribution of sum of Binomial, Poisson and mean of Normal distributions. Independence of sample mean and variance in random sampling from a Normal distribution (without derivation).

**Unit II**

Statistical tests and interval estimation: Null and alternative hypothesis. Types of errors, level of significance, p values, one and two tailed tests, Procedure for testing of hypothesis. Statement of chi-squares, Student's t and F statistics. Testing for the single mean and variance of a univariate normal distribution, testing the equality of two means and testing for the equality of two variances of two univariate normal distributions. Related confidence intervals. Testing for the significance of sample correlation in sampling from bi-variate normal distribution and for equality of means and equality of variances in sampling from bivariate normal populations.

**Unit III**

Large sample tests: use of central limit theorem for testing and interval estimation of a single mean and a single proportion and difference of two means and two proportions, Fisher's Z transformation and its uses. Pearson's chi-square test for goodness of fit and for homogeneity for standard distributions. Contingency table and test of independence in a contingency table.

**Unit IV**

Nonparametric tests: Definition of order statistics and their distributions, Non-parametric tests, Sign test for univariate and bivariate distributions, Wilcoxon test, Mann-Whitney test, Run test, median test and Spearman's rank correlation test.

**Unit V**

Four short notes, one from each unit will be asked. Students have to answer any two.

**REFERENCES**

1. Frund J.E. (2001) Mathematical Statistics, Prentice Hall of India.
2. Goon A.M., Gupta M.K., Das Gupta.B. (1991): Fundamentals of Statistics, Vol.I, World Press, Culcutta.
3. Gupta and Kapoor: Fundamentals of Mathematical Statistics S.Chand & Sons.
4. Hodges, J.L. and Lehman E.L. (1964): Basic Concepts of Probability and Statistics, Holden Day.
5. Mood A.M, Graybill F.A and Boes D.C. (1974): Introduction to the Theory of Statistics, McGraw Hill.

## **ADDITIONAL REFERENCES**

- 1..Bhat B.R., Shrivienkatramana T and Rao Madhava K.S. (1997): A Beginner's Text, Vol. II, New age International (P) Ltd.
2. Rohatgi, V.K. (1967): An Introduction to Probability Theory and Mathematical Statistics, John Wiley & Sons.
3. Snedecor, G.W. and Cochran W.G. (1967): Statistical Methods. Iowa State University Press.



**Paper-II** (Paper Code-0854)  
**Sampling Theory and Design of Experiments**

**Unit I**

Concepts of population and sample, need for sampling, Census and sample survey, Basic concepts in sampling, organizational aspects of survey sampling, sample selection and sample size.  
Some basic sampling methods – simple random sampling (SRS) with and without replacement.

**Unit II**

Stratified random sampling, Systematic sampling, Allocation problems, ratio and regression methods of estimation under SRS.

Non-sampling errors, acquaintance of working (questionnaires, sampling design, methods followed in field investigation, principal findings, etc) of NSSO and other agencies undertaking sample surveys.

**Unit III**

Analysis of variance for one way and two-way classifications. Need for design of experiments, fundamental principal of design, basic designs- CRD, RBD, LSD and their analysis.

**Unit IV**

Missing plot technique. Analysis of co-variance. Factorial experiments :  $2^2$ ,  $2^3$  factorial experiments, illustrations, main effects and interactions, confounding and illustrations. Yates method of finding treatment totals.

**Unit V**

Four short notes, one from each unit will be asked. Students have to answer any two.

**REFERENCES**

1. Cochran W.G. (1977): Sampling Techniques, John Wiley and Sons.
2. Des Raj (2000): Sample Survey Theory, Narosa Publishing House.
3. Murthy M.N.(1967): Sampling Theory and Methods, Statistical Publishing Society, Calcutta.
4. Singh, D. and Chaudhary, F.S. (1986): Theory and analysis of Sample Survey Designs. New Age International Publisher.
5. Sukhatme P.V., Sukhatme B.V., Sukhatme S. and Ashok C.(1984), : Sample Survey Methods and Its Applications, Indian Society of Agricultural Statistics, New Delhi.
6. Das M.N. and Giri (1986) : Design and analysis of experiments, Springer Verlag.
7. Goon A.M., Gupta M.K., Das Gupta B. (1986): Fundamentals of Statistics, Vol.II, World Press, Calcutta.
8. Joshi, D.D.(1987): Linear Estimation and Design of Experiments, Wiley Eastern.
9. Kempthorne O.(1965) : The Design and Analysis of Experiments, Wiley Eastern.

### **Paper III:**

#### **Practical : Practicals Based on Paper I & II**

1. drawing random samples from standard univariate discrete and continuous distributions such as Binomial, Poission, Normal, Cauichy and Exponential.
2. Tests of significance based on Student's t, Chi-square, F. Test of significance of sample correlation coefficient. Use of Z Transformation. Testing of equality of means and equality of variance in sampling from bivariate normal.
3. Large sample tests for means and proportions, tests of goodness of fit and independence of attributes in contingency tables.
4. Nonparametric tests: Sign, Run, Median, Wilcoxon, Mann-Whitney tests.
5. Selection of samples and determination of sample size. Simple random sampling, Statified and systematic sampling. Allocation problem in stratified sampling. Ratio and regression methods of estimation.
6. Analysis of variance for one way and two way classifications. Analysis of CRD, RBD and LSD. Analysis of  $2^2$  and  $2^3$  experiments.

**DEFENCE - STUDIES**  
**PAPER - I**  
**WESTERN MILITARY HISTORY**

**(Paper Code - 0867)**

**Note :** The aim of this paper is to give a historical, political & social back ground of the state engaged in the conflicts under study and the factors influencing the development of different forms of warfare and weapons system.

**Note :** Question will be set from each unit there will be only Internal choice.

- UNIT-I**
1. Sun Tzu - Founder of Military Theory and philosophy.
  2. Clausewitz - War and its relationship with politics.
  3. Machiavelli - Renaissance of Art of war.
  4. Jomini - Concept of mass armies.
- UNIT-II**
1. Churchill.
  2. Mahatma Gandhi.
  3. Kautilya.
  4. A. Hitler.
- UNIT-III**
1. Mao Tse Tung.
  2. Che Guevara.
  3. Economic and Psychological war.
  4. Collective Security.
- UNIT-IV**
1. Indo-China War -1962 Causes of war, political & military lesson.
  2. Indo - Pak War -1965 Causes of war, political & military lesson.
  3. Indo - Pak War - 1971 Causes of war, political & military lesson.
  4. Kargil Conflict 1999.
- UNIT-V**
1. Internal & External threats of National Security.
  2. Insurgency and Counter-Insurgency.
  3. Terrorism - Problem and Solution.
  4. Naxalism - Problem and solution.

**REFERENCE BOOKS:**

1. Howard M. : Theory and Practice of war
2. ---, --- : Clausewitz
3. Mao Tse Tung : Guerilla warfare
4. Palit, D.K. : The lightning War Tadi Yudh
5. Mankekar : War of 1971
6. आर.सी. जोहरी : पाश्चात्य सैन्य विचारक
7. शर्मा च निगम : सैन्य विचारक ।

## **PRACTICAL**

There shall be a practical examination of 3.5 hours duration carrying 50 Marks. The division of marks shall be as follow:

- |                                    |            |
|------------------------------------|------------|
| (a) Exercise based on Map-reading: | 15marks    |
| (b) T.W.E.S.T.                     | : 15marks  |
| (c) Sessional work                 | : 10marks  |
| (d) Viva-Voce                      | : 10markss |

### **PART - A**

Map-reading:

1. Scales - Definition, method of expressing, construction of simple, time, diagonal and comparative.
2. Relief and its representation.
3. Slopes and Gradient.
4. Visibility and inter-visibility by Gradient, proportionate and section method.
5. Re-section and inter-section.
6. Grid system-Map reference, Index to map. Four figure and Six figure.

### **PART - B**

7. Organization and equipment of infantry Platoon and Section.
8. Section Formation.
9. Indication of Target by various methods.
10. Fire control order.
11. Patrols.
12. Battle Procedures (ROFT).
13. Verbal Order.
14. Message-Writing.

### **BOOKS RECOMMENDED:**

1. Manual of Map Reading: Landon Her
2. युद्ध स्थल कला : चौ. नरेन्द्र सिंह
3. एन.सी.सी. परिचय : विष्णु कांत शर्मा ।

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## INDUSTRIAL CHEMISTRY

### PAPER – I

(Paper Code - 0871)

M.M. 34

**UNIT-I** Material Science : Mechanical Properties of materials and change with respect to temperature. **02L**

**Material of constructions used in Industry :**

**Metals and Alloys :** Important metals & alloys; iron, copper, aluminium lead, nikel, titanium and their alloys- Mechanical and chemical properties and their applications. **06L**

**Cement :** Types of cement, composition, manufacturing process, setting of cement. **04L**

**Ceramics :** Introduction, Types, Manufacturing process, Applications. Refractories. **04L**

**UNIT-II** Polymeric Mateials : Industrial polymer and comoposite materials- Their constitution, Chemical and physical properties, Industrial applications. **06L**

**UNIT-III Glass :** Types, composition, manufacture, physical and chemical properties, Applications. **04L**

**Corrosion :** Various types of corrosion relevant to chemical Industry-Machanism, Preventive methods. **04L**

**UNIT-IV** Pollution : Air, Oxygen, nitrogen cycle, water, Biosphere, flora and fauna, Energy, soil. **05L**

Pollutants and their statutory limits, pollution evaluation methods. **04L**

**UNIT-V** Air pollution-various pollutants. water pollution-organic/inorganic pollutants, Noise pollution, sewage analysis, pesticide pollution, Radiation pollution, green house effect, future. **10L**

### Books Recommended :

1. Pollution control in chemical & Allied Industries, S.P. Mahajan.
2. Poolution Control in Industries, A Sories of Books by Jones, H.P.
3. Air Pollution - Vol.1 to 4, Editor, STERN, A.C.; Academic Press.
4. Environmental Engineering, G.N. Pandey, Tata McGraw Hill.
5. Homd Book of Air Pollution, A. Parker, Tata McGraw Hill.
6. Science of Ceromic chemical Processing, Hench, L.L.
7. Science of Ceramics, Stewarts, G.H.
8. Chemistry of Cement.
9. Properties of Glass, Morcy, G.W.
10. Chemistry of Glasses, Paul, A.
11. Corrosion, causes & Prevention, Spellur, F.N.



**PAPER - II**  
**(Paper Code - 0872)**

**M.M. 33**

**UNIT-I** Unit processes in organic chemicals manufacture -

**Nitration** : Introduction - Nitrating agents, Kinetics and mechanism of nitration processes such as nitration of :

- i Paraffinic hydrocarbons
- ii. Benzene to nitrobenzene and m-dinitrobenzene
- iii. Chlorobenzene to o and p nitrochloro benzenes.
- iv. Acetanilide to p-nitroacetanilide
- v. Toluene

Continuous vs batch nitration.

**12L**

**UNIT-II Helogenation:** Introduction-Kinetics of helogenation reactions reagents for elogenation, Helogenation of aromatics-side chain and nuclear helogenations, commercial manufacture of chlorobenzenes, chloral, monochloroacetic acid and chloromethanes, dichloro fluormethane.

**09L**

**UNIT-III Sulphonation** : Introduction-sulphonating agents, chemical and physical factors in sulphonation, Kinetics and mechanism of sulphonation reaction, commercial sulfonation of benzene, naphthalene, alkyl benzene, Batch vs continuous sultphonation.

**09L**

**UNIT-IV Effluent Treatment and waste Management** : Principles and equipments for aerobic, anaerobic treatment, adsorption, filtration, sedimentation. **09L**

**UNIT-V** Bag fillters, electrostatic precipitator, mist eliminators, wet scrubbers, absorbers, solid waste management, industrial safety. **09L**

**Books Recommended :**

1. Unit process in Organic synthesis P.M. Groggins, McGraw Hill.
2. Effluent Treatment in process Industries - Inst. of Cham. Engg.
3. Effluent Treatment and waste Disposal - Inst. of Chem. Engg.
4. Effluent Treatment and Disposal - Inst. of Chem. Engg.

The image shows five handwritten signatures and dates, likely from examiners. From left to right: 1. Signature 'A. B. Srinivas' with date '24.7.2017'. 2. Signature 'A. Srinivas' with date '24.7.17'. 3. Signature 'B. Srinivas' with date '24.7.17'. 4. Signature 'D. Srinivas' with date '24.7.17'. 5. Signature 'P. Srinivas' with date '24.7.17' and a checkmark.

**PAPER - III**  
**(Paper Code - 0873)**

**M.M. 33**

**UNIT-I Oxidation :** Introduction-Types of oxidation reactions, oxidizing agents, kinetics and mechanism of oxidation of organic compounds liquid phase oxidation, vapor phase oxidation, commercial manufacture of benzoic acid, maleic anhydride, phthalic anhydride, acrolein, acetaldehyde, acetic acid. **07L**

**UNIT-II Hydrogenation :** Introduction-Kinetics and thermo-dynamics of hydrogenation reactions, catalysts for hydrogenation reactions, hydrogenation of vegetable oil. manufacture of methanol from carbon monoxide and hydrogen, hydrogenation of acids and esters to alcohols, catalytic reforming. **07L**  
Alkylation: Introduction; Types of alkylation, Alkylating agents, Thermodynamics and mechanism of alkylation reactions, manufacture of - alkyl benzenes (for detergent manufacture), ethyl benzene, phenyl ethyl alcohol, N-alkyl anilines (mono and di- methyl anilines) **03L**

**UNIT-III Esterification :** Introduction; Hydrodynamics and kinetics of esterification reactions, Esterification by organic acids, by addition of unsaturated compounds, esterification of carboxy acid derivatives, commercial manufacture of ethyl acetate, dioctyl phthalate, vinyl acetate, cellulose acetate. **04L**

**Amination : (A) By reduction :** Introduction, Methods of reduction-metal and acid, catalytic, sulfide, electrolytic, metal and alkali sulfites, metal hydrides, sodium metal, concentrated caustic oxidation, reduction, commercial manufacture of aniline, m-nitroaniline, p-amino phenol.

**(B) By aminolysis :** Introduction, aminating agents, factors affecting. **09L**

**Hydrolysis :** Introduction; hydrolysing agents, kinetics, thermodynamics and mechanism of hydrolysis. **02L**

**UNIT-IV Process Instrumentation :** concept of measurement and accuracy Principle, construction and working of following measuring instruments.

Temperature : Glass thermometers, bimetallic thermometer pressure spring thermometer, vapour filled thermometers resistance thermometers. radiation pyrometers.

Pressure : Manometers, barometers, bourdon pressure gauge ; bellows type, diaphragm type pressure gauges, macleod gauges, pirani gauges, etc. **12L**

**UNIT-V Liquid level :** Direct-indirect liquid level measurement, Float type liquid level gauge, ultrasonic level gauges; bubbler system, density measurement, viscosity measurement. **07L**

  
The block contains six handwritten signatures, each followed by the date '24.7.17'. The signatures are written in blue ink on a white background.

**Books Recommended :**

1. Unit process in organic synthesis, P.M. Groggins, McGraw Hill.
2. Industrial Instrumentation, Bekmen, D.P., John Wiley.
3. Applied Instrumentation in process Industries, Vol. I, II & III, Andrews, W.G., Gulf Publication.
4. Instrumentation and Control for the process Industries, Borer, S. Elsevier Applied Science Publishers.
5. Chemical Engineer's Hand book, Perry, J.H. and Green, D. McGraw Hill.

**Time : 4 Hours****PRACTICALS****M.M. 50**

**Unit Process :** One to two examples of each of the following unit processes.

Nitration, sulphonation, Friedel-Crafts reaction, esterification, hydrolysis, oxidation, Halogenation, chloro-sulphonation, reduction, polymerization, reactions of diazonium salts. **Instrumental methods of analysis :** Use of colourimeter pH meter, potentiometer, conductometer, refractometer, polarimeter

**Material testing:** Testing of alloys identification of plastics/rubber estimation of yield point, Young's modulus, flaredness; Optical, thermal mechanical and electrical properties. **Process Instrumentation :** Transducers of different types. use of Transducer for measuring flow control. Determination of flash point and ignition points of liquids.

**Water analysis :** Solid contents, Hardness, COD and other tests as per industrial specifications.

**Flow measuring devices :** Floats Monographs of representative raw materials such as sulphuric acid, toluene, sodium carbonate, sodium hydroxide, carbon tetrachloride benzoic acid (5-6 compounds). Limit tests for heavy metals Pb, AS, Hg, Fe and ash content.

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**VOCATIONAL COURSE IN ELECTRONIC  
EQUIPMENT MAINTENANCE  
SCHEME OF EXAMINATION**

		<b>Max. Marks</b>	<b>Min. Pass Marks</b>
Paper - I	Operational Principles of Audio	50	17
Paper - II	Microprocessor Based Instrumentation and Control	50	17
	Practicals	50	17

**1. SUBJECT OBJECTIVE :**

The objective of this syllabus is to familiarize students with the fundamentals of electronics and prepares him/her to keep in track with fast change in this field so that he/she is prepared to takenup advance studies or go for self employment. It is proposed to give the students an idea of basics of all the developments in the field of electronics. Efforts are directed to impart some knowledge of computer hardware and software too, which fall in the realu of electronics so that the students become aware of fast changing scene of information superhigh wey also.

**2. JOB POTENTIALS :**

The students in (by) taking up this course may find adequta job- opportunities in industries or manufacturing firms. They may opt for setting up their own small scale industries of electronics, thus enhancing self employment.

3. **Contents :** As per attached syallbus.

4. Subject scheme.
5. On the job training will be imparted in Summer days.
6. As detailed out in the prospectus.
7. As per the draft given in the syllabus.
8. Permissible combination of subject Physics, Mathemetics & Electonic equipment mathematics.

## **PAPER - I**

**(Paper Code - 0859)**

### **OPERATIONAL PRINCIPLES OF AUDIO AND VIDEO EQUIPMENTS**

**M.M. 50**

**UNIT-I** Revision of All and FH, communication bands, signal sources, Basic Principles of propagation of e.m. wave through atmosphere and ionosphere; ground waves, sky waves, space waves, dead zones etc.

**RECEIVING ANTENNAE:** Antenna Parameters like gain, radiation pattern, effective aperture. Ferrite AE. Type of antennae like wire, loop, dish, Yagi, telescopic, their construction and operating principles.

**SUPERHETERODYNE RECEIVERS:** Principles, advantages, block diagram, RF input and AE coupling arrangements, RF amplifiers, mixer, local oscillator, IF amp. Detector, audio amplifier, loud speaker, power requirements, tuning/aligning of receivers, waveforms and voltages at different check points. Circuit reading of various radio sets, repair and trouble shooting, automobile radios.

**UNIT-II ELEMENTS OF A TELEVISION SYSTEM :** Picture transmission, sound transmission, picture reception, sound reception, synchronisation.

**TYPE VIDEO SIGNAL :** Scanning sequence details, sync details of the 625 line system, channel bandwidth, vestigial sideband transmission, reception of vestigial sideband signals, frequency modulation, FH channel bandwidth, channel bandwidth for colour transmission, allocation of frequency bands for television bandwidth for colour transmission, allocation of frequency bands for television signal transmission, television standards.

Picture tubes- monochrome and colour : Beam deflection, face plate, picture tube characteristics, picture tube circuit controls.

**UNIT-III TELEVISION RECEIVERS :** Types of television receivers, receiver sections, video detector, video section fundamentals, video amplifiers-design principles, video amplifier circuits, automatic gain control and noise cancelling circuits, sync separation circuits, sync-processing and AFC circuits, deflection circuits, sound system, RF tuner, video IF amplifiers, receiver power supplies, television receiver antennae, colour television antennae.

**TELEVISION APPLICATIONS :** Television broadcasting, cable television, closed circuit television, theatre television, picture phone and facsimile, video tape recording (VTr, television via satellite, TV games, HDTV, flatpanel TV teleconferencing.

**UNIT-IV TAPE RECORDERS :** Principles of magnetic recording, characteristics of magnetism, the hysteresis loop, recording head, recorded wave-length, response of head during reply, the effect of gap length, low frequency loss, other losses, equalization, the effect of non-linear characteristic of magnification recording bias, A.C. bias, erasing the tape, block diagram of audio tape recorder.

Oscillator, preamplifier, dolby, amplifier, record (play back) head, erase head, tapes (metal polymer), mechanical transport system, stereo recording, double deck, single deck, microphones (RF, Cable), noise, maintenance of mechanical parts, head cleaners, head alignment, graphic equalisers.

**UNIT-V TELEPHONES :** Modulation, demodulation, modem, subscriber frequency allotment, channel organisation, signalling, switching, manual exchanges, STD, ISD, EFABX, Intercom-connection on equipment and EPABX, Value added services like FAX E mail.

**MEASURING INSTRUMENTS :** Multimeters analog/digital, oscilloscopes, signal generators, noise and sound level meters, frequency counters, error sources and precautions during measurement.

**GENERAL NOTE :** Familiarisation with catalogues, standard specification, knowledge about companies referring to service manual.

**PAPER - II**  
**MICROPROCESSOR BASED INSTRUMENTATION AND CONTROL**  
**(Paper Code - 0860)**

**M.M. 50**

**UNIT-I MICROCOMPUTER FUNDAMENTALS :** Introduction, simplified microcomputer architecture, simplified memory organization, instruction set, simplified CPU organisation, microcomputer operation, Personal computer organization and Word Processor. Data sheet descriptions, pin diagram and function, microprocessor architecture, using the data/address register, using the stack pointer.

**UNIT-II THE INTEL 8080/8085 MICROPROCESSOR :** Introduction, the 8085 pin diagram and functions, the 8085 architecture, addressing modes, the 8080/8085 instructions set, the 8080/8085 data transfer instructions, the 8080/8085 arithmetic instructions, the 8080/8085 logical instructions, the 8080/8085 stack, I/O, and machine control instructions.

**UNIT-III PROGRAMMING THE MICROPROCESSOR :** Machine and assembly languages, simplified instruction set, instruction set, arithmetic operations, instruction set-logical operations, instruction set-data transfer operations, instruction set branch operations, instruction set-subroutine call and return operations, instruction set-miscellaneous operations, writing a program, addressing modes, program branching, program looping using subroutines.

Programming the 8080/8085 microprocessor : Introduction, straight-line programs, looping programs, mathematical programs.

**UNIT-IV INTERFACING THE MICROPROCESSOR :** Introduction, interfacing with ROM, interfacing with RAM, input/output interfacing basics, interfacing with practical I/O ports, synchronizing I/O data transfers using interrupts. address decoding.

**UNIT-V Application to illustrate the use of microprocessor in :**

- (i) Traffic control
- (i) Temperature control
- (i) Digital clock
- (iv) Stepper motor control
- (v) Washing machine control

## PRACTICALS

A student is required to do atleast 12 experiments in an academic year, and one month Summer Training. The scheme of practical examination will be as follows :

(i) One experiment of 3 hours duration and one Month Summer Training.

(i) Marks

Experiment : 25 Marks

Sessional : 10 Marks

One Month Summer Training : 15 Marks

**Total 50 Marks**

\* The marks for summer training will be awarded by the teachers teaching the students on the basis of the certificate issued by the external supervisor of the summer training.

## LIST OF PRACTICALS

1. Development of soldering skill by constructing a few circuits and testing.
2. PCB making.
3. Study of modulator.
4. Study of oscillator.
5. Tape recorder-testing, assembly and dis-assembly.
6. Radio receiver-testing.
7. Study of PA system and i.s. testing.
8. Study of EPABK, wiring and connectivity with telephone instruments.
9. Familiarisation with 8085 Based microprocessor trainer kit. Location of 8085, 8279, 8253 keyboard, display fields, EPROM Programmer, expansion slot, TTY and serial lines.
10. Entering and executing an assembly language program, codes for insertion, deletion, memory move, block fill, setting and examining registers and memory, single step execution of a program.
11. Writing of a program to add, subtract and multiply two numbers stored in memory (nnnn & nnnn \* 1) and place the result in the subsequent memory, (nnn \* 2).
12. Writing of a program to test R.H. for errors by writing 0's & 1's in alternate location and reading it for checking.
13. Making of a board with a 3 LED's and four switches to connect to the 8085 kit on the expansion slot (8279).
14. Making of a board with a 8 LED's and four switches to connect to the 8-85 kit on the expansion slot (8255).
  - (a) Program the 8255 to glow/switch of LED's.
  - (b) Program the 8255 to switch on and OFF the LED's every few second according to a given pattern (Hint : The pattern can be 01010101 and 10101010 or 001001100, or any other).

**Reference Books:**

1. Fundamentals of acoustics : Kinsler & Frey
2. System trouble shooting : Luces K, Faulken Berry  
Handbook (John Wiley & Sons)
3. Monochrom & Colour Television : P.R. Gulati
4. Television Engineering : Dhake
5. Microprocessor : Gaonkar
6. Microprocessor : B. Ram
7. Microprocessor : Shaum Saries

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**B.SC.-II  
COMPUTER SCIENCE  
PAPER - I  
COMPUTER HARDWARE  
(PAPER CODE - 0855)**

**DURATION 3 HOURS**

**MAX.MARKS 50**

**AIM -** The emphasis is on the design concepts & organisational details of the common PC, learning the complicated electronics of the system of the computer Engineers.

**OBJECT OF THE COURSE -**

1. To introduce the overall organisation of the microcomputers.
2. To introduce the common peripheral devices used in computers.
3. To introduce the hardware components, use of micro processor and function of various chips used in microcomputer.

**N.B. :** Since the computer organisation study is very vast & complicated, so the study is restricted to only the description and understanding part, hence the paper setter is requested to keep this important factor in mind.

**UNIT-I CLASSIFICATION AND ORGANIZATION OF COMPUTERS**

Digital and analog computers and its evolution. Major components of digital computers; Memory addressing capability of CPU; word length and processing speed of computers. Microprocessors single chip microcomputers; large and small computers. User interface Hardware software and firmware. multi programming multi user system. Dumb smart and intelligent terminals computer network and multi processing, LAN parallel processing. Flynn's classification of computers. Computer flow and data flow computers.

**UNIT-II CENTRAL PROCESSING UNIT.**

CPU organization, ALU control unit registers. Instructions for INTEL 8085, Instruction word size, Various addressing mode interrupts and exceptions, some special Control signals and I/O devices. Instruction cycle fetch and execute operation, time Diagram, data flow.

**UNIT-III MEMORY OF COMPUTERS.**

Main memory secondary memory, backup memory, cache memory; real and virtual Memory Semiconductor memory. Memory controller and magnetic memory; RAM; disks, optical disks Magnetic bubble memory; DASD, destructive and non destructive readout. Program of data Memory and MMU.

**UNIT-IV I/O DEVICES.**

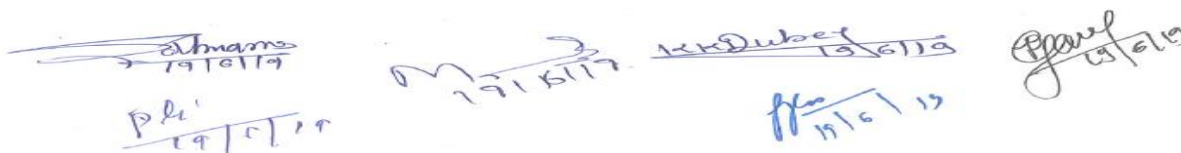
I/O devices of micro controller; processors. I/O devices, printer, plotter, other output devices, I/O port serial data transfer scheme, Micro controller, signal processor, I/O processor I/O processor arithmetic processor.

**UNIT-V SYSTEM SOFTWARE AND PROGRAMMING TECHNIQUE.**

ML, AL, HLL, stack subroutine debugging of programs macro, micro programming, Program Design, software development, flow & chart multi programming, multi user, multi tasking Protection, operating system and utility program, application package.

**RECOMMENDED BOOKS :**

1. Computer Fundamentals : Architecture and Organization - By B.Ram (Wilky Eastern Ltd.)
2. Computers Today - By Donal H. Sanders
3. Computers Fundamental - By Rajaraman.
4. IBM PC - XT Clones - By Govinda Rajalu

The bottom of the page contains five handwritten signatures and dates. From left to right: 1. A signature that appears to be 'Sharma' with the date '19/6/19'. 2. A signature that appears to be 'M...' with the date '19/6/19'. 3. A signature that appears to be 'K. Dubey' with the date '19/6/19'. 4. A signature that appears to be 'H...' with the date '19/6/19'. 5. A signature that appears to be 'P...' with the date '19/6/19'.

**B.Sc.-II**  
**PAPER - II**  
**SOFTWARE**  
**(Paper Code - 0856)**

AIM - Introduction to the web-language-HTML & problem solving through the concept of object oriented programming.

**OBJECT OF THE COURSE -**

1. To introduce the internet & web related technology & learn the intricacies of web-page designing using HTML.
2. To introduce the object oriented programming concept using C++ language.
3. To introduce the problem solving methodology using the C++ programming features.

**N.B. : Examiners are requested to prepare unit-wise Questions papers.**

**UNIT-I HTML BASICS & WEB SITE DESIGN PRINCIPLES**

Concept of a Web Site, Web Standards, What is HTML? HTML Versions, Naming Scheme for HTML Documents , HTML document/file, HTML Editor , Explanation of the Structure of the homepage , Elements in HTML Documents ,HTML Tags, BasicHTML Tags, Comment tag in HTML, Viewing the Source of a web page, How to download the web page source? XHTML, CSS, Extensible Markup Language (XML), Extensible Style sheet language (XSL), Some tips for designing web pages, HTML Document Structure. HTML Document Structure-Head Section, Illustration of Document Structure, <BASE> Element, <ISINDEX> Element, <LINK> Element , <META>, <TITLE> Element, <SCRIPT> Element , Practical Applications, HTML Document Structure-Body Section:-Body elements and its attributes: Background; BackgroundColor; Text; Link; Active Link (ALINK); Visited Link (VLINK); Left margin; Top margin, Organization of Elements in the BODY of the document: Text Block Elements; Text Emphasis Elements; Special Elements — Hypertext Anchors; Character-Level Elements; Character References , Text Block Elements: HR (Horizontal Line); Hn(Headings) ; P (Paragraph); Lists; ADDRESS ; BLOCKQUOTE; TABLE; DIV (HTML3.2 and up) ; PRE (Preformatted); FORM , Text Emphasis Elements, Special Elements — Hypertext Anchors , Character-Level Elements: line breaks (BR) and Images (IMG), Lists , ADDRESS Element, BLOCKQUOTE Element, TABLE Element, COMMENTS in HTML , CHARACTER Emphasis Modes, Logical & Physical Styles, Netscape, Microsoft and Advanced Standard Elements List, FONT, BASEFONT and CENTER.

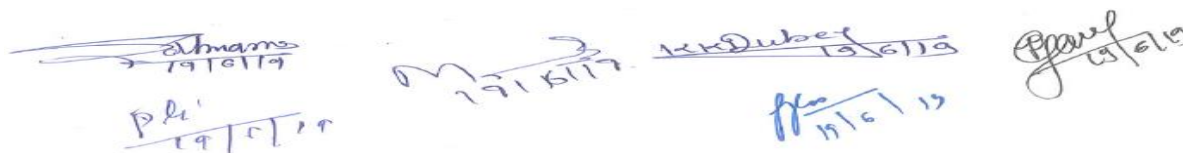
**UNIT-II IMAGE, INTERNAL AND EXTERNAL LINKING BETWEEN WEBPAGES**

Netscape, Microsoft and Advanced Standard Elements List, FONT, BASEFONT and CENTER Insertion of images using the element IMG (Attributes: SRC (Source), WIDTH, HEIGHT, ALT (Alternative), ALIGN), IMG (In-line Images) Element and Attributes; Illustrations of IMG Alignment, Image as Hypertext Anchor, Internal and External Linking between Web Pages Hypertext Anchors , HREF in Anchors , Link to a Particular Place in a Document , NAME attribute in an Anchor , Targeting NAME Anchors , TITLE attribute, Practical IT Application Designing web pages links with each other, Designing Frames in HTML. Practical examples.

**UNIT-III INTRODUCTION TO OOP**

Advantages of OOP, The Object Oriented Approach, Characteristics of object oriented languages- Object, Classes, Inheritance, Reusability, Polymorphism and C++.

Function: Function Declaration, Calling Function, Function Defines, Passing Argument to function, Passing Constant, Passing Value, Reference Argument, returning by reference, Inline Function, Function Overloading, Default Arguments in function.

The bottom of the page contains four handwritten signatures and dates. From left to right: 1. A signature that appears to be 'Shama' with the date '19/01/19' below it. 2. A signature that appears to be 'M...' with the date '19/01/19' below it. 3. A signature that appears to be 'K. Dubey' with the date '19/01/19' below it. 4. A signature that appears to be 'P. Singh' with the date '19/01/19' below it.



#### UNIT-IV OBJECT CLASSES AND INHERITANCE


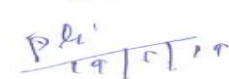
Object and Class, Using the class, class constructor, class destructors, object as function argument, copy constructor, struct and classes, array as class member, Static Class Data, Static Member Functions, Friend function, Friend class, operator overloading. Type of inheritance, Base class, Derive class. Access Specifier: protected. Function Overriding, member function, String, Template Function.

#### UNIT-V POINTERS AND VIRTUAL FUNCTION

pointers: & and \* operator pointer variables, pointer to pointer, void pointer, pointer and array, pointer and function, pointer and string, memory management, new and delete, pointer to object, this pointer Virtual Function: Virtual Function, Virtual member function, accesses with pointer, pure virtual function  
File and Stream: C++ streams, C++ Manipulators, Stream class, string I/O, char I/O, Object I/O, I/O with multiple object, Disk I/O,

#### RECOMMENDED BOOKS :

- |                                       |   |  |
|---------------------------------------|---|--|
| 1. Introduction to HTML               | : | Kamlesh Agarwala, O.P. Vyas, Prateek A. Agrawala (Kitab Mahal Publication) |
| 2. Let us C++                         | : | Y. Kanetkar B.P.B Publication  |
| 3. Programming in C++                 | : | E. Balaguruswami   |
| 4. Mastering in C++                   | : | Venu Gopal   |
| 5. Object Oriented Programming in C++ | : | Lafore R, Galgotia Publications.   |

  
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M. J. S. S.  
19/6/19

  
K. K. Dubey  
19/6/19  
  
  
H. K. S.  
19/6/19

  
P. K. S.  
19/6/19

# Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

Session 2019-20

June 2019 onwards

Class: B.Sc. Electronics

## Scheme of Examination

Paper Code	Course Opted	Title of Course	Theory	Practical	Grand Total	Minimum Passing Marks
First Year						
ELB-101	Core Course	Network Analysis And Analog Electronics	50		100	33
ELB-102	Core Course	Linear and Digital Integrated Circuits	50			
ELB-103P	Core Course Practical/Tutorial	Networks Analysis and Analog Electronics Lab	25	50	50	17
ELB-104P	Core Course Practical/Tutorial	Linear and Digital Integrated Circuits Lab	25			
Second Year						
ELB-201	Core Course	Communication Electronics	50		100	33
ELB-202	Core Course	Microprocessor and Microcontrollers	50			
ELB-203P	Course Practical/Tutorial	Communication Electronics Lab	25	50	50	17
ELB-204P	Course Practical/Tutorial	Microprocessor& Microcontroller Lab	25			
Third Year						
EL301	Skill Enhancement Course	Industrial Electronics	50		100	33
EL302	Skill Enhancement Course	Mobile Application Programming and Introduction to VHDL	50			
EL303P	Skill Enhancement CoursePractical	Industrial Electronics Lab	25	50	50	17
EL304P	Skill Enhancement Course Practical	Mobile Application Programming and Introduction to VHDL Lab	25			

# **B . S c . P a r t I I**

## **ELECTRONICS**

### **Paper I**

#### **ELB 201: COMMUNICATION ELECTRONICS**

**Theory:**

**Max. Marks :50**

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#### **Unit-1**

**Electronic communication:** Introduction to communication – means and modes. Need for modulation. Block diagram of an electronic communication system. Brief idea of frequency allocation for radio communication system in India (TRAI). Electromagnetic communication spectrum, band designations and usage. Channels and base-band signals. Concept of Noise, signal-to-noise (S/N) ratio.

#### **Unit-2**

**Analog Modulation:** Amplitude Modulation, modulation index and frequency spectrum. Generation of AM (Emitter Modulation), Amplitude Demodulation (diode detector), Concept of Single side band generation and detection. Frequency Modulation (FM) and Phase Modulation (PM), modulation index and frequency spectrum, equivalence between FM and PM, Generation of FM using VCO, FM detector (slope detector), Qualitative idea of Super heterodyne receiver

**Analog Pulse Modulation:** Channel capacity, Sampling theorem, Basic Principles-PAM, PWM, PPM, modulation and detection technique for PAM only, Multiplexing.

#### **Unit-3**

**Digital Pulse Modulation:** Need for digital transmission, Pulse Code Modulation, Digital Carrier Modulation Techniques, Sampling, Quantization and Encoding. Concept of Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), and Binary Phase Shift Keying (BPSK).

**Optical Communication:** Introduction of Optical Fiber, Block Diagram of optical communication system.

#### **Unit-4**

**Introduction to Communication and Navigation systems:**

**Satellite Communication–** Introduction, need, Geosynchronous satellite orbits, geostationary satellite advantages of geostationary satellites. Satellite visibility, transponders (C - Band), path loss, ground station, simplified block diagram of earth station. Uplink and downlink.

## Unit-5

**Mobile Telephony System** – Basic concept of mobile communication, frequency bands used in mobile communication, concept of cell sectoring and cell splitting, SIM number, IMEI number, need for data encryption, architecture (block diagram) of mobile communication network, idea of GSM, CDMA, TDMA and FDMA technologies, simplified block diagram of mobile phone handset, 2G, 3G and 4G concepts (qualitative only). GPS navigation system (qualitative idea only)

### Reference Books:

1. Electronic Communications, D. Roddy and J. Coolen, Pearson Education India.
  2. Advanced Electronics Communication Systems- Tomasi, 6<sup>th</sup> edition, Prentice Hall.
  3. Modern Digital and Analog Communication Systems, B.P. Lathi, 4<sup>th</sup> Edition, 2011, Oxford University Press.
  4. Electronic Communication systems, G. Kennedy, 3<sup>rd</sup> Edn., 1999, Tata McGraw Hill.
  5. Principles of Electronic communication systems – Frenzel, 3rd edition, McGraw Hill
  6. Communication Systems, S. Haykin, 2006, Wiley India
  7. Electronic Communication system, Blake, Cengage, 5<sup>th</sup> edition.
  8. Wireless communications, Andrea Goldsmith, 2015, Cambridge University Press
-

**Paper II**  
**ELB 202 :MICROPROCESSOR ANDMICROCONTROLLER**

**Theory:**

**Max. Marks :50**

**Unit-1**

**Microcomputer Organization:** Input/Output Devices. Data storage (idea of RAM andROM). Computer memory. Memory organization & addressing. Memory Interfacing. Memory Map.

**8085 Microprocessor Architecture:** Main features of 8085. Block diagram. Pin-outdiagram of 8085. Data and address buses. Registers. ALU. Stack memory. Program counter.

**Unit-2**

**8085 Programming :**Instruction classification, Instructions set (Data transfer includingstacks. Arithmetic, logical, branch, and control instructions). Subroutines, delay loops. Timing & Control circuitry. Timing states. Instruction cycle, Timing diagram of MOV and MVI. Hardware and software interrupts.

**Unit-3**

**8051 microcontroller:** Introduction and block diagram of 8051 microcontroller,architecture of 8051, overview of 8051 family, 8051 assembly language programming, Program Counter and ROM memory map, Data types and directives, Flag bits and Program Status Word (PSW) register, Jump, loop and call instructions.

**Unit 4**

**8051 I/O port programming:** Introduction of I/O port programming, pin out diagram of8051 microcontroller, I/O port pins description & their functions, I/O port programming in 8051 (using assembly language), I/O programming: Bit manipulation.

**8051 Programming:** 8051 addressing modes and accessing memory locations usingvarious addressing modes, assembly language instructions using each addressing mode, arithmetic and logic instructions,

**Unit 5**

8051 programming in C: for time delay & I/O operations and manipulation, for arithmetic and logic operations, for ASCII and BCD conversions.

**Introduction to embedded system:** Embedded systems and general purpose computersystems. Architecture of embedded system. Classifications, applications and purpose of embedded systems.

**Reference Books:**

1. Microprocessor Architecture Programming & applications with 8085, 2002, R.S. Goankar, Prentice Hall.
  2. Embedded Systems: Architecture, Programming & Design, Raj Kamal, 2008, Tata McGraw Hill
  3. The 8051 Microcontroller and Embedded Systems Using Assembly and C, M.A. Mazidi, J.G. Mazidi, and R.D. McKinlay, 2<sup>nd</sup> Ed., 2007, Pearson Education India.
  4. Microprocessor and Microcontrollers, N. Senthil Kumar, 2010, Oxford University Press
  5. 8051 microcontrollers, Satish Shah, 2010, Oxford University Press.
  6. Embedded Systems: Design & applications, S.F. Barrett, 2008, Pearson Education India
  7. Introduction to embedded system, K.V. Shibu, 1<sup>st</sup> edition, 2009, McGraw Hill
  8. Embedded Microcomputer systems: Real time interfacing, J.W. Valvano 2011, Cengage Learning
-

## **ELECTRONICS LABORATORY**

*The scheme of practical examination will be as follows-*

<b>Experiment</b>	<b>--</b>	<b>30</b>
<b>Viva</b>	<b>--</b>	<b>10</b>
<b>Sessional</b>	<b>--</b>	<b>10</b>
<b>Total</b>	<b>--</b>	<b>50</b>

### **ELB 203P: COMMUNICATIONELECTRONICS LAB (Hardware and Circuit Simulation Software) 60 Lectures Max.Marks:25**

1. To design an Amplitude Modulator using Transistor
2. To study envelope detector for demodulation of AM signal
3. To study FM - Generator and Detector circuit
4. To study AM Transmitter and Receiver
5. To study FM Transmitter and Receiver
6. To study Time Division Multiplexing (TDM)
7. To study Pulse Amplitude Modulation (PAM)
8. To study Pulse Width Modulation (PWM)
9. To study Pulse Position Modulation (PPM)
10. To study ASK, PSK and FSK modulators

#### **Reference Books:**

1. Electronic Communication systems, G. Kennedy, 1999, Tata McGraw Hill.
2. Electronic Communication system, Blake, Cengage, 5th edition.

**ELB 204P: MICROPROCESSOR AND MICROCONTROLLER**  
**LAB(Hardware and Circuit Simulation Software)**

**Max.Marks:25**

**At least 06 experiments each from Section-A and Section-B**

***Section-A: Programs using 8085 Microprocessor***

1. Addition and subtraction of numbers using direct addressing mode
2. Addition and subtraction of numbers using indirect addressing mode
3. Multiplication by repeated addition.
4. Division by repeated subtraction.
5. Handling of 16-bit Numbers.
6. Use of CALL and RETURN Instruction.
7. Block data handling.
8. Other programs (e.g. Parity Check, using interrupts, etc.).

***Section-B: Experiments using 8051 microcontroller:***

1. To find that the given numbers is prime or not.
2. To find the factorial of a number.
3. Write a program to make the two numbers equal by increasing the smallest number and decreasing the largest number.
4. Use one of the four ports of 8051 for O/P interfaced to eight LED's. Simulate binary counter (8 bit) on LED's .
5. Program to glow the first four LEDs then next four using TIMER application.
6. Program to rotate the contents of the accumulator first right and then left
7. Program to run a countdown from 9-0 in the seven segment LED display.
8. To interface seven segment LED display with 8051 microcontroller and display 'HELP' in the seven segment LED display.
9. To toggle '1234' as '1324' in the seven segment LED display.
10. Interface stepper motor with 8051 and write a program to move the motor through a given angle in clock wise or counter clockwise direction.
11. Application of embedded systems: Temperature measurement & display on LCD

**Reference Books:**

1. Microprocessor Architecture Programming & applications with 8085, 2002, R.S. Goankar, Prentice Hall.
2. Embedded Systems: Architecture, Programming & Design, Raj Kamal, 2008, Tata McGraw Hill
3. The 8051 Microcontroller and Embedded Systems Using Assembly and C, M.A. Mazidi, J.G. Mazidi, and R.D. McKinlay, 2<sup>nd</sup> Ed., 2007, Pearson Education India.
4. 8051 microcontrollers, Satish Shah, 2010, Oxford University Press.
5. Embedded Microcomputer systems: Real time interfacing, J.W. Valvano 2011, Cengage Learning.



**B.Sc.-II**  
**INFORMATION TECHNOLOGY**  
**PAPER - I**  
**DIGITAL CIRCUITS & COMPUTERH/W**  
**(Paper Code - 0874)**

**UNIT-I(A) Number Systems :**

Octal and hexadecimal number, decimal rep., complements, addition, subtraction, multiplication, division, fixed point rep, floating point rep., other binary code- gray code, excess 3 gray, 2421, etc. error detection code.

**(B) Boolean Algebra :**

Laws, demorgan's theorem, Simplification boolean expression & logic diagram, positive & negative logic, K-map and simplification of K-map.

**UNIT-II Combinational circuits :**

Half adder, full adder, flip-flop : SR, JK, D,T, sequential circuits : encoder, decoder, multiplexer, shift register, binary counters, BCD adder.

**UNIT-III Multivibrator circuits :**

Monostable, astable, bistable, smitt trigger, clocked RS, master-slave flip-flop, edge triggered flip-flop, latch.

Intergrated circuits :

RTL, DITL, TTL, CMOS, MOS.

**UNIT-IV (A) Central Processing Unit :**

Introduction, register organisation, stack organisation, Instruction formats, Addressing modes.

**(B) I/O Organisation :**

I/O interfaces, Data transfer, types and modes, interrupts, DMA, IOP.

**UNIT-V Memory Organisation :**

Memory hierarchy, main memory, Auxiliary memory, Associative memory, cache memory, virtual memory, memory management techniques.

**REFERENCE TEXT BOOK :**

- |  |   |                 |
|--|---|-----------------|
| 1. Integrated Electronics                  | - | Millman&Halkias |
| 2. Principle of Electronics                | - | V.K. Mehta      |
| 3. Digital Electronics                     | - | R.P. Jain       |
| 4. Computer System Architecture            | - | Morris Mano     |
| 5. Digital Electronics & Computer Hardware | - | Morris Mano     |

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**B.Sc.-II**  
**PAPER - II**  
**(Paper Code - 0875)**

**UNIT-I Introduction to OPP :** Advantages of OPP, the Object oriented approach, characteristics of object oriented languages : object, classes, inheritance, reusability, polymorphism and C++.

**UNIT-II Function :** function declaration, calling function, function definition, passing arguments to function, passing constant, passing value, fegerence argument, returning by reference, inline function, function overloading, default arguments in function.

**UNIT-III Object and Classes,** using the Classes Constructor, class destructor, object as function argument, copy constructor, struct and classes, array as class member, static class data, static member functions, friend function, friend class, operator overloading, type of inheritance, base class derive class, access speceifier, protected, member function.

**UNIT-IV Pointers :** & and \* operator pointer variables, pointer to pointer, void pointer, pointer and array, pointer and functions, pointer and string, memory management, new and delete, pointer to object, this pointer, virtual function : virtual function, virtual member function, accesses with pointer, pure virtual function.

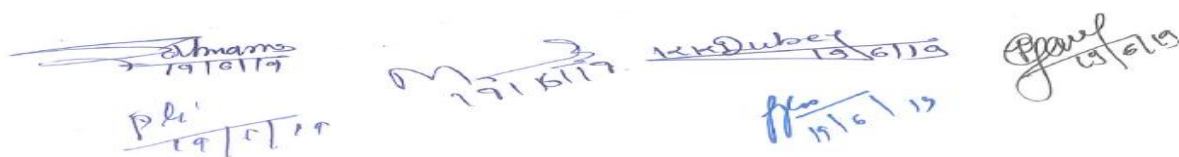
**UNIT-V File and stream :** C++ steams, C++ manipulators, Stream class, string I/O, char I/O, object I/O, I/O with multiple objects, disk I/O.

**REFERENCE TEXT BOOKS:**

- |   |                                    |   |                  |
|---|------------------------------------|---|------------------|
| 1 | Programming in C++                 | - | E. Balaguruswami |
| 2 | Mastering in C++                   | - | VenuGopal        |
| 3 | Object Oriented Programming in C++ | - | Robert Lafore    |
| 4 | Let us C++                         | - | Y. Kanetkar      |

**PRACTICAL WORK**

1. The sufficient Practical work should be done for understanding the paper 2.
2. At least five programs on each unit from unit 2 to unit 5 be prepared.
3. All practical works should be prepared in form of print outs and be valuated while practical examination.

  
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## INDUSTRIAL MICROBIOLOGY

Paper	Title	Time	Marks
First	Environmental Microbiology and Biostatistics	3 hrs.	50
Second	Microbial Physiology and Immunobiotechnology	3 hrs.	50
	PRACTICAL Examination (including sessionals)	4 hrs.	50 (40+10)

**Note :** During Two months Summer Vacation, students will visit some Industries. He/She will submit "Summer Job-Training Report" in B.Sc. IIRD Year Viva Voce Exam.

### PAPER - I ENVIRONMENTAL MICROBIOLOGY AND BIOSTATISTICS (Paper Code - 0876)

**M.M.50**

**UNIT-1** Our environment : Soil, water and air. Concept of environment in relation to microbes. Environment included physiological adaptations in microorganisms. Nature of microbial population in soil, water and air. Biogeochemical cycling - Carbon, Nitrogen, Sulphur and Phosphorus.

**UNIT-2** Population interactions : Neutralism, Commensalism, Synergism, Mutualism, Antagonistic relationships. Mycorrhizal associations. VAM and its importance.

**UNIT-3** Nitrogen fixation by symbiotic and non-symbiotic microorganisms. Use of microorganisms as biofertilizers. Mass cultivation of Rhizobium and Azotobacter. Use of blue-green algae as biofertilizers.

**UNIT-4** Liquid waste disposal. Nature of domestic and municipal waste and sewage. Sewage treatment. Solid waste disposal. Methods of disposal of Agricultural waste.

**UNIT-5** Basic idea of probability, normal, binomial and poisson distribution. Mean, Mode and Median. Chi-Square test. Exponential and Logarithmic Functions.

### PRACTICALS

1. Isolation of Microorganisms from Air.
2. Isolation of Microorganisms from Water.
3. Isolation of Microorganisms from soil.
4. Determination of MPN of faecal contaminants in water.
5. Measurement & confirmation of E. coli in water sample.
6. Biochemical tests for identification of enteric bacteria.
7. Study of Rhizobium from root nodules.
8. Study of symbiotic and non-symbiotic blue-green algae.
9. Problems based on the determination of Mean, Median and Mode.
10. Problems on Chi-Square Test.
11. Experiments to demonstrate Symbiotic, Antagonistic activities and relations amongst microbes and their interactions with plants.

  
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**RECOMMENDED BOOKS :**

1. Introduction to Soil Microbiology by Martin Alexander.
2. General Microbiology by Pelczar, Reid & Chan.
3. Biofertilizers in Agriculture by N.S. Subba Rao.
4. Statistics by Mishra & Mishra.
5. General Microbiology, Vol. II, by Power & Dagainawala.

**PAPER - II****MICROBIAL PHYSIOLOGY AND IMMUNABIOTECHNOLOGY**  
**(Paper Code - 0877)****M.M. 50**

**UNIT-1** Diffusion, gaseous exchange, Osmosis, Plasmolysis, Biochemical properties of membranes, Passive and Active transport mechanism. Role of ionophores, group translocation across the membranes.

**UNIT-2** Photosynthetic microbes, Oxygenic and non-oxygenic reaction centre. Electron transport, Photophosphorylation, Calvin Cycle. Photorespiration and its significance. Effect of various factors on rate of photosynthesis.

**UNIT-3** Respiration mechanisms - Breakdown of carbohydrates through glycolysis, Krebs's cycle. Fermentation. Pentose Phosphate Pathway. Fermentation of alcohol, Citric acid and acetic acid.

**UNIT-4** Methanogens and Methylophiles. Sulphur utilizing bacteria. Sulphate reduction pathway. Economic importance of Methylophiles and sulphur utilizing bacteria.

**UNIT-5** History and Scope of immunology, Types of immunity. Antigen-Antibody reactions. Immunoglobulins - Structure and functions. Production of Vaccines and Monoclonal antibodies.

**PRACTICAL**

1. Isolation of photosynthetic bacteria and cyanobacteria from soil.
2. Isolation and characterisation of Methanogens.
3. Study of Hydrogen-production by bacteria.
4. Measurement of nitrate uptake by microorganisms.
5. Study of nitrate and nitrite reduction by microorganisms.
6. Demonstration of evolution during photosynthesis.
7. Demonstration of plasmolysis, osmosis, active and passive transport mechanism.
8. Testing of Blood Groups.
9. Titration of Antigen and Antibody.
10. Precipitation reaction of antigens and antibodies.

**BOOK RECOMMENDED :**

1. Cell Biology by Pawar.
2. General Microbiology, Vol. II, by Power and Dagainawala.
3. Immunology by Davis.
4. Immunology by G.P. Talwar.

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**BIOCHEMISTRY**  
**PAPER - I**  
**ENZYMOLOGY**

**M.M. 50**

**UNIT-I INTRODUCTION**

History, general characteristics, nomenclature, IUB enzyme classification (rationale, over view and specific examples), significance of numbering system. Definitions with examples of holoenzyme, apoenzyme, coenzymes. cofactors, activators, inhibitors, active site (identification of groups excluded), metallo-enzymes, units of enzyme activity, specific enzymes, Isoenzymes, monomeric enzymes, oligomeric enzymes and multienzyme complexes. Enzyme specificity. Historical perspective, nature of non-enzymatic and enzymatic catalysis. Measurement and expression of enzyme activity-enzyme assays. Definition of IU, Katal, enzyme turn over number and specific activity. Role of non-protein organic molecules and inorganic ions coenzyme, prosthetic groups. Role of vitamins as coenzymes precursors (general treatment).

**UNIT-I ENZYME CATALYSIS**

Role of cofactors in enzyme catalysis : NAD/NADP<sup>+</sup>, FMN/FAD, coenzyme A, biocytin, cobamide, lipoamide, TPP, pyridoxal phosphate, tetrahydrofolate and metal ions with special emphasis on coenzyme functions. Acid-base catalysis, covalent, proximity and orientation effects, strain and distortion theory. Mechanism of action of chymotrypsin, carboxypeptidase, ribonuclease and lysozyme.

**UNIT- I ENZYME PURIFICATION**

Methods for isolation, purification and characterization of enzymes.

**UNIT-IV ENZYME KINETICS**

Factors affecting enzyme activity : enzyme concentration, substrate concentration, pH and temperature. Derivation of Michaelis-Menten equation for uni-substrate reactions.  $K_m$  and its significance. Line weaver-Burk plot and its limitations. Importance of  $K_m$ . Bi-substrate reactions-brief introduction to sequential and ping-pong mechanism with examples.

Kinetics of zero and first order reactions. Significance and evaluation of energy of activation and free energy.

Reversible and irreversible inhibition, competitive, non-competitive and uncompetitive inhibitions. determination of  $K_m$  &  $V_{max}$  in presence and absence of inhibitor. Allosteric enzymes.

**UNIT-V INDUSTRIAL AND CLINICAL APPLICATION OF ENZYME.**

Immobilization of enzyme and their industrial applications. Production of glucose from starch, cellulose and dextran; use of lactase in dairy industry; production of glucose-fructose syrup from sucrose; use proteases in food, detergent and leather industry; medical application of enzymes. use of glucose oxidase in enzyme electrodes.

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## PAPER - II

### INTERMEDIARY METABOLISM

M.M. 50

#### UNIT-I INTRODUCTION TO METABOLISM

General features of metabolism, experimental approaches to study metabolism; use of intact organism, bacterial mutants, tissue slices, stable and radioactive isotopes.

#### CARBOHYDRATE METABOLISM

Reactions and energetics of glycolysis. Alcoholic and lactic acid fermentations. Entry of fructose, galactose, mannose etc. Reactions and energetics of TCA cycle. Gluconeogenesis, glycogenesis and glycogenolysis, Reactions and physiological significance of pentose phosphate pathway. Regulation of glycolysis and TCA cycle. Photosynthesis, a brief review.

#### UNIT-II ELECTRON TRANSPORT CHAIN AND OXIDATIVE PHOSPHORYLATION

Structure of mitochondria, sequence of electron carriers, sites of ATP production, inhibitors of electron transport chain. Hypothesis of mitochondrial oxidative phosphorylation (basic concepts). Inhibitors and uncouplers of oxidative phosphorylation. Transport of reducing potentials into mitochondria.

#### UNIT-III LIPID METABOLISM

Introduction, hydrolysis of triacylglycerols, transport of fatty acids into mitochondria.

$\beta$ -oxidation of saturated fatty acids, ATP yield from fatty acid oxidation. Biosynthesis of saturated and unsaturated fatty acids. Metabolism of ketone bodies, oxidation of unsaturated and odd chain fatty acids. Biosynthesis of triglycerides and important phospholipids, glycolipids, sphingolipids and cholesterol. Regulation of cholesterol metabolism.

#### UNIT-IV AMINO ACID METABOLISM

General reactions of amino acid metabolism : transamination, oxidative deamination and decarboxylation. Urea cycle. Degradation and biosynthesis of amino acids. Glycogenic and ketogenic amino acids.

#### UNIT-V NUCLEOTIDE METABOLISM

Sources of the atoms in the purine and pyrimidine molecules. Biosynthesis and degradation of purines and pyrimidines. Regulation of purine and pyrimidine biosynthesis.

#### PORPHYRIN METABOLISM

Biosynthesis and degradation of porphyrins. Production of bile pigments.

  
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## PRACTICAL

1. Separation of Blood Plasma and Serum
  - a. Estimation of proteins from serum by biuret and lowry methods.
  - b. Determination of albumin and A/G ratio in serum.
2. Estimation of bilirubin (conjugated and unconjugated) in serum.
3.
  - i. Estimation of total lipids in serum by vanillin method.
  - ii. Estimation of cholesterol in serum.
4. Estimation of lipoproteins in plasma.
5. Estimation of lactic acid in blood before and after exercise.
6. Estimation of blood urea nitrogen from plasma.
7. Separation and identification of amino acids by (a) paper chromatography and (b) thin-layer chromatography.
8. Separation of polar and non-polar lipids by thin-layer chromatography.
9. Estimation of SGPT and SGOT in serum.
10.
  - a. Assay of serum alkaline phosphatase activity.
  - b. Inhibition of alkaline phosphatase activity by EDTA.
  - c. Effect of substrate concentration on alkaline phosphatase activity and determination of its  $K_m$  value.
11.
  - a. Effect of temperature on enzyme activity and determination of activation energy.
  - b. Effect of pH on enzyme activity and determination of optimum pH.
  - c. Effect of enzyme concentration on enzyme activity.
12.
  - a. Preparation of starch from potato and its hydrolysis by salivary amylase.
  - b. Determination of achromatic point in salivary amylase.
  - c. Effect of sodium chloride on amylases.

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A student's signature, 24.7.17

# **Syllabus of Biotechnology**

**(B. Sc. II Year)**

**Session**

**2019-2020**

**2020-2021**

  
10.6.19

  
10.6.19

  
10/6/19

  
10.6.19



**HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**

**B.Sc. II  
BIOTECHNOLOGY**

**PAPER – I**

**MOLECULAR BIOLOGY & BIOPHYSICS**

**M.M. 50**

**UNIT-I**

1. Nucleic Acid: Bases, Nucleosides and Nucleotides, DNA and RNA structure.
2. Plasmids.
3. Transposons: Repetitive elements, LINEs & SINEs, Structure of Gene.

**UNIT-II**

1. DNA Replication: Enzymes involved and mechanism of DNA Replication in Prokaryotes.
2. Mutation: Molecular level of Mutation, Types of Mutagens, Spontaneous and Induced Mutation.
3. DNA Repair: NER, BER and Mismatch Repair.

**UNIT-III**

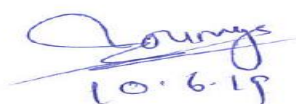
1. Genetic Code: Features, Condon Assignment and Wobble hypothesis.
2. Transcription: Initiation, Elongation and Termination in Prokaryotes.
3. Translation: Initiation, Elongation and Termination Translation machinery in Prokaryotes.  
Operon-Concept of Operator, Regulator, Promoter gene, Inducer and Co-repressor.

**UNIT –IV**

1. Biophysics : Introduction, Scope and Application
2. Principle, Structure, Functions of the following:
  - a. Microscopy
  - b. Colorimeter and Spectroscopy
  - c. Electrophoresis
  - d. Centrifugation
  - e. Chromatography.

**UNIT –V**

1. Radioisotopes techniques: Measurement of radioactivity, Ionization Chambers, Geiger Muller and Scintillation Counter.
2. Autoradiography and DNA Fingerprinting.
3. Biosensor.

  
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## List of Books

1. Gerald Karp - Cell and Molecular biology, 4th Edition (2005).
2. Lewis J.Klein Smith and Valerie M.Kish-Principles of cell and molecular biology-Third Edition (2002)
3. P.K. Gupta- Cell and molecular biology, Second Edition (2003), Rastogi publications.
4. Richard M-Twyaman-Advanced Molecular Biology, First South Asian Edition (1998), VivaBooks Pvt. Ltd.
5. K. Wilson and J.Walker (2012) Principle and Techniques of Biotechnology and MolecularBiotechnology.
6. Upadhyya and Upadhyya : Biophysical Chemistry.
7. David, I. Nelson and Michael M.Cox :Lehninger : Principal of Biochemistry 4th Edition. W.H. Freeman and Company, New York.
8. Buchanan, Gruissem& Jones (2015) Biochemistry & Molecular Biology of Plant, 2<sup>nd</sup> edition.

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**B.Sc. II  
BIOTECHNOLOGY**

**PAPER II**

**RECOMBINANT DNA TECHNOLOGY AND GENOMICS**

**M.M. 50**

**UNIT-I**

1. Recombinant DNA technology: General concept. Steps in gene cloning and application.
2. Host controlled Restriction Modification System, Ligases and Polymerases, Klenow fragment, Taq, Pfu polymerase and Nuclease (Endo, Exo and restriction endonuclease).
3. Modification Enzyme (Kinase, Phosphatases and terminal deoxynucleotidyl transferase). Reverse Transcriptase.

**UNIT –II**

1. Vectors: Plasmid, Bacteriophages, Cosmid, SV40 and Expression vectors.
2. Gene Library: Genomic and cDNA library.
3. Selection and Screening of Recombinants: Genetic and Hybridization methods.

**UNIT –III**

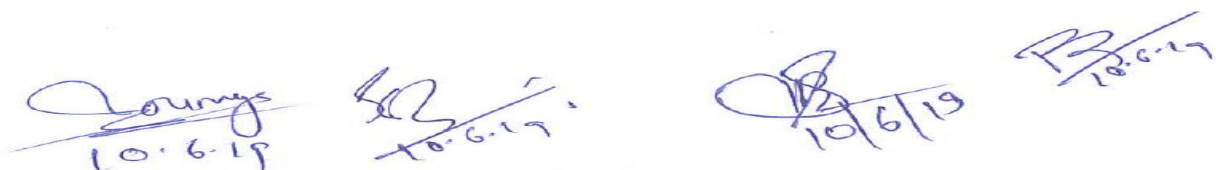
1. PCR: Types of PCR, Steps (Denaturation, Annealing and Extension); Applications, Advantages and Limitation of PCR.
2. Molecular Marker-RFLP, RAPD and Micro array.
3. Human Genome Project.

**UNIT-IV**

1. Basic concept of Gene Transfer Methods: Microinjection, Electroporation, Lipofection and Microprojectile.
2. Gene Therapy: *In vivo* and *Ex vivo*, Germ line and Somatic gene therapy.
3. Basic idea of Stem cell technology: Types of stem cell cultures and their Significance.

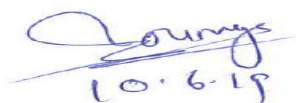
**UNIT-V**

1. Introduction to Bioinformatics: History, Objective and Application.
2. Major Bioinformatics Resource – NCBI , Types of Databases (Primary and Secondary Databases) , BLAST and FASTA
3. Basic concept of Genomics and Proteomics



## List of Books

1. B.D. Singh (2004) Biotechnology, Expanding Horizons. First Edition. Kalyani Publishers, Ludhiana.
2. P.K. Gupta (2005) Biotechnology and Genomics, Rastogi Publication, Meerut.
3. Stan bury and Whittaker - Principles of Sterilization techniques, First Indian reprint Edition (1997). Aditya Book (P) Ltd. New Delhi.
4. L.E. Casida (1994) Industrial Microbiology Edition .
5. A.H. Patel (2003) Industrial Microbiology 4th Edition.
6. K.S. Bilgrami and A.K. Pandey(1998) Introduction to Biotechnology Edition 2nd (1998)
7. U Satyanarayan (2005) Biotechnology, First Edition Books and Allied (P) Ltd. Kolkata.
8. Atul kumar and VandanaA.Kumar (2004) Plant Biotechnology and tissue culture, Principle and Perspectives, International Books Distributing Co. Lucknow.
10. S Choudhuri, and DB Carlson (2008) Genomics: Fundamentals and applications, 1st edition.
11. TK Attwood and DJ Parry (2009) Introduction of Bioinformatics.
12. Philip E Bourne Helge Whisking (2003) Structural Bioinformatics.
13. Des Higgins and Willie Taylor (2000) Bioinformatics Sequence, Structure and Databanks.

  
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## List of Practical's

### MOLECULAR BIOLOGY, BIOPHYSICS, RECOMBINANT DNA TECHNOLOGY AND GENOMICS


1. Isolation of DNA from Plant cell.
2. Estimation of DNA by DPA method.
3. Isolation RNA from yeast cells

Experiment based on-

4. Centrifugation
5. Spectrophotometer/Colorimeter
6. Electrophoresis
7. Paper chromatography/TLC

Experiment based on Bioinformatics -

8. Retrieve DNA /Protein sequence from Biological Data Bases (NCBI).
9. Use of tools studied

  
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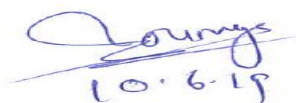
  
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## SCHEME FOR PRACTICAL EXAMINATION

**Time: 4 hrs. M.M.: 50**

- |                                       |          |
|---------------------------------------|----------|
| 1. Experiment based on DNA/RNA        | 10 marks |
| 2. Experiment based on Instruments    | 10 marks |
| 3. Experiment based on Bioinformatics | 10 marks |
| 4. Spotting                           | 10 marks |
| 5. <i>Viva - Voce</i>                 | 05 marks |
| 6. Record / Sessional                 | 05 marks |

  
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# हेमचंद यादव विश्वविद्यालय, दुर्ग (छ.ग.)

(पूर्व नाम- दुर्ग विश्वविद्यालय, दुर्ग)

रायपुर नाका दुर्ग (छ.ग.)-491001

ई मेल : [academic@durguniversity.ac.in](mailto:academic@durguniversity.ac.in)

वेब साइट : [www.durguniversity.ac.in](http://www.durguniversity.ac.in)

दूरभाष : 0788-2359400

क्र. 2960/A / अका. / 2020

दुर्ग, दिनांक 10/9/2020

प्रति,

प्राचार्य,  
समस्त संबद्ध महाविद्यालय,  
हेमचंद यादव विश्वविद्यालय,  
दुर्ग (छ.ग.)

विषय:- स्नातक स्तर भाग-दो के पाठ्यक्रम विषयक।

संदर्भ:- संयुक्त संचालक, उच्च शिक्षा विभाग के पत्र क्र. 2456/315/आउशि/सम/2019, दिनांक 16.05.2019।

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विषयांतर्गत लेख है कि संदर्भित पत्र के माध्यम से प्राप्त स्नातक स्तर भाग-दो के निम्नलिखित कक्षा/विषयों के परिवर्तित/संशोधित पाठ्यक्रम शिक्षा सत्र 2020-21 से लागू किये जाते हैं:-

1. बी.ए. - आधार पाठ्यक्रम-हिन्दी भाषा, हिन्दी साहित्य, राजनीतिशास्त्र, अर्थशास्त्र, नृत्य, दर्शनशास्त्र, समाजशास्त्र, इतिहास, मानवविज्ञान, संस्कृत, सांख्यिकी प्राचीन भारतीय इतिहास, भूगोल, मनोविज्ञान
2. बी.एस-सी.- आधार पाठ्यक्रम-हिन्दी भाषा, जीव विज्ञान, मानवविज्ञान, बायोटेक्नोलॉजी, कम्प्यूटर साईंस, गणित, भौतिक शास्त्र, प्राणीशास्त्र, सूक्ष्मजीव विज्ञान, वनस्पतिशास्त्र, भूविज्ञान, इलेक्ट्रॉनिक्स, रसायन शास्त्र, सांख्यिकी, भूगोल।
3. बी.ए./बी.एस.सी (गृह विज्ञान) - आधार पाठ्यक्रम - हिन्दी भाषा एवं गृह विज्ञान।

उपरोक्त विषयों को शिक्षा सत्र 2020-21 से संशोधित रूप में स्नातक स्तर भाग-दो के लिए लागू किया जाता है स्नातक स्तर भाग-एक हेतु सत्र 2019-20 में लागू पाठ्यक्रम मान्य होंगे एवं भाग - तीन के पाठ्यक्रम यथावत रहेंगे।

टीप:- परिवर्तित/संशोधित पाठ्यक्रम विश्वविद्यालय के परीक्षा विभाग एवं वेबसाइट पर प्रकाशित करने हेतु वेबसाइट प्रभारी को उपलब्ध करा दी गई है।

कुलसचिव

क्र. 2961/A / अका. / 2020

दुर्ग, दिनांक 10/9/2020

प्रतिलिपि:-

1. संयुक्त संचालक, उच्च शिक्षा विभाग के पत्र क्र. 2456/315/आउशि/सम/2019, दिनांक 16.05.2019 परिपेक्ष्य में सूचनार्थ।
2. उपकुलसचिव, परीक्षा विभाग एवं उपकुलसचिव, गोपनीय विभाग हेमचंद यादव विश्वविद्यालय, दुर्ग।
3. कुलपति के निज सहायक एवं कुलसचिव के निज सहायक, हेमचंद यादव विश्वविद्यालय, दुर्ग।

सहा. कुलसचिव (अका.)

**REVISED ORDINANCE NO. 21**  
**BACHELOR OF SCIENCE**

1. The three year course has been broken up into three Parts. Part-I known as B.Sc. Part-I examination at the end of the first year, Part-II known as B.Sc. Part-II examination at the end of the second year and Part-III known as B.Sc. Part-III examination at the end of the third year.
2. A candidate who after passing (10+2) Higher Secondary or Intermediate examination of C.G. Board of Secondary Education Bhopal or any other Examination recognised by the University or C.G. Board of Secondary Education as equivalent thereto, has attended a regular course of study in an affiliated College or in the Teaching Department of the University for one academic year shall be eligible for appearing at the B.Sc. Part-I examination.
3. A candidate who, after passing the B.Sc.-I examination of the University or any other examination recognised by the University as equivalent thereto, has attended a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.Sc. Part-II examination.
4. A candidate who, after passing the B.Sc. Part-II examination of the University, has completed a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.Sc. Part-III examination.
5. Besides regular students, subject to their compliance with this Ordinance ex-student and non-collegiate candidates shall be permitted to offer only such subjects/papers as are taught to the regular student at any of the University Teaching Department or College.
6. Every candidate appearing in B.Sc. Part-I, Part-II and Part-III examination shall be examined in-
  - (i) Foundation Course:
  - (ii) Any one of the following combinations of three subjects:-
    1. Physics, Chemistry & Mathematics.
    2. Chemistry, Botany & Zoology.
    3. Chemistry, Physics & Geology.
    4. Chemistry, Botany & Geology.
    5. Chemistry, Zoology & Geology.
    6. Geology, Physics & Mathematics.
    7. Chemistry, Mathematics & Geology.
    8. Chemistry, Botany & Defence Studies.
    9. Chemistry, Zoology & Defence Studies
    10. Physics, Mathematics & Defence Studies.
    11. Chemistry, Geology & Defence Studies



12. Physics, Mathematics & Statistics
  13. Physics, Chemistry & Statistics
  14. Chemistry, Mathematics & Statistics.
  15. Chemistry, Zoology & Anthropology.
  16. Chemistry, Botany & Anthropology.
  17. Chemistry, Geology & Anthropology.
  18. Chemistry, Mathematics & Statistics.
  19. Chemistry, Anthropology & Defence Studies.
  20. Geology, Mathematics & Statistics.
  21. Mathematics, Defence Studies & Statistics
  22. Anthropology, Mathematics & Statistics
  23. Chemistry, Anthropology & Applied Statistics
  24. Zoology, Botany & Anthropology
  25. Physics, Mathematics & Electronics.
  26. Physics, Mathematics & Computer Application
  27. Chemistry, Mathematics & Computer Application
  28. Chemistry, Bio-Chemistry & Pharmacy
  29. Chemistry, Zoology & Fisheries.
  30. Chemistry, Zoology & Agriculture
  31. Chemistry, Zoology & Sericulture
  32. Chemistry, Botany & Environmental Biology
  33. Chemistry, Botany & Microbiology
  34. Chemistry, Zoology & Microbiology
  35. Chemistry, Industrial Chemistry & Mathematics
  36. Chemistry, Industrial Chemistry & Zoology
  37. Chemistry, Biochemistry, Botany
  38. Chemistry, Biochemistry, Zoology
  39. Chemistry, Biochemistry, Microbiology
  40. Chemistry, Biotechnology, Botany
  41. Chemistry, Biotechnology, Zoology
  42. Geology, Chemistry & Geography
  43. Geology, Mathematics & Geography
  44. Mathematics, Physics & Geography
  45. Chemistry, Botany & Geography
- (iii) Practical in case prescribed for core subjects.

7. Any candidate who has passed the B.Sc. examination of the University shall be allowed to present himself for examination in any of the additional subjects prescribed for the B.Sc. examination and not taken by him at the degree examination. Such candidate will have to first appear and pass the B.Sc. Part-I examination in the subjects which he proposes to offer and then the B.Sc. Part-II and Part-III examination in the same subject. Successful candidates will be given a certificate to that effect.

8. In order to pass at any part of the three year degree course examination an examinee must obtain not less than 33% of the total marks in each subject/ group of subjects. In subject/ group of subjects where both theory and practical examination are provided an examinee must pass in both theory and practical parts of the examination separately.
9. Candidate will have to pass separately at the Part-I, Part-II and Part-III examinations. No division shall be assigned on the result of the Part-I and Part-II examination. In determining the division of the final examination, total marks obtained by the examinees in their Part-I, Part-II and Part-III examination in the aggregate shall be taken in to account. Provided in case of candidate who has passed the examination through supplementary examination having failed in one subject/ group only, the total aggregate marks being carried over for determining the division shall include actual marks obtained in the subject/ group in which he appeared at the supplementary examination.
10. Successful examinee at the Part-III examination obtaining 60% or more marks shall be placed in the First Division, those obtaining less than 60% but not less than 45% marks in the Second Division and other successful examinees in the Third Division.

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## SCHEME OF EXAMINATION

Subject	Paper	Max. Marks	Total Marks	Min. Marks
C Environmental Studies		75	100	33
Fild Work		25		
<b>Foundation Course</b>				
Hindi Language		75	75	26
English Language		75	75	26

**नोट:-** प्रत्येक में से 02 (दो) प्रश्न करने होंगे । सभी प्रश्न समान अंक के होंगे ।

Three Elective Subject :

1.	Physics	I	50	100	33
		II	50		
2.	Chemistry	Practical		50	17
		I	33		
		II	33	100	33
		III	34		
3.	Mathematics	Practical		50	17
		I	50		
		II	50	150	50
		III	50		
4.	Botany	I	50	100	33
		II	50		
5.	Zoology	Practical		50	17
		I	50	100	33
		II	50		
6.	Geology	Practical		50	17
		I	50	100	33
		II	50		
7.	Statistics	Practical	50		17
		I	50	100	33
		II	50		
8.	Anthropology	Practical		50	17
		I	50	100	50
		II	50		
		Practical		50	17

Subject	Paper	Max. Marks	Total Marks	Min. Marks
Compulsory Subject–Foundation Course:				
9. Defense Studies	I	50	100	33
	II	50		
	Practical		50	17
10. MicroBiology	I	50	100	33
	II	50		
	Practical		50	17
11. Computer Sciences	I	50	100	33
	II	50		
	Practical		50	17
12. Information Technology	I	50	100	33
	II	50		
	Practical		50	17
13. Industrial Chemistry	I	34		
	II	33	100	33
	III	33		
	Practical		50	17
14. BioChemistry	I	50		
	II	50	100	33
15. BioTechnology	Practical	50	50	17
	I			
	II	50	100	33
	Practical		50	17

### USE OF CALCULATORS

The Students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986.

1. Student will bring their own Calculators.
2. Calculators will not be provided either by the University or examination centres.
3. Calculators with, memory and following variables be permitted +, -, x,  $\div$ , square, reciprocal, exponentials log, square root, trigonometric functions, sine, cosine, tangent etc. factorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.

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संशोधित पाठ्यक्रम  
बी.ए./बी.एस-सी./बी.कॉम./बी.एच.एस.-सी.  
भाग - दो, आधार पाठ्यक्रम  
प्रश्न पत्र - प्रथम (हिन्दी भाषा) (पेपर कोड - 0171)

पूर्णांक- 75

खण्ड - क निम्नलिखित 5 लेखकों के पाठ शामिल होंगे -

अंक-35

- |                        |   |                          |
|------------------------|---|--------------------------|
| 1. महात्मा गांधी       | — | चोरी और प्रायश्चित       |
| 2. आचार्य नरेंद्र देव  | — | युवकों का समाज में स्थान |
| 3. वासुदेव शरण अग्रवाल | — | मातृभूमि                 |
| 4. हरि ठाकुर           | — | डॉ. खूबचंद बघेल          |
| 5. पं. माधवराव सप्रे   | — | सम्भाषण-कुशलता           |

खण्ड-ख हिन्दी भाषा और उसके विविध रूप

अंक-16

1. कार्यालयीन भाषा
2. मीडिया की भाषा
3. वित्त एवं वाणिज्य की भाषा
4. मशीनी भाषा

खण्ड-ग हिन्दी की व्याकरणिक कोटियाँ

अंक-24

संज्ञा, सर्वनाम, विशेषण, क्रिया विशेषण,  
समास, संधि एवं संक्षिप्तियाँ  
अनुवाद व्यवहार : अंग्रेजी से हिन्दी में अनुवाद

इकाई विभाजन-

- |         |   |
|---------|---|
| इकाई- 1 | चोरी और प्रायश्चित : महात्मा गांधी / कार्यालयीन भाषा, मीडिया की भाषा                        |
| इकाई- 2 | युवकों का समाज में स्थान : आचार्य नरेन्द्र देव / वित्त एवं वाणिज्य की भाषा, मशीनी भाषा      |
| इकाई- 3 | मातृभूमि: वासुदेवशरण अग्रवाल / संज्ञा सर्वनाम, विशेषण, क्रिया विशेषण                        |
| इकाई- 4 | डॉ. खूबचंद बघेल : हरि ठाकुर/समास, संधि,   |
| इकाई- 5 | सम्भाषण-कुशलता : पं. माधवराव सप्रे, / अनुवाद - अंग्रेजी से हिन्दी में अनुवाद, संक्षिप्तियाँ |

मूल्यांकन योजना -

प्रत्येक इकाई से एक-एक प्रश्न पूछे जाएंगे। प्रत्येक प्रश्न में आंतरिक विकल्प होगा। प्रत्येक प्रश्न के 15 अंक होंगे। प्रत्येक इकाई को दो-दो खण्डों (क्रमशः 'क' और 'ख' में) विभक्त करते हुए निर्धारित पाठ से 8 एवं शेष पाठ्य सामग्री से 7 अंक के प्रश्न होंगे। इस प्रकार पूरे प्रश्न-पत्र के पूर्णांक 75 होंगे।

**पाठ्यक्रम संशोधन का औचित्य :** विद्यार्थी चर्चित एवं सुप्रसिद्ध व्यक्तियों के लेख के माध्यम से समाज एवं राष्ट्रहित के साथ-साथ व्यक्तित्व विकास विषयक मुद्दों से परिचित हो सकें तथा व्याकरणक एवं भाषा विषयक प्रस्तावित पाठ्यक्रम के माध्यम से हिन्दी भाषा संबंधित प्रयोग पक्ष से परिचित होते हुए प्रतियोगी परीक्षाओं की दृष्टि से ज्ञानार्जन कर सकें।

ENGLISH LANGUAGE (Paper Code-1132)

B.A. / B.Sc. /B.COM. /B.H. Sc. - II

M.M.75

The question paper for B.A. /B.Sc./B.Com./B.H.Sc., English Language and cultural values shall comprise the following units:

UNIT-I Short answer questions to be passed by (Five short answer questions of three marks each) 15 Marks

UNIT-II (a) Reading comprehension of an unseen passage 05 Marks  
(b) Vocabulary

UNIT-III Report-Writing 10 Marks

UNIT-IV Expansion of an idea 10 Marks

UNIT-V Grammar and Vocabulary based on the prescribed text book. 20+15Marks

Note: Question on all the units shall asked from the prescribed text which will  
Comprise Specimens of popular creative/writing and the following it any

a Matter & technology

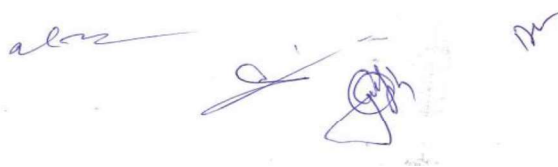
- i. State of matter and its structure
- ii. Technology (Electronics Communication, Space Science)

b Our Scientists & Institutions

- I. Life & work of our eminent scientist Arya Bhatt. Kaard  
Charak Shusruta, Nagarjuna, J.C. Bose and C.V. Raman, S.  
Rmanujam, Homi J. Babha Birbal Sahani.
- II. Indian Scientific Institutions (Ancient & Modern)

Books Prescribed:

Foundation English for U.G. Second Year - Published by M.P. Hindi Granth  
Academy, Bhopal.



**HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**  
**NEW CURRICULUM OF B.Sc. PART II**  
**SESSION 2019-20**  
**CHEMISTRY**

The new curriculum will comprise of three papers of 33, 33 and 34 marks each and practical work of 50 marks. The Curriculum is to be completed in 180 working days as per UGC norms and conforming to the directives of Govt. of Chhattisgarh. The theory papers are of 60 hrs. each duration and practical work of 180 hrs duration.

**Paper – I**  
**INORGANIC CHEMISTRY** **60 Hrs., Max Marks 33**

**UNIT-I**

**CHEMISTRY OF TRANSITION SERIES ELEMENTS**

Transition Elements: Position in periodic table, electronic configuration, General Characteristics, viz., atomic and ionic radii, variable oxidation states, ability to form complexes, formation of coloured ions, magnetic moment  $\mu_{so}$  (spin only) and  $\mu_{eff}$  and catalytic behaviour. General comparative treatment of 4d and 5d elements with their 3d analogues with respect to ionic radii, oxidation states and magnetic properties.

**UNIT-II**

**A. OXIDATION AND REDUCTION:** Redox potential, electrochemical series and its applications, Principles involved in extraction of the elements.

**B. COORDINATION COMPOUNDS:** Werner's theory and its experimental verification, IUPAC nomenclature of coordination compounds, isomerism in coordination compounds. Stereochemistry of complexes with 4 and 6 coordination numbers. Chelates, polynuclear complexes.

**UNIT-III**

**COORDINATION CHEMISTRY**

Valence bond theory (inner and outer orbital complexes), electroneutrality principle and back bonding. Crystal field theory, Crystal field splitting and stabilization energy, measurement of  $10 Dq$  ( $\Delta_o$ ), CFSE in weak and strong fields, pairing energies, factors affecting the magnitude of  $10 Dq$  ( $\Delta_o$ ,  $\Delta_t$ ). Octahedral vs. tetrahedral coordination.

B.Sc.-II

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*24.6.2019*

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## UNIT-IV

### A. CHEMISTRY OF LANTHANIDE ELEMENTS

Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds.

### B. CHEMISTRY OF ACTINIDES

General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from uranium, similarities between the latter actinides and the latter lanthanides

## UNIT-V

**A. ACIDS BASES :** Arrhenius, Bronsted-Lowry, conjugate acids and bases, relative strengths of acids and bases, the Lux-flood, Solvent system and Lewis concepts of acids and bases.

### B. NON-AQUEOUS SOLVENTS

.Physical properties of a solvent, types of solvents and their general characteristics, reaction in non-aqueous solvents with reference to liquid ammonia and liquid sulphur dioxide, HF, H<sub>2</sub>SO<sub>4</sub> , Ionic liquids.

## REFERENCE BOOKS

1. Basic Inorganic Chemistry, F. A. Cotton, G. Wilkinson and P. L. Gaus, Wiley
2. Concise Inorganic Chemistry, J. D. Lee, ELBS
3. Concepts of Models of Inorganic Chemistry, B. Douglas, D. Mc Daniel and J. Alexander, John Wiley.
4. Inorganic Chemistry, D. E. Shriver, P. W. Atkins and C. H. Langford, Oxford.
5. Inorganic Chemistry, W. W. Porterfield, Addison – Wiley.
6. Inorganic Chemistry, A. G. Sharp, ELBS.
7. Inorganic Chemistry, G. L. Miessler and D. A. Tarr, Prentice Hall.
8. Advanced Inorganic Chemistry, Satya Prakash.
9. Advanced Inorganic Chemistry, Agarwal and Agarwal
10. Advanced Inorganic Chemistry, Puri, Sharma, S. Naginchand
11. Inorganic Chemistry, Madan, S. Chand
12. Aadhunik Akarbanic Rasayan, A. K. Shrivastav & P. C. Jain, Goel Pub
13. Uchchattar Akarbanic Rasayan, satya Prakash & G. D. Tuli, Shyamal Prakashan
14. Uchchattar Akarbanic Rasayan, Puri & Sharma
15. Selected topic in Inorganic Chemistry by Madan Malik & Tuli, S. Chand.

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**UNIT-I**

**CHEMISTRY OF ORGANIC HALIDES**

Alkyl halides: Methods of preparation, nucleophilic substitution reactions –  $S_N1$ ,  $S_N2$  and  $S_Ni$  mechanisms with stereochemical aspects and effect of solvent etc.; nucleophilic substitution, elimination reactions.

Aryl halides: Preparation, including preparation from diazonium salts, Nucleophilic Aromatic Substitution;  $S_NAr$ , Benzyne mechanism. Relative reactivity of alkyl, allyl/benzyl, vinyl and aryl halides towards nucleophilic substitution reactions.

**UNIT-II**

**ALCOHOLS**

- A. Alcohols: Nomenclature, preparation, properties and relative reactivity of  $1^\circ$ ,  $2^\circ$ ,  $3^\circ$  alcohols, Bouvaelt-Blanc Reduction for the preparation of alcohols, Dihydric alcohols – methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [ $Pb(OAc)_4$  and  $HIO_4$ ] and pinacol-pinacolone rearrangement.
- B. Trihydric alcohols - Nomenclature, methods of formation, chemical reactions of glycerol.

**PHENOLS**

- A. Structure and bonding in phenols, physical properties and acidic character, Comparative acidic strength of alcohols and phenols, acylation and carboxylation.
- B. Mechanism of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Hauben-Hoesch reaction, Lederer-Manasse reaction and Reimer-Tiemann reaction.

**UNIT-III**

**ALDEHYDES AND KETONES**

- A. Nomenclature, structure and reactivity of carbonyl group. General methods of preparation of aldehydes and ketones.
- Mechanism of nucleophilic addition to carbonyl groups: Benzoin, Aldol, Perkin and Knoevenagel condensation. Condensation with ammonia and its derivatives, Wittig reaction, Mannich reaction, Beckmann and Benzil- Benzilic rearrangement.
- B. Use of acetate as protecting group, Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizzaro reaction, MPV, Clemmensen reduction, Wolf-Kishner reaction,  $LiAlH_4$  and  $NaBH_4$  reduction. Halogenation of enolizable ketones, An introduction to  $\alpha,\beta$ -unsaturated aldehydes and ketones.

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## UNIT-IV

### A. CARBOXYLIC ACIDS

Preparation, Structure and bonding, Physical and chemical properties including, acidity of carboxylic acids, effects of substituents on acid strength, Hell-Volhard Zeilinsky reaction. Reduction of carboxylic groups, Mechanism of decarboxylation.

Di carboxylic acids: Methods of formation and effect of heat and dehydrating agents, Hydroxyacids.

### B. CARBOXYLIC ACID DERIVATIVES

Structure of acid chlorides, esters, amides and acid anhydrides, Relative stability of acyl derivatives.

Physical properties, inter-conversion of acid derivatives by nucleophilic acyl substitution.

Mechanism of acid and base catalyzed esterification and hydrolysis.

## UNIT-V

### ORGANIC COMPOUNDS OF NITROGEN

A. Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanism of nucleophilic substitution in nitroarenes and their reduction in acidic, neutral and alkaline medium.

B. Reactivity, structure and nomenclature of amines, physical properties. Stereochemistry of amines. Separation of mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Preparation of alkyl and aryl amines (reduction of nitro compounds and nitriles), reductive amination of aldehydic and ketonic compounds. Gabriel-Phthalimide reaction, Hofmann-Bromamide reaction, Reactions of amines, electrophilic aromatic substitution of aryl amines, Reaction of amines with nitrous acid. Synthetic transformations of aryl diazonium salts, Azo coupling.

### REFERENCE BOOKS

1. Organic Chemistry, Morrison and Boyd, Prentice-Hall.
2. Organic Chemistry, L. G. Wade Jr. Prentice Hall.
3. Fundamentals of Organic Chemistry, Solomons, John Wiley.
4. Organic Chemistry, Vol I, II, III S. M. Mukherjee, S. P. Singh and R. P. Kapoor, Wiley Eastern (New Age).
5. Organic Chemistry, F. A. Carey, McGraw Hill.
6. Introduction to Organic Chemistry, Struieweisser, Heathcock and Kosover, Macmillan.
7. Organic Chemistry, P. L. Soni.
8. Organic Chemistry, Bahl and Bahl.
9. Organic Chemistry, Joginder Singh.
10. Carbanic Rasayan, Bahl and Bahl.
11. Carbanic Rasayan, R. N. Singh, S. M. I. Gupta, M. M. Bakidia & S. K. Wadhwa.
12. Carbanic Rasayan, Joginder Singh.

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## UNIT-I

### A. THERMODYNAMICS-I

Intensive and extensive variables; state and path functions; isolated, closed and open systems; Zeroth law of thermodynamics. First law: Concept of heat, work, internal energy and statement of first law; enthalpy, Relation between heat capacities, calculations of  $q$ ,  $w$ ,  $U$  and  $H$  for reversible, irreversible and free expansion of gases under isothermal and adiabatic conditions. Joule-Thomson expansion, inversion temperature of gases, expansion of ideal gases under isothermal and adiabatic condition

### B. THERMO CHEMISTRY

Thermochemistry, Laws of Thermochemistry, Heats of reactions, standard states; enthalpy of formation of molecules and ions and enthalpy of combustion and its applications; calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data, effect of temperature (Kirchhoff's equations) and pressure on enthalpy of reactions, Adiabatic flame temperature, explosion temperature.

## UNIT-II

### A. THERMODYNAMICS-II

Second Law of Thermodynamics: Spontaneous process, Second law, Statement of Carnot cycle and efficiency of heat engine, Carnot's theorem, thermodynamic state of temperature. Concept of entropy: Entropy change in a reversible and irreversible process, entropy change in isothermal reversible expansion of an ideal gas, entropy change in isothermal mixing of ideal gases, physical signification of entropy, Molecular and statistical interpretation of entropy.

B. Gibbs and Helmholtz free energy, variation of  $G$  and  $A$  with pressure, volume, temperature, Gibbs-Helmholtz equation, Maxwell relations, Elementary idea of Third law of Thermodynamics, concept of residual entropy, calculation of absolute entropy of molecule.

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## UNIT III

### A CHEMICAL EQUILIBRIUM

Criteria of thermodynamic equilibrium, degree of advancement of reaction, chemical equilibria in ideal gases. Concept of Fugacity, Thermodynamic derivation of relation between Gibbs free energy of reaction and reaction quotient. Coupling of exergonic and endergonic reactions. Equilibrium constants and their quantitative dependence on temperature, pressure and concentration. Thermodynamic derivation of relations between the various equilibrium constants  $K_p$ ,  $K_c$  and  $K_x$ . Le Chatelier principle (quantitative treatment). Equilibrium between ideal gas and a pure condensed phase.

### B IONIC EQUILIBRIA

Ionization of weak acids and bases, pH scale, common ion effect; dissociation constants of mono protic acids (exact treatment). Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions; derivation of Henderson equation and its applications. Solubility and solubility product of sparingly soluble salts – applications of solubility product principle.

## UNIT-IV

### PHASE EQUILIBRIUM

A. Phase rule, Phase, component and degree of freedom, derivation of Gibbs phase rule, Clausius-Claperton equation and its applications to Solid-Liquid, Liquid-Vapor and Solid-Vapor, limitation of phase rule, applications of phase rule to one component system: Water system and sulphur system.

Application of phase rule to two component system: Pb-Ag system, desilverization of lead, Zn-Mg system, Ferric chloride-water system, congruent and incongruent melting point and eutectic point.

Three component system: Solid solution liquid pairs.

B. Nernst distribution law, Henry's law, application, solvent extraction

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## UNIT V

### PHOTOCHEMISTRY

Characteristics of electromagnetic radiation, Interaction of radiation with matter, difference between thermal and photochemical processes, Lambert-Beer's law and its limitations, physical significance of absorption coefficients. Laws of photochemistry: Grothus-Draper law, Stark-Einstein law, quantum yield, actinometry, examples of low and high quantum yields, Photochemical equilibrium and the differential rate of photochemical reactions, Quenching, Role of photochemical reaction in biochemical process.

Jablonski diagram depicting various process occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), photosensitized reactions, energy transfer processes {simple examples}, photostationary states, Chemiluminescence.

### REFERENCE BOOKS

1. Physical Chemistry, G. M. Barrow, International student edition, McGraw Hill.
2. University General Chemistry, C. N. R. Rao, Macmillan.
3. Physical Chemistry, R. A. Alberty, Wiley Eastern.
4. The elements of physical chemistry, Wiley Eastern.
5. Physical Chemistry through problems, S. K. Dogra & S. Dogra, Wiley Eastern.
6. Physical Chemistry, B. D. Khosla,.
7. Physical Chemistry, Puri & Sharma.
8. Bhautik Rasayan, Puri, Sharma and Pathania, Vishal Publishing Company.
9. Bhautik Rasayan, P. L. Soni.
10. Bhautik Rasayan, Bahl and Tuli.
11. Physical Chemistry, R. L. Kapoor, Vol I-IV .
12. Chemical kinetics, K. J. Laidler, Pearson Educations, New Delhi (2004).

B.Sc.-II

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## LABORATORY COURSE

### INORGANIC CHEMISTRY

Qualitative semimicro analysis of mixtures containing 5 radicals. Emphasis should be given to the understanding of the chemistry of different reactions. The following radicals are suggested:

$\text{CO}_3^{2-}$ ,  $\text{NO}_2^-$ ,  $\text{S}^{2-}$ ,  $\text{SO}_3^{2-}$ ,  $\text{S}_2\text{O}_3^{2-}$ ,  $\text{CH}_3\text{COO}^-$ ,  $\text{F}^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{NO}_3^-$ ,  $\text{BO}_3^{3-}$ ,  $\text{C}_2\text{O}_4^{2-}$ ,  $\text{PO}_4^{3-}$ ,  $\text{NH}_4^+$ ,  $\text{K}^+$ ,  $\text{Pb}^{2+}$ ,  $\text{Cu}^{2+}$ ,  $\text{Cd}^{2+}$ ,  $\text{Bi}^{3+}$ ,  $\text{Sn}^{2+}$ ,  $\text{Sb}^{3+}$ ,  $\text{Fe}^{3+}$ ,  $\text{Al}^{3+}$ ,  $\text{Cr}^{3+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Mn}^{2+}$ ,  $\text{Co}^{2+}$ ,  $\text{Ni}^{2+}$ ,  $\text{Ba}^{2+}$ ,  $\text{Sr}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ .

Mixtures should preferably contain one interfering anion, or insoluble component ( $\text{BaSO}_4$ ,  $\text{SrSO}_4$ ,  $\text{PbSO}_4$ ,  $\text{CaF}_2$  or  $\text{Al}_2\text{O}_3$ ) or combination of anions e.g.  $\text{CO}_3^{2-}$  and  $\text{SO}_3^{2-}$ ,  $\text{NO}_2^-$  and  $\text{NO}_3^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ , and  $\text{I}^-$ .

#### Volumetric analysis

- Determination of acetic acid in commercial vinegar using NaOH.
  - Determination of alkali content-antacid tablet using HCl.
  - Estimation of calcium content in chalk as calcium oxalate by permanganometry.
  - Estimation of hardness of water by EDTA.
  - Estimation of ferrous & ferric by dichromate method.
  - Estimation of copper using thiosulphate.
- Principles involved in chromatographic separations. Paper chromatographic separation of following metal ions: i. Ni (II) and Co (II) ii. Fe (III) and Al (III)

### ORGANIC CHEMISTRY

- Detection of elements (X, N, S).
- Qualitative analysis of unknown organic compounds containing simple functional groups (alcohols, carboxylic acids, phenols, nitro, amine, amide, and carbonyl compounds, carbohydrates)
- Preparation of Organic Compounds:
  - m-dinitrobenzene, (ii) Acetanilide, (iii) Bromo/Nitro-acetanilide, (iv) Oxidation of primary alcohols-Benzoic acid from benzylalcohol, (v) azo dye.

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## PHYSICAL CHEMISTRY

### Transition Temperature

- Determination of the transition temperature of the given substance by thermometric/dilatometric method (e.g.  $\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$  /  $\text{SrBr}_2 \cdot 2\text{H}_2\text{O}$ ).

### Thermochemistry

- Determination of heat capacity of a calorimeter for different volumes using change of enthalpy data of a known system (method of back calculation of heat capacity of calorimeter from known enthalpy of solution or enthalpy of neutralization).
- Determination of heat capacity of the calorimeter and enthalpy of neutralization of hydrochloric acid with sodium hydroxide.
- To determine the solubility of benzoic acid at different temperature and to determine  $\Delta H$  of the dissolution process.
- To determine the enthalpy of neutralization of a weak acid/ weak base versus strong base/ strong acid and determine the enthalpy of ionization of the weak acid/ weak base.
- To determine the enthalpy of solution of solid calcium chloride and calculate the lattice energy of calcium chloride from its enthalpy data using Born Haber cycle.

### Phase Equilibrium

- To study the effect of a solute (e.g.  $\text{NaCl}$ , Succinic acid) on the critical solution temperature of two partially miscible liquids (e.g. phenol-water system) and to determine the concentration of that solute in the given phenol-water system.
- To construct the phase diagram of two component system (e.g. diphenylamine–benzophenone) by cooling curve method.
- Distribution of acetic/ benzoic acid between water and cyclohexane.
- Study the equilibrium of at least one of the following reactions by the distribution method:
  - (i)  $\text{I}_2(\text{aq}) + \text{I}^- \rightarrow \text{I}_3^-(\text{aq})$
  - (ii)  $\text{Cu}^{2+}(\text{aq}) + n\text{NH}_3 \rightarrow \text{Cu}(\text{NH}_3)_n$

### Molecular Weight Determination

Determination of molecular weight by Rast Camphor and Landsburger method.

**Note: Experiments may be added/ deleted subject to availability of time and facilities.**

B.Sc.-II

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## Reference Books

1. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
2. Furniss, B.S., Hannaford, A.J., Smith, P.W.G. & Tatchell, A.R. Practical Organic Chemistry, 5th Ed. Pearson (2012)
3. Ahluwalia, V.K. & Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000). 22
4. Ahluwalia, V.K. & Dhingra, S. Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press (2000).
5. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011). Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. Experiments in Physical Chemistry 8th Ed.; McGraw-Hill: New York (2003).
6. Halpern, A. M. & McBane, G. C. Experimental Physical Chemistry 3rd Ed.; W.H. Freeman & Co.: New York

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Three Experiments are to be performed.

1. Inorganic – Qualitative semimicro analysis of mixtures.

**12 marks**

OR

One experiment from synthesis and analysis by preparing the standard solution.

2. (a) Identification of the given organic compound & determine its M.Pt./B.Pt.

**6 marks**

(b) Determination of R<sub>f</sub> value and identification of organic compounds by paper chromatography.

**6 marks**

3. Any one physical experiment that can be completed in two hours including calculations.

**12 marks**

4. Viva

**10 marks**

5. Sessional

**04 marks**

In case of Ex-Students one marks will be added to each of the experiment.

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Session 2019-20

## PHYSICS

B.Sc. Part-II

Paper-I

### THERMODYNAMICS, KINETIC THEORY AND STATISTICAL PHYSICS

**Unit-1** The laws of thermodynamics : The Zeroth law, first law of thermodynamics, internal energy as a state function, reversible and irreversible change, Carnot's cycle, Carnot theorem, second law of thermodynamics. Clausius theorem inequality. Entropy, Change of entropy in simple cases (i) Isothermal expansion of an ideal gas (ii) Reversible isochoric process (iii) Free adiabatic expansion of an ideal gas. Concept of entropy, Entropy of the universe. Entropy change in reversible and irreversible processes, Entropy of Ideal gas, Entropy as a thermodynamic variable, S-T diagram, Principle of increase of entropy. The thermodynamic scale of temperature, Third law of thermodynamics, Concept of negative temperature.

**Unit-2** Thermodynamic functions, Internal energy, Enthalpy, Helmholtz function and Gibb's free energy, Maxwell's thermodynamical equations and their applications, TdS equations, Energy and heat capacity equations Application of Maxwell's equation in Joule-Thomson cooling, adiabatic cooling of a system, Van der Waals gas, Clausius-Clapeyron heat equation. Blackbody spectrum, Stefan-Boltzmann law, Wien's displacement law, Rayleigh-Jean's law, Planck's quantum theory of radiation.

**Unit-3** Maxwellian distribution of speeds in an ideal gas: Distribution of speeds and velocities, experimental verification, distinction between mean, rms and most probable speed values. Doppler broadening of spectral lines. Transport phenomena in gases: Molecular collisions mean free path and collision cross sections. Estimates of molecular diameter and mean free path. Transport of mass, momentum and energy and interrelationship, dependence on temperature and pressure.  
Behaviour of Real Gases: Deviations from the Ideal Gas Equation. The Virial Equation. Andrew's Experiments on CO<sub>2</sub> Gas. Critical Constants.

**Unit-4** The statistical basis of thermodynamics: Probability and thermodynamic probability, principle of equal a priori probabilities, statistical postulates. Concept of Gibb's ensemble, accessible and inaccessible states. Concept of phase space,  $\gamma$  phase space and  $\mu$  phase space. Equilibrium before two systems in thermal contact, probability and entropy, Boltzmann entropy relation. Boltzmann canonical distribution law and its applications, law of equipartition of energy.

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Transition to quantum statistics: 'h' as a natural constant and its implications, cases of particle in a one-dimensional box and one-dimensional harmonic oscillator.

**Unit-5** Indistinguishability of particles and its consequences, Bose-Einstein & Fermi-Dirac conditions, Concept of partition function, Derivation of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics, Limits of B-E and F-D statistics to M-B statistics. Application of B-E statistics to black body radiation, Application of F-D statistics to free electrons in a metal.

**TEXT AND REFERENCE BOOKS:**

1. B.B. Laud, "Introduction to Statistical Mechanics" (Mcmillan 1981)
2. F. Reif : "Statistical Physics" (Mcgraw-Hill, 1998).
3. K, Haung : "Statatistical Physics" (Wiley Eastern, 1988).
4. Thermal and statistical Physics: R.K. Singh, Y.M. Gupta and S. Sivraman.
5. Statistical Physics: Berkeley Physics Course, Vol. 5
6. Physics (Part-2): Editor, Prof. B.P. Chandra, M.P. Hindi Granth Academy.
7. Heat and Thermodynamics: K.W. Zeemansky.
8. Thermal Physics: B.K. Agarwal.
9. Heat and Thermodynamics: Brij Lal and N. Subramanyam.
10. Heat and Thermodynamics: Dayal, Verma and Pandey.
11. A Treatise on Heat: M.N. Saha and B.N. Srivastava.

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Session 2019-20

PHYSICS

Paper-II

## WAVES, ACOUSTICS AND OPTICS

**Unit-1** Waves in media: Speed of transverse waves on uniform string, speed of longitudinal waves in a fluid, energy density and energy transmission in waves. Waves over liquid surface: gravity waves and ripples. Group velocity and phase velocity and relationship between them. Production and detection of ultrasonic and infrasonic waves and applications.

Reflection, refraction and diffraction of sound : Acoustic impedance of a medium, percentage reflection & refraction at a boundary, impedance matching for transducers, diffraction of sound, principle of a sonar system, sound ranging.

**Unit-2** Fermat's Principle of extremum path, the aplanatic points of a sphere and other applications. Cardinal points of an optical system, thick lens and lens combinations. Lagrange equation of magnification, telescopic combinations, telephoto lenses. Monochromatic aberrations and their reductions; aspherical mirrors and Schmidt corrector plates, aplanatic points, oil immersion objectives, meniscus lens. Optical instruments: Entrance and exit pupils, need for a multiple lens eyepiece, common types of eyepieces. (Ramsdon and Hygen's eyepieces).

**Unit-3** Interference of light: The principle of superpositions, two slit interference, coherence requirement for the sources, optical path retardations, Conditions for sustained interference, Theory of interference, Thin films. Newton's rings and Michelson interferometer and their applications, its application for precision determinations of wavelength, wavelength difference and the width of spectral lines. Multiple beam interference in parallel film and Fabry-Perot interferometer. Rayleigh refractometer, Twyman-Green interferometer and its uses.

**Unit-4** Diffraction, Types of Diffraction, Fresnel's diffraction, half-period zones, phasor diagram and integral calculus methods, the intensity distribution, Zone plates, diffraction due to straight edge, Fraunhofer diffraction due to a single slit and double slit, Diffraction at N-Parallel slit, Plane Diffraction grating, Rayleigh criterion, resolving power of grating, Prism, telescope.

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Polarized light and its mathematical representation, Production of polarized light by reflection, refraction and scattering. Polarization by double refraction and Huygen's theory, Nicol prism, Retardation plates, Production and analysis of circularly and elliptically polarized light. Optical activity and Fresnel's theory, Biquartz polarimeter.

**Unit-5** Laser system: Basic properties of Lasers, coherence length and coherence time, spatial coherence of a source, Einstein's A and B coefficients, Spontaneous and induced emissions, conditions for laser action, population inversion, Types of Laser : Ruby and, He-Ne laser, and, Applications of laser : Application in communication, Holography and Basics of non linear optics and Generation of Harmonic.

**TEXT AND REFERENCE BOOKS:**

1. A.K. Ghatak, 'Physical Optics'
2. D.P. Khandelwal, 'Optical and Atomic Physics' (Himalaya Publishing House, Bombay, 1988)
3. K.D. Moltev; 'Optics' (Oxford University Press)
4. Sears: 'Optics'
5. Jenkins and White: 'Fundamental of Optics' (McGraw-Hill)
6. B.B. Laud: 'Lasers and Non-linear Optics' (Wiley Eastern 1985)
7. Smith and Thomson: 'Optics' (John Wiley and Sons)
8. Berkely Physics Courses: Vol.-III, 'Waves and Oscillations'
9. I.G. Main, 'Vibrations and Waves' (Cambridge University Press)
10. H.J. Pain: 'The Physics of Vibrations and Waves' (MacMillan 1975)
11. Text Book of Optics: B.K. Mathur
12. B.Sc. (Part III) Physics: Editor: B.P. Chandra, M.P. Hindi Granth Academy.
13. F. Smith and J.H. Thomson, Manchester Physics series: optics (John wiley, 1971)
14. Born and Wolf : 'Optics'.
15. Physical Optics: B. K. Mathur and T. P. Pandya.
16. A textbook of Optics: N. Subrahmanyam, Brijlal and M. N. Avadhanulu.
17. Geometrical and Physical Optics: Longhurst.
18. Introduction to Modern Optics: G. R. Fowels.
19. Optics: P. K. Srivastav.

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## PHYSICS

## PRACTICALS

Minimum 16 (Eight from each group)

Experiments out of the following or similar experiments of equal standard

1. Study of Brownian motion.
2. Study of adiabatic expansion of a gas.
3. Study of conversion of mechanical energy into heat.
4. Heating efficiency of electrical kettle with varying voltage.
5. Study of temperature dependence of total radiation.
6. Study of temperature dependence of spectral density of radiation.
7. Resistance thermometry.
8. Thermo emf thermometry.
9. Conduction of heat through poor conductors of different geometries.
10. Experimental study of probability distribution for a two-option system using a coloured dice.
11. Study of statistical distribution on nuclear disintegration data (GM counter used as a black box).
12. Speed of waves on a stretched strings.
13. Studies on torsional waves in a lumped system.
14. Study of interference with two coherent source of sound.
15. Chlandi's figures with varying excitation and loading points.
16. Measurements of sound intensities with different situations.
17. Characteristics of a microphone-loudspeakers system
18. Designing an optical viewing system.
19. Study of monochromatic defects of images.
20. Determining the principle point of a combination of lenses.
21. Study of interference of light (biprism or wedge film).
22. Study of diffraction at a straight edge or a single slit.
23. Study of F-P etalon fringes.
24. Study of diffraction grating and its resolving power.
25. Resolving power of telescope system.
26. Polarization of light by reflection; also cos-squared law.
27. Study of optical rotation for any system.
28. Study of laser as a monochromatic coherent source.
29. Study of a divergence of laser beam.
30. Calculation of days between two dates of a year.
31. To check if triangle exists and the type of a triangles.
32. To find the sum of the sine and cosines series and print out the curve.





33. To solve simultaneous equation by elimination method.
34. To prepare a mark-list of polynomials.
35. Fitting a straight line or a simple curve
36. Convert a given integer into binary and octal systems and vice versa .
37. Inverse of a matrix.
38. Spiral array.

#### TEXT AND REFERENCE BOOKS

1. D.P. Khandelwal, Optics and Atomic physics (Himalaya Publishing house, Bombay 1988).
2. D.P. Khandelwal, A Laboratory Manual for Undergraduate Classes (Vani Publishing House, New Delhi).
3. S. Lipschutz and a Poe, Schaum's outline of theory and Problems of Programming with Fortran (McGraw-hill Book Company 1986).
4. C Dixon, Numerical Analysis .

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## MATHEMATICS

There shall be three compulsory papers. Each paper of 50 marks is divided into five units and each unit carry equal marks.

### B.Sc. Part-II

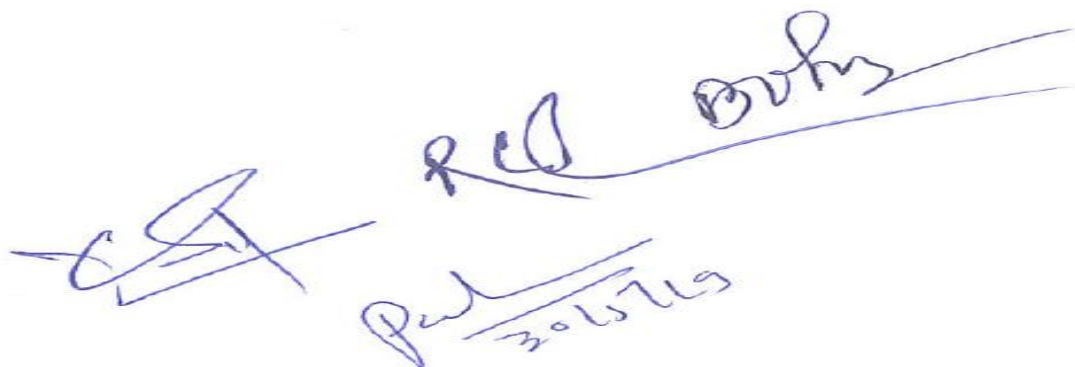
#### Paper-I

#### ADVANCED CALCULUS

- UNIT-I Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion. Series of non-negative terms. Comparison tests, Cauchy's integral test, Ratio tests, Raabe's, Logarithmic, De Morgan and Bertrand's tests. Alternating series, Leibnitz's theorem. Absolute and conditional convergence.
- UNIT-II Continuity, Sequential continuity, Properties of continuous functions, Uniform continuity, Chain rule of differentiability, Mean value theorems and their geometrical interpretations. Darboux's intermediate value theorem for derivatives, Taylor's theorem with various forms of remainders.
- UNIT-III Limit and continuity of functions of two variables. Partial differentiation. Change of variables. Euler's theorem on homogeneous functions. Taylor's theorem for functions of two variables. Jacobians.
- UNIT-IV Envelopes, evolutes. Maxima, minima and saddle points of functions of two variables. Lagrange's multiplier method.
- UNIT-V Beta and Gamma functions, Double and triple integrals, Dirichlet's integrals, Change of order of integration in double integrals.

#### REFERENCES :

1. Gabriel Klaumber, Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975.
2. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
3. R.R. Goldberg, Real Analysis, Oxford & I.B.H. Publishing Co., New Delhi, 1970.
4. D. Soma Sundaram and B. Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997.
5. P.K. Jain and S.K. Kaushik, An introduction to Real Analysis, S. Chand & Co., New Delhi, 2000.
6. Gorakh Prasad, Differential Calculus, Pothishala Pvt. Ltd., Allahabad.
7. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Co., New York.
8. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd., Allahabad.
9. S.C. Malik, Mathematical Analysis, Wiley Eastern Ltd., New Delhi.
10. O.E. Stanaitis, An Introduction to Sequences, Series and Improper Integrals, Holden-Dey, Inc., San Francisco, California.
11. Earl D. Rainville, Infinite Series, The Macmillan Company, New York.
12. Chandrika Prasad, Text Book on Algebra and Theory of Equations, Pothishala Pvt. Ltd., Allahabad.
13. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
14. Shanti Narayan, A Course of Mathematical Analysis, S.Chand and Company, New Delhi.



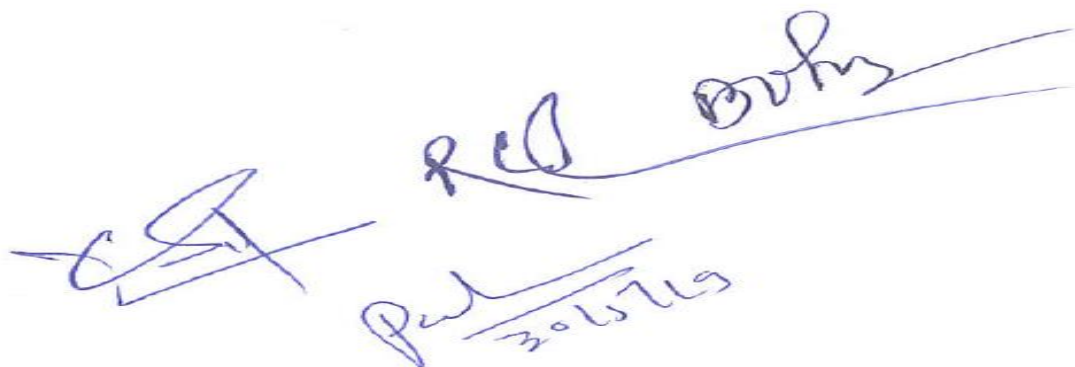
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**B.Sc. Part-II**  
**Paper-II**  
**DIFFERENTIAL EQUATIONS**

- UNIT-I Series solutions of differential equations- Power series method, Bessel and Legendre functions and their properties-convergence, recurrence and generating relations, Orthogonality of functions, Sturm-Liouville problem, Orthogonality of eigen-functions, Reality of eigen values, Orthogonality of Bessel functions and Legendre polynomials.
- UNIT-II Laplace Transformation- Linearity of the Laplace transformation, Existence theorem for Laplace transforms, Laplace transforms of derivatives and integrals, Shifting theorems. Differentiation and integration of transforms. Convolution theorem. Solution of integral equations and systems of differential equations using the Laplace transformation.
- UNIT-III Partial differential equations of the first order. Lagrange's solution, Some special types of equations which can be solved easily by methods other than the general method, Charpit's general method of solution.
- UNIT-IV Partial differential equations of second and higher orders, Classification of linear partial differential equations of second order, Homogeneous and non-homogeneous equations with constant coefficients, Partial differential equations reducible to equations with constant coefficients, Monge's methods.
- UNIT-V Calculus of Variations- Variational problems with fixed boundaries- Euler's equation for functionals containing first order derivative and one independent variable, Extremals, Functionals dependent on higher order derivatives, Functionals dependent on more than one independent variable, Variational problems in parametric form, invariance of Euler's equation under coordinates transformation.
- Variational Problems with Moving Boundaries- Functionals dependent on one and two functions, One sided variations.
- Sufficient conditions for an Extremum- Jacobi and Legendre conditions, Second Variation. Variational principle of least action.

**REFERENCES :**

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, Inc., New York, 1999.
2. D.A. Murray, Introductory Course on Differential Equations, Orient Longman, (India), 1967.
3. A.R. Forsyth, A Treatise on Differential Equations, Macmillan and Co. Ltd., London.
4. Lan N. Sneddon, Elements of Partial Differential Equations, McGraw-Hill Book Company, 1988.
5. Francis B. Hilderbrand, Advanced Calculus for Applications, Prentice Hall of India Pvt. Ltd., New Delhi, 1977.
6. Jane Cronin, Differential equations, Marcel Dekkar, 1994.
7. Frank Ayres, Theory and Problems of Differential Equations, McGraw-Hill Book Company, 1972.
8. Richard Bronson, Theory and Problems of Differential Equations, McGraw-Hill, Inc., 1973.
9. A.S. Gupta, Calculus of variations with-Applications, Prentice-Hall of India, 1997.
10. R. Courant and D. Hilbert, Methods of Mathematical Physics, Vols. I & II, Wiley-Interscience, 1953.
11. I.M. Gelfand and S.V. Fomin, Calculus of Variations, Prentice-Hill, Englewood Cliffs (New Jersey), 1963.
12. A.M. Arthurs, Complementary Variational Principles, Clarendon Press, Oxford, 1970.
13. V. Kornkov, Variational Principles of Continuum Mechanics with Engineering Applications, Vol. I, Reidel Publ. : Dordrecht, Holland, 1985.
14. T. Oden and J.N. Reddy, Variational Methods in Theoretical Mechanics, Springer-Verlag, 1976.

  
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**B.Sc. Part-II  
Paper-III  
MECHANICS**

**STATICS**

UNIT-I Analytical conditions of Equilibrium, Stable and unstable equilibrium. Virtual work, Catenary.

UNIT-II Forces in three dimensions, Poinsot's central axis, Null lines and planes.

**DYNAMICS**




UNIT-III Simple harmonic motion. Elastic strings. Velocities and accelerations along radial and transverse directions, Projectile, Central orbits.

UNIT-IV Kepler's laws of motion, velocities and acceleration in tangential and normal directions, motion on smooth and rough plane curves.

UNIT-V Motion in a resisting medium, motion of particles of varying mass, motion of a particle in three dimensions, acceleration in terms of different co-ordinate systems.

**REFERENCES :**

1. S.L. Loney, Statics, Macmillan and Company, London.
2. R.S. Verma, A Text Book on Statics, Pothishala Pvt. Ltd., Allahabad.
3. S.L. Loney, An Elementary Treatise on the Dynamics of a particle and of rigid bodies, Cambridge University Press, 1956.

## **B.Sc.-II (BOTANY) PAPER-I**

### **(PLANT TAXONOMY, ECONOMIC BOTANY, PLANT ANATOMY AND EMBRYOLOGY)**

#### **UNIT-I**

Bentham and Hooker system of classification. Binomial Nomenclature, International Code of Nomenclature for Algae, Fungi, and plants (IUCN), Typification, numerical Taxonomy and chemotaxonomy. Preservation of Plant material and Herbarium techniques. Important botanical gardens and herbaria of India, Kew Botanical garden, England.

#### **UNIT-II**

Systematic position, distinguishing characters and economic importance of the following families, Ranunculaceae, Magnoliaceae, Brassicaceae, Rosaceae, Papaveraceae, Caryophyllaceae, Rutaceae, Cucurbitaceae, Apiaceae, Rubiaceae, Apocynaceae, Asclepiadaceae, Solanaceae, Malvaceae, Convolvulaceae, Orchidaceae, Acanthaceae, verbenaceae, Lamiaceae, Asteraceae, Fabaceae, Euphorbiaceae, Poaceae and Liliaceae.

#### **UNIT-III**

Economic Botany: Botanical name, family, part used and uses of the following economically important plants, fiber yielding plants; Cotton, jute, sun, hemp, coir. Timber yielding plants: Sal, Teak, Shisham and Pine. Medicinal plants: Kalmegh, Ashwagandha, Ghritkumari, Giloy, Brahmi, sarpagandha, ---of medicinal plants of C.G. Food plants: Pearl millet, Buck of wheat, Sorghum, Soyabean, gram, Ground nut, Sugarcane and Potato. Fruit plants: Pear, Peach, Litchi. Spices: Cinnamon, Turmeric, Ginger, Asafoetida and Cumin. Beverages : Tea, Coffee Rubber Cultivation of important flowers: Chrysanthemum, Dahelia, Biodiesel plants Jatropha, Pongamia Ethnobotany in context of Chhattisgarh.

#### **UNIT-IV**

Plant Anatomy: Root and shoot apical meristems theories of root and shoot apex organization, permanent tissues, anatomy of root, stem and leaf of dicot and monocot, secondary growth in root and stem, Anatomical anomalies in the primary structure of stems (Nyctanthes, Boerhaavia, Casuarina), Anamolous secondary growth in Dracaena, Bignonia, Laptadenia.

#### **UNIT-V**

Embryology: Flower as a reproductive organ, anther, microsporogenesis, types of ovules, megasporogenesis, development of male and female gametophyte, pollination, mechanisms, self incompatibility, fertilization, endosperm, embryo, polyembryonoy, apomixes and parthenocarpy.

#### **Books Recommended:**

Amal  
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Roshni  
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Shruti  
13.6.19

Shruti  
13.6.19

Singh, Pandey, Jain. *Diversity and Systematics of Seed Plants*, Rastogi Publications Merrut

Sharma OP, *Plant Taxonomy*, Tata Mc Graw Hill, New Delhi

Pandey BP, *Taxonomy of Angiosperms*, S. Chand Publishing, New Delhi

Pandey, BP, *Plant Anatomy*, S.Chand Publishing, New Delhi

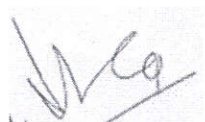
Pandey, BP, *Economic Botany*, S.Chand Publishing, New Delhi

Bhojwani, SS and Bhatanagar SP, *Embryology of Angiosperm*, Vikas Publication House, New Delhi

Singh, Pandey, Jain, *Embryology of Angiosperms*, Rastogi Publication, Meerut

Sharma, V, Alum, A. *Ethnobotany*, Rastogi Publications, Meerut

Tayal, MS *Plant Anatomy*, Rastogi Publication, Meerut



(Dr. J.N. Verma)

Proff. & Head

Govt. D.B. Girls PG College

Raipur, (C.G.)



(Dr. Rekha Pimpalgaonkar)

Proff. & Head

Govt. N PG Science College

Raipur, (C.G.)

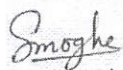


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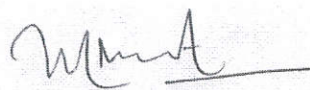
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Raipur, (C.G.)



(Mrs. Sanchal Moghe)

Govt. Bilasa Girls College, Bilaspur



(Mr. Shivakant Mishra)

(Mr. Sudheer Tiwari)

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**B.Sc.-II (BOTANY) PAPER-II**  
**(ECOLOGY AND PLANT PHYSIOLOGY)**

**UNIT-I**

Introduction and scope of ecology, environmental and ecological factors, Soil formation and soil profile, Liebig's law of minimum, Shelford's law of tolerance, morphological and anatomical adaptations in hydrophytes, xerophytes and epiphytes.

**UNIT-II**

Population and community characteristics, Raunkiaer's life forms, population interactions (e.g. Symbiosis, Amensalism etc.), succession, ecotone and edge effect, ecological niches, ecotypes, ecads, keystone species

Concept of ecosystem, trophic levels, flow of energy in ecosystem, food chain and food web, concept of ecological pyramids

Biogeochemical cycles: carbon cycle, nitrogen cycle and phosphorus cycle

**UNIT-III**

Plant water relations: Diffusion, permeability, osmosis, imbibitions, plasmolysis, osmotic potential and water potential, Types of soil water, water holding capacity, wilting, Absorption of water, theories of Ascent of sap, Mineral nutrition and absorption, Deficiency symptoms, Transpiration, stomatal movement, significance of transpiration, Factors affecting transpiration, guttation.

**UNIT-IV**

Photosynthesis: Photosynthetic apparatus and pigments, light reaction mechanism of ATP synthesis. C3, C4 CAM pathway of carbon reduction, photorespiration, factors affecting photosynthesis.

Respiration: Aerobic and anaerobic respiration, Glycolysis, Krebs's cycle, factors affecting respiration, R.Q.

**UNIT-V**

Plant growth hormones: Auxin, Gibberellin, Cytokinin, Ethylene and Abscissic acid. Physiology of flowering, Florigen concept, Photoperiodism and Vernalization. Seed dormancy and germination, plant movement.

**Books Recommended:**

Koromondy, E.J. *Concepts of Ecology*, Prentice Hall, USA

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Singh, JS Singh SP and Gupta SR. *Ecology and Environmental Science and Conservation*, S. Chand Publishing, New Delhi

Sharma, PD. *Ecology and Environment*, Rastogi Publications, Meerut

Hopkins, WG and Huner, PA. *Introduction to Plant Physiology*, John Wiley and Sons.

Pandey SN and Sinha BK, *Plant Physiology*, Vikas Publishing, New Delhi

Taiz, L and Zeiger, E. *Plant Physiology*, 5<sup>th</sup> edition, Sinauer Associates Inc. M.A, USA

Srivastava, HS *Plant Physiology and Biotechnology*, Rastogi Publications, Meerut

## B.Sc. II (BOTANY)

### Practical

1. Taxonomy: Detailed description and identification of locally available plants of the families as prescribed in the theory paper.
2. Economic Botany: Identification and comment on the plants and plant products belonging to different economic use categories
3. Preparation of Herbarium of local wild plants.
4. Quantitative vegetation analysis of a grassland ecosystem.
5. Anatomical characteristics of hydrophytes and xerophytes.
6. Demonstration of root pressure.
7. Demonstration of transpiration.
8. Demonstration of evolution of O<sub>2</sub> in photosynthesis, factors affecting of photosynthesis.
9. Comparison of R.Q. of different respiratory substrates.
10. Demonstration of fermentation.
11. Determination of BOD of a water body.
12. Demonstration of mitosis.

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## PRACTICAL SCHEME

TIME: 4 Hrs.

M.M. : 50

1.	Anatomy	08
2.	Economic Botany	04
3.	Physiology	08
4.	Ecology	10
5.	Spotting	10
6.	Viva-Voce	05
7.	Project Work/ Field Study	10

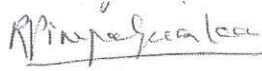


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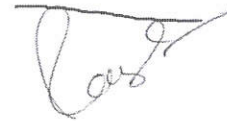


(Dr. Rekha Pimpalgaonkar )

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Raipur, (C.G.)

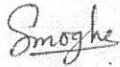


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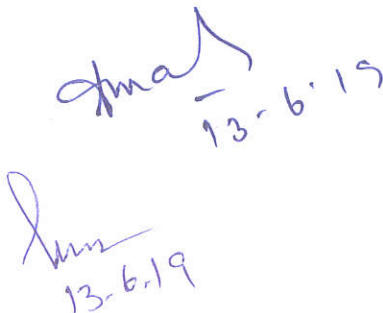
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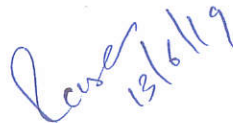
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# **Hemchand Yadav Vishwavidyala, Durg (C.G.)**

## **Zoology**

### **B.Sc. Part – II (2019-20)**

#### **Paper – I**

#### **(Anatomy and Physiology)**

Comparative Anatomy of various organ systems of vertebrates:

##### **Unit: I**

- Integument and its derivatives: structure of scales, hair and feathers
- Alimentary canal and digestive glands in vertebrates
- Respiratory organs : Gills and lung , air-sac in birds

##### **Unit: II**

- Endoskeleton: (a) Axial Skeleton- Skull and Vertebrae, (b) Appendicular Skeleton Limbs and girdles
- Circulatory System: Evolution of heart and aortic arches
- Urinogenital System: Kidney and excretory ducts

##### **Unit: III**

- Nervous System: General plan of brain and spinal cord
- Ear and Eye: structure and function
- Gonads and genital ducts

##### **Unit: IV**

- Digestion and absorption of dietary components
- Physiology of heart, cardiac cycle and ECG
- Blood Coagulation
- Respiration: mechanism and control of breathing

##### **Unit: V**

- Excretion: Physiology of excretion, osmoregulation
- Physiology of muscle contraction
- Physiology of nerve impulse, Synaptic transmission

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**Zoology**  
**B.Sc. Part – II (2019-20)**

Paper-II

**VERTEBRATE ENDOCRINOLOGY, REPRODUCTIVE BIOLOGY  
BEHAVIOUR, EVOLUTION AND APPLIED ZOOLOGY**

**Unit: I**

- Structure and function of Endocrine glands
- Hormone receptor
- Biosynthesis and secretion of thyroid, adrenal, ovarian and testicular hormones
- Endocrine disorder of pituitary, thyroid, adrenal and pancreas

**Unit:II**

- Reproductive cycle in vertebrates
- Menstruation, lactation and pregnancy
- Mechanism of parturition
- Hormonal regulation of gametogenesis

**Unit: III**

- Evidences of organic evolution.
- Theories of organic evolution.
- Variation, Mutation, Isolation and Natural selection.
- Evolution of Horse

**Unit:IV**

- Introduction to Ethology: Branches and concept of ethology.
- Patterns of Behaviour, Taxes, Reflexes, Drives and Stereotyped behaviour.
- Reproductive behavioural patterns.
- Drugs and behavior, Hormones and behaviour

**Unit:V**

- Prawn Culture
- Sericulture
- Apiculture
- Pisciculture
- Poultry keeping
- Elements of Pest Control: Chemical & Biological Control

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**Zoology**  
**B.Sc. Part II (2019-20)**  
**Practical**

The practical work in general shall be based on the syllabus prescribed and the students will be required to show the knowledge of the following:

- Study of the representative examples of the different chordates (Classified characters).
- Dissection of various systems of scoliodon-Afferent and Efferent branchial cranial nerves, internal ear.

**Alternative methods: By Clay/Thermacol/ Drawing/ Model etc.)**

- Simple microscopic technique through unstained or stained permanent mount.
- Study of prepared slides histological, as per theory papers.
- Study of limb girdles and vertebrae of Frog, Varanus, Fowl and Rabbit.
- Identification of species and individual of honey bee.
- Life cycle of honey bee and silkworm.
- Exercise based on Evolution and Animal behavior.

**Scheme of Practical Exam**

**Time: 3:30hrs**

• Major dissection (Cranial nerves/efferent branchial vessel)	10
• Exercise based on evolution	05
• Exercise based on applied zoology	05
• Exercise based on animal behavior	04
• Spotting-8 (slides-4,bones-2,specimen-2)	16
• Viva	05
• Sessional marks.	05

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# MICROBIOLOGY

## BSc-2<sup>nd</sup>

### Paper- I: Molecular Biology and Genetic Engineering

#### UNIT-1: FUNDAMENTALS OF MOLECULAR BIOLOGY

History and scope of molecular biology, concept and mechanism of heredity. DNA as genetic material- experimental evidences. DNA replication- mechanism, process and enzymes/proteins involved in replication.

#### UNIT-2: CENTRAL DOGMA OF PROTEIN SYNTHESIS

Transcription- initiation, elongation, termination, RNA polymerases and sigma factor. Transcription inhibitors (antibiotics, drugs). Translation- initiation, elongation and termination. Factors involved in translation. Genetic code.

#### UNIT-3: MUTATION AND DNA REPAIR MECHANISM

Introduction and Types of Gene mutations- Base substitution, frame shift mutation (insertion, deletion, miss-sense, nonsense mutation.) mutagens – physical and chemical. Reverse mutation in bacteria. DNA repair mechanism (mismatch repair, photo-reactivation, excision and SOS repair). Beneficial and harmful effect of mutation.

#### UNIT-4: GENE REGULATION

Concept of gene- Cistron, Recon, Muton. Operon Concept- lac Operon, tryptophan Operon, His Operon. Activator, Co-activator and Repressor. Introduction to Bioinformatics- Elementary genome Database.

#### UNIT-5: GENETIC ENGINEERING

Basic concept of Genetic Engineering, DNA modifying enzymes Restriction endonuclease, DNA ligase, terminal transferase. Vectors- pBR322, pUC19, BAC and YAC. Phage based vectors, expression of vector. Transformation – physical and chemical method. Bacterial Host. Screening of recombinant vector Blue white Screening, Colony Hybridization.

### Text Books Recommended:

1. Gene Cloning by T.A. Brown.
2. General Microbiology by Power and Daganwala.
3. Zinssers Microbiology by KJ Wolfgang, McGraw- HJill Company.
4. Microbial Genetics by RM Stanley, F David and EC John.
5. Bacteriological Techniques by FJ Baker.
6. Molecular Biology of the Cell; 3<sup>rd</sup> Edition; Bruce Alberts ,et.al; Garland Publishing.
7. Cell biology; C.B. Powar; Himalaya Publishing House; Fifth edition
8. Cell & Molecular Biology; Gerald Karp; Fourth edition
9. A Textbook of Microbiology; Dubey&Maheshwari; S.chand& Sons.
10. Cell biology & Genetics; P. K. Gupta
11. Introduction to Bioinformatics; T K Atwood and D J Parry-Smith; Pearson Education Ltd

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## Paper- II: Bioinstrumentation and Biostatistics

### UNIT-1: MICROSCOPY AND CENTRIFUGATION

Simple and compound light microscope, Bright field, Dark field, Phase contrast and Electron microscope. Centrifugation- principle and types of centrifuges (analytical and preparatory), types of centrifugation- differential and rate zonal centrifugation.

### UNIT-2: pH metry and chromatography

Principle of pH meter, types of electrodes, factors affecting pH measurements, and application of pH meter. Chromatography- principle, types- paper, TLC and column chromatography, HPLC.

### UNIT-3: SPECTROPHOTOMETRY

Electromagnetic spectrum, Beers-Lamberts law, Types (Principles, working and application)- colorimeter, UV - Vis Spectrophotometry and IR- Spectrophotometry, Turbidometry.

### UNIT-4: Electrophoresis and X-Ray Diffraction

Principle of electrophoresis, instrumentation and Application, types of Paper, Gel electrophoresis and Immunoelectrophoresis. X-ray diffraction- principle and application.

### UNIT-5: Biostatistics

Data- Types, characteristics, presentation and distribution. Data analysis- central tendency (Mean, Median and Mode), Deviation (variance SD and SE). Concept of probability.

### Text Books Recommended:

1. Introduction to Instrumental analysis by Robert Braun.
2. Instrumental Techniques by Upadhyay and Upadhyay.
3. Instrumental Methods of Chemical Analysis by BK Sharma.
4. Bio statistics; Sunder Rao
5. Statistical Methods; S. P. Gupta; Sultan Chand & Sons

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## PRACTICAL

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Determination of antibiotic resistance by plating method.  
 Assaying of microbial enzymes; Catalase, Proteases, Peroxidases,  
 Cellulase, Cellobioases, Amylase, Diastase.  
 Exercise on paper, thin layer, column chromatography.  
 Exercise on paper and gel electrophoresis.  
 determination of pH of various water and soil sample.  
 testing of lambert beer's law.  
 Determination of lamda max of dye by spectrophotometer  
 Isolation of resistant bacteria from soil and water sample

## Scheme of Practical Examination

Time - 4 hours

M.M. 50

1. Exercise on spectrophotometer/ pH meter	10
2. Exercise on chromatography	10
3. Exercise on genetics	05
4. Spotting (1-5)	10
5. Viva-Voce	05
6. Sessional	10

Total 50

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## Scheme of Examination

कक्षा	प्रश्नपत्र	विषय समूह	सैद्धा. अंक	प्रायो. अंक	योग
BSc. I year	I	भूगतिकी एवं भू-आकृति विज्ञान (Geodynamics & Geomorphology)	50	50	150
	II	खनिज एवं क्रिस्टल विज्ञान (Mineralogy & Crystallography)	50		
BSc. II year	I	शैलिकी (Petrology)	50	50	150
	II	संरचनात्मक भूविज्ञान (Structural Geology)	50		
BSc. III year	I	जीवाश्म विज्ञान एवं संस्तर विज्ञान (Palaeontology & Stratigraphy)	50	50	150
	II	भूसंसाधन एवं व्यावहारिक भूविज्ञान (Earth Resources & Applied Geology)	50		

### -: Note :-

प्रत्येक वर्ष के विद्यार्थियों हेतु पाठ्यक्रम में उल्लेखित भूवैज्ञानिक क्षेत्रीय अध्ययन अनिवार्य होगा।

  
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कक्षा / Class- B.Sc-II  
Paper –I  
शैलिकी  
(PETROLOGY)

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- इकाई—01
- (i) मैग्मा; परिभाषा, उत्पत्ति एवं संगठन
  - (ii) बॉवेन की अभिक्रिया श्रेणी, मैग्मीय विभेदन एवं स्वांगीकरण
  - (iii) तंत्र, प्रावस्था एवं घटक, उष्मागतिकी के सिद्धांत, एकघटकीय (सिलिका) द्विघटकीय ऐल्बर्ट—एनॉर्थाइट तथा डायोप्साइड—एनॉर्थाइट एवं त्रिघटकीय सिलिकेट सिस्टम डायोप्साइड—एल्बर्ट—एनॉर्थाइट क्रिस्टलीकरण, प्रावस्था संतुलन
  - (iv) आग्नेय शैलों का गठन, संरचनायें एवं वर्गीकरण
  - (v) आग्नेय शैलों का रूप
- इकाई—02
- (i) दिक्काल में शैल—संलग्नता, शैल—ग्रंथियों की अवधारणा
  - (ii) अम्लीय आग्नेय शैलों का शिला विवरणात्मक अध्ययन
  - (iii) क्षारीय आग्नेय शैलों का शिला—विवरणात्मक अध्ययन
  - (iv) अल्पसिलिक आग्नेय शैलों का शिलाविवरणात्मक अध्ययन
  - (v) अत्यल्पसिलिक आग्नेय शैलों का शिलाविवरणात्मक अध्ययन
- इकाई—03
- (i) अवसाद की उत्पत्ति, परिवहन एवं निक्षेपण
  - (ii) अवसाद निक्षेपण की वायूढ़, जलोढ़, तटीय, एवं गंभीर समुद्री वातावरण की गतिकी
  - (iii) अवसादी संलक्षणाओं की अवधारणा
  - (iv) डायजिनेसिस की अवधारणा
  - (v) अवसादी शैलों का गठन एवं संरचनायें
- इकाई—04
- (i) अवसादी शैलों का वर्गीकरण
  - (ii) अवसादी शैलों की शैलिकी : रूडेशियस, एरेनेशियस, केल्केरियस अवसादी शैल
  - (iii) कायान्तरण: परिभाषा एवं कारक, संलक्षणा, कायान्तरण श्रेणी
  - (iv) कायान्तरित शैलों का गठन, संरचना एवं वर्गीकरण
  - (v) कायान्तरण प्रक्रियाओं की साम्य एवं असाम्य अभिक्रियायें

  
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- इकाई—05
- (i) पैराजिनेटिक—आरेख: प्रक्षेपीय विश्लेषण, ए.सी.एफ. एवं ए.के.एफ. आरेख
  - (ii) मृण्मय अवसादों का प्रगामी कायान्तरण
  - (iii) अशुद्ध चूना पत्थरों का प्रगामी—उष्मागतिक कायान्तरण
  - (iv) अल्प सिलिक शैलों का प्रगामी उष्मागतिक कायान्तरण
  - (v) भारत का शैलिकीय—प्रादेशिक विभाजन

#### **प्रायोगिक कार्य—**

- (1) आग्नेय, अवसादी एवं कायान्तरित शैलों के विभिन्न रूपों एवं संरचनाओं को रेखाचित्र की सहायता से प्रदर्शित करना।
- (2) विभिन्न आग्नेय शैलों का स्थूलदर्शी अध्ययन एवं सूक्ष्मदर्शी अध्ययन
- (3) विभिन्न अवसादी शैलों का स्थूलदर्शी एवं सूक्ष्मदर्शी अध्ययन
- (4) विभिन्न कायान्तरित शैलों का स्थूलदर्शी एवं सूक्ष्मदर्शी अध्ययन
- (5) भारत के शैलिकीय प्रदेशों का मानचित्र में प्रदर्शन
- (6) नार्म कैलकुलेशन

#### **Suggested Readings:-**

- |  |   |                                       |
|--|---|---------------------------------------|
| (1) शैलिकी के सिद्धान्त                                | — | डॉ. अंबिका प्रसाद अग्रवाल             |
| (2) शैलिकी के सिद्धान्त                                | — | ए. जी. झिंगरन                         |
| (3) Principles of petrology                            | - | G.W. Tyrell                           |
| (4) Petrology  | - | H.William, F.J. Turner & E.M. Gilbert |
| (5) Petrology of igneous & metamorphic rocks of India- |   | S.C. Chattarjee                       |
| (6) A text book of sedimentary petrology               | - | Verma & Prasad                        |
| (7) Metamorphism & Metamorphic rocks of India-         |   | S. Ray                                |
| (8) Sedimentary rocks                                  | - | F.J. Pettijohn                        |
| (9) Introduction of sedimentology                      | - | S.Sengupta                            |
| (10) Sedimentary Environment                           | - | H.G. Readings                         |

  
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<b>Unit:1</b>	<ul style="list-style-type: none"> <li>(i) Magma, definition, origin &amp; composition</li> <li>(ii) Bowen's reaction series, magmatic differentiation &amp; assimilation</li> <li>(iii) System, phases &amp; component, principles of thermodynamics, Crystallisation and phase equilibrium of unicomponent magma:(Silica), Bi-component magma: Albite-Anorthite and Diopside-Anorthite Tri-component magma: Diopside-Albite-Anorthite</li> <li>(iv) Textures, structures &amp; classification of igneous rocks</li> <li>(v) Forms of igneous rocks</li> </ul>
<b>Unit:2</b>	<ul style="list-style-type: none"> <li>(i) Rock association in Time &amp; Space, concepts of rock kindreds</li> <li>(ii) Petrographic studies of Acid igneous rocks.</li> <li>(iii) Petrographic studies of Alkaline igneous rocks</li> <li>(iv) Petrographic studies of Basic igneous rock</li> <li>(v) Petrographic studies of Ultrabasic igneous rocks.</li> </ul>
<b>Unit:3</b>	<ul style="list-style-type: none"> <li>(i) Origin, transportation &amp; deposition of sediments</li> <li>(ii) Dynamics of sedimentary depositional environment; Aeolian, fluvial, coastal and abyssal environment.</li> <li>(iii) Concept of sedimentary facies</li> <li>(iv) Concept of diagenesis</li> <li>(v) Textures &amp; structures of sedimentary rocks.</li> </ul>
<b>Unit:4</b>	<ul style="list-style-type: none"> <li>(i) Classification of sedimentary rocks.</li> <li>(ii) Petrography of sedimentary rock; rudaceous, arenaceous, calcareous sedimentary rocks.</li> <li>(iii) Metamorphism; definition, agents, facies &amp; grade</li> <li>(iv) Textures, structures &amp; classification of metamorphic rocks.</li> <li>(v) Equilibrium &amp; non-equilibrium reactions in metamorphism.</li> </ul>
<b>Unit:5</b>	<ul style="list-style-type: none"> <li>(i) Paragenetic diagrams; projective analysis A.C.F &amp; A.K.F. diagrams</li> <li>(ii) Progressive metamorphism of Argillaceous rocks.</li> <li>(iii) Progressive dynamo-thermal metamorphism of impure limestone.</li> <li>(iv) Progressive dynamo-thermal metamorphism of basic igneous rocks.</li> <li>(v) Petrographic provinces of India.</li> </ul>

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**Practical:**

- (1) Diagrammatic representation of various forms & structures of igneous, sedimentary & Metamorphic rocks
- (2) Megascopic studies of various sedimentary, metamorphic & igneous rocks.
- (3) Microscopic studies of various sedimentary, metamorphic & igneous rocks.
- (4) Norm calculation
- (5) Diagrammatic representation of petrographic provinces of India in outline map of India.

**Suggested Readings:-**

- |  |   |  |
|--|---|--|
| (1) शैलिकी के सिद्धान्त                                | — | डॉ. अंबिका प्रसाद अग्रवाल              |
| (2) शैलिकी के सिद्धान्त                                | — | ए. जी. झिंगरन                          |
| (3) Principles of petrology                            | - | G.W. Tyrell                            |
| (4) Petrology  | - | H. William, F.J. Turner & E.M. Gilbert |
| (5) Petrology of igneous & metamorphic rocks of India- |   | S.C. Chattarjee                        |
| (6) A text book of sedimentary petrology               | - | Verma & Prasad                         |
| (7) Metamorphism & Metamorphic rocks of India-         |   | S.Ray                                  |
| (8) Sedimentary rocks                                  | - | F.J. Pettijohn                         |
| (9) Introduction of sedimentology                      | - | S.Sengupta                             |
| (10) Sedimentary environment                           | - | H.G. Readings                          |

  
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कक्षा / Class- B.Sc-II  
Paper –II  
संरचनात्मक भू-विज्ञान  
(STRUCTURAL GEOLOGY)

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- इकाई—01 (1) संरचनात्मक भूविज्ञान की परिभाषा एवं अध्ययन क्षेत्र।  
(2) शैल दृष्यांशों का अध्ययन। दृष्यांशों पर नति तथा ढाल के प्रभाव।  
(3) संस्तरण की पहचान। नति एवं नतिलम्ब की माप।  
(4) क्लाइनोमीटर एवं ब्रन्टन कम्पास।  
(5) संस्तरों के शीर्ष तथा तल की पहचान।  
(6) शैलविरूपण की अवधारणा। प्रतिबल तथा विकृति दीर्घवृत्तज की अवधारणा।
- इकाई—02 (1) वलन की आकारिकी।  
(2) वलन की ज्यामितिक एवं जननिक वर्गीकरण।  
(3) स्थलीय तथा भूवैज्ञानिक मानचित्र में वलन की पहचान।  
(4) दृष्यांशों पर वलन के प्रभाव।  
(5) वलन क्रियाविधि की प्राथमिक अवधारणा।
- इकाई—03 (1) भ्रंश आकारिकी। सर्पण और सेपरेशन।  
(2) भ्रंश का ज्यामितिक एवं जननिक वर्गीकरण।  
(3) स्थलक्षेत्र तथा भूवैज्ञानिक मानचित्र में भ्रंश की पहचान।  
(4) दृष्यांशों पर भ्रंश के प्रभाव।  
(5) भ्रंशन क्रियाविधि की प्राथमिक अवधारणा।
- इकाई—04 (1) संधि; आकारिकी, संधि का ज्यामितिक एवं जननिक वर्गीकरण।  
(2) पत्रण की परिभाषिक शब्दावली, प्रकार, उत्पत्ति एवं विशाल संरचनाओं से संबंध।  
(3) रेखण की परिभाषिक शब्दावली, प्रकार, उत्पत्ति एवं विशाल संरचनाओं से संबंध।  
(4) लवण गुम्बद,  
(5) प्लूटान; विवर्तनिकी एवं अभिस्थापन
- इकाई—05 (1) विषमविन्यास के प्रकार एवं पहचान।  
(2) पुरान्तशायी एवं नवान्तशायी, अतिव्यापन तथा अपव्यापन।  
(3) विवर्तनिकी की अवधारणा।  
(4) प्रायद्वीपीय, सिंधु गंगा के मैदान तथा प्रायद्वीपेत्तर भारत का विवर्तनिकी विन्यास।  
(5) त्रिविमीय प्रक्षेपण का संरचनात्मक भूविज्ञान में अनुप्रयोग।

  
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## प्रायोगिक कार्य—

- (1) प्राकृतिक संरचनात्मक प्रादर्शों का अध्ययन ।
- (2) विभिन्न संरचनाओं का प्रादर्शों के माध्यम से अध्ययन ।
- (3) मानचित्र में दृश्यांश को पूरा करना ।
- (4) सरल से जटिल संरचनाओं को प्रदर्शित करने वाले मानचित्रों से भूवैज्ञानिक काट बनाना एवं भूवैज्ञानिक इतिहास की विवेचना करना ।
- (5) संरचनात्मक भूविज्ञान में स्टिरियोग्राफिक प्रोजेक्शन का अनुप्रयोग ।
- (6) सात दिवसीय भूवैज्ञानिक क्षेत्रीय अध्ययन ।

  
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Class- B.Sc - II  
Paper –II  
(STRUCTURAL GEOLOGY)

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- Unit:1**
- (i) Definition and scope of Structural Geology. Study of outcrops. Effects of dip and slope on outcrops.
  - (ii) Identification of bedding. Dip and strike measurement.
  - (iii) Clinometer and Brunton compass.
  - (iv) Recognition of top and bottom of beds.
  - (v) Concept of rock deformation. Concept of stress and strain ellipsoids.
- Unit:2**
- (i) Fold morphology.
  - (ii) Geometric and genetic classification of folds.
  - (iii) Recognition of folds in the field and on geological maps.
  - (iv) Effect of folds on outcrops.
  - (v) Elementary idea of mechanics of folding.
- Unit:3**
- (i) Fault morphology. Slip and separation.
  - (ii) Geometric and genetic classification of faults.
  - (iii) Recognition of faults in the field and on geological maps.
  - (iv) Effect of faults on outcrops.
  - (vi) Elementary idea of mechanics of faulting.
- Unit:4**
- (i) Joint morphology; geometric and genetic classification of joints.
  - (ii) Foliation; terminology, kinds, origin and relation to major structures.
  - (iii) Lineation: terminology, kinds, origin and relation to major structures.
  - (iv) Salt domes.
  - (vii) Plutons; tectonics & emplacement.
- Unit:5**
- (i) Types and recognition of Unconformity.
  - (ii) Outlier and inlier. Overlap & offlap.
  - (iii) Concept of tectonics.
  - (iv) Tectonic framework of Peninsula, Indo-Gangetic Plains and Extra-Peninsular India.
  - (v) Stereographic projection & its use in Structural Geology.

  
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**Practical-**

- (1) Study of Natural Structures in hand specimens.
- (2) Study of structures with the help of models.
- (3) Completion of outcrops.
- (4) Preparation of geological section from simple to complex geological maps and its interpretation.
- (5) Application of stereographic projection in structural geology.
- (6) Geological excursion for seven days.

**Books recommended:**

- (1) संरचनात्मक भूविज्ञान — डॉ.डी.के. श्रीवास्तव
- (2) भूवैज्ञानिक संरचनाएँ — डॉ. भरत सिंह राठौर
- (3) प्रायोगिक भूविज्ञान (भाग-2) — आर.पी. मांजरेकर
- (4) Structural Geology : M.P. Billings.
- (5) Theory of Structural Geology : Gokhale, N.W.
- (6) Exercises on Geological maps and dip-Strike: Gokhale, N.W.
- (7) Outlines of structural Geology: E.S. Hills.
- (8) Structural Geology : Hobbs, Means and Williams.
- (9) Geological maps : Chiplonkar and Pawar.

  
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## **B.A./B.Sc. – Second Year**

**Session : 2019-20**

Name of the Subject :- Anthropology  
Paper :- First  
Name of the Paper :- ARCHAEOLOGICAL ANTHROPOLOGY

Total Marks : 50

Pass Marks : 17

### **Syllabus**

- UNIT – I Meaning and scope of Archaeological Anthropology, branches of Archaeology: Classical Archaeology, Historical Archaeology, Prehistoric Archaeology and Protohistoric Archaeology. Anthropology as Archaeology. Differences between the Old world and new world Archaeological Traditions. Absolute and Relative Dating.
- UNIT – II Geological time scale. The Great Ice Age  
Stratigraphy and other evidences of Ice Age: River terraces. Moraines etc. Pluvial and interpluvials  
Stone Age tools: Types and Technology.
- UNIT – III Age of Paleolithic savagery:  
European lower Paleolithic period: Stone tools and cultures  
Indian lower Paleolithic period: Sohan Culture & Madrasian Culture.  
European Middle Paleolithic Period: Tools & culture; Flake tool complex in India  
European Upper Paleolithic period; Tools and Culture, main characteristics of the European Paleolithic Home and Cave art and its significance.
- UNIT – IV Mesolithic complex in North Europe. Mesolithic complex in Western Europe, Mesolithic Culture in India. Chief feature of Neolithic revolution. Neolithic complex in India.
- UNIT – V Metal Age: Copper, Bronze and Iron Age  
Urban revolution: General Features  
Indus valley civilization: Main Features, Town Planning, Economic activities, origin and decay

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20/06/19



## **B.A. /B.Sc. – Second Year**

**Session: 2019-20**

Name of the Subject :- Anthropology  
Paper :- Second  
Name of the Paper :- TRIBAL CULTURE OF INDIA  
Total Marks : 50

Pass Marks : 17

### **Syllabus**

- UNIT-I** Define tribe and scheduled tribe. Geographical distribution of Indian tribes and their racial and linguistic classification. Contribution of Anthropology in the study of Indian tribes.  
Sacred complex, Universalisation and parochialisation, Sanskritisation, westernization, dominant caste.  
Tribes and caste, Difference between S.C. and S.T.  
Particularly Vulnerable Tribes Group (PVTG) of Chhattisgarh (Kamar, Birhor, Hill Korwa, Abujmariya, Baiga)
- UNIT-II** Primitive economy:-  
Stages of tribal economy: Hunting, food gathering, fishing, shifting and settled agriculture.  
Concept of Property and ownership in tribal societies  
Problems of tribal people: land alienation, bonded labour, indebtedness, shifting cultivation, irrigation, Unemployment, agricultural labour; Forest and Tribals  
New economic anthropology: Exchange- Gifts, barter, trade, ceremonial exchange and market economy
- UNIT-III** The problems of culture contact: Problems due to urbanization and industrialization, Regionalism  
Tribal religion: origin & function, animism, totemism.  
Concept and practices of Magic and witchcraft, shamanism, head hunting.
- UNIT-IV** Political organisation of Indian tribes: Distinction between state and stateless society, law in primitive society  
Social organization of Indian Tribes: Matriarchal and patriarchal family,. Lineage and clan, Ways of acquiring mates in tribal societies.  
Youth dormitories: Type, organisation and functions.
- UNIT-V** Tribal development: History of tribal development, the constitutional safeguards for the scheduled tribes.  
Tribal problem: isolation, migration, acculturation, detribalization.  
Policies, plans and programmes of tribal development and their implementation. Tribal revolts in India.  
Contributions of anthropology to tribal development.  
Response of the tribal people for development programs of government and NGO

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Recommended Readings:

1. Chaudhary, Bhudadeb (Ed.). Tribal Development in India.
2. Elwin, V.A. Philosophy for NEFA.
3. Haimendorf. The Tribes of India: Struggle for survival.
4. Shara B.D. Basic Issues in tribal Development.

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## **B.A./B.Sc. – Second Year**

**Session : 2019-20**

Name of the Subject :- Anthropology  
Paper :- Practical  
Name of the Paper :- MATERIAL CULTURE AND RESEARCH TOOLS

Total Marks : 50


Pass Marks : 17

### **OBJECTIVES :**

The objective of this practical course is to introduce the student with the primitive material culture and technology used by primitive man and the student will be introduced with various techniques commonly used by social Anthropology.

### **MATERIAL CULTURE :**

- Part – I. Identification and technological descriptions of the following.
1. Implements for food gathering, hunting, fishing and agriculture
  2. Fire making implements
  3. Types of habitations
  4. Land and water transport
- Part-II Sketching, identification and the description of Paleolithic, Mesolithic and Neolithic tools
- ( It is essential that students should draw at least five tools of each age )
- Part- III Construction of schedule, Geneology and Questionnaire
- Each student should collect information through above tools from 10 Respondents.
- The Student will be required to maintain practical records of all work done in the practical class.

  
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**HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**  
**Syllabus for B.A. / B.Sc. Course, 2019-20**  
**Subject: Statistics**

Each year of B.A. /B.Sc. I, II, III shall have two theories and one practical course. All the Theory as well as Practical Examinations will be of 3 hours duration. In each practical examination 10% marks shall be fixed for viva –voce and 20% marks for practical record.

**Scheme of Examination**

	<b>Title of the paper</b>	<b>MAX. Marks</b>
<b>B.A./B.Sc. I</b>	<b>Paper-I</b> (Code No. 0803): <b>Probability I</b>	50
	<b>Paper-II</b> (Code No. 0804): <b>Descriptive Statistics I</b>	50
	<b>Paper III: Practical-</b> Based on Theory Papers I & II	50
	<b>Total</b>	<b>150</b>
<b>B.A./B.Sc. II</b>	<b>Paper-I</b> (Code No. 0853): <b>Statistical Methods</b>	50
	<b>Paper-II</b> (Code No. 0854): <b>Sampling Theory and Design of Experiments</b>	50
	<b>Paper III: Practical-</b> Based on Theory Papers I & II	50
	<b>Total</b>	<b>150</b>
<b>B.A./B.Sc. III</b>	<b>Paper I</b> (Code No. 0907): <b>Applied Statistics</b>	50
	<b>Paper II</b> ( Code No. 0908): <b>Statistical Quality Control and Computational Techniques</b>	50
	<b>Paper III: Practical-</b> Based on Theory Papers I & II	50
	<b>Total</b>	<b>150</b>

**B.A./B.Sc. –II**  
**Subject: Statistics**  
**Paper-I( Paper Code-0853)**  
**Statistical Methods**

**Unit I**

Sampling from a distribution: Definition of a random sample, simulating random sample from standard distributions (uniform, Normal, Exponential), concept of derived distributions of a functions of random variables, concept of a statistics and its sampling distribution. Point estimate of a parameter. Properties of a good estimator, Concept of bias and standard error of an estimate .Standard errors of sample mean, sample proportion. Sampling distribution of sum of Binomial, Poisson and mean of Normal distributions. Independence of sample mean and variance in random sampling from a Normal distribution (without derivation).

**Unit II**

Statistical tests and interval estimation: Null and alternative hypothesis. Types of errors, level of significance, p values, one and two tailed tests, Procedure for testing of hypothesis. Statement of chi-squares, Student's t and F statistics. Testing for the single mean and variance of a univariate normal distribution, testing the equality of two means and testing for the equality of two variances of two univariate normal distributions. Related confidence intervals. Testing for the significance of sample correlation in sampling from bi-variate normal distribution and for equality of means and equality of variances in sampling from bivariate normal populations.

**Unit III**

Large sample tests: use of central limit theorem for testing and interval estimation of a single mean and a single proportion and difference of two means and two proportions, Fisher's Z transformation and its uses. Pearson's chi-square test for goodness of fit and for homogeneity for standard distributions. Contingency table and test of independence in a contingency table.

**Unit IV**

Nonparametric tests: Definition of order statistics and their distributions, Non-parametric tests, Sign test for univariate and bivariate distributions, Wilcoxon test, Mann-Whitney test, Run test, median test and Spearman's rank correlation test.

**Unit V**

Four short notes, one from each unit will be asked. Students have to answer any two.

**REFERENCES**

1. Frund J.E. (2001) Mathematical Statistics, Prentice Hall of India.
2. Goon A.M., Gupta M.K., Das Gupta.B. (1991): Fundamentals of Statistics, Vol.I, World Press, Culcutta.
3. Gupta and Kapoor: Fundamentals of Mathematical Statistics S.Chand & Sons.
4. Hodges, J.L. and Lehman E.L. (1964): Basic Concepts of Probability and Statistics, Holden Day.
5. Mood A.M, Graybill F.A and Boes D.C. (1974): Introduction to the Theory of Statistics, McGraw Hill.

## **ADDITIONAL REFERENCES**

- 1..Bhat B.R., Shrivienkatramana T and Rao Madhava K.S. (1997): A Beginner's Text, Vol. II, New age International (P) Ltd.
2. Rohatgi, V.K. (1967): An Introduction to Probability Theory and Mathematical Statistics, John Wiley & Sons.
3. Snedecor, G.W. and Cochran W.G. (1967): Statistical Methods. Iowa State University Press.

**Paper-II** (Paper Code-0854)  
**Sampling Theory and Design of Experiments**

**Unit I**

Concepts of population and sample, need for sampling, Census and sample survey, Basic concepts in sampling, organizational aspects of survey sampling, sample selection and sample size.  
Some basic sampling methods – simple random sampling (SRS) with and without replacement.

**Unit II**

Stratified random sampling, Systematic sampling, Allocation problems, ratio and regression methods of estimation under SRS.

Non-sampling errors, acquaintance of working (questionnaires, sampling design, methods followed in field investigation, principal findings, etc) of NSSO and other agencies undertaking sample surveys.

**Unit III**

Analysis of variance for one way and two-way classifications. Need for design of experiments, fundamental principal of design, basic designs- CRD, RBD, LSD and their analysis.

**Unit IV**

Missing plot technique. Analysis of co-variance. Factorial experiments :  $2^2$ ,  $2^3$  factorial experiments, illustrations, main effects and interactions, confounding and illustrations. Yates method of finding treatment totals.

**Unit V**

Four short notes, one from each unit will be asked. Students have to answer any two.

**REFERENCES**

1. Cochran W.G. (1977): Sampling Techniques, John Wiley and Sons.
2. Des Raj (2000): Sample Survey Theory, Narosa Publishing House.
3. Murthy M.N.(1967): Sampling Theory and Methods, Statistical Publishing Society, Calcutta.
4. Singh, D. and Chaudhary, F.S. (1986): Theory and analysis of Sample Survey Designs. New Age International Publisher.
5. Sukhatme P.V., Sukhatme B.V., Sukhatme S. and Ashok C.(1984), : Sample Survey Methods and Its Applications, Indian Society of Agricultural Statistics, New Delhi.
6. Das M.N. and Giri (1986) : Design and analysis of experiments, Springer Verlag.
7. Goon A.M., Gupta M.K., Das Gupta B. (1986): Fundamentals of Statistics, Vol.II, World Press, Calcutta.
8. Joshi, D.D.(1987): Linear Estimation and Design of Experiments, Wiley Eastern.
9. Kempthorne O.(1965) : The Design and Analysis of Experiments, Wiley Eastern.

### **Paper III:**

#### **Practical : Practicals Based on Paper I & II**

1. drawing random samples from standard univariate discrete and continuous distributions such as Binomial, Poission, Normal, Cauichy and Exponential.
2. Tests of significance based on Student's t, Chi-square, F. Test of significance of sample correlation coefficient. Use of Z Transformation. Testing of equality of means and equality of variance in sampling from bivariate normal.
3. Large sample tests for means and proportions, tests of goodness of fit and independence of attributes in contingency tables.
4. Nonparametric tests: Sign, Run, Median, Wilcoxon, Mann-Whitney tests.
5. Selection of samples and determination of sample size. Simple random sampling, Statified and systematic sampling. Allocation problem in stratified sampling. Ratio and regression methods of estimation.
6. Analysis of variance for one way and two way classifications. Analysis of CRD, RBD and LSD. Analysis of  $2^2$  and  $2^3$  experiments.



**DEFENCE - STUDIES**  
**PAPER - I**  
**WESTERN MILITARY HISTORY**

**(Paper Code - 0867)**

**Note :** The aim of this paper is to give a historical, political & social back ground of the state engaged in the conflicts under study and the factors influencing the development of different forms of warfare and weapons system.

**Note :** Question will be set from each unit there will be only Internal choice.

- UNIT-I**
1. Sun Tzu - Founder of Military Theory and philosophy.
  2. Clausewitz - War and its relationship with politics.
  3. Machiavelli - Renaissance of Art of war.
  4. Jomini - Concept of mass armies.
- UNIT-II**
1. Churchill.
  2. Mahatma Gandhi.
  3. Kautilya.
  4. A. Hitler.
- UNIT-III**
1. Mao Tse Tung.
  2. Che Guevara.
  3. Economic and Psychological war.
  4. Collective Security.
- UNIT-IV**
1. Indo-China War -1962 Causes of war, political & military lesson.
  2. Indo - Pak War -1965 Causes of war, political & military lesson.
  3. Indo - Pak War - 1971 Causes of war, political & military lesson.
  4. Kargil Conflict 1999.
- UNIT-V**
1. Internal & External threats of National Security.
  2. Insurgency and Counter-Insurgency.
  3. Terrorism-Problem and Solution.
  4. Naxalism - Problem and solution.

**REFERENCE BOOKS:**

1. Howard M. : Theory and Practice of war
2. ---, --- : Clausewitz
3. Mao Tse Tung : Guerilla warfare
4. Palit, D.k. : The lightning War Tadi Yudh
5. Mankekar : War of 1971
6. आर.सी. जोहरी : पाश्चात्य सैन्य विचारक
7. शर्मा च निगम : सैन्य विचारक ।

## **PRACTICAL**

There shall be a practical examination of 3.5 hours duration carrying 50 Marks. The division of marks shall be as follow:

- |                                    |            |
|------------------------------------|------------|
| (a) Exercise based on Map-reading: | 15marks    |
| (b) T.W.E.S.T.                     | : 15marks  |
| (c) Sessional work                 | : 10marks  |
| (d) Viva-Voce                      | : 10markss |

### **PART - A**

Map-reading:

1. Scales - Definition, method of expressing, construction of simple, time, diagonal and comparative.
2. Relief and its representation.
3. Slopes and Gradient.
4. Visibility and inter-visibility by Gradient, proportionate and section method.
5. Re-section and inter-section.
6. Grid system-Map reference, Index to map. Four figure and Six figure.

### **PART - B**

7. Organization and equipment of infantry Platoon and Section.
8. Section Formation.
9. Indication of Target by various methods.
10. Fire control order.
11. Patrols.
12. Battle Procedures (ROFT).
13. Verbal Order.
14. Message-Writing.

### **BOOKS RECOMMENDED:**

1. Manual of Map Reading: Landon Her
2. युद्ध स्थल कला : चौ. नरेन्द्र सिंह
3. एन.सी.सी. परिचय : विष्णु कांत शर्मा ।

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## INDUSTRIAL CHEMISTRY

### PAPER – I

(Paper Code - 0871)

M.M. 34

**UNIT-I** Material Science : Mechanical Properties of materials and change with respect to temperature. **02L**

**Material of constructions used in Industry :**

**Metals and Alloys :** Important metals & alloys; iron, copper, aluminium lead, nikel, titanium and their alloys- Mechanical and chemical properties and their applications. **06L**

**Cement :** Types of cement, composition, manufacturing process, setting of cement. **04L**

**Ceramics :** Introduction, Types, Manufacturing process, Applications. Refractories. **04L**

**UNIT-II** Polymeric Mateials : Industrial polymer and comoposite materials- Their constitution, Chemical and physical properties, Industrial applications. **06L**

**UNIT-III Glass :** Types, composition, manufacture, physical and chemical properties, Applications. **04L**

**Corrosion :** Various types of corrosion relevant to chemical Industry-Machanism, Preventive methods. **04L**

**UNIT-IV** Pollution : Air, Oxygen, nitrogen cycle, water, Biosphere, flora and fauna, Energy, soil. **05L**

Pollutants and their statutory limits, pollution evaluation methods. **04L**

**UNIT-V** Air pollution-various pollutants. water pollution-organic/inorganic pollutants, Noise pollution, sewage analysis, pesticide pollution, Radiation pollution, green house effect, future. **10L**

### Books Recommended :

1. Pollution control in chemical & Allied Industries, S.P. Mahajan.
2. Poolution Control in Industries, A Sories of Books by Jones, H.P.
3. Air Pollution - Vol.1 to 4, Editor, STERN, A.C.; Academic Press.
4. Environmental Engineering, G.N. Pandey, Tata McGraw Hill.
5. Homd Book of Air Pollution, A. Parker, Tata McGraw Hill.
6. Science of Ceromic chemical Processing, Hench, L.L.
7. Science of Ceramics, Stewarts, G.H.
8. Chemistry of Cement.
9. Properties of Glass, Morcy, G.W.
10. Chemistry of Glasses, Paul, A.
11. Corrosion, causes & Prevention, Spellur, F.N.



**PAPER - II**  
**(Paper Code - 0872)**

**M.M. 33**

**UNIT-I** Unit processes in organic chemicals manufacture -

**Nitration** : Introduction - Nitrating agents, Kinetics and mechanism of nitration processes such as nitration of :

- i Paraffinic hydrocarbons
- ii. Benzene to nitrobenzene and m-dinitrobenzene
- iii. Chlorobenzene to o and p nitrochloro benzenes.
- iv. Acetanilide to p-nitroacetanilide
- v. Toluene

Continuous vs batch nitration.

**12L**

**UNIT-II Helogenation:** Introduction-Kinetics of helogenation reactions reagents for elogenation, Helogenation of aromatics-side chain and nuclear helogenations, commercial manufacture of chlorobenzenes, chloral, monochloroacetic acid and chloromethanes, dichloro fluormethane.

**09L**

**UNIT-III Sulphonation** : Introduction-sulphonating agents, chemical and physical factors in sulphonation, Kinetics and mechanism of sulphonation reaction, commercial sulfonation of benzene, naphthalene, alkyl benzene, Batch vs continuous sultphonation.

**09L**

**UNIT-IV Effluent Treatment and waste Management** : Principles and equipments for aerobic, anaerobic treatment, adsorption, filtration, sedimentation. **09L**

**UNIT-V** Bag fillters, electrostatic precipitator, mist eliminators, wet scrubbers, absorbers, solid waste management, industrial safety. **09L**

**Books Recommended :**

1. Unit process in Organic synthesis P.M. Groggins, McGraw Hill.
2. Effluent Treatment in process Industries - Inst. of Cham. Engg.
3. Effluent Treatment and waste Disposal - Inst. of Chem. Engg.
4. Effluent Treatment and Disposal - Inst. of Chem. Engg.

The image shows five handwritten signatures and dates, likely from examiners. From left to right: 1. Signature 'A. B. Srinivas' with date '24.7.2017'. 2. Signature 'A. Srinivas' with date '24.7.17'. 3. Signature 'B. Srinivas' with date '24.7.17'. 4. Signature 'D. Srinivas' with date '24/7/17'. 5. Signature 'S. Srinivas' with date '24.7.17' and a checkmark.

**PAPER - III**  
**(Paper Code - 0873)**

**M.M. 33**

**UNIT-I Oxidation :** Introduction-Types of oxidation reactions, oxidizing agents, kinetics and mechanism of oxidation of organic compounds liquid phase oxidation, vapor phase oxidation, commercial manufacture of benzoic acid, maleic anhydride, phthalic anhydride, acrolein, acetaldehyde, acetic acid. **07L**

**UNIT-II Hydrogenation :** Introduction-Kinetics and thermo-dynamics of hydrogenation reactions, catalysts for hydrogenation reactions, hydrogenation of vegetable oil. manufacture of methanol from carbon monoxide and hydrogen, hydrogenation of acids and esters to alcohols, catalytic reforming. **07L**  
Alkylation: Introduction; Types of alkylation, Alkylating agents, Thermodynamics and mechanism of alkylation reactions, manufacture of - alkyl benzenes (for detergent manufacture), ethyl benzene, phenyl ethyl alcohol, N-alkyl anilines (mono and di- methyl anilines) **03L**

**UNIT-III Esterification :** Introduction; Hydrodynamics and kinetics of esterification reactions, Esterification by organic acids, by addition of unsaturated compounds, esterification of carboxy acid derivatives, commercial manufacture of ethyl acetate, dioctyl phthalate, vinyl acetate, cellulose acetate. **04L**

**Amination : (A) By reduction :** Introduction, Methods of reduction-metal and acid, catalytic, sulfide, electrolytic, metal and alkali sulfites, metal hydrides, sodium metal, concentrated caustic oxidation, reduction, commercial manufacture of aniline, m-nitroaniline, p-amino phenol.

**(B) By aminolysis :** Introduction, aminating agents, factors affecting. **09L**

**Hydrolysis :** Introduction; hydrolysing agents, kinetics, thermodynamics and mechanism of hydrolysis. **02L**

**UNIT-IV Process Instrumentation :** concept of measurement and accuracy Principle, construction and working of following measuring instruments.

Temperature : Glass thermometers, bimetallic thermometer pressure spring thermometer, vapour filled thermometers resistance thermometers. radiation pyrometers.

Pressure : Manometers, barometers, bourdon pressure gauge ; bellows type, diaphragm type pressure gauges, macleod gauges, pirani gauges, etc. **12L**

**UNIT-V Liquid level :** Direct-indirect liquid level measurement, Float type liquid level gauge, ultrasonic level gauges; bubbler system, density measurement, viscosity measurement. **07L**

The image shows six handwritten signatures, each followed by the date '24.7.17'. The signatures are written in blue ink on a white background. The first signature is 'Abhinav', the second is 'Anshu', the third is 'Anshu', the fourth is 'Anshu', the fifth is 'Anshu', and the sixth is 'Anshu'.

**Books Recommended :**

1. Unit process in organic synthesis, P.M. Groggins, McGraw Hill.
2. Industrial Instrumentation, Bekmen, D.P., John Wiley.
3. Applied Instrumentation in process Industries, Vol. I, II & III, Andrews, W.G., Gulf Publication.
4. Instrumentation and Control for the process Industries, Borer, S. Elsevier Applied Science Publishers.
5. Chemical Engineer's Hand book, Perry, J.H. and Green, D. McGraw Hill.

**Time : 4 Hours****PRACTICALS****M.M. 50**

**Unit Process :** One to two examples of each of the following unit processes.

Nitration, sulphonation, Friedel-Crafts reaction, esterification, hydrolysis, oxidation, Halogenation, chloro-sulphonation, reduction, polymerization, reactions of diazonium salts. **Instrumental methods of analysis :** Use of colourimeter pH meter, potentiometer, conductometer, refractometer, polarimeter

**Material testing:** Testing of alloys identification of plastics/rubber estimation of yield point, Young's modulus, flaredness; Optical, thermal mechanical and electrical properties. **Process Instrumentation :** Transducers of different types. use of Transducer for measuring flow control. Determination of flash point and ignition points of liquids.

**Water analysis :** Solid contents, Hardness, COD and other tests as per industrial specifications.

**Flow measuring devices :** Floats Monographs of representative raw materials such as sulphuric acid, toluene, sodium carbonate, sodium hydroxide, carbon tetrachloride benzoic acid (5-6 compounds). Limit tests for heavy metals Pb, AS, Hg, Fe and ash content.

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The image shows six handwritten signatures, each followed by the date '24.7.17'. The signatures are written in blue ink on a white background. The first signature is 'Abhinav', the second is 'Anshu', the third is 'Bhaskar', the fourth is 'Divyanshu', the fifth is 'Gopal', and the sixth is 'Kumar'.

**VOCATIONAL COURSE IN ELECTRONIC  
EQUIPMENT MAINTENANCE  
SCHEME OF EXAMINATION**

		<b>Max. Marks</b>	<b>Min. Pass Marks</b>
Paper - I	Operational Principles of Audio	50	17
Paper - II	Microprocessor Based Instrumentation and Control	50	17
	Practicals	50	17

**1. SUBJECT OBJECTIVE :**

The objective of this syllabus is to familiarize students with the fundamentals of electronics and prepares him/her to keep in track with fast change in this field so that he/she is prepared to takenup advance studies or go for self employment. It is proposed to give the students an idea of basics of all the developments in the field of electronics. Efforts are directed to impart some knowledge of computer hardware and software too, which fall in the realu of electronics so that the students become aware of fast changing scene of information superhigh wey also.

**2. JOB POTENTIALS :**

The students in (by) taking up this course may find adequta job- opportunities in industries or manufacturing firms. They may opt for setting up their own small scale industries of electronics, thus enhancing self employment.

3. **Contents :** As per attached syallbus.

4. Subject scheme.
5. On the job training will be imparted in Summer days.
6. As detailed out in the prospectus.
7. As per the draft given in the syllabus.
8. Permissible combination of subject Physics, Mathemetics & Electonic equipment mathematics.

## **PAPER - I**

**(Paper Code - 0859)**

### **OPERATIONAL PRINCIPLES OF AUDIO AND VIDEO EQUIPMENTS**

**M.M. 50**

**UNIT-I** Revision of All and FH, communication bands, signal sources, Basic Principles of propagation of e.m. wave through atmosphere and ionosphere; ground waves, sky waves, space waves, dead zones etc.

**RECEIVING ANTENNAE:** Antenna Parameters like gain, radiation pattern, effective aperture. Ferrite AE. Type of antennae like wire, loop, dish, Yagi, telescopic, their construction and operating principles.

**SUPERHETERODYNE RECEIVERS:** Principles, advantages, block diagram, RF input and AE coupling arrangements, RF amplifiers, mixer, local oscillator, IF amp. Detector, audio amplifier, loud speaker, power requirements, tuning/aligning of receivers, waveforms and voltages at different check points. Circuit reading of various radio sets, repair and trouble shooting, automobile radios.

**UNIT-II ELEMENTS OF A TELEVISION SYSTEM :** Picture transmission, sound transmission, picture reception, sound reception, synchronisation.

**TYPE VIDEO SIGNAL :** Scanning sequence details, sync details of the 625 line system, channel bandwidth, vestigial sideband transmission, reception of vestigial sideband signals, frequency modulation, FH channel bandwidth, channel bandwidth for colour transmission, allocation of frequency bands for television bandwidth for colour transmission, allocation of frequency bands for television signal transmission, television standards.

Picture tubes- monochrome and colour : Beam deflection, face plate, picture tube characteristics, picture tube circuit controls.

**UNIT-III TELEVISION RECEIVERS :** Types of television receivers, receiver sections, video detector, video section fundamentals, video amplifiers-design principles, video amplifier circuits, automatic gain control and noise cancelling circuits, sync separation circuits, sync-processing and AFC circuits, deflection circuits, sound system, RF tuner, video IF amplifiers, receiver power supplies, television receiver antennae, colour television antennae.



**TELEVISION APPLICATIONS :** Television broadcasting, cable television, closed circuit television, theatre television, picture phone and facsimile, video tape recording (VTr, television via satellite, TV games, HDTV, flatpanel TV teleconferencing.

**UNIT-IV TAPE RECORDERS :** Principles of magnetic recording, characteristics of magnetism, the hysteresis loop, recording head, recorded wave-length, response of head during reply, the effect of gap length, low frequency loss, other losses, equalization, the effect of non-linear characteristic of magnification recording bias, A.C. bias, erasing the tape, block diagram of audio tape recorder.

Oscillator, preamplifier, dolby, amplifier, record (play back) head, erase head, tapes (metal polymer), mechanical transport system, stereo recording, double deck, single deck, microphones (RF, Cable), noise, maintenance of mechanical parts, head cleaners, head alignment, graphic equalisers.

**UNIT-V TELEPHONES :** Modulation, demodulation, modem, subscriber frequency allotment, channel organisation, signalling, switching, manual exchanges, STD, ISD, EFABX, Intercom-system on equipment and EPABX, Value added services like FAX E mail.

**MEASURING INSTRUMENTS :** Multimeters analog/digital, oscilloscopes, signal generators, noise and sound level meters, frequency counters, error sources and precautions during measurement.

**GENERAL NOTE :** Familiarisation with catalogues, standard specification, knowledge about companies referring to service manual.

**PAPER - II**  
**MICROPROCESSOR BASED INSTRUMENTATION AND CONTROL**  
**(Paper Code - 0860)**

**M.M. 50**

**UNIT-I MICROCOMPUTER FUNDAMENTALS :** Introduction, simplified microcomputer architecture, simplified memory organization, instruction set, simplified CPU organisation, microcomputer operation, Personal computer organization and Word Processor. Data sheet descriptions, pin diagram and function, microprocessor architecture, using the data/address register, using the stack pointer.

**UNIT-II THE INTEL 8080/8085 MICROPROCESSOR :** Introduction, the 8085 pin diagram and functions, the 8085 architecture, addressing modes, the 8080/8085 instructions set, the 8080/8085 data transfer instructions, the 8080/8085 arithmetic instructions, the 8080/8085 logical instructions, the 8080/8085 stack, I/O, and machine control instructions.

**UNIT-III PROGRAMMING THE MICROPROCESSOR :** Machine and assembly languages, simplified instruction set, instruction set, arithmetic operations, instruction set-logical operations, instruction set-data transfer operations, instruction set branch operations, instruction set-subroutine call and return operations, instruction set-miscellaneous operations, writing a program, addressing modes, program branching, program looping using subroutines.

Programming the 8080/8085 microprocessor : Introduction, straight-line programs, looping programs, mathematical programs.

**UNIT-IV INTERFACING THE MICROPROCESSOR :** Introduction, interfacing with ROM, interfacing with RAM, input/output interfacing basics, interfacing with practical I/O ports, synchronizing I/O data transfers using interrupts. address decoding.

**UNIT-V Application to illustrate the use of microprocessor in :**

- (i) Traffic control
- (i) Temperature control
- (i) Digital clock
- (iv) Stepper motor control
- (v) Washing machine control

## PRACTICALS

A student is required to do atleast 12 experiments in an academic year, and one month Summer Training. The scheme of practical examination will be as follows :

(i) One experiment of 3 hours duration and one Month Summer Training.

(i) Marks

Experiment : 25 Marks

Sessional : 10 Marks

One Month Summer Training : 15 Marks

**Total 50 Marks**

\* The marks for summer training will be awarded by the teachers teaching the students on the basis of the certificate issued by the external supervisor of the summer training.

## LIST OF PRACTICALS

1. Development of soldering skill by constructing a few circuits and testing.
2. PCB making.
3. Study of modulator.
4. Study of oscillator.
5. Tape recorder-testing, assembly and dis-assembly.
6. Radio receiver-testing.
7. Study of PA system and i.s. testing.
8. Study of EPABK, wiring and connectivity with telephone instruments.
9. Familiarisation with 8085 Based microprocessor trainer kit. Location of 8085, 8279, 8253 keyboard, display fields, EPROM Programmer, expansion slot, TTY and serial lines.
10. Entering and executing an assembly language program, codes for insertion, deletion, memory move, block fill, setting and examining registers and memory, single step execution of a program.
11. Writing of a program to add, subtract and multiply two numbers stored in memory (nnnn & nnnn \* 1) and place the result in the subsequent memory, (nnn \* 2).
12. Writing of a program to test R.H. for errors by writing 0's & 1's in alternate location and reading it for checking.
13. Making of a board with a 3 LED's and four switches to connect to the 8085 kit on the expansion slot (8279).
14. Making of a board with a 8 LED's and four switches to connect to the 8-85 kit on the expansion slot (8255).
  - (a) Program the 8255 to glow/switch of LED's.
  - (b) Program the 8255 to switch on and OFF the LED's every few second according to a given pattern (Hint : The pattern can be 01010101 and 10101010 or 001001100, or any other).

**Reference Books:**

- |                                     |   |   |
|-------------------------------------|---|---|
| 1. Fundamentals of acoustics        | : | Kinsler & Frey                                |
| 2. System trouble shooting Handbook | : | Lucas K, Faulken Berry<br>(John Wiley & Sons) |
| 3. Monochrome & Colour Television   | : | P.R. Gulati                                   |
| 4. Television Engineering           | : | Dhake   |
| 5. Microprocessor                   | : | Gaonkar                                       |
| 6. Microprocessor                   | : | B. Ram  |
| 7. Microprocessor                   | : | Sham Saries                                   |

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**B.SC.-II  
COMPUTER SCIENCE  
PAPER - I  
COMPUTER HARDWARE  
(PAPER CODE - 0855)**

**DURATION 3 HOURS**

**MAX.MARKS 50**

**AIM -** The emphasis is on the design concepts & organisational details of the common PC, learning the complicated electronics of the system of the computer Engineers.

**OBJECT OF THE COURSE -**

1. To introduce the overall organisation of the microcomputers.
2. To introduce the common peripheral devices used in computers.
3. To introduce the hardware components, use of micro processor and function of various chips used in microcomputer.

**N.B. :** Since the computer organisation study is very vast & complicated, so the study is restricted to only the description and understanding part, hence the paper setter is requested to keep this important factor in mind.

**UNIT-I CLASSIFICATION AND ORGANIZATION OF COMPUTERS**

Digital and analog computers and its evolution. Major components of digital computers; Memory addressing capability of CPU; word length and processing speed of computers. Microprocessors single chip microcomputers; large and small computers. User interface Hardware software and firmware. multi programming multi user system. Dumb smart and intelligent terminals computer network and multi processing, LAN parallel processing. Flynn's classification of computers. Computer flow and data flow computers.

**UNIT-II CENTRAL PROCESSING UNIT.**

CPU organization, ALU control unit registers. Instructions for INTEL 8085, Instruction word size, Various addressing mode interrupts and exceptions, some special Control signals and I/O devices. Instruction cycle fetch and execute operation, time Diagram, data flow.

**UNIT-III MEMORY OF COMPUTERS.**

Main memory secondary memory, backup memory, cache memory; real and virtual Memory Semiconductor memory. Memory controller and magnetic memory; RAM; disks, optical disks Magnetic bubble memory; DASD, destructive and non destructive readout. Program of data Memory and MMU.

**UNIT-IV I/O DEVICES.**

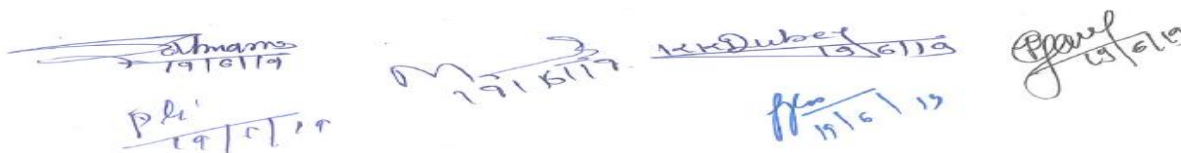
I/O devices of micro controller; processors. I/O devices, printer, plotter, other output devices, I/O port serial data transfer scheme, Micro controller, signal processor, I/O processor I/O processor arithmetic processor.

**UNIT-V SYSTEM SOFTWARE AND PROGRAMMING TECHNIQUE.**

ML, AL, HLL, stac subroutine debugging of programs macro, micro programming, Program Design, software development, flow & chart multi programming, multi user, multi tasking Protection, operating system and utility program, application package.

**RECOMMENDED BOOKS :**

1. Computer Fundamentals : Architecture and Organization - By B.Ram (Wilky Eastern Ltd.)
2. Computers Today - By Donal H. Sanders
3. Computers Fundamental - By Rajaraman.
4. IBM PC - XT Clones - By Govinda Rajalu

The bottom of the page contains five handwritten signatures and dates. From left to right: 1. Signature 'Sharma' with date '19/6/19'. 2. Signature 'P. K.' with date '19/6/19'. 3. Signature 'M.' with date '19/6/19'. 4. Signature 'K. Dubey' with date '19/6/19'. 5. Signature 'P. K.' with date '19/6/19'.

**B.Sc.-II**  
**PAPER - II**  
**SOFTWARE**  
**(Paper Code - 0856)**

AIM - Introduction to the web-language-HTML & problem solving through the concept of object oriented programming.

**OBJECT OF THE COURSE -**

1. To introduce the internet & web related technology & learn the intricacies of web-page designing using HTML.
2. To introduce the object oriented programming concept using C++ language.
3. To introduce the problem solving methodology using the C++ programming features.

**N.B. : Examiners are requested to prepare unit-wise Questions papers.**

**UNIT-I HTML BASICS & WEB SITE DESIGN PRINCIPLES**

Concept of a Web Site, Web Standards, What is HTML? HTML Versions, Naming Scheme for HTML Documents , HTML document/file, HTML Editor , Explanation of the Structure of the homepage , Elements in HTML Documents ,HTML Tags, BasicHTML Tags, Comment tag in HTML, Viewing the Source of a web page, How to download the web page source? XHTML, CSS, Extensible Markup Language (XML), Extensible Style sheet language (XSL), Some tips for designing web pages, HTML Document Structure. HTML Document Structure-Head Section, Illustration of Document Structure, <BASE> Element, <ISINDEX> Element, <LINK> Element , <META>, <TITLE> Element, <SCRIPT> Element , Practical Applications, HTML Document Structure-Body Section:-Body elements and its attributes: Background; BackgroundColor; Text; Link; Active Link (ALINK); Visited Link (VLINK); Left margin; Top margin, Organization of Elements in the BODY of the document: Text Block Elements; Text Emphasis Elements; Special Elements — Hypertext Anchors; Character-Level Elements; Character References , Text Block Elements: HR (Horizontal Line); Hn(Headings) ; P (Paragraph); Lists; ADDRESS ; BLOCKQUOTE; TABLE; DIV (HTML3.2 and up) ; PRE (Preformatted); FORM , Text Emphasis Elements, Special Elements — Hypertext Anchors , Character-Level Elements: line breaks (BR) and Images (IMG), Lists , ADDRESS Element, BLOCKQUOTE Element, TABLE Element, COMMENTS in HTML , CHARACTER Emphasis Modes, Logical & Physical Styles, Netscape, Microsoft and Advanced Standard Elements List, FONT, BASEFONT and CENTER.

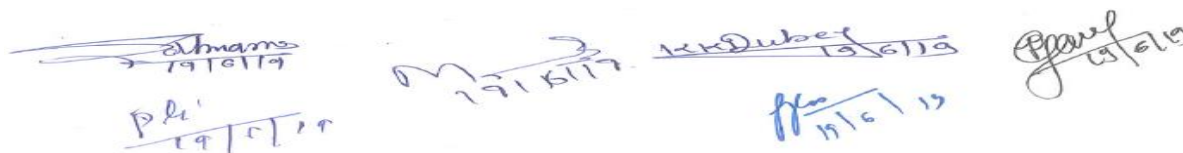
**UNIT-II IMAGE, INTERNAL AND EXTERNAL LINKING BETWEEN WEBPAGES**

Netscape, Microsoft and Advanced Standard Elements List, FONT, BASEFONT and CENTER Insertion of images using the element IMG (Attributes: SRC (Source), WIDTH, HEIGHT, ALT (Alternative), ALIGN), IMG (In-line Images) Element and Attributes; Illustrations of IMG Alignment, Image as Hypertext Anchor, Internal and External Linking between Web Pages Hypertext Anchors , HREF in Anchors , Link to a Particular Place in a Document , NAME attribute in an Anchor , Targeting NAME Anchors , TITLE attribute, Practical IT Application Designing web pages links with each other, Designing Frames in HTML. Practical examples.

**UNIT-III INTRODUCTION TO OOP**

Advantages of OOP, The Object Oriented Approach, Characteristics of object oriented languages- Object, Classes, Inheritance, Reusability, Polymorphism and C++.

Function: Function Declaration, Calling Function, Function Defines, Passing Argument to function, Passing Constant, Passing Value, Reference Argument, returning by reference, Inline Function, Function Overloading, Default Arguments in function.

The bottom of the page contains four handwritten signatures and dates. From left to right: 1. A signature that appears to be 'Sharma' with the date '19/01/19' below it. 2. A signature that appears to be 'M...' with the date '19/01/19' below it. 3. A signature that appears to be 'K. Dubey' with the date '19/01/19' below it. 4. A signature that appears to be 'P. Singh' with the date '19/01/19' below it.

#### UNIT-IV OBJECT CLASSES AND INHERITANCE


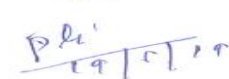
Object and Class, Using the class, class constructor, class destructors, object as function argument, copy constructor, struct and classes, array as class member, Static Class Data, Static Member Functions, Friend function, Friend class, operator overloading. Type of inheritance, Base class, Derive class. Access Specifier: protected. Function Overriding, member function, String, Template Function.

#### UNIT-V POINTERS AND VIRTUAL FUNCTION

pointers: & and \* operator pointer variables, pointer to pointer, void pointer, pointer and array, pointer and function, pointer and string, memory management, new and delete, pointer to object, this pointer Virtual Function: Virtual Function, Virtual member function, accesses with pointer, pure virtual function  
File and Stream: C++ streams, C++ Manipulators, Stream class, string I/O, char I/O, Object I/O, I/O with multiple object, Disk I/O,

#### RECOMMENDED BOOKS :

- |                                       |   |  |
|---------------------------------------|---|--|
| 1. Introduction to HTML               | : | Kamlesh Agarwala, O.P. Vyas, Prateek A. Agrawala (Kitab Mahal Publication) |
| 2. Let us C++                         | : | Y. Kanetkar B.P.B Publication  |
| 3. Programming in C++                 | : | E. Balaguruswami   |
| 4. Mastering in C++                   | : | Venu Gopal   |
| 5. Object Oriented Programming in C++ | : | Lafore R, Galgotia Publications.   |

  
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P. K. Iyer  
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M. J. S. S.  
19/6/19

  
K. K. Dubey  
19/6/19  
  
  
H. K. S.  
19/6/19

  
P. K. S.  
19/6/19

# Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

Session 2019-20

June 2019 onwards

Class: B.Sc. Electronics

## Scheme of Examination

Paper Code	Course Opted	Title of Course	Theory	Practical	Grand Total	Minimum Passing Marks
First Year						
ELB-101	Core Course	Network Analysis And Analog Electronics	50		100	33
ELB-102	Core Course	Linear and Digital Integrated Circuits	50			
ELB-103P	Core Course Practical/Tutorial	Networks Analysis and Analog Electronics Lab	25	50	50	17
ELB-104P	Core Course Practical/Tutorial	Linear and Digital Integrated Circuits Lab	25			
Second Year						
ELB-201	Core Course	Communication Electronics	50		100	33
ELB-202	Core Course	Microprocessor and Microcontrollers	50			
ELB-203P	Course Practical/Tutorial	Communication Electronics Lab	25	50	50	17
ELB-204P	Course Practical/Tutorial	Microprocessor& Microcontroller Lab	25			
Third Year						
EL301	Skill Enhancement Course	Industrial Electronics	50		100	33
EL302	Skill Enhancement Course	Mobile Application Programming and Introduction to VHDL	50			
EL303P	Skill Enhancement CoursePractical	Industrial Electronics Lab	25	50	50	17
EL304P	Skill Enhancement Course Practical	Mobile Application Programming and Introduction to VHDL Lab	25			



# **B . S c . P a r t I I**

## **ELECTRONICS**

### **Paper I**

#### **ELB 201: COMMUNICATION ELECTRONICS**

**Theory:**

**Max. Marks :50**

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#### **Unit-1**

**Electronic communication:** Introduction to communication – means and modes. Need for modulation. Block diagram of an electronic communication system. Brief idea of frequency allocation for radio communication system in India (TRAI). Electromagnetic communication spectrum, band designations and usage. Channels and base-band signals. Concept of Noise, signal-to-noise (S/N) ratio.

#### **Unit-2**

**Analog Modulation:** Amplitude Modulation, modulation index and frequency spectrum. Generation of AM (Emitter Modulation), Amplitude Demodulation (diode detector), Concept of Single side band generation and detection. Frequency Modulation (FM) and Phase Modulation (PM), modulation index and frequency spectrum, equivalence between FM and PM, Generation of FM using VCO, FM detector (slope detector), Qualitative idea of Super heterodyne receiver

**Analog Pulse Modulation:** Channel capacity, Sampling theorem, Basic Principles-PAM, PWM, PPM, modulation and detection technique for PAM only, Multiplexing.

#### **Unit-3**

**Digital Pulse Modulation:** Need for digital transmission, Pulse Code Modulation, Digital Carrier Modulation Techniques, Sampling, Quantization and Encoding. Concept of Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), and Binary Phase Shift Keying (BPSK).

**Optical Communication:** Introduction of Optical Fiber, Block Diagram of optical communication system.

#### **Unit-4**

**Introduction to Communication and Navigation systems:**

**Satellite Communication–** Introduction, need, Geosynchronous satellite orbits, geostationary satellite advantages of geostationary satellites. Satellite visibility, transponders (C - Band), path loss, ground station, simplified block diagram of earth station. Uplink and downlink.

## Unit-5

**Mobile Telephony System** – Basic concept of mobile communication, frequency bands used in mobile communication, concept of cell sectoring and cell splitting, SIM number, IMEI number, need for data encryption, architecture (block diagram) of mobile communication network, idea of GSM, CDMA, TDMA and FDMA technologies, simplified block diagram of mobile phone handset, 2G, 3G and 4G concepts (qualitative only). GPS navigation system (qualitative idea only)

### Reference Books:

1. Electronic Communications, D. Roddy and J. Coolen, Pearson Education India.
  2. Advanced Electronics Communication Systems- Tomasi, 6<sup>th</sup> edition, Prentice Hall.
  3. Modern Digital and Analog Communication Systems, B.P. Lathi, 4<sup>th</sup> Edition, 2011, Oxford University Press.
  4. Electronic Communication systems, G. Kennedy, 3<sup>rd</sup> Edn., 1999, Tata McGraw Hill.
  5. Principles of Electronic communication systems – Frenzel, 3rd edition, McGraw Hill
  6. Communication Systems, S. Haykin, 2006, Wiley India
  7. Electronic Communication system, Blake, Cengage, 5<sup>th</sup> edition.
  8. Wireless communications, Andrea Goldsmith, 2015, Cambridge University Press
-

**Paper II**  
**ELB 202 :MICROPROCESSOR ANDMICROCONTROLLER**

**Theory:**

**Max. Marks :50**

**Unit-1**

**Microcomputer Organization:** Input/Output Devices. Data storage (idea of RAM andROM). Computer memory. Memory organization & addressing. Memory Interfacing. Memory Map.

**8085 Microprocessor Architecture:** Main features of 8085. Block diagram. Pin-outdiagram of 8085. Data and address buses. Registers. ALU. Stack memory. Program counter.

**Unit-2**

**8085 Programming :**Instruction classification, Instructions set (Data transfer includingstacks. Arithmetic, logical, branch, and control instructions). Subroutines, delay loops. Timing & Control circuitry. Timing states. Instruction cycle, Timing diagram of MOV and MVI. Hardware and software interrupts.

**Unit-3**

**8051 microcontroller:** Introduction and block diagram of 8051 microcontroller,architecture of 8051, overview of 8051 family, 8051 assembly language programming, Program Counter and ROM memory map, Data types and directives, Flag bits and Program Status Word (PSW) register, Jump, loop and call instructions.

**Unit 4**

**8051 I/O port programming:** Introduction of I/O port programming, pin out diagram of8051 microcontroller, I/O port pins description & their functions, I/O port programming in 8051 (using assembly language), I/O programming: Bit manipulation.

**8051 Programming:** 8051 addressing modes and accessing memory locations usingvarious addressing modes, assembly language instructions using each addressing mode, arithmetic and logic instructions,

**Unit 5**

8051 programming in C: for time delay & I/O operations and manipulation, for arithmetic and logic operations, for ASCII and BCD conversions.

**Introduction to embedded system:** Embedded systems and general purpose computersystems. Architecture of embedded system. Classifications, applications and purpose of embedded systems.

**Reference Books:**

1. Microprocessor Architecture Programming & applications with 8085, 2002, R.S. Goankar, Prentice Hall.
  2. Embedded Systems: Architecture, Programming & Design, Raj Kamal, 2008, Tata McGraw Hill
  3. The 8051 Microcontroller and Embedded Systems Using Assembly and C, M.A. Mazidi, J.G. Mazidi, and R.D. McKinlay, 2<sup>nd</sup> Ed., 2007, Pearson Education India.
  4. Microprocessor and Microcontrollers, N. Senthil Kumar, 2010, Oxford University Press
  5. 8051 microcontrollers, Satish Shah, 2010, Oxford University Press.
  6. Embedded Systems: Design & applications, S.F. Barrett, 2008, Pearson Education India
  7. Introduction to embedded system, K.V. Shibu, 1<sup>st</sup> edition, 2009, McGraw Hill
  8. Embedded Microcomputer systems: Real time interfacing, J.W. Valvano 2011, Cengage Learning
-

## **ELECTRONICS LABORATORY**

*The scheme of practical examination will be as follows-*

<b>Experiment</b>	<b>--</b>	<b>30</b>
<b>Viva</b>	<b>--</b>	<b>10</b>
<b>Sessional</b>	<b>--</b>	<b>10</b>
<b>Total</b>	<b>--</b>	<b>50</b>

### **ELB 203P: COMMUNICATIONELECTRONICS LAB** **(Hardware and Circuit Simulation Software) 60 Lectures** **Max.Marks:25**

1. To design an Amplitude Modulator using Transistor
2. To study envelope detector for demodulation of AM signal
3. To study FM - Generator and Detector circuit
4. To study AM Transmitter and Receiver
5. To study FM Transmitter and Receiver
6. To study Time Division Multiplexing (TDM)
7. To study Pulse Amplitude Modulation (PAM)
8. To study Pulse Width Modulation (PWM)
9. To study Pulse Position Modulation (PPM)
10. To study ASK, PSK and FSK modulators

#### **Reference Books:**

1. Electronic Communication systems, G. Kennedy, 1999, Tata McGraw Hill.
2. Electronic Communication system, Blake, Cengage, 5th edition.

**ELB 204P: MICROPROCESSOR AND MICROCONTROLLER**  
**LAB(Hardware and Circuit Simulation Software)**

**Max.Marks:25**

**At least 06 experiments each from Section-A and Section-B**

***Section-A: Programs using 8085 Microprocessor***

1. Addition and subtraction of numbers using direct addressing mode
2. Addition and subtraction of numbers using indirect addressing mode
3. Multiplication by repeated addition.
4. Division by repeated subtraction.
5. Handling of 16-bit Numbers.
6. Use of CALL and RETURN Instruction.
7. Block data handling.
8. Other programs (e.g. Parity Check, using interrupts, etc.).

***Section-B: Experiments using 8051 microcontroller:***

1. To find that the given numbers is prime or not.
2. To find the factorial of a number.
3. Write a program to make the two numbers equal by increasing the smallest number and decreasing the largest number.
4. Use one of the four ports of 8051 for O/P interfaced to eight LED's. Simulate binary counter (8 bit) on LED's .
5. Program to glow the first four LEDs then next four using TIMER application.
6. Program to rotate the contents of the accumulator first right and then left
7. Program to run a countdown from 9-0 in the seven segment LED display.
8. To interface seven segment LED display with 8051 microcontroller and display 'HELP' in the seven segment LED display.
9. To toggle '1234' as '1324' in the seven segment LED display.
10. Interface stepper motor with 8051 and write a program to move the motor through a given angle in clock wise or counter clockwise direction.
11. Application of embedded systems: Temperature measurement & display on LCD

**Reference Books:**

1. Microprocessor Architecture Programming & applications with 8085, 2002, R.S. Goankar, Prentice Hall.
2. Embedded Systems: Architecture, Programming & Design, Raj Kamal, 2008, Tata McGraw Hill
3. The 8051 Microcontroller and Embedded Systems Using Assembly and C, M.A. Mazidi, J.G. Mazidi, and R.D. McKinlay, 2<sup>nd</sup> Ed., 2007, Pearson Education India.
4. 8051 microcontrollers, Satish Shah, 2010, Oxford University Press.
5. Embedded Microcomputer systems: Real time interfacing, J.W. Valvano 2011, Cengage Learning.

**B.Sc.-II**  
**INFORMATION TECHNOLOGY**  
**PAPER - I**  
**DIGITAL CIRCUITS & COMPUTERH/W**  
**(Paper Code - 0874)**

**UNIT-I(A) Number Systems :**

Octal and hexadecimal number, decimal rep., complements, addition, subtraction, multiplication, division, fixed point rep, floating point rep., other binary code- gray code, excess 3 gray, 2421, etc. error detection code.

**(B) Boolean Algebra :**

Laws, demorgan's theorem, Simplification boolean expression & logic diagram, positive & negative logic, K-map and simplification of K-map.

**UNIT-II Combinational circuits :**

Half adder, full adder, flip-flop : SR, JK, D,T, sequential circuits : encoder, decoder, multiplexer, shift register, binary counters, BCD adder.

**UNIT-III Multivibrator circuits :**

Monostable, astable, bistable, smitt trigger, clocked RS, master-slave flip-flop, edge triggered flip-flop, latch.

Intergrated circuits :

RTL, DITL, TTL, CMOS, MOS.

**UNIT-IV (A) Central Processing Unit :**

Introduction, register organisation, stack organisation, Instruction formats, Addressing modes.

**(B) I/O Organisation :**

I/O interfaces, Data transfer, types and modes, interrupts, DMA, IOP.

**UNIT-V Memory Organisation :**

Memory hierarchy, main memory, Auxiliary memory, Associative memory, cache memory, virtual memory, memory management techniques.

**REFERENCE TAXT BOOK :**

- |  |   |                 |
|--|---|-----------------|
| 1. Integrated Electronics                  | - | Millman&Halkias |
| 2. Principle of Electronics                | - | V.K. Mehta      |
| 3. Digital Electronics                     | - | R.P. Jain       |
| 4. Computer System Architecture            | - | Morris Mano     |
| 5. Digital Electronics & Computer Hardware | - | Morris Mano     |

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**B.Sc.-II**  
**PAPER - II**  
**(Paper Code - 0875)**

**UNIT-I Introduction to OPP :** Advantages of OPP, the Object oriented approach, characteristics of object oriented languages : object, classes, inheritance, reusability, polymorphism and C++.

**UNIT-II Function :** function declaration, calling function, function definition, passing arguments to function, passing constant, passing value, fegerence argument, returning by reference, inline function, function overloading, default arguments in function.

**UNIT-III Object and Classes,** using the Classes Constructor, class destructor, object as function argument, copy constructor, struct and classes, array as class member, static class data, static member functions, friend function, friend class, operator overloading, type of inheritance, base class derive class, access speceifier, protected, member function.

**UNIT-IV Pointers :** & and \* operator pointer variables, pointer to pointer, void pointer, pointer and array, pointer and functions, pointer and string, memory management, new and delete, pointer to object, this pointer, virtual function : virtual function, virtual member function, accesses with pointer, pure virtual function.

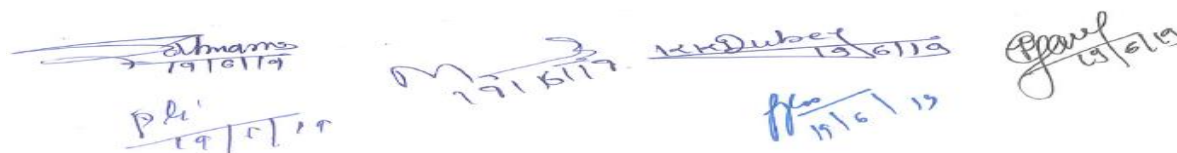
**UNIT-V File and stream :** C++ steams, C++ manipulators, Stream class, string I/O, char I/O, object I/O, I/O with multiple objects, disk I/O.

**REFERENCE TEXT BOOKS:**

- |   |                                    |   |                  |
|---|------------------------------------|---|------------------|
| 1 | Programming in C++                 | - | E. Balaguruswami |
| 2 | Mastering in C++                   | - | VenuGopal        |
| 3 | Object Oriented Programming in C++ | - | Robert Lafore    |
| 4 | Let us C++                         | - | Y. Kanetkar      |

**PRACTICAL WORK**

1. The sufficient Practical work should be done for understanding the paper 2.
2. At least five programs on each unit from unit 2 to unit 5 be prepared.
3. All practical works should be prepared in form of print outs and be valuated while practical examination.

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## INDUSTRIAL MICROBIOLOGY

Paper	Title	Time	Marks
First	Environmental Microbiology and Biostatistics	3 hrs.	50
Second	Microbial Physiology and Immunobiotechnology	3 hrs.	50
	PRACTICAL Examination (including sessionals)	4 hrs.	50 (40+10)

**Note :** During Two months Summer Vacation, students will visit some Industries. He/She will submit "Summer Job-Training Report" in B.Sc. IIRD Year Viva Voce Exam.

### PAPER - I ENVIRONMENTAL MICROBIOLOGY AND BIOSTATISTICS (Paper Code - 0876)

**M.M.50**

**UNIT-1** Our environment : Soil, water and air. Concept of environment in relation to microbes. Environment included physiological adaptations in microorganisms. Nature of microbial population in soil, water and air. Biogeochemical cycling - Carbon, Nitrogen, Sulphur and Phosphorus.

**UNIT-2** Population interactions : Neutralism, Commensalism, Synergism, Mutualism, Antagonistic relationships. Mycorrhizal associations. VAM and its importance.

**UNIT-3** Nitrogen fixation by symbiotic and non-symbiotic microorganisms. Use of microorganisms as biofertilizers. Mass cultivation of Rhizobium and Azotobacter. Use of blue-green algae as biofertilizers.

**UNIT-4** Liquid waste disposal. Nature of domestic and municipal waste and sewage. Sewage treatment. Solid waste disposal. Methods of disposal of Agricultural waste.

**UNIT-5** Basic idea of probability, normal, binomial and poisson distribution. Mean, Mode and Median. Chi-Square test. Exponential and Logarithmic Functions.

### PRACTICALS

1. Isolation of Microorganisms from Air.
2. Isolation of Microorganisms from Water.
3. Isolation of Microorganisms from soil.
4. Determination of MPN of faecal contaminants in water.
5. Measurement & confirmation of E. coli in water sample.
6. Biochemical tests for identification of enteric bacteria.
7. Study of Rhizobium from root nodules.
8. Study of symbiotic and non-symbiotic blue-green algae.
9. Problems based on the determination of Mean, Median and Mode.
10. Problems on Chi-Square Test.
11. Experiments to demonstrate Symbiotic, Antagonistic activities and relations amongst microbes and their interactions with plants.

  
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**RECOMMENDED BOOKS :**

1. Introduction to Soil Microbiology by Martin Alexander.
2. General Microbiology by Pelczar, Reid & Chan.
3. Biofertilizers in Agriculture by N.S. Subba Rao.
4. Statistics by Mishra & Mishra.
5. General Microbiology, Vol. II, by Power & Dagainawala.

**PAPER - II****MICROBIAL PHYSIOLOGY AND IMMUNABIOTECHNOLOGY**  
**(Paper Code - 0877)****M.M. 50**

**UNIT-1** Diffusion, gaseous exchange, Osmosis, Plasmolysis, Biochemical properties of membranes, Passive and Active transport mechanism. Role of ionophores, group translocation across the membranes.

**UNIT-2** Photosynthetic microbes, Oxygenic and non-oxygenic reaction centre. Electron transport, Photophosphorylation, Calvin Cycle. Photorespiration and its significance. Effect of various factors on rate of photosynthesis.

**UNIT-3** Respiration mechanisms - Breakdown of carbohydrates through glycolysis, Krebs's cycle. Fermentation. Pentose Phosphate Pathway. Fermentation of alcohol, Citric acid and acetic acid.

**UNIT-4** Methanogens and Methylophiles. Sulphur utilizing bacteria. Sulphate reduction pathway. Economic importance of Methylophiles and sulphur utilizing bacteria.

**UNIT-5** History and Scope of immunology, Types of immunity. Antigen-Antibody reactions. Immunoglobulins - Structure and functions. Production of Vaccines and Monoclonal antibodies.

**PRACTICAL**

1. Isolation of photosynthetic bacteria and cyanobacteria from soil.
2. Isolation and characterisation of Methanogens.
3. Study of Hydrogen-production by bacteria.
4. Measurement of nitrate uptake by microorganisms.
5. Study of nitrate and nitrite reduction by microorganisms.
6. Demonstration of evolution during photosynthesis.
7. Demonstration of plasmolysis, osmosis, active and passive transport mechanism.
8. Testing of Blood Groups.
9. Titration of Antigen and Antibody.
10. Precipitation reaction of antigens and antibodies.

**BOOK RECOMMENDED :**

1. Cell Biology by Pawar.
2. General Microbiology, Vol. II, by Power and Dagainawala.
3. Immunology by Davis.
4. Immunology by G.P. Talwar.

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**BIOCHEMISTRY**  
**PAPER - I**  
**ENZYMOLOGY**

**M.M. 50**

**UNIT-I INTRODUCTION**

History, general characteristics, nomenclature, IUB enzyme classification (rationale, over view and specific examples), significance of numbering system. Definitions with examples of holoenzyme, apoenzyme, coenzymes. cofactors, activators, inhibitors, active site (identification of groups excluded), metallo-enzymes, units of enzyme activity, specific enzymes, Isoenzymes, monomeric enzymes, oligomeric enzymes and multienzyme complexes. Enzyme specificity. Historical perspective, nature of non-enzymatic and enzymatic catalysis. Measurement and expression of enzyme activity-enzyme assays. Definition of IU, Katal, enzyme turn over number and specific activity. Role of non-protein organic molecules and inorganic ions coenzyme, prosthetic groups. Role of vitamins as coenzymes precursors (general treatment).

**UNIT-I ENZYME CATALYSIS**

Role of cofactors in enzyme catalysis : NAD/NADP<sup>+</sup>, FMN/FAD, coenzyme A, biocytin, cobamide, lipoamide, TPP, pyridoxal phosphate, tetrahydrofolate and metal ions with special emphasis on coenzyme functions. Acid-base catalysis, covalent, proximity and orientation effects, strain and distortion theory. Mechanism of action of chymotrypsin, carboxypeptidase, ribonuclease and lysozyme.

**UNIT- I ENZYME PURIFICATION**

Methods for isolation, purification and characterization of enzymes.

**UNIT-IV ENZYME KINETICS**

Factors affecting enzyme activity : enzyme concentration, substrate concentration, pH and temperature. Derivation of Michaelis-Menten equation for uni-substrate reactions.  $K_m$  and its significance. Line weaver-Burk plot and its limitations. Importance of  $K_m$ . Bi-substrate reactions-brief introduction to sequential and ping-pong mechanism with examples.

Kinetics of zero and first order reactions. Significance and evaluation of energy of activation and free energy.

Reversible and irreversible inhibition, competitive, non-competitive and uncompetitive inhibitions. determination of  $K_m$  &  $V_{max}$  in presence and absence of inhibitor. Allosteric enzymes.

**UNIT-V INDUSTRIAL AND CLINICAL APPLICATION OF ENZYME.**

Immobilization of enzyme and their industrial applications. Production of glucose from starch, cellulose and dextran; use of lactase in dairy industry; production of glucose-fructose syrup from sucrose; use proteases in food, detergent and leather industry; medical application of enzymes. use of glucose oxidase in enzyme electrodes.

  
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## PAPER - II

### INTERMEDIARY METABOLISM

M.M. 50

#### UNIT-I INTRODUCTION TO METABOLISM

General features of metabolism, experimental approaches to study metabolism; use of intact organism, bacterial mutants, tissue slices, stable and radioactive isotopes.

#### CARBOHYDRATE METABOLISM

Reactions and energetics of glycolysis. Alcoholic and lactic acid fermentations. Entry of fructose, galactose, mannose etc. Reactions and energetics of TCA cycle. Gluconeogenesis, glycogenesis and glycogenolysis, Reactions and physiological significance of pentose phosphate pathway. Regulation of glycolysis and TCA cycle. Photosynthesis, a brief review.

#### UNIT-II ELECTRON TRANSPORT CHAIN AND OXIDATIVE PHOSPHORYLATION

Structure of mitochondria, sequence of electron carriers, sites of ATP production, inhibitors of electron transport chain. Hypothesis of mitochondrial oxidative phosphorylation (basic concepts). Inhibitors and uncouplers of oxidative phosphorylation. Transport of reducing potentials into mitochondria.

#### UNIT-III LIPID METABOLISM

Introduction, hydrolysis of triacylglycerols, transport of fatty acids into mitochondria.

$\beta$ -oxidation of saturated fatty acids, ATP yield from fatty acid oxidation. Biosynthesis of saturated and unsaturated fatty acids. Metabolism of ketone bodies, oxidation of unsaturated and odd chain fatty acids. Biosynthesis of triglycerides and important phospholipids, glycolipids, sphingolipids and cholesterol. Regulation of cholesterol metabolism.

#### UNIT-IV AMINO ACID METABOLISM

General reactions of amino acid metabolism : transamination, oxidative deamination and decarboxylation. Urea cycle. Degradation and biosynthesis of amino acids. Glycogenic and ketogenic amino acids.

#### UNIT-V NUCLEOTIDE METABOLISM

Sources of the atoms in the purine and pyrimidine molecules. Biosynthesis and degradation of purines and pyrimidines. Regulation of purine and pyrimidine biosynthesis.

#### PORPHYRIN METABOLISM

Biosynthesis and degradation of porphyrins. Production of bile pigments.

  
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## PRACTICAL

1. Separation of Blood Plasm and Serum
  - a. Estimation of proteins from serum by biuret and lowry methods.
  - b. Determination of albumin and A/G ratio in serum.
2. Estimation of bilirubin (conjugated and unconjugated) in serum.
3.
  - i. Estimation of total lipids in serum by vanillin method.
  - ii. Estimation of cholesterol in serum.
4. Estimation of lipoproteins in plasma.
5. Estimation of lactic acid in blood before and after exercise.
6. Estimation of blood urea nitrogen from plasma.
7. Separation and identification of amino acids by (a) paper chromatography and (b) thin-layer chromatography.
8. Separation of polar and non-polar lipids by thin-layer chromatography.
9. Estimation of SGPT and SGOT in serum.
10.
  - a. Assay of serum alkaline phosphatase activity.
  - b. Inhibition of alkaline phosphatase activity by EDTA.
  - c. Effect of substrate concentration on alkaline phosphatase activity and determination of its  $K_m$  value.
11.
  - a. Effect of temperature on enzyme activity and determination of activation energy.
  - b. Effect of pH on enzyme activity and determination of optimum pH.
  - c. Effect of enzyme concentration on enzyme activity.
12.
  - a. Preparation of starch from potato and its hydrolysis by salivary amylase.
  - b. Determination of achromatic point in salivary amylase.
  - c. Effect of sodium chloride on amylases.

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# **Syllabus of Biotechnology**

**(B. Sc. II Year)**

**Session**

**2019-2020**

**2020-2021**

  
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10.6.19

**HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**

**B.Sc. II  
BIOTECHNOLOGY**

**PAPER – I**

**MOLECULAR BIOLOGY & BIOPHYSICS**

**M.M. 50**

**UNIT-I**

1. Nucleic Acid: Bases, Nucleosides and Nucleotides, DNA and RNA structure.
2. Plasmids.
3. Transposons: Repetitive elements, LINEs & SINEs, Structure of Gene.

**UNIT-II**

1. DNA Replication: Enzymes involved and mechanism of DNA Replication in Prokaryotes.
2. Mutation: Molecular level of Mutation, Types of Mutagens, Spontaneous and Induced Mutation.
3. DNA Repair: NER, BER and Mismatch Repair.

**UNIT-III**

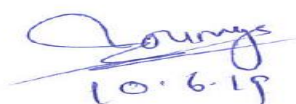
1. Genetic Code: Features, Condon Assignment and Wobble hypothesis.
2. Transcription: Initiation, Elongation and Termination in Prokaryotes.
3. Translation: Initiation, Elongation and Termination Translation machinery in Prokaryotes.  
Operon-Concept of Operator, Regulator, Promoter gene, Inducer and Co-repressor.

**UNIT –IV**

1. Biophysics : Introduction, Scope and Application
2. Principle, Structure, Functions of the following:
  - a. Microscopy
  - b. Colorimeter and Spectroscopy
  - c. Electrophoresis
  - d. Centrifugation
  - e. Chromatography.

**UNIT –V**

1. Radioisotopes techniques: Measurement of radioactivity, Ionization Chambers, Geiger Muller and Scintillation Counter.
2. Autoradiography and DNA Fingerprinting.
3. Biosensor.

  
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## List of Books

1. Gerald Karp - Cell and Molecular biology, 4th Edition (2005).
2. Lewis J.Klein Smith and Valerie M.Kish-Principles of cell and molecular biology-Third Edition (2002)
3. P.K. Gupta- Cell and molecular biology, Second Edition (2003), Rastogi publications.
4. Richard M-Twyaman-Advanced Molecular Biology, First South Asian Edition (1998), VivaBooks Pvt. Ltd.
5. K. Wilson and J.Walker (2012) Principle and Techniques of Biotechnology and MolecularBiotechnology.
6. Upadhyya and Upadhyya : Biophysical Chemistry.
7. David, I. Nelson and Michael M.Cox :Lehninger : Principal of Biochemistry 4th Edition. W.H. Freeman and Company, New York.
8. Buchanan, Gruissem& Jones (2015) Biochemistry & Molecular Biology of Plant, 2<sup>nd</sup> edition.

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**B.Sc. II  
BIOTECHNOLOGY**

**PAPER II**

**RECOMBINANT DNA TECHNOLOGY AND GENOMICS**

**M.M. 50**

**UNIT-I**

1. Recombinant DNA technology: General concept. Steps in gene cloning and application.
2. Host controlled Restriction Modification System, Ligases and Polymerases, Klenow fragment, Taq, Pfu polymerase and Nuclease (Endo, Exo and restriction endonuclease).
3. Modification Enzyme (Kinase, Phosphatases and terminal deoxynucleotidyl transferase). Reverse Transcriptase.

**UNIT –II**

1. Vectors: Plasmid, Bacteriophages, Cosmid, SV40 and Expression vectors.
2. Gene Library: Genomic and cDNA library.
3. Selection and Screening of Recombinants: Genetic and Hybridization methods.

**UNIT –III**

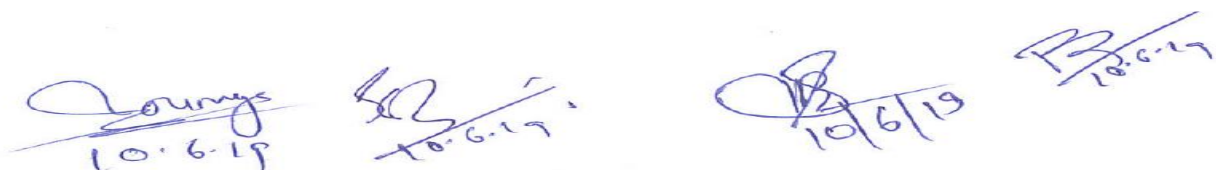
1. PCR: Types of PCR, Steps (Denaturation, Annealing and Extension); Applications, Advantages and Limitation of PCR.
2. Molecular Marker-RFLP, RAPD and Micro array.
3. Human Genome Project.

**UNIT-IV**

1. Basic concept of Gene Transfer Methods: Microinjection, Electroporation, Lipofection and Microprojectile.
2. Gene Therapy: *In vivo* and *Ex vivo*, Germ line and Somatic gene therapy.
3. Basic idea of Stem cell technology: Types of stem cell cultures and their Significance.

**UNIT-V**

1. Introduction to Bioinformatics: History, Objective and Application.
2. Major Bioinformatics Resource – NCBI , Types of Databases (Primary and Secondary Databases) , BLAST and FASTA
3. Basic concept of Genomics and Proteomics



## List of Books

1. B.D. Singh (2004) Biotechnology, Expanding Horizons. First Edition. Kalyani Publishers, Ludhiana.
2. P.K. Gupta (2005) Biotechnology and Genomics, Rastogi Publication, Meerut.
3. Stan bury and Whittaker - Principles of Sterilization techniques, First Indian reprint Edition (1997). Aditya Book (P) Ltd. New Delhi.
4. L.E. Casida (1994) Industrial Microbiology Edition .
5. A.H. Patel (2003) Industrial Microbiology 4th Edition.
6. K.S. Bilgrami and A.K. Pandey (1998) Introduction to Biotechnology Edition 2nd (1998)
7. U Satyanarayan (2005) Biotechnology, First Edition Books and Allied (P) Ltd. Kolkata.
8. Atul kumar and Vandana A. Kumar (2004) Plant Biotechnology and tissue culture, Principle and Perspectives, International Books Distributing Co. Lucknow.
10. S Choudhuri, and DB Carlson (2008) Genomics: Fundamentals and applications, 1st edition.
11. TK Attwood and DJ Parry (2009) Introduction of Bioinformatics.
12. Philip E Bourne Helge Whisking (2003) Structural Bioinformatics.
13. Des Higgins and Willie Taylor (2000) Bioinformatics Sequence, Structure and Databanks.

  
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## List of Practical's

### MOLECULAR BIOLOGY, BIOPHYSICS, RECOMBINANT DNA TECHNOLOGY AND GENOMICS


1. Isolation of DNA from Plant cell.
2. Estimation of DNA by DPA method.
3. Isolation RNA from yeast cells

Experiment based on-

4. Centrifugation
5. Spectrophotometer/Colorimeter
6. Electrophoresis
7. Paper chromatography/TLC

Experiment based on Bioinformatics -

8. Retrieve DNA /Protein sequence from Biological Data Bases (NCBI).
9. Use of tools studied

  
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## SCHEME FOR PRACTICAL EXAMINATION

**Time: 4 hrs. M.M.: 50**

- |                                       |          |
|---------------------------------------|----------|
| 1. Experiment based on DNA/RNA        | 10 marks |
| 2. Experiment based on Instruments    | 10 marks |
| 3. Experiment based on Bioinformatics | 10 marks |
| 4. Spotting                           | 10 marks |
| 5. <i>Viva - Voce</i>                 | 05 marks |
| 6. Record / Sessional                 | 05 marks |

  
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## हेमचंद्र यादव विश्वविद्यालय, दुर्ग (छ.ग.)

(पूर्व नाम- दुर्ग विश्वविद्यालय, दुर्ग)

रायपुर नाका दुर्ग (छ.ग.)-491001

ई मेल : [academic@durguniversity.ac.in](mailto:academic@durguniversity.ac.in)

वेब साइट : [www.durguniversity.ac.in](http://www.durguniversity.ac.in)

दूरभाष : 0788-2359400

क्र. 1460 /अका./2019

दुर्ग, दिनांक 04/07/2019

प्रति,

प्राचार्य,  
समस्त संबद्ध महाविद्यालय,  
हेमचंद्र यादव विश्वविद्यालय,  
दुर्ग (छ.ग.)

विषय:- स्नातक स्तर भाग-एक के पाठ्यक्रम विषयक।

संदर्भ:- संयुक्त संचालक, उच्च शिक्षा विभाग के पत्र क्र. 2456/315/आउशि/सम/2019, दिनांक 16.05.2019।

—00—

विषयांतर्गत लेख है कि संदर्भित पत्र के माध्यम से प्राप्त स्नातक स्तर भाग-एक के निम्नलिखित कक्षा/विषयों के परिवर्तित/संशोधित पाठ्यक्रम शिक्षा सत्र 2019-20 से लागू किये जाते हैं:-

1. बी.ए. — आधार पाठ्यक्रम-हिन्दी भाषा, हिन्दी साहित्य, राजनीतिशास्त्र, अर्थशास्त्र, नृत्य, दर्शनशास्त्र, समाजशास्त्र, इतिहास, मानवविज्ञान, संस्कृत, सांख्यिकी, प्राचीन भारतीय इतिहास, भूगोल, मनोविज्ञान, लाइब्रेरी साईंस
2. बी.एस-सी. — आधार पाठ्यक्रम-हिन्दी भाषा, जीव विज्ञान, मानवविज्ञान, बायोटेक्नोलॉजी, कम्प्यूटर साईंस, गणित, भौतिक शास्त्र, प्राणीशास्त्र, सूक्ष्मजीव विज्ञान, वनस्पतिशास्त्र, भूविज्ञान, इलेक्ट्रॉनिक्स, रसायन शास्त्र, सांख्यिकी, भूगोल।
3. बी.एस.सी- (गृह विज्ञान) — आधार पाठ्यक्रम — हिन्दी भाषा एवं गृह विज्ञान।
4. विधि — एल.एल.बी.
5. प्रबंध — बी.बी.ए.

उपरोक्त विषयों को शिक्षा सत्र 2019-20 से संशोधित रूप में स्नातक स्तर भाग-एक के लिए लागू किया जाता है स्नातक स्तर भाग दो एवं तीन के पाठ्यक्रम यथावत रहेंगे।

अतः आपसे अनुरोध है कि पाठ्यक्रम परिवर्तन/संशोधन से महाविद्यालय के शिक्षकों एवं छात्र-छात्राओं को अवगत कराने का कष्ट करेंगे।

टीप :- परिवर्तित/संशोधित पाठ्यक्रम विश्वविद्यालय की वेबसाईट पर उपलब्ध है।

संलग्न : उपरोक्तानुसार।

कुलसचिव

**B. Sc. Part-I**

**विषय-सूची**

1. Revised Ordinance No. 21
2. Scheme of Examination
3. Environmental Studies
4. Foundation Course : आधार पाठ्यक्रम  
प्रथम हिन्दी  
द्वितीय – अंग्रेजी भाषा  
Physics (भौतिक शास्त्र)
6. Chemistry (रासायन शास्त्र)
7. Zoology (प्राणी शास्त्र)
8. Botany (वनस्पति शास्त्र)
9. Mathematics (गणित)
10. Microbiology (सूक्ष्म जीव विज्ञान)
11. Geology (भू – विज्ञान)
12. Anthropology (मानव विज्ञान)
13. Statistics (सांख्यिकी)
14. Defense Studies (रक्षा अध्ययन)
15. Industrial Chemistry (औद्योगिक रसायन)
16. Computer Science
17. Electronics Equipment Maintenance
18. Electronics
19. Information Technologies
20. Industrial Microbiology
21. Bio Chemistry
22. Biotechnology

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**REVISED ORDINANCE NO. 21**  
**BACHELOR OF SCIENCE**

1. The three year course has been broken up into three Parts. Part-I known as B.Sc. Part-I examination at the end of the first year, Part-II known as B.Sc. Part-II examination at the end of the second year and Part-III known as B.Sc. Part-III examination at the end of the third year.
2. A candidate who after passing (10+2) Higher Secondary or Intermediate examination of C.G. Board of Secondary Education Bhopal or any other Examination recognized by the University or C.G. Board of Secondary Education as equivalent thereto, has attended a regular course of study in an affiliated College or in the Teaching Department of the University for one academic year shall be eligible for appearing at the B.Sc. Part-I examination.
3. A candidate who, after passing the B.Sc.-I examination of the University or any other examination recognized by the University as equivalent thereto, has attended a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.Sc. Part-II examination.
4. A candidate who, after passing the B.Sc. Part-II examination of the University, has completed a regular course of study for one academic year in an affiliated college or in the Teaching Department of the University shall be eligible for appearing at the B.Sc. Part-III examination.
5. Besides regular students, subject to their compliance with this Ordinance ex-student and non-collegiate candidates shall be permitted to offer only such subjects/papers as are taught to the regular student at any of the University Teaching Department or College.
6. Every candidate appearing in B.Sc. Part-I, Part-II and Part-III examination shall be examined in-
  - (i) Foundation Course:
  - (ii) Any one of the following combinations of three subjects:-
    1. Physics, Chemistry & Mathematics.
    2. Chemistry, Botany & Zoology.
    3. Chemistry, Physics & Geology.
    4. Chemistry, Botany & Geology.
    5. Chemistry, Zoology & Geology.
    6. Geology, Physics & Mathematics.
    7. Chemistry, Mathematics & Geology.
    8. Chemistry, Botany & Defense Studies.
    9. Chemistry, Zoology & Defense Studies
    10. Physics, Mathematics & Defense Studies.
    11. Chemistry, Geology & Defense Studies

12. Physics, Mathematics & Statistics
13. Physics, Chemistry & Statistics
14. Chemistry, Mathematics & Statistics.
15. Chemistry, Zoology & Anthropology.
16. Chemistry, Botany & Anthropology.
17. Chemistry, Geology & Anthropology.
18. Chemistry, Mathematics & Statistics.
19. Chemistry, Anthropology & Defense Studies.
20. Geology, Mathematics & Statistics.
21. Mathematics, Defense Studies & Statistics
22. Anthropology, Mathematics & Statistics
23. Chemistry, Anthropology & Applied Statistics
24. Zoology, Botany & Anthropology
25. Physics, Mathematics & Electronics.
26. Physics, Mathematics & Computer Application
27. Chemistry, Mathematics & Computer Application
28. Chemistry, Bio-Chemistry & Pharmacy
29. Chemistry, Zoology & Fisheries.
30. Chemistry, Zoology & Agriculture
31. Chemistry, Zoology & Sericulture
32. Chemistry, Botany & Environmental Biology
33. Chemistry, Botany & Microbiology
34. Chemistry, Zoology & Microbiology
35. Chemistry, Industrial Chemistry & Mathematics
36. Chemistry, Industrial Chemistry & Zoology
37. Chemistry, Biochemistry, Botany
38. Chemistry, Biochemistry, Zoology
39. Chemistry, Biochemistry, Microbiology
40. Chemistry, Biotechnology, Botany
41. Chemistry, Biotechnology, Zoology
42. Geology, Chemistry & Geography
43. Geology, Mathematics & Geography
44. Mathematics, Physics & Geography
45. Chemistry, Botany & Geography

(iii) Practical in case prescribed for core subjects.

7. Any candidate who has passed the B.Sc. examination of the University shall be allowed to present himself for examination in any of the additional subjects prescribed for the B.Sc. examination and not taken by him at the degree examination. Such candidate will have to first appear and pass the B.Sc. Part-I examination in the subjects which he proposes to offer and then the B.Sc. Part-II and Part-III examination in the same subject. Successful candidates will be given a certificate to that effect.



8. In order to pass at any part of the three year degree course examination an examinee must obtain not less than 33% of the total marks in each subject/ group of subjects. In subject/ group of subjects where both theory and practical examination are provided an examinee must pass in both theory and practical parts of the examination separately.
9. Candidate will have to pass separately at the Part-I, Part-II and Part-III examinations. No division shall be assigned on the result of the Part-I and Part-II examination. In determining the division of the final examination, total marks obtained by the examinees in their Part-I, Part-II and Part-III examination in the aggregate shall be taken in to account. Provided in case of candidate who has passed the examination through supplementary examination having failed in one subject/ group only, the total aggregate marks being carried over for determining the division shall include actual marks obtained in the subject/ group in which he appeared at the supplementary examination.
10. Successful examinee at the Part-III examination obtaining 60% or more marks shall be places in the First Division, those obtaining less than 60% but not less than 45% marks in the Second Division and other successful examinees in the Third Division.

## SCHEME OF EXAMINATION

Subject	Paper	Max. Mark	Total Marks	Min. Marks
<b>Environmental Studies</b>		<b>75</b>	<b>100</b>	<b>33</b>
<b>Field Work</b>		<b>25</b>		
<b>Foundation Course</b>				
Hindi Language	I	75	75	26
English Language	I	75	75	26
<b>नोट— प्रत्येक खंड में से 2 दो प्रश्न हल करने होंगे। सभी प्रश्नपत्र समान अंक के होंगे।</b>				
<b>Three Elective Subject:</b>				
1. Physics	I		50	
	II		50	100
	Practical			50
				17
2. Chemistry	I		33	
	II		33	100
	III		34	
	Practical			50
				17
3. Mathematics	I		50	
	II		50	150
	III		50	
4. Botany	I		50	
	II		50	100
	Practical			50
				17
5. Zoology	I		50	
	II		50	100
	Practical			50
				17
6. Geology	I		50	

		II	50	100	33
		Practical		50	17
7. Statistics	I		50		
	II		50	100	33
	Practical			50	17
8. Anthropology	I		50		
	II		50	100	33
	Practical			50	17
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Subject	Paper	Max. Marks	Total Marks	Min. Marks	
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9. Defense Studies	I	50			
	II	50	100	33	
	Practical		50	17	
10. Micro Biology	I	50			
	II	50	100	33	
	Practical		50	17	
11. Computer Science	I	50			
	II	50	100	33	
	Practical		50	17	
12. Information Technology	I	50			
	II	50	100	33	
	Practical		50	17	
13. Industrial Chemistry	I	34			
	I	33	100	33	
	II	33			
	Practical		50	17	
14. Bio Chemistry	I	50			
	II	50	100	33	
	Practical		50	17	
15. Bio Technology	I	50			
	II	50	100	33	
	Practical		50	17	
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### **USE OF CALCULATORS**

The Students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986.

1. Student will bring their own Calculators.
2. Calculators will not be provided either by the University or examination centres.
3. Calculators with, memory and following variables be permitted +, −, x, , square, reciprocal, exponentials log, square root, trigonometric functions, wize, sine, cosine, tangent etc. factorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.

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Part - I  
**SYLLABUS FORENVIRONMENTAL STUDIES AND HUMAN RIGHTS**  
**(Paper code-0828)**

**MM. 75**

इन्वायरमेंटल साईंसेस के पाठ्यक्रम को स्नातक स्तर भाग—एक की कक्षाओं में विश्वविद्यालय अनुदान आयोग के निर्देशानुसार अनिवार्य रूप से शिक्षा सत्र 2003—2004 (परीक्षा 2004) से प्रभावशील किया गया है। स्वशासी महाविद्यालयों द्वारा भी अनिवार्य रूप से अंगीकृत किया जाएगा।

भाग 1, 2 एवं 3 में से किसी भी वर्ष में पर्यावरण प्रश्न—पत्र उत्तीर्ण करना अनिवार्य है। तभी उपाधि प्रदाय योग्य होगी।

पाठ्यक्रम 100 अंकों का होगा, जिसमें से 75 अंक सैद्धांतिक प्रश्नों पर होंगे एवं 25 अंक क्षेत्रीय कार्य (Field Work) पर्यावरण पर होंगे।

सैद्धांतिक प्रश्नों पर अंक — 75 (सभी प्रश्न इकाई आधार पर रहेंगे जिसमें विकल्प रहेगा)

- |                      |   |        |
|----------------------|---|--------|
| (अ) लघु प्रश्नोंत्तर | — | 25 अंक |
| (ब) निबंधात्मक       | — | 50 अंक |

Field Work- 25 अंकों का मूल्यांकन आंतरिक मूल्यांकन पद्धति से कर विश्वविद्यालय को प्रेषित किया जावेगा। अभिलेखों की प्रायोगिक उत्तर पुस्तिकाओं के समान संबंधित महाविद्यालयों द्वारा सुरक्षित रखेंगे।

उपरोक्त पाठ्यक्रम से संबंधित परीक्षा का आयोजन वार्षिक परीक्षा के साथ किया जाएगा। पर्यावरण विज्ञान विषय अनिवार्य विषय है, जिसमें अनुत्तीर्ण होने पर स्नातक स्तर भाग—एक के छात्र/छात्राओं को एक अन्य विषय के साथ पूरक की पात्रता होगी। पर्यावरण विज्ञान के सैद्धांतिक एवं फील्ड वर्क के संयुक्त रूप से 33: (तीनतीस प्रतिशत) अंक उत्तीर्ण होने के लिए अनिवार्य होंगे।

स्नातक स्तर भाग—एक के समस्त नियमित/भूतपूर्व/अमहाविद्यालयीन छात्र/छात्राओं को अपना फील्ड वर्क सैद्धांतिक परीक्षा की समाप्ति के पश्चात् 10 (दस) दिनों के भीतर संबंधित महाविद्यालय/परीक्षा केन्द्र में जमा करेंगे एवं महाविद्यालय के प्राचार्य/केन्द्र अधीक्षक, परीक्षकों की नियुक्ति के लिए अधिकृत रहेंगे तथा फील्ड वर्क जमा होने के सात दिनों के भीतर प्राप्त अंक विश्वविद्यालय को भेजेंगे।

## **UNIT-I THE MULTI DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES**

### **Definition, Scope and**

### **Importance Natural Resources:**

### **Renewable and Nonrenewable Resources**

- (a) Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people and relevant forest Act.
- (b) Water resources: Use and over-utilization of surface and ground water, floods drought, conflicts over water, dams benefits and problems and relevant Act.
- (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.
- (d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.
- (e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.
- (f) Land resources: Land as a resource, land degradation, man induced landslides soil erosion and desertification.

**(12 Lecture)**

## **UNIT-II ECOSYSTEM**

### **(a) Concept, Structure and Function of and ecosystem**

- Producers, consumers and decomposers.
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids.
- Introduction, Types, Characteristics Features, Structure and Function of Forest, Grass, Desert and Aquatic Ecosystem.

### **(b) Biodiversity and its Conservation**

- Introduction - Definition: genetic, species and ecosystem diversity
- Bio-geographical classification of India.
- Value of biodiversity: Consumptive use, Productive use, social ethics, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as mega-diversity nation.

- Hot spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wild life conflict.
- Endangered and endemic species of India.
- Conservation of biodiversity: In situ and Ex-situ conservation of biodiversity.

**(12Lecture)**

### **UNIT- III**

#### **(a) Causes, effect and control measures of**

- Air water, soil, marine, noise, nuclear pollution and Human population.
- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Disaster Management: floods, earthquake, cyclone and landslides.

**(12Lecture)**

#### **(b) Environmental Management**

- From Unsustainable to sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, water shed management.
- Resettlement and rehabilitation of people, its problems and concerns.
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
- Wasteland reclamation
- Environment protection Act: Issues involved in enforcement of environmental legislation.
- Role of Information Technology in Environment and Human Health.

#### **UNIT- IV**

General background and historical perspective- Historical development and concept of Human Rights, Meaning and definition of Human Rights, Kind and Classification of Human Rights.

Protection of Human Rights under the UNO Charter, protection of Human Rights under the Universal Declaration of Human Rights, 1948.

Convention on the Elimination of all forms of Discrimination against women.

Convention on the Rights of the Child, 1989.

#### **UNIT-V**

Impact of Human Rights norms in India, Human Rights under the Constitution of India, Fundamental Rights under the Constitution of India, Directive Principles of State policy under the Constitution of India, Enforcement of Human Rights in India.

Protection of Human Rights under the Human Rights Act, 1993- National Human Rights Commission, State Human Rights Commission and Human Rights court in India.

Fundamental Duties under the Constitution of India.



## Reference/ Books Recommended

1. SK Kapoor- Human rights under International Law and Indian Law.
2. HO Agrawal- International Law and Human Rights
3. एस.के. कपूर —मानव अधिकार
4. जे.एन. पान्डेय — भारत का संविधान
5. एम.डी. चतुर्वेदी —भारत का संविधान
6. J.N.Pandey - Constitutional Law of India
7. Agarwal K.C. 2001 Environmental Biology, Nidi pub. Ltd. Bikaner
8. Bharucha Erach, the Biodiversity of India, Mapin pub. Ltd. Ahmedabad 380013, India, Email: mapin@icenet.net(R)
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10. Clark R.S. Marine pollution, Clanderson press Oxford (TB)
11. Cuningham, W.P. Cooper. T.H. Gorhani, E & Hepworth. M.T, 200
12. Dr. A.K.- Environmental Chemistry. Wiley Eastern Ltd.
13. Down to Earth, Center for Science and Environment (R)
14. Gloick, H.P. 1993 Water in crisis. Pacific Institute for Studies in Development, Environment & Security. Stockholm Eng. Institute. Oxford University, Press. 473p.
15. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Mumbai (R)
16. Heywood, V.H. & Watson, T.T. 1995 Global Biodiversity Assessment, Cambridge Univ. Press 1140p
17. Jadhav H. & Bhosale, V.H. 1995 Environmental Protection and Law. Himalaya pub. House, Delhi 284p
18. McKinney M.L. & School R.M. 1996, Environmental Science systems & solutions, web enhanced edition, 639p
19. Mhadkar A.K. Matter Hazardous, Techno-Science publication (TB)
20. Miller T.G. Jr. Environment Science, Wadsworth publication co. (TB)
21. Odum E.P. 1971, Fundamentals of Ecology, W.B. Saunders Co. USA, 574p
22. Rao M.N. & Datta, A.K. 1987, Waste water treatment. Oxford & IBH pub. co. pvt. Ltd 345p
23. Sharma B.K. 2001, Environmental chemistry, Goel pub. House, Meerut
24. Survey of the Environment, The Hindu (M)
25. Townsend C. Harper J. And Michael Begon, Essentials of Ecology, Blackwell Science (TB)
26. Trivedi R.K. Handbook of Environment Laws, Rules, Guidelines, Compliances and Standards, Vol I and II, Environment Media (R)
27. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science publication (TB)
28. Wanger K.D. 1998, Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

**संशोधित पाठ्यक्रम**  
बी.ए./ बी.एस-सी./ बी.कॉम./ बी.एच.एस.-सी.  
भाग - एक (आधार पाठ्यक्रम)  
प्रश्न पत्र- प्रथम (हिन्दी भाषा)  
(पेपर कोड -0101)

पूर्णांक- 75

नोट :-

1. प्रश्न पत्र 75 अंक का होगा।
2. प्रश्न पत्र अनिवार्य होगा।
3. इसके अंक श्रेणी निर्धारण के लिए जोड़े जायेंगे।
4. प्रत्येक इकाई के अंक समान होंगे।

**पाठ्य विषय :-**

**इकाई-1**

- क. पल्लवन, पत्राचार, अनुवाद, पारिभाषिक शब्दावली एवं हिंदी में पदनाम  
ख. ईदगाह (कहानी) - मुंशी प्रेमचंद

**इकाई-2**

- क. शब्द शुद्धि, वाक्य शुद्धि, शब्द ज्ञान-पर्यायवाची शब्द, विलोम शब्द, अनेकार्थी शब्द, समश्रुत शब्द, अनेक शब्दों के लिए एक शब्द एवं मुहावरे-लोकोक्तियाँ  
ख. भारत वंदना (कविता)- सूर्यकान्त त्रिपाठी निराला

**इकाई-3**

- क. देवनागरी लिपि - नामकरण, स्वरूप एवं देवनागरी लिपि की विशेषताएँ, हिंदी अपठित गद्यांश, संक्षेपण, हिंदी में संक्षिप्तीकरण  
ख. भोलाराम का जीव (व्यंग्य) - हरिशंकर परसाई

**इकाई-4**

- क. कम्प्यूटर का परिचय एवं कम्प्यूटर में हिंदी का अनुप्रयोग  
ख. शिकागो से स्वामी विवेकानंद का पत्र

**इकाई-5**

- क. मानक हिन्दी भाषा का अर्थ, स्वरूप, विशेषताएँ, मानक, उपमानक, अमानक भाषा  
ख. सामाजिक गतिशीलता - प्राचीन काल, मध्यकाल, आधुनिक काल

**मूल्यांकन योजना :-**

प्रत्येक इकाई से एक-एक प्रश्न पूछा जाएगा। प्रत्येक प्रश्न में आंतरिक विकल्प होगा। प्रत्येक प्रश्न के 15 अंक होंगे। प्रत्येक प्रश्न के दो भाग 'क' और 'ख' होंगे एवं अंक क्रमशः 8 एवं 7 होंगे। प्रश्न-पत्र का पूर्णांक 75 निर्धारित है।

### पाठ्यक्रम संशोधन का औचित्य :-

व्याकरण के बुनियादी ज्ञान, संप्रेषण, कौशल, सामाजिक संदेश एवं भाषायी दक्षता को ध्यान में रखते हुए यह पाठ्यक्रम प्रस्तावित है।

**FOUNDATION COURSE  
PAPER - II  
ENGLISH LANGUAGE  
(Paper code - 0792)**

**M.M. 75**

- UNIT-1**    **Basic Language skills : Grammar and Usage.**  
Grammar and Vocabulary based on the prescribed text.  
To be assessed by objective / multiple choice tests.  
(Grammar - 20 Marks  
Vocabulary - 15 Marks)
- UNIT-2**    **Comprehension of an unseen passage.**    **05**  
This should simply not only (a) an understanding of the passage in question, but also.  
(b) a grasp of general language skills and issues with reference to words and usage within the passage and (c) the Power of short independent composition based on themes and issues raised in the passage.  
To be assessed by both objective multiple choice and short answer type tests.
- UNIT-3**    **Composition : Paragraph writing**    **10**
- UNIT-4**    **Letter writing (The formal and one Informal)**    **10**  
Two letters to be attempted of 5 marks each. One formal and one informal.
- UNIT-5**    **Texts :**    **15**  
Short prose pieces (Fiction and not fiction) short poems, the pieces should cover a range of authors, subjects and contexts. With poetry if may sometimes be advisable to include pieces from earlier periods, which are often simpler than modern examples. In all cases, the language should be accessible (with a minimum of explanation and reference to standard dictionaries) to the general body of students schooled in the medium of an Indian language.  
Students should be able to grasp the contents of each piece ; explain specific words, phrases and allusions; and comment on general points of narrative or argument. Formal Principles of Literary criticism should not be taken up at this stage.

To be assessed by five short answers of three marks each.

**BOOKS PRESCRIBED -**

English Language and Indian Culture - Published by M.P. Hindi Grant Academy Bhopal.

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Semester  
2019-20

## PHYSICS

### OBJECTIVES OF THE COURSE

The undergraduate training in physics is aimed at providing the necessary inputs so as to set forth the task of bringing about new and innovative ideas/concepts so that the formulated model curricula in physics becomes in tune with the changing scenario and incorporate new and rapid advancements and multi disciplinary skills, societal relevance, global interface, self sustaining and supportive learning.

It is desired that undergraduate i.e. B.Sc. level besides grasping the basic concepts of physics should in addition have broader vision. Therefore, they should be exposed to societal interface of physics and role of physics in the development of technologies.


### EXAMINATION SCHEME:

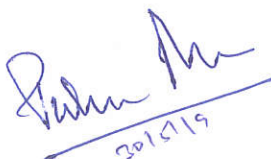
1. There shall be 2 theory papers of 3 hours duration each and one practical paper of 4 hours duration. Each paper shall carry 50 marks.
2. Numerical problems of at least 30% will compulsorily be asked in each theory paper.
3. In practical paper, each student has to perform two experiments one from each groups as listed in the list of experiments.
4. Practical examination will be of 4 hours duration- one experiment to be completed in 2 hours.

The distribution practical marks as follows:

Experiment	:	15+15=30
Viva voce	:	10
Internal assessment	:	10

5. The external examiner should ensure that at least 16 experiments are in working order at the time of examination and submit a certificate to this effect.

  
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Session 2019-20

PHYSICS

B.Sc. Part-I

Paper-I

**MECHANICS, OSCILLATIONS AND PROPERTIES OF MATTER**




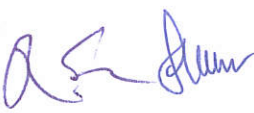
(Paper code 0793)

- Unit-1** Cartesian, Cylindrical and Spherical coordinate system, Inertial and non-inertial frames of reference, uniformly rotating frame, Coriolis force and its applications. Motion under a central force, Kepler's laws. Effect of Centrifugal and Coriolis forces due to earth's rotation, Center of mass (C.M.), Lab and C.M. frame of reference, motion of C.M. of system of particles subject to external forces, elastic, and inelastic collisions in one and two dimensions, Scattering angle in the laboratory frame of reference, Conservation of linear and angular momentum, Conservation of energy.
- Unit-2** Rigid body motion, rotational motion, moments of inertia and their products, principal moments & axes, introductory idea of Euler's equations. Potential well and Periodic Oscillations, case of harmonic small oscillations, differential equation and its solution, kinetic and potential energy, examples of simple harmonic oscillations: spring and mass system, simple and compound pendulum, torsional pendulum.
- Unit-3** Bifilar oscillations, Helmholtz resonator, LC circuit, vibrations of a magnet, oscillations of two masses connected by a spring. Superposition of two simple harmonic motions of the same frequency, Lissajous figures, damped harmonic oscillator, case of different frequencies. Power dissipation, quality factor, examples, driven (forced) harmonic oscillator, transient and steady states, power absorption, resonance.
- Unit-4** E as an accelerating field, electron gun, case of discharge tube, linear accelerator, E as deflecting field- CRO sensitivity, Transverse B field,  $180^\circ$  deflection, mass spectrograph, curvatures of tracks for energy determination, principle of a cyclotron. Mutually perpendicular E and B fields: velocity selector, its resolution. Parallel E and B fields, positive ray parabolas, discovery of isotopes, elements of mass spectrography, principle of magnetic focusing lens.
- Unit-5** Elasticity: Strain and stress, elastic limit, Hooke's law, Modulus of rigidity, Poisson's ratio, Bulk modulus, relation connecting different elastic- constants, twisting couple of a cylinder (solid and hollow), Bending moment, Cantilever, Young modulus by bending of beam.
- Viscosity: Poiseuille's equation of liquid flow through a narrow tube, equations of continuity. Euler's equation, Bernoulli's theorem, viscous fluids, streamline and turbulent flow. Poiseuille's law, Coefficient of viscosity, Stoke's law, Surface tension and molecular interpretation of surface tension, Surface energy, Angle of contact, wetting.

*[Handwritten signatures and initials in blue ink]*

### TEXT AND REFERENCE BOOKS:

1. E M Purcell, Ed Berkely physics course, vol. Mechanics (Mc. Gr. Hill) R P Feynman.
2. R B Lighton and M Sands, the Feynman lectures in physics, vol I (B) publications, Bombay, Delhi, Calcutta, Madras.
3. D P Khandelwal, Oscillations and waves (Himalaya Publishing House Bombay).
4. R. K. Ghosh, The Mathematics of waves and vibrations (Macmillan 1975).
5. J.C. Upadhyaya- Mechanics (Hindi and English Edition.)
6. D.S. Mathur- Mechanics and properties of matter.
7. Brijlal and Subramaniam- Oscillations and waves. Resnick and Halliday- Volume I
8. Physics Part -1: Resnick and Halliday.



Session 2019-20

PHYSICS

Paper-II

## ELECTRICITY, MAGNETISM AND ELECTROMAGNETIC THEORY

**Unit-1** Repeated integrals of a function of more than one variable, definition of a double and triple integral. Gradient of a scalar field and its geometrical interpretation, divergence and curl of a vector field, and their geometrical interpretation, line, surface and volume integrals, flux of a vector field. Gauss's divergence theorem, Green's theorem and Stoke's theorem and their physical significance. Kirchoff's law, Ideal Constant-voltage and Constant-current Sources. Thevenin theorem, Norton theorem, Superposition theorem, Reciprocity theorem and Maximum Power Transfer theorem.

**Unit-2** Coulomb's law in vacuum expressed in Vector forms, calculations of E for simple distributions of charges at rest, dipole and quadrupole fields. Work done on a charge in a electrostatic field expressed as a line integral, conservative nature of the electrostatic field. Relation between Electric potential and Electric field, torque on a dipole in a uniform electric field and its energy, flux of the electric field.  
Gauss's law and its application: E due to (1) an Infinite Line of Charge, (2) a Charged Cylindrical Conductor, (3) an Infinite Sheet of Charge and Two Parallel Charged Sheets, capacitors, electrostatic field energy, force per unit area of the surface of a conductor in an electric field, conducting sphere in a uniform electric field.

**Unit-3** Dielectric constant, Polar and Non Polar dielectrics, Dielectrics and Gauss's Law, Dielectric Polarization, Electric Polarization vector P, Electric displacement vector D. Relation between three electric vectors, Dielectric susceptibility and permittivity, Polarizability and mechanism of Polarization, Lorentz local field, Clausius Mossotti equation, Debye equation,

Ferroelectric and Paraelectric dielectrics, Steady current, current density J, non-steady currents and continuity equation, rise and decay of current in LR, CR and LCR circuits, decay constants, AC circuits, complex numbers and their applications in solving AC circuit problems, complex impedance and reactance, series and parallel resonance, Q factor, power consumed by an AC circuit, power factor.

**Unit-4** Magnetization Current and magnetization vector M, three magnetic vectors and their relationship, Magnetic permeability and susceptibility, Diamagnetic, paramagnetic and ferromagnetic substances. B.H. Curve, cycle of magnetization and hysteresis, Hysteresis loss.





Biot-Savart's Law and its applications: B due to (1) a Straight Current Carrying Conductor and (2) Current Loop. Current Loop as a Magnetic Dipole and its Dipole Moment (Analogy with Electric Dipole). Ampere's Circuital law (Integral and Differential Forms).

**Unit-5** Electromagnetic induction, Faraday's law, electromotive force, integral and differential forms of Faraday's law Mutual and self inductance, Transformers, energy in a static magnetic field. Maxwell's displacement current, Maxwell's equations, electromagnetic field energy density. The wave equation satisfied by E and B, plane electromagnetic waves in vacuum, Poynting's vector.

**TEXT AND REFERENCE BOOKS:**

1. Berkeley Physics Course, Electricity and Magnetism, Ed. E.M. Purcell (Mc Graw - Hill).
2. Halliday and Resnik, Physics, Vol. 2.
3. D J Griffith, Introduction to Electrodynamics (Prentice-Hall of India).
4. Raitz and Milford, Electricity and Magnetism (Addison-Wesley).
5. A S Mahajan and A A Rangwala, Electricity and Magnetism (Tata Mc Graw-hill).
6. A M Portis, Electromagnetic fields.
7. Pugh & Pugh, Principles of Electricity and Magnetism (Addison-Wesley).
8. Panofsky and Phillips, Classical Electricity and Magnetism, (India Book House).
9. S S Atwood, Electricity and Magnetism (Dover).



Session 2019-20

## PHYSICS

### PRACTICALS

Minimum 16 (Eight from each group)

Experiments out of the following or similar experiments of equal standard

#### GROUP-A

1. Study of laws of parallel and perpendicular axes for moment of inertia.
2. Moment of inertia of Fly wheel.
3. Moment of inertia of irregular bodies by inertia table.
4. Study of conservation of momentum in two dimensional oscillations.
5. Study of a compound pendulum.
6. Study of damping of a bar pendulum under various mechanics.
7. Study of oscillations under a bifilar suspension.
8. Study of modulus of rigidity by Maxwell's needle.
9. Determination of  $Y$ ,  $k$ ,  $\eta$  by Searl's apparatus.
10. To study the oscillation of a rubber band and hence to draw a potential energy curve from it.
11. Study of oscillation of a mass under different combinations of springs.
12. Study of torsion of wire (static and dynamic method).
13. Poisson's ratio of rubber tube.
14. Study of bending of a cantilever or a beam.
15. Study of flow of liquids through capillaries.
16. Determination of surface tension of a liquid.
17. Study of viscosity of a fluid by different methods.

#### GROUP-B

1. Use of a vibration magnetometer to study a field.
2. Study of magnetic field  $B$  due to a current.
3. Measurement of low resistance by Carey-Foster bridge.
4. Measurement of inductance using impedance at different frequencies.
5. Study of decay of currents in LR and RC circuits.
6. Response curve for LCR circuit and response frequency and quality factor.
7. Study of waveforms using cathode-ray oscilloscope.
8. Characteristics of a choke and Measurement of inductance.
9. Study of Lorentz force.
10. Study of discrete and continuous LC transmission line.
11. Elementary FORTRAN programs, Flowcharts and their interpretation.
12. To find the product of two matrices.
13. Numerical solution of equation of motion.
14. To find the roots of quadratic equation.



#### TEXT AND REFERENCE BOOKS:

1. B saraf et al Mechanical Systems(Vikas publishing House,New Delhi).
2. D.P. khandelwal, A Laboratory Manual of Physics for Undergraduate classes (Vani Publication House,New Delhi).
3. C G Lambe Elements of statistics (Longmans Green and Co London New York, Tprpnto).
4. C Dixon, Numerical analysis.
5. S Lipsdutz and A Poe, schaum's outline of theory and problems of programming with Fortran (MC Graw-Hill Book Company, Singapore 1986).

*M. P. B.*

*P. K. B.*

*Q. G.*

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*Jim*

**HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**  
**NEW CURRICULUM OF B.Sc. PART I**  
**Session 2019-20**  
**CHEMISTRY**

The new curriculum will comprise of three theory papers of 33, 33 and 34 marks each and practical work of 50 marks. The curriculum is to be completed in 180 working days as per the UGC norms & conforming to the directives of the Govt. of Chhattisgarh. The theory papers are of 60 hrs each duration and the practical work of 180 hrs duration.

**PAPER I**  
**INORGANIC CHEMISTRY**

60Hrs. M.M.33

**UNIT-I**

**A. ATOMIC STRUCTURE**

Bohr's theory, its limitation and atomic spectrum of hydrogen atom. General idea of de-Broglie matter-waves, Heisenberg uncertainty principle, Schrödinger wave equation, significance of  $\Psi$  and  $\Psi^2$ , radial & angular wave functions and probability distribution curves, quantum numbers, Atomic orbital and shapes of s, p, d orbitals, Aufbau and Pauli exclusion principles, Hund's Multiplicity rule, electronic configuration of the elements.

**B. PERIODIC PROPERTIES**

Detailed discussion of the following periodic properties of the elements, with reference to s and p-block. Trends in periodic table and applications in predicting and explaining the chemical behavior.

- a) Atomic and ionic radii,
- b) Ionization enthalpy,
- c) Electron gain enthalpy,
- d) Electronegativity, Pauling's, Mulliken's, Allred Rochow's scales.
- e) Effective nuclear charge, shielding or screening effect, Slater rules, variation of effective nuclear charge in periodic table.

**UNIT-II**

**CHEMICAL BONDING I**

**Ionic bond:** Ionic Solids - Ionic structures, radius ratio & co-ordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy Born- Haber cycle, Solvation energy and solubility of ionic solids, polarising power & polarisability of ions, Fajans rule, Ionic character in covalent compounds: Bond moment and dipole moment, Percentage ionic character from dipole moment and electronegativity difference, Metallic bond-free electron, Valence bond & band theories.

B.Sc.-I

*Aswini*  
20.6.2019

*Divyanshu*  
24.6.19

*Nalini*

*g. parthasarathi*

*V. J. Kumar*

### UNIT-III

#### CHEMICAL BONDING II

**Covalent bond:** Lewis structure, Valence bond theory and its limitations, Concept of hybridization, Energetics of hybridization, equivalent and non-equivalent hybrid orbitals. Valence shell electron pair repulsion theory (VSEPR), shapes of the following simple molecules and ions containing lone pairs and bond pairs of electrons:  $\text{H}_2\text{O}$ ,  $\text{NH}_3$ ,  $\text{PCl}_3$ ,  $\text{PCl}_5$ ,  $\text{SF}_6$ ,  $\text{H}_3\text{O}^+$ ,  $\text{SF}_4$ ,  $\text{ClF}_3$ , and  $\text{ICl}_2^-$ . Molecular orbital theory. Bond order and bond strength, Molecular orbital diagrams of diatomic and simple polyatomic molecules  $\text{N}_2$ ,  $\text{O}_2$ ,  $\text{F}_2$ ,  $\text{CO}$ ,  $\text{NO}$ .

### UNIT-IV

#### A. s-BLOCK ELEMENTS

General concepts on group relationships and gradation properties, Comparative study, salient features of hydrides, solvation & complexation tendencies including their function in biosystems and introduction to alkyl & aryls, Derivatives of alkali and alkaline earth metals

#### B. p-BLOCK ELEMENTS

General concepts on group relationships and gradation properties. Halides, hydrides, oxides and oxyacids of Boron, Aluminum, Nitrogen and Phosphorus. Boranes, borazines, fullerenes, graphene and silicates, interhalogens and pseudohalogens.

### UNIT-V

#### A CHEMISTRY OF NOBLE GASES

Chemical properties of the noble gases, chemistry of xenon, structure, bonding in xenon compounds

#### B. THEORETICAL PRINCIPLES IN QUALITATIVE ANALYSIS ( $\text{H}_2\text{S}$ SCHEME)

Basic principles involved in the analysis of cations and anions and solubility products, common ion effect. Principles involved in separation of cations into groups and choice of group reagents. Interfering anions (fluoride, borate, oxalate and phosphate) and need to remove them after Group II.

#### REFERENCE BOOKS:

1. Lee, J. D. Concise Inorganic Chemistry ELBS, 1991.
2. Douglas, B.E. and McDaniel, D.H. Concepts & Models of Inorganic Chemistry Oxford, 1970
3. Atkins, P.W. & Paula, J. Physical Chemistry, 10th Ed., Oxford University Press, 2014.
4. Day, M.C. and Selbin, J. Theoretical Inorganic Chemistry, ACS Publications, 1962.
5. Rodger, G.E. Inorganic and Solid State Chemistry, Cengage Learning India Edition, 2002.
6. Puri, B. R., Sharma, L. R. and Kalia, K. C., Principles of Inorganic Chemistry, Milestone Publishers/ Vishal Publishing Co.; 33rd Edition 2016
7. Madan, R. D. Modern Inorganic Chemistry, S Chand Publishing, 1987.

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## PAPER: II

### ORGANIC CHEMISTRY

#### UNIT-I      BASICS OF ORGANIC CHEMISTRY

Hybridization, Shapes of molecules, Influence of hybridization on bond properties. Electronic Displacements: Inductive, electromeric, resonance and mesomeric effects, hyperconjugation and their applications; Dipole moment. Electrophiles and Nucleophiles; Nucleophilicity and basicity; Homolytic and Heterolytic cleavage, Generation, shape and relative stability of Carbocations, Carbanions, Free radicals, Carbenes and Nitrenes. Introduction to types of organic reactions: Addition, Elimination and Substitution reactions.

#### UNIT-II      INTRODUCTION TO STEREOCHEMISTRY

Optical Isomerism: Optical Activity, Specific Rotation, Chirality/Asymmetry, Enantiomers, Molecules with two or more chiral-centres, Diastereoisomers, meso compounds, Relative and absolute configuration: Fischer, Newmann and Sawhorse Projection formulae and their interconversions; Erythrose and threose, D/L, d/l system of nomenclature, Cahn-Ingold-Prelog system of nomenclature (C.I.P rules), R/S nomenclature. Geometrical isomerism: cis-trans, syn-anti and E/Z notations.

#### UNIT-III      CONFORMATIONAL ANALYSIS OF ALKANES

Conformational analysis of alkanes, ethane, butane, cyclohexane and sugars. Relative stability and Energy diagrams. Types of cycloalkanes and their relative stability, Baeyer strain theory: Theory of strainless rings, Chair, Boat and Twist boat conformation of cyclohexane with energy diagrams; Relative stability of mono-substituted cycloalkanes and disubstituted cyclohexane.

#### UNIT-IV      CHEMISTRY OF ALIPHATIC HYDROCARBONS

##### A. Carbon-Carbon sigma ( $\sigma$ ) bonds

Chemistry of alkanes: Formation of alkanes, Wurtz Reaction, Wurtz-Fittig Reaction, Free radical substitutions: Halogenation-relative reactivity and selectivity.

##### B. Carbon-Carbon Pi ( $\pi$ ) bonds:

Formation of alkenes and alkynes by elimination reactions, Mechanism of E1, E2, E1cb reactions. Saytzeff and Hofmann eliminations.

B.Sc.-I

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Reactions of alkenes: Electrophilic additions and mechanisms (Markownikoff/Anti -Markownikoff addition), mechanism of oxymercuration-demercuration, hydroboration-oxidation, ozonolysis, reduction (catalytic and chemical), syn and anti-hydroxylation (oxidation). 1,2-and 1,4-addition reactions in conjugated dienes and, Diels-Alder reaction; Allylic and benzylic bromination and mechanism, e.g. propene, 1-butene, toluene, ethyl benzene.

Reactions of alkynes: Acidity, Electrophilic and Nucleophilic additions. Hydration to form carbonyl compounds, Alkylation of terminal alkynes.

## UNIT-V AROMATIC HYDROCARBONS

Aromaticity: Hückel's rule, aromatic character of arenes, cyclic carbocations/ carbanions and heterocyclic compounds with suitable examples. Electrophilic aromatic substitution: halogenation, nitration, sulphonation and Friedel-Craft's alkylation/acylation with their mechanism. Directive effects of the groups.

### REFERENCE BOOKS:

1. Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd.(Pearson Education).
2. Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
4. Eliel, E. L. & Wilen, S. H. Stereochemistry of Organic Compounds, Wiley: London, 1994.
5. Kalsi, P. S. Stereochemistry Conformation and Mechanism, New Age International, 2005.
6. McMurry, J.E. Fundamentals of Organic Chemistry, 7th Ed. Cengage Learning India Edition, 2013.
7. Organic Chemistry, Paula Y. Bruice, 2nd Edition, Prentice-Hall, International Edition (1998).
8. A Guide Book of Reaction Mechanism by Peter Sykes.

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**PAPER - III**  
**PHYSICAL CHEMISTRY**

M.M.34

**UNIT-I**

**MATHEMATICAL CONCEPTS FOR CHEMIST**

Basic Mathematical Concepts: Logarithmic relations, curve sketching, linear graphs, Properties of straight line, slope and intercept, Functions, Differentiation of functions, maxima and minima; integrals; ordinary differential equations; vectors and matrices; determinants; Permutation and combination and probability theory, Significant figures and their applications.

**UNIT-II**

**GASEOUS STATE CHEMISTRY**

Kinetic molecular model of a gas: postulates and derivation of the kinetic gas equation; collision frequency; collision diameter; mean free path; Maxwell distribution and its use in evaluating molecular velocities (average, root mean square and most probable) and average kinetic energy, law of equipartition of energy, degrees of freedom and molecular basis of heat capacities. Joule Thomson effect, Liquification of Gases.

Behaviour of real gases: Deviations from ideal gas behaviour, compressibility factor ( $Z$ ), and its variation with pressure and temperature for different gases. Causes of deviation from ideal behaviour. van der Waals equation of state, its derivation and application in explaining real gas behaviour, calculation of Boyle temperature. Isotherms of real gases and their comparison with van der Waals isotherms, continuity of states, critical state, relation between critical constants and van der Waals constants, law of corresponding states.

**UNIT-III**

**A. LIQUID STATE CHEMISTRY**

Intermolecular forces, magnitude of intermolecular force, structure of liquids, Properties of liquids, viscosity and surface tension.

**B. COLLOIDS and SURFACE CHEMISTRY**

Classification, Optical, Kinetic and Electrical Properties of colloids, Coagulation, Hardy Schulze law, flocculation value, Protection, Gold number, Emulsion, micelles and types, Gel, Syneresis and thixotrophy, Application of colloids.

Physical adsorption, chemisorption, adsorption isotherms (Langmuir and Freundlich). Nature of adsorbed state. Qualitative discussion of BET.

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## UNIT-IV

### SOLID STATE CHEMISTRY

Nature of the solid state, law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry, symmetry elements and symmetry operations, qualitative idea of point and space groups, seven crystal systems and fourteen Bravais lattices; X-ray diffraction, Bragg's law, a simple account of rotating crystal method and powder pattern method.

Crystal defects.

## UNIT-V

### A. CHEMICAL KINETICS

Rate of reaction, Factors influencing rate of reaction, rate law, rate constant, Order and molecularity of reactions, rate determining step, Zero, First and Second order reactions, Rate and Rate Law, methods of determining order of reaction, Chain reactions.

Temperature dependence of reaction rate, Arrhenius theory, Physical significance of Activation energy, collision theory, demerits of collision theory, non mathematical concept of transition state theory.

### B. CATALYSIS

Homogeneous and Heterogeneous Catalysis, types of catalyst, characteristic of catalyst, Enzyme catalysed reactions, Micellar catalysed reactions, Industrial applications of Catalysis.

### REFERENCE BOOKS:

1. Atkins, P. W. & Paula, J. de Atkin's Physical Chemistry 10th Ed., Oxford University Press (2014).
2. Ball, D. W. Physical Chemistry Thomson Press, India (2007).
3. Castellan, G. W. Physical Chemistry 4th Ed. Narosa (2004).
4. Mortimer, R. G. Physical Chemistry 3rd Ed. Elsevier: NOIDA, UP (2009).
5. Engel, T. & Reid, P. Physical Chemistry 3rd Ed. Pearson (2013).
6. Puri, B.R., Sharma, L. R. and Pathania, M.S., Principles of Physical Chemistry, Vishal Publishing Co., 47th Ed. (2016).
7. Bahl, A., Bahl, B.S. and Tuli, G.D. Essentials of Physical Chemistry, S Chand Publishers (2010).
8. Rakshit P.C., Physical Chemistry, Sarat Book House Ed. (2014).
9. Singh B., Mathematics for Chemist, Pragati Publications.

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# PAPER - IV

## LABORATORY COURSE

### INORGANIC CHEMISTRY

A. Semi-micro qualitative analysis (using  $\text{H}_2\text{S}$  or other methods) of mixtures - not more than four ionic species (two anions and two cations, excluding interfering, insoluble salts) out of the following:

Cations :  $\text{NH}_4^+$ ,  $\text{Pb}^{2+}$ ,  $\text{Bi}^{3+}$ ,  $\text{Cu}^{2+}$ ,  $\text{Cd}^{2+}$ ,  $\text{Fe}^{3+}$ ,  $\text{Al}^{3+}$ ,  $\text{Co}^{2+}$ ,  $\text{Ni}^{2+}$ ,  $\text{Mn}^{2+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Ba}^{2+}$ ,  $\text{Sr}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Na}^+$   
Anions :  $\text{CO}_3^{2-}$ ,  $\text{S}^{2-}$ ,  $\text{SO}_3^{2-}$ ,  $\text{S}_2\text{O}_3^{2-}$ ,  $\text{NO}_2^-$ ,  $\text{CH}_3\text{COO}^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{NO}_3^-$ ,  $\text{SO}_4^{2-}$

(Spot tests may be carried out wherever feasible)

### B. Acid-Base Titrations

- Standardization of sodium hydroxide by oxalic acid solution.
- Determination of strength of  $\text{HCl}$  solution using sodium hydroxide as intermediate.
- Estimation of carbonate and hydroxide present together in mixture.
- Estimation of carbonate and bicarbonate present together in a mixture.
- Estimation of free alkali present in different soaps/detergents

### C. Redox Titrations

- Standardization of  $\text{KMnO}_4$  by oxalic acid solution.
- Estimation of  $\text{Fe(II)}$  using standardized  $\text{KMnO}_4$  solution.
- Estimation of oxalic acid and sodium oxalate in a given mixture.
- Estimation of  $\text{Fe(II)}$  with  $\text{K}_2\text{Cr}_2\text{O}_7$  using internal (diphenylamine, anthranilic acid) and external indicator.

### D. Iodo / Iodimetric Titrations

- Estimation of  $\text{Cu(II)}$  and  $\text{K}_2\text{Cr}_2\text{O}_7$  using sodium thiosulphate solution iodimetrically.
- Estimation of (a) arsenite and (b) antimony iodimetrically.
- Estimation of available chlorine in bleaching powder iodometrically.
- Estimation of Copper and Iron in mixture by standard solution of  $\text{K}_2\text{Cr}_2\text{O}_7$  using sodium thiosulphate solution as titrants.

### ORGANIC CHEMISTRY

1. Demonstration of laboratory Glasswares and Equipments.
2. Calibration of the thermometer.  $80^\circ\text{--}82^\circ$  (Naphthalene),  $113.5^\circ\text{--}114^\circ$  (Acetanilide),  $132.5^\circ\text{--}133^\circ$  (Urea),  $100^\circ$  (Distilled Water).
3. Purification of organic compounds by crystallization using different solvents.
  - Phthalic acid from hot water (using fluted filter paper and stemless funnel).
  - Acetanilide from boiling water.
  - Naphthalene from ethanol.
  - Benzoic acid from water.

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4. Determination of the melting points of organic compounds.

Naphthalene 80°–82°, Benzoic acid 121.5°–122°, Urea 132.5°–133° Succinic acid 184.5°–185°, Cinnamic acid 132.5°–133°, Salicylic acid 157.5°–158°, Acetanilide 113.5°–114°, m-Dinitrobenzene 90°, p-Dichlorobenzene 52°, Aspirin 135°.

5. Effect of impurities on the melting point – mixed melting point of two unknown organic compounds.

- Urea – Cinnamic acid mixture of various compositions (1:4, 1:1, 4:1).

6. Determination of boiling point of liquid compounds. (boiling point lower than and more than 100 °C by distillation and capillary method).

- Ethanol 78°, Cyclohexane 81.4°, Toluene 110.6°, Benzene 80°.

i. Distillation (Demonstration)

- Simple distillation of ethanol-water mixture using water condenser.
- Distillation of nitrobenzene and aniline using air condenser.

ii. Sublimation

- Camphor, Naphthalene, Phthalic acid and Succinic acid.

iii. Decolorisation and crystallization using charcoal.

- Decolorisation of brown sugar with animal charcoal using gravity filtrations crystallization and decolorisation of impure naphthalene (100 g of naphthalene mixed with 0.3 g of Congo red using 1 g of decolorizing carbon) from ethanol.

7. Qualitative Analysis

Detection of elements (N, S and halogens) and functional groups (Phenolic, Carboxylic, Carbonyl, Esters, Carbohydrates, Amines, Amides, Nitro and Anilide) in simple organic compounds.

## PHYSICAL CHEMISTRY

1. Surface tension measurements.

- Determine the surface tension by (i) drop number (ii) drop weight method.
- Surface tension composition curve for a binary liquid mixture.

2. Viscosity measurement using Ostwald's viscometer.

- Determination of viscosity of aqueous solutions of (i) sugar (ii) ethanol at room temperature.

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- Study of the variation of viscosity of sucrose solution with the concentration of solute.
- Viscosity Composition curve for a binary liquid mixture.

### 3. Chemical Kinetics

- To determine the specific rate of hydrolysis of methyl/ethyl acetate catalysed by hydrogen ions at room temperature.
- To study the effect of acid strength on the hydrolysis of an ester.
- To compare the strengths of HCl & H<sub>2</sub>SO<sub>4</sub> by studying the kinetics of hydrolysis of ethyl acetate.

### 4. Colloids

- To prepare colloidal solution of silver nanoparticles (reduction method) and other metal nanoparticles using capping agents.

**Note: Experiments may be added/ deleted subject to availability of time and facilities**

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## PRACTICAL EXAMINATION

05 Hrs. M.M. 50

Three experiments are to be performed

1. Inorganic Mixture Analysis, four radicals two basic & two acid (excluding insoluble, Interfering & combination of acid radicals) OR Two Titrations (Acid-Bases, Redox and Iodo/Iodimetry)

**12 marks**

2. Detection of functional group in the given organic compound and determine its MPt/BPt.

**8 marks**

OR

Crystallization of any one compound as given in the prospectus along with the Determination of mixed MPt.

OR

Decolorisation of brown sugar along with sublimation of camphor/ Naphthlene.

3. Any one physical experiment that can be completed in two hours including calculations.

**14 marks**

4. Viva

**10 marks**

5. Sessionals

**06 marks**

In case of Ex-Students two marks will be added to each of the experiments

### REFERENCE TEXT:

1. Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6th Ed., Pearson, 2009.
2. Ahluwalia, V. K., Dhingra, S. and Gulati, A. College practical Chemistry, University Press.
3. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
4. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5th Ed., Pearson (2012)
5. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011).
6. Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. Experiments in Physical Chemistry 8th Ed.; McGraw-Hill: New York (2003).
7. Halpern, A. M. & McBane, G. C. Experimental Physical Chemistry 3rd Ed.; W.H. Freeman & Co.: New York (2003).

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# **Hemchand Yadav Vishwavidyala, Durg (C.G.)**

## **Zoology**

### **B.Sc. Part I (2019-20)**

#### **Paper I**

#### **(Cell Biology and Non-chordata)**

##### **Unit:I**

1. The cell (Prokaryotic and Eukaryotic)
2. Organization of Cell: Extra-nuclear and nuclear  
Plasma membrane, Mitochondria, Endoplasmic reticulum, Golgi body, Ribosome and Lysosome).
3. Nucleus, Chromosomes, DNA and RNA

##### **Unit:II**

1. Cell division (Mitosis and Meiosis).
2. An elementary idea of Cancer cells And Cell transformation.
3. An elementary idea of Immunity: Innate & Acquired Immunity, Lymphoid organs, Cells of Immune System, Antigen, antibody and their interactions

##### **Unit:III**

- General characters and classification of Phylum Protozoa, Porifera, and Coelenterata up to order.
2. Protozoa: Type study - Paramecium,
  2. Porifera: Type study - Sycon.
  3. Coelenterata: Type study - Obelia

##### **Unit: IV**

- General characters and classification of Phylum Platyhelminthes, Nematelminthes, Annelida and Arthropoda up to order.
2. Platyhelminthes and Nematelminthes: Type Study – Fasciola, Ascaris
  3. Annelida: Type Study - Pheretima.
  4. Arthropoda: Type Study - Palaemone.

##### **Unit:V**

- General characters and classification of Phylum Mollusca and Echinodermata up to order.
2. Mollusca: Type Study - Pila.
  3. Echinodermata- Type Study- Asterias (Starfish).

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**Zoology**  
**B.Sc. Part I (2019-20)**  
**Paper II**  
**(Chordata and Embryology)**

**Unit:I**

1. Classification of Hemichordata
2. Hemichordata- Type study-Balanoglossus
3. Classification of Chordates upto orders..
4. Protochordata-Type study - Amphioxus.
5. A comparative account of Petromyzon and Myxine.

**Unit-II**

1. Fishes-Skin & Scales, migration in fishes, Parental care in fish.
2. Amphibia-Parental care and Neoteny.
3. Reptilia- Poisonous & Non-poisonous Snakes, Poison apparatus, snake venom and Extinct Reptiles

**Unit:-III**

1. Birds- Flight Adaptation, Migration, and Perching mechanism, Discuss-Birds are glorified reptiles.
2. Mammals-Comparative account of Prototheria, Metatheria, Eutheria and Affinities.
3. Aquatic Mammals and their adaptations.

**Unit:IV**

**1. Fertilization**

2. Gametogenesis, Structure of gamete and Types of eggs
3. Cleavage
4. Development of Frog up to formation of three germ layers.
5. Parthenogenesis

**Unit:V**

1. Embryonic induction, Differentiation and Regeneration.
2. Development of Chick (a) up to formation of three germ layers, (2) Extra-embryonic membranes.
3. Placenta in mammals.

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**Zoology**  
**B.Sc. Part I (2019-20)**  
**Practical**

The practical work will, in general be based on the syllabus prescribed in theory and the candidates will be required to show knowledge of the following:-

- Dissection of Earthworm, Cockroach, Palaemon and Pila
- Minor dissection—appendages of Prawn & hastate plate, mouth parts of insects, radulla of Pila.

**(Alternative methods: By Clay/Thermacol/drawing/Model etc.)**

- Adaptive characters of Aquatic, terrestrial, aerial and desert animals.
- Museum specimen invertebrate
- Slides- Invertebrates, frog embryology, Chick embryology and cytology,

**Scheme of Practical Exam**

**Time: 3hrs**

1. Major Dissection	10 Marks
2. Minor Dissection	05 Marks
3. Comments on Excercise based on Adaptation	04 Marks
4. Cytological Preparation	05 Marks
5. Spots-8 (Slides-4, Specimens-4)	16 Marks
6. Sessional	10 Marks

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## B.Sc.- I (BOTANY) PAPER-I

### BACTERIA, VIRUSES, FUNGI, LICHENS AND ALGAE

#### UNIT-I

**VIRUSES:** General characteristics, types of viruses based on structure and genetic material. Multiplication of viruses (General account), Lytic and Lysogenic cycle. Economic importance. Structure and multiplication of Bacteriophages. General account of Viroids, Virusoids, Prions, and Cyanophages. Mycorrhiza-Types and Significance.

#### UNIT -II

**BACTERIA:** General characteristics and classification (on the basis of morphology), fine structure of bacterial cell, Gram positive and Gram negative bacteria, mode of nutrition and reproduction vegetative, asexual and recombination (Conjugation, transformation and transduction), Economic importance. Microbial Biotechnology, *Rhizobium*, *Azotobacter*, *Anabena*.

#### UNIT-III

**FUNGI:** General account of habit and habitat, structure (range of thallus organization), cell wall composition, nutrition and reproduction in fungi. Heterothallism and Parasexuality. Outlines of classification of fungi. Economic importance of fungi. Life cycles of *Saprolegnia*, *Albugo*, *Aspergillus*, *Peziza*, *Agaricus*, *Ustilago*, *Puccinia*, *Alternaria* and *Cercospora*. VAM Fungi

#### UNIT-IV

**ALGAE:** Algae: General characters, range of thallus organization, Gaidukov phenomenon, reproduction, life cycle patterns and economic importance. Classification, Systematic position, occurrence, structure and life cycle of following genera : *Nostoc*, *Gloeocapsa*, *Volvox*, *Oedogonium*, *Vaucheria*, *Chara*, *Ectocarpus*, *Polysiphonia*.

#### UNIT -V

Lichens- General account, types, structure, nutrition, reproduction and economic importance. Mycoplasma: Structure and importance. Blue Green Algae (BGA) in nitrogen economy of soil and reclamation of Ushar land. Mushroom Biotechnology

#### Books Recommended:

Dubey R.C. and Maheshwari D.K. *A text book of Microbiology*, S. Chand Publishing, New Delhi

Presscott, L. Harley, J. and Klein, D. *Microbiology*, 7<sup>th</sup> edition, Tata Mc Graw-Hill Co. New Delhi.

Sharma P.D., *Microbiology and Plant pathology*, Rastogi Publication. New Delhi.

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Alexopolous, C.J. Mims, C.W. and Blackwell, MM. *Introduction to Mycology*, John Wiley & Sons.

Dubey H.C. *An Introduction to Fungi*, Vikas Publishing, New Delhi

Mehrotra R.S. & Agrawal A., *Plant Pathology*, Tata McGraw, New Delhi

Sharma P.D. *Plant Pathology*, Rastogi Publishers, Meeruth.

Sristava, H.N. *Fungi*, Pradeep Publications, Jalandhar

Webster, J. & Weber, R. *Introduction to Fungi*, Cambridge University Press, Cambridge

Kumar H.D. *Introduction to phycology*, Aff. East-west Press, New Delhi

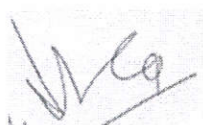
Lee RE, *Phycology*, Cambridge University Press U.K.

Srivastava, H.N., *Algae*, Pradeep Publications, Jalandhar

Pandey S.K. Quick *Concept of Botany*, Lambert Academic publishing, Germany

Pandey S.N., Mishra S.P. & Trivedi P.S. *A Text Book of Botany* (Vol.-I), Vikas Publishing, New Delhi

Singh, Pandey and Jain, *A Text book of Botany*, Rastogi Publication, Meerut.

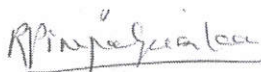


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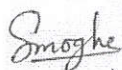


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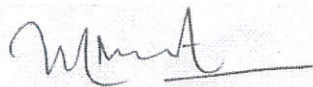
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Govt. Bilasa Girls College, Bilaspur



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**B.Sc.-I (BOTANY) PAPER –II**  
**(BRYOPHYTES, PTERIDOPHYTES, GYMNOSPERMS AND**  
**PALAEOBOTANY)**

**UNIT –I**

**BRYOPHYTA:** General characteristics, affinities, range of thallus organization, general classification and economic & ecological importance, Systematic position, occurrence, morphology anatomy and reproductive structure in *Riccia*, *Marchantia*, *Pellia*, *Anthoceros*, *Funaria*. Vegetative reproduction in Bryophytes, Evolution of sporophytes.

**UNIT-II**

**PTERIDOPHYTES:** General characteristics, affinities, economic importance and classification, Heterospory and seed habit, stellar system in Pteridophytes, Aposory and apogamy, Telome theory, *Azolla* as Biofertilizer.

**UNIT-III**

Systematic position, occurrence. Morphology, anatomy and reproductive structure of *Psilotum*, *Lycopodium*, *selaginella*, *Equisetum*, *Marsilea*.

**UNIT-IV**

Gymnosperm: General characteristics, affinities, economic importance and classification, Morphology, anatomy and reproduction in *Cycas*, *Pinus* and *Ephedra*.

**UNIT-V**

**PALAEOBOTANY:** Geological time scale, types of fossils and fossilization, Rhynia, study of some fossil gymnosperms. *Lygenopteris*

**Books Recommended:**

Parihar, N.S. *The Biology and Morphology of Pteridophytes*, Central Book Depot, Allahabad.

Parihar, N.S. *An introduction to Bryophyta Vol.I: Bryophytes* Central Book Depot, Allahabad.

Sambamurthy, AVSS, *A textbook of Bryophytes, Pteridophytes, Gymnosperms and Palaeobotany*, IK International Publishers.

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Pandey SN, Mishra SP and Trivedi PS *A text Book of Botany (Vol.II)*, Vikas Publishing, New Delhi

Bhatanagar, SP and Moitra, A. *Gymnosperm*, New Age International (P) Ltd., Publishers, New Delhi

Biswas C. and Johri BM, *The Gymnosperms*, Springer-Verlag, Germany.

Srivastava, HN, *Palaeobotany*, Pradeep Publications Jalandhar

Srivastava, HN, Bryophyta, Pradeep Publications Jalandhar

Singh, Pandey and Jain, *A Text Book of Botany*, Rastogi Publication, Meerut

Sristava, HN, *Fundamentals of Pteridophytes*, Pradeep Publications, Jalandhar

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Pradeep  
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## B.Sc. I (BOTANY)

### PRACTICAL

Study of external (Morphological) and internal (microscopic/anatomical) features of representative genera given in the theory.

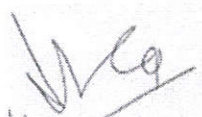
1. Algae: Gloeocapsa, Scytonema, Gloeotrichia, Volvox, Oedogonium, Vaucheria, Chara, Ectocarpus, Sargassum, Batrachospermum
2. Gram staining
3. Fungi: Albugo, Aspergillus, Peziza, Agaricus, Puccinia, Alternaria and Cercospora
4. Bryophyta: Riccia, Marchantia, Peltia, Anthoceros, Sphagnum, Funaria
5. Pteridophyta: Lycopodium, Selaginella, Equisetum, Marsilea.
6. Gymnosperm: Cycas, Pinus, Ephedra.

### PRACTICAL SCHEME

TIME: 4 Hrs.

M.M. : 50

1.	Algae/Fungi/Gram Staining	10
2.	Bryophyta/Pteridophyta	10
3.	Gymnosperm	10
4.	Spotting	10
5.	Viva-Voce	05
6.	Sessional	05

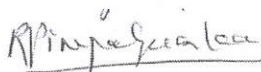


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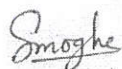


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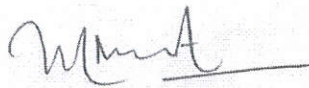
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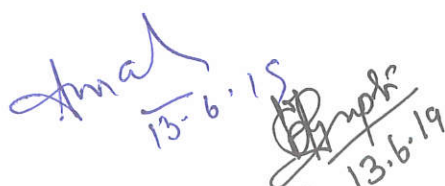
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## MATHEMATICS

There shall be three compulsory papers. Each paper of 50 marks is divided into five units and each unit carry equal marks.

### B.Sc. Part-I MATHEMATICS

#### PAPER - I ALGEBRA AND TRIGONOMETRY

**UNIT-I** Elementary operations on matrices, Inverse of a matrix. Linear independence of row and column matrices, Row rank, column rank and rank of a matrix. Equivalence of column and row ranks. Eigenvalues, eigenvectors and the characteristic equations of a matrix. Cayley Hamilton theorem and its use in finding inverse of a matrix.

**UNIT-II** Application of matrices to a system of linear (both homogeneous and nonhomogeneous) equations. Theorems on consistency of a system of linear equations. Relation between the roots and coefficients of general polynomial equations in one variable. Transformation of equations. Descarte's rule of signs. Solutions of cubic equations (Cardons method), Biquadratic equation.

**UNIT-III** Mappings, Equivalence relations and partitions. Congruence modulo  $n$ . Definition of a group with examples and simple properties. Subgroups, generation of groups, cyclic groups, coset decomposition, Lagrange's theorem and its consequences. Fermat's and Euler's theorems. Normal subgroups. Quotient group, Permutation groups. Even and odd permutations. The alternating groups  $A_n$ . Cayley's theorem.

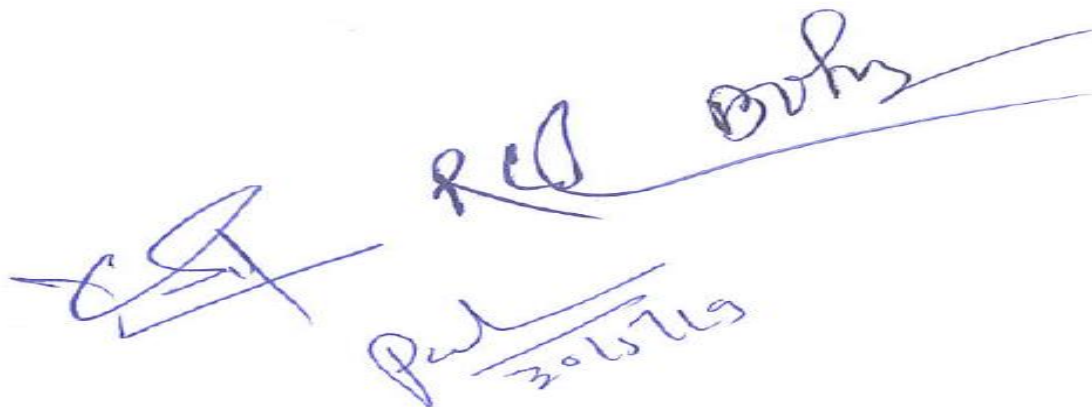
**UNIT-IV** Homomorphism and Isomorphism of groups. The fundamental theorems of homomorphism. Introduction, properties and examples of rings, Subrings, Integral domain and fields Characteristic of a ring and Field.

#### TRIGONOMETRY :

**UNIT-V** De-Moivre's theorem and its applications. Direct and inverse circular and hyperbolic functions. Logarithm of a complex quantity. Expansion of trigonometrical functions. Gregory's series. Summation of series.

#### TEXT BOOK :

1. I.N. Herstein, Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975
2. K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd. New Delhi, 2000.
3. Chandrika Prasad, Text-Book on Algebra and Theory of equations, Pothishala Private Ltd., Allahabad.
4. S.L. Loney, Plane Trigonometry Part II, Macmillan and Company, London.



Handwritten signatures and dates in blue ink. The signatures are stylized and appear to be of the same person. One signature is dated 30/5/19.

**REFERENCES :**

1. P.B. Bhattacharya, S.K. Jain and S.R. Nagpaul, First Course in linear Algebra, Wiley Eastern, New Delhi, 1983.
2. P.B. Bhattacharya, S.K.Jain and S.R. Nagpaul, Basic Abstract Algebra (2 edition), Cambridge University Press, Indian Edition, 1997.
3. S.K. Jain, A. Gunawardena and P.B. Bhattacharya, Basic linear Algebra with MATLAB, Key College Publishing (Springer-Verlag), 2001.
4. H.S. Hall and S.R. Knight, Higher Algebra, H.M. Publications, 1994.
5. R.S. Verma and K.S. Shukla, Text Book on Trigonometry, Pothishala Pvt. Ltd., Allahabad.

The bottom of the page contains three handwritten signatures in blue ink. The signature on the left is a stylized 'S' with a horizontal line. The middle signature is 'R.C. Verma' with a long horizontal line extending to the right. The signature on the right is 'R.S. Verma' with a horizontal line. Below the 'R.S. Verma' signature is the date '30/5/19'.

**B.Sc. Part-I**  
**MATHEMATICS**  
**PAPER - II**  
**CALCULUS**

**DIFFERENTIAL CALCULUS :**

**UNIT-I**  $\varepsilon - \delta$  definition of the limit of a function. Basic properties of limits. Continuous functions and classification of discontinuities. Differentiability. Successive differentiation. Leibnitz theorem. Maclaurin and Taylor series expansions.

**UNIT-II** Asymptotes. Curvature. Tests for concavity and convexity. Points of inflexion. Multiple points. Tracing of curves in cartesian and polar coordinates.

**INTEGRAL CALCULUS:**

**UNIT-III** Integration of transcendental functions. Reduction formulae. Definite integrals. Quadrature. Rectification. Volumes and surfaces of solids of revolution.

**ORDINARY DIFFERENTIAL EQUATIONS :**

**UNIT-IV** Degree and order of a differential equation. Equations reducible to the linear form. Exact differential equations. First order higher degree equations solvable for x, y, p. Clairaut's form and singular solutions. Geometrical meaning of a differential equation. Orthogonal trajectories. Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations.

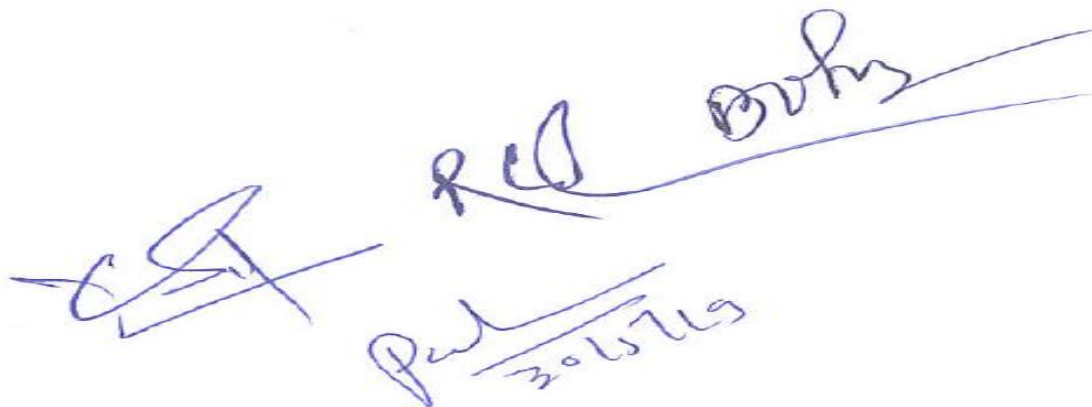
**UNIT-V** Linear differential equations of second order. Transformation of the equation by changing the dependent variable/the independent variable. Method of variation of parameters. Ordinary simultaneous differential equations.

**TEXT BOOK :**

1. Gorakh Prasad, Differential Calculus, Pothishala Private Ltd. Allahabad.
2. Gorakh Prasad, Integral Calculus, Pothishala Private Ltd. Allahabad.
3. D.A. Murray Introductory Course in Differential Equations, Orient Longman (India), 1976.

**REFERENCES :**

1. Gabriel Klambauer, Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975.
2. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum's outline series, Schaum Publishing Co. New York.
3. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
4. P.K. Jain and S.K. Kaushik, An Introduction to Real Analysis, S. Chand & Co. New Delhi, 2000.
5. G.F. Simmons, Differential Equations, Tata Mc Graw Hill, 1972.
6. E.A. Codington, An Introduction to Ordinary Differential Equations, Prentics Hall of India, 1961.
7. H.T.H. Piaggio, Elementary Treatise on Differential Equations and their Applications, C.B.S. Publishe & Distributors, Dehli, 1985.
8. W.E. Boyce and P.O. Dprima, Elementary Differential Equations and Boundary Value Problems, John Wiley, 1986.
12. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley and Sons, 1999.

  
Three handwritten signatures in blue ink are visible. The top signature is a cursive 'Red' followed by a flourish. Below it, another signature is partially visible. At the bottom, a date '30/5/19' is written in blue ink.



**B.Sc. Part-I**  
**MATHEMATICS**  
**PAPER - III**  
**VECTOR ANALYSIS AND GEOMETRY**

**VECTOR ANALYSIS :**

- UNIT-I**      Scalar and vector product of three vectors. Product of four vectors. Reciprocal Vectors. Vector differentiation. Gradient, divergence and curl.
- UNIT-II**      Vector integration. Theorems of Gauss, Green, Stokes and problems based on these.
- UNIT-III**     General equation of second degree. Tracing of conics. System of conics. Confocal conics. Polar equation of a conic.
- UNIT-IV**     Sphere. Cone. Cylinder.
- UNIT-V**      Central Conicoids. Paraboloids. Plane sections of conicoids. Generating lines. Confocal Conicoids. Reduction of second degree equations.

**TEXT BOOKS :**

1. N. Saran and S.N. Nigam, Introduction to vector Analysis, Pothishala Pvt. Ltd. Allahabad.
2. Gorakh Prasad and H.C. Gupta, Text Book on Coordinate Geometry, Pothishala Pvt. Ltd., Allahabad.
3. R.J.T. Bell, Elementary Treatise on Coordinate Geometry of three dimensions, Machmillan India Ltd. 1994.

**REFERENCES :**

1. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Company, New York.
2. Murray R. Spiegel, Vector Analysis, Schaum Publishing Company, New York.
3. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 1999.
4. Shanti Narayan, A Text Book of Vector Calculus, S. Chand & Co., New Delhi.
5. S.L. Loney, The Elements of Coordinate Geometry, Macmillan and Company, London.
6. P.K. Jain and Khalil Ahmad, A Text Book of Analytical Geometry of two Dimensions, Wiley Eastern Ltd., 1994.
7. P.K. Jain and Khalil Ahmad, A Text Book of Analytical Geometry of three Dimensions, Wiley Eastern Ltd., 1999.
8. N. Saran and R.S. Gupta, Analytical Geometry of three Dimensions, Pothishala Pvt. Ltd. Allahabad.

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# MICROBIOLOGY

## BSc-1<sup>st</sup>

### Paper- I: General Microbiology & Basic Technique

#### UNIT-1: Fundamental, History & Developments

Introduction to major groups of microorganisms and fields of Microbiology; Historical development, Contributions of Pioneers (Louis Pasteur, Edward Jenner, Anton Von Leewenhoeck and Alexander Flemming). Beneficial and harmful microbes and its role in daily life.

#### UNIT-2: Basic Microbial Techniques

Methods of studying microorganism; Sterilization Techniques (Physical & Chemical Sterilization). Pure culture isolation Technique: Streaking, Waksman serial dilution and plating methods. cultivation, maintenance and preservation of pure cultures. Culture media & conditions for microbial growth. Staining technique: simple staining, Differential (gram staining), negative staining and acid fast staining.

#### UNIT-3: Virology & Bacteriology

Diversity of microbial world; Principle and classification of Viruses and Bacteria. Structure, Multiplication and Economic importance of viruses (TMV, Influenza virus & T<sub>4</sub>-Phage). Structure & Functional organization of Bacteria, Cell wall of Gram Positive & Gram Negative bacteria; Economic importance of Bacteria.

#### UNIT-4: Mycology

General characteristics and classification of Fungi; Structure and Reproduction of fungi (*Rhizopus*, *Penicillium*, *Aspergillus*, *Yeast* & *Agaricus*). Common fungal disease of crops (Late & Early blight of potato, Smut of Rice, Tikka and Red rot of Sugarcane). Structure, reproduction and economic aspect of Lichens.

#### UNIT-5: Phycology & Protozoology

General characteristics and classification of Algae and Protozoa; General account & economic importance of Cyanobacteria (*Microcystis*, *Oscillatoria*, *Nostoc* & *Anabaena*) and Protozoa (*Amoeba*, *Paramoecium*, *Euglena* and *plasmodium*).

*Oscillatoria*

#### Text Books Recommended:

1. General microbiology; Vol I & II, Powar C. B. and Dagainawala H. I., Himalaypub.house, Bombay.
2. A textbook of Microbiology; Dubey & Maheshwari.
3. Microbiology: An Introduction; G. Tor tora, B. Funke, C. Benjamin Cummings.
4. General Microbiology; Seventh edition by Hans G Schlegel, Cambridge University Press.
5. Practical Microbiology; Dubey and Maheshwari.
6. Handbook of Microbiology; Bisen P.S., Varma K., CBS Publishers and Distributors, Delhi. General Microbiology by Brock.
7. General Microbiology by Pelzar et al.
8. Introduction on Microbial Techniques by Gunasekaran.

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## Paper- II: Biochemistry and Physiology

### UNIT-1: CARBOHYDRATES AND PROTEINS

Structure, classification and properties of Carbohydrates – Monosaccharide, Oligosaccharides (Disaccharides) and Polysaccharides. Structure, classification and properties of Protein - Amino acids, peptides and Proteins (Primary, Secondary, Tertiary and Quaternary structure).

### UNIT-2: LIPIDS AND NUCLEIC ACIDS

Structure, classification and properties of Lipids; Saturated and Unsaturated fatty acids. Structure and properties of Nucleotides. Structure and forms of DNA; Replication of DNA. Types, Structure and Function of RNA.

### UNIT-3: ENZYMES

Structure, Nomenclature, Classification and Properties of Enzymes. Mechanism of enzyme action, Enzyme kinetic: Michaelis-Menten. Equation & derivation, Enzyme inhibition, Lineweaver-Burk Plot (LB plot). Co-enzymes and their role; Allosteric enzymes and Isoenzyme. Extracellular enzymes and their role.

### UNIT-4: MICROBIAL METABOLISM

Bacterial photosynthesis and Chemosynthesis; Glycolysis, TCA cycle and Oxidative Phosphorylation. Anaerobic catabolism of glucose; Fat Biosynthesis, alpha and beta oxidation of fatty acids. Deamination, trans-amination and Urea cycle.

### UNIT-5: GROWTH PHYSIOLOGY & TRANSPORT SYSTEM

Bacterial cell division, Genome replication and Growth Phases, Conditions for growth. Plasma membrane & Transport system, types of transport (Passive and active). Diffusion (simple & facilitated), Concept of Uniport, Antiport and Symport;

### *Text Books Recommended:*

1. General Biochemistry by A.C. Deb.
2. Biochemistry by Lehninger (Kalyani publication)
3. Biochemistry by U. Satyanarayan.
4. Microbiology by Anantanarayan and Panikar.
5. Fundamentals of Biochemistry; J L Jain, Sunjay Jain, Nitin Jain; S. Chand & Company Ltd
6. Practical Biochemistry: Principles and Techniques; 5th Edition; Keith Wilson and John Walker
7. Biophysical Biochemistry: Principles and Techniques; Avinash Upadhyay, Kakoli Upadhyay and Nirmalendu Nath; Himalaya Publishing House.

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**PRACTICAL****M. M. 50**


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Basic information about autoclave, hot air oven, laminar air flow and other laboratory instruments

Preparation of solid/liquid culture media.

Isolation of single colonies on solid media.

Enumeration of bacterial numbers by serial dilution and plating.

Simple and differential staining.

Measurement of microorganism (micrometry) and camera Lucida drawing of isolated organism.

Determination of bacterial growth by optical density measurement.

General and specific qualitative test for carbohydrates

General and specific qualitative test for amino acids

General and specific qualitative test for lipids

Estimation of protein

Estimation of blood glucose

Assay of the activity of amylases

Assay of the activity of Phosphates

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**Scheme of Practical Examination**

Time - 4 hours

M.M. 50

1. Exercise on Microbiological methods	10
2. Exercise on Biochemical tests	10
3. Exercise on staining method	05
4. Spotting (1-5)	10
5. Viva-Voce	05
6. Sessional	10

Total 50

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## Scheme of Examination

B.Sc. Part-01 Geology

कक्षा	प्रश्नपत्र	विषय समूह	सैद्धा. अंक	प्रायो. अंक	योग
BSc. I year	I	भूगतिकी एवं भू-आकृति विज्ञान (Geodynamics & Geomorphology)	50	50	150
	II	खनिज एवं क्रिस्टल विज्ञान (Mineralogy & Crystallography)	50		
BSc. II year	I	शैलिकी (Petrology)	50	50	150
	II	संरचनात्मक भूविज्ञान (Structural Geology)	50		
BSc. III year	I	जीवाश्म विज्ञान एवं संस्तर विज्ञान (Palaeontology & Stratigraphy)	50	50	150
	II	भूसंसाधन एवं व्यावहारिक भूविज्ञान (Earth Resources & Applied Geology)	50		

**-: Note :-**

प्रत्येक वर्ष के विद्यार्थियों हेतु पाठ्यक्रम में उल्लेखित भूवैज्ञानिक क्षेत्रीय अध्ययन अनिवार्य होगा।

  
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कक्षा / Class - B. Sc. – I  
Session 2019-20  
Paper –I  
भूगतिकी एवं भूआकृति विज्ञान  
(Geodynamics & Geomorphology)

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- इकाई— 01 (i) भूविज्ञान एवं परिप्रेक्ष्य; सौरमण्डल में सूर्य की स्थिति ; परिमाण, आकार, संहति, घनत्व।  
(ii) पृथ्वी की उत्पत्ति  
(iii) पृथ्वी की आंतरिक संरचना, भूपर्पटी, प्रवार एवं क्रोड  
(iv) पृथ्वी की आयु: निर्धारण की विधियाँ, रेडियोधर्मी विधि  
(v) वायुमण्डल, जलमण्डल एवं जैवमण्डल का निर्माण एवं संगठन
- इकाई— 02 (i) प्लेटविवर्तनिकी का प्रारंभिक अध्ययन  
(ii) महाद्वीपीय विस्थापन की अवधारणायें एवं सिद्धान्त  
(iii) समस्थैतिकी की अवधारणायें एवं सिद्धान्त  
(iv) समुद्रतल विस्तारण का साक्ष्य  
(v) समुद्र, महाद्वीप एवं पर्वतों की उत्पत्ति
- इकाई— 03 (i) भूकम्प: भूकम्प की पट्टियाँ, भूकम्प की तीव्रता  
(ii) ज्वालामुखी: प्रकार एवं वितरण  
(iii) अंतः समुद्रीपर्वतों, चापाकार द्वीपमालाओं एवं खाइयों का उद्भव, वितरण एवं महत्व  
(iv) महाद्वीपीय तटीय क्षेत्रों की विवर्तनिकी : सक्रिय तट एवं सीमांतीय द्रोणियाँ  
(v) नवविवर्तनिकी : सक्रियभ्रंश, अपवाह परिवर्तन
- इकाई— 04 (i) भूआकृति विज्ञान की मूलभूत धारणायें  
(ii) भूआकृतिक कारक एवं शैल अपक्षय की प्रक्रियायें,  
(iii) नदी के भूवैज्ञानिक कार्य एवं नदीय भूआकृतियाँ  
(iv) वायु के भूवैज्ञानिक कार्य एवं वायुजनित भूआकृतियाँ  
(v) हिमनदों के भूवैज्ञानिक कार्य एवं हिमनदजनित भूआकृतियाँ
- इकाई— 05 (i) समुद्र के भूवैज्ञानिक कार्य एवं तटीय भूआकृतियाँ  
(ii) भूमिगत जल के भूवैज्ञानिक कार्य एवं कार्स्टस्थलाकृति  
(iii) ज्वालामुखीय भूआकृतियाँ  
(iv) पृथ्वी का उष्मा बजट एवं वैश्विक जलवायु परिवर्तन  
(v) भारत का भूआकृतिक विभाजन

  
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## प्रायोगिक कार्य –

- (1) भूआकृतिक संरचनाओं को प्रदर्शित करने वाले प्रादर्शों का अध्ययन
- (2) स्थलाकृतिक मानचित्रों का अध्ययन एवं विभिन्न पैमानों पर सूचक–निर्धारण की जानकारीयों
- (3) भूआकृतिक–मानचित्रों में विभिन्न भूआकृतियों एवं प्रवाह प्रणालियों का अध्ययन
- (4) भारत के रेखित–मानचित्र में मुख्य पर्वतों, झीलों एवं नदियों को अंकित करना
- (5) भारत के रेखित मानचित्र में भूकम्प प्रेक्षणालयों को अंकित करना
- (6) भारतीय महाद्वीपों में आये भूकम्पों के अधिकेन्द्र एवं तीव्रता को मानचित्र में अंकित करना।
- (7) आकारमितिक विश्लेषण

## Suggested Readings:-

भौतिक–भूविज्ञान	–	डॉ. मुकुल घोष–
भौतिक–भूविज्ञान	–	जे.पी. तिवारी एवं बी.के. सिंह–
भूआकृति–विज्ञान	–	डॉ. सविन्द्र सिंह
भूविज्ञान एक परिचय	–	डॉ. विद्यासागर दुबे
Physical Geology	-	Miller
Principles of physical geology	-	A. Holmes
An introduction to physical geology-		A.K. Dutta
Principles of Geomorphology	-	W.D. Thornbury
Principles of Geomorphology	-	A.F. Ahmed

  
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Class- B. Sc. - I  
Paper –I  
(Geodynamics & Geomorphology)

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- Unit:1**
- (i) Geology & its perspectives. Earth in the solar system; size, shape, mass & density.
  - (ii) Origin of Earth.
  - (iii) Internal structure of Earth, Crust, Mantle and Core.
  - (iv) Age of Earth: with special emphasis on Radioactive dating.
  - (v) Formation & composition of Hydrosphere, Biosphere & Atmosphere.
- Unit:2**
- (i) Elementary idea about Plate-Tectonics.
  - (ii) Concept & theories of continental-drift
  - (iii) Concept & theories of Isostasy.
  - (iv) Evidences of Sea-floor spreading.
  - (v) Origin of oceans, continents & mountains.
- Unit:3**
- (i) Earthquakes, Earthquake Belts, measurement of Earthquakes.
  - (ii) Volcanoes: Types & distribution.
  - (iii) Mid –oceanic- ridges, trenches & island arc; origin, distribution & importance.
  - (iv) Tectonics of continental margins; Active margins & marginal basins.
  - (v) Neo-tectonics; active faults, drainage changes.
- Unit:4**
- (i) Fundamental concepts of Geomorphology.
  - (ii) Geomorphic agents & processes of rock-weathering.
  - (iii) Geological work of rivers; fluvial landforms.
  - (iv) Geological work of wind; Aeolian landforms.
  - (v) Geological work of Glaciers; glacial landforms.
- Unit:5**
- (i) Geological work of oceans; coastal landforms.
  - (ii) Geological work of Ground water. Karst topography.
  - (iii) Volcanic landforms.
  - (iv) Earth's heat budget & global climatic changes.
  - (vi) Physiographic divisions of India.

  
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## PRACTICALS:

- (1) Study of models showing various Geomorphic features.
- (2) Numbering, Indexing of topographic maps on various scales.
- (3) Interpretation of various Geomorphic landforms & drainage pattern on topographic maps.
- (4) Plotting of major mountain Ranges, Lakes & rivers on outline map of India.
- (5) Plotting of seismic observatories on outline map of India.
- (6) Plotting of epicenters & magnitude of major earthquakes of Indian subcontinent.
- (7) Morphometric analysis.

## Suggested Readings:-

भौतिक-भूविज्ञान	—	डॉ. मुकुल घोष—
भौतिक-भूविज्ञान	—	जे.पी. तिवारी एव 'बी.के. सिंह
भूआकृति-विज्ञान	—	डॉ. सविन्द्र सिंह
भूविज्ञान एक परिचय	—	डॉ. विद्यासागर दुबे
Physical Geology	-	Miller
Principles of physical geology	-	A. Holmes
An introduction to physical geology-		A.K. Dutta
Principles of Geomorphology	-	W.D. Thornbury
Principles of Geomorphology	-	A.F. Ahmed

  
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कक्षा / Class- B.Sc-I  
Paper –II  
खनिज एवं क्रिस्टल विज्ञान  
(Mineralogy & Crystallography)

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- इकाई— 01 (i) खनिज एवं क्रिस्टल की परिभाषा ।  
(ii) क्रिस्टल संरचना एवं यूनिट सेल ।  
(iii) क्रिस्टल के तत्व, क्रिस्टल रूप ।  
(iv) क्रिस्टलीय अक्ष एवं अक्षीय कोण ।  
(v) क्रिस्टल नोटेशन, अन्तःखण्डीय अनुपात एवं सूचकांक
- इकाई— 02 (i) क्रिस्टल विज्ञान के नियम ।  
(ii) क्रिस्टलीय सममिति ।  
(iii) क्रिस्टलों का वर्गीकरण । क्रिस्टल समुदायों के सामान्यवर्ग की सममिति ।  
(iv) सामान्य वर्ग के रूप ।  
(v) क्रिस्टलों में यमलन ।
- इकाई— 03 (i) प्रकाश की प्रकृति, प्रकाश का परावर्तन एवं अपवर्तन ।  
(ii) अपवर्तनांक, क्रांतिक कोण, पूर्ण आंतरिक परावर्तन एवं बेके प्रभाव ।  
(iii) द्वि-अपवर्तन, निकॉल प्रिज्म की रचना एवं कार्य प्रणाली ।  
(iv) ध्रुवण सूक्ष्मदर्शी : अवयव एवं कार्यप्रणाली ।  
(v) खनिजों के प्रकाशीय गुण ।
- इकाई— 04 (i) सिलिकेट संरचनाएं  
(ii) खनिजों में बंध ।  
(iii) समाकृतिकता, बहुरूपता एवं कूटरूपता ।  
(iv) ठोस-विलयन  
(v) खनिजों के भौतिक गुण ।
- इकाई— 05 निम्नलिखित खनिज समूहों के संगठन, भौतिक एवं प्रकाशकीय गुणों का अध्ययन—  
(i) ऑलिवीन्, गार्नेट एवं अभ्रक समूह ।  
(ii) पायरोक्सीन ।  
(iii) एम्फीबोल ।  
(iv) फेल्सपार ।  
(v) सिलिका ।

  
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## प्रायोगिक कार्य—

- (1) क्रिस्टल मॉडल में सममिति तत्त्वों का अध्ययन।
- (2) सातों क्रिस्टल समुदायों की सामान्य वर्ग की मूल आकृतियों का अध्ययन।
- (3) यूलर प्रमेय का सत्यापन।
- (4) प्रमुख शैलकर खनिजों का स्थूलदर्शी अध्ययन।
- (5) ध्रुवण—सूक्ष्मदर्शी की सहायता से प्रमुख शैलकर खनिजों के प्रकाशीय गुणों का अध्ययन।
- (6) सात दिवसीय भूवैज्ञानिक क्षेत्रीय अध्ययन

  
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Class- B.Sc.-I  
Paper –II  
(Mineralogy & Crystallography)

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- Unit:1**
- (i) Definition of Mineral and Crystal.
  - (ii) Crystal structures, Unit cells
  - (iii) Elements of crystal. Crystal forms.
  - (iv) Crystallographic axes and axial angles.
  - (v) Parameters and indices of crystal notation
- Unit:2**
- (i) Laws of Crystallography
  - (ii) Crystal symmetry
  - (iii) Classification and symmetry of normal classes of seven crystal systems
  - (iv) Forms of normal classes.
  - (v) Twinning in crystals
- Unit:3**
- (i) Nature of light : reflection and refraction of light.
  - (ii) Refractive index. Critical angle. Total internal reflection and Becke effect.
  - (iii) Double refraction. Nicol prism, it's construction and working.
  - (iv) Polarizing Microscope- its parts & functions.
  - (v) Optical properties of minerals.
- Unit:4**
- (i) Silicate structures.
  - (ii) Bonding in Minerals.
  - (iii) Isomorphism. Polymorphism and Pseudomorphism.
  - (iv) Solid solution
  - (v) Physical properties of minerals
- Unit:5**
- Study of Composition, physical and optical properties of the following Mineral groups:
- (i) Olivine, Garnet and Mica groups.
  - (ii) Pyroxenes
  - (iii) Amphiboles
  - (iv) Feldspars
  - (v) Silica

  
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## PRACTICALS-

- (1) Study of symmetry elements in crystal models.
- (2) Study of fundamental forms of normal classes of all seven crystal systems.
- (3) Verification of Euler's theorem.
- (4) Study of physical properties of rock forming minerals.
- (5) Study of the optical properties of important rock forming minerals using polarizing Microscope.
- (6) Geological excursion for seven days.

## Suggested Readings:

Rutley's elements of Mineralogy	:	Read, H.H.
Dana's text book of Mineralogy	:	Ford W.E.
खनिज तथा क्रिस्टल विज्ञान	—	डॉ. बी. सी. जैश
खनिज विज्ञान के सिद्धांत	—	डॉ. ए. पी. अग्रवाल
प्रायोगिक भू-विज्ञान (भाग-1)	—	डॉ. र. प्र. मांजरेकर
प्रकाशीय खनिज विज्ञान के मूल तत्व	—	विंचेल

  
27-5-19

  
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## **B.A./B.Sc. – First Year**

**Session : 2019-20**

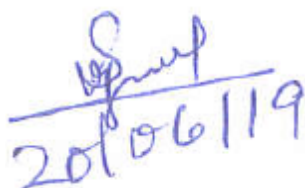
Name of the Subject :- Anthropology  
Paper :- First  
Name of the Paper :- FOUNDATION OF ANTHROPOLOGY

Total Marks : 50

Pass Marks : 17

### **Syllabus**

- UNIT – I Meaning and scope of Anthropology. History of Anthropology. Branches of Anthropology -  
(a) Socio-cultural Anthropology  
(b) Physical Biological Anthropology  
(c) Archaeological Anthropology  
(d) Linguistic Anthropology
- UNIT – II Relationship of Anthropology with other disciplines: Life Sciences, Medical Sciences, Social Sciences: History, Economics, Sociology, Psychology, Political Science
- UNIT – III Foundation in Biological Anthropology  
(a) Human Evolution with respect to Hominid fossils  
(b) Human Variation: Types and causes  
(c) Human Genetics: Concept, scope and branches  
(d) Human growth and development: Definition, scope, methods and factors effecting human growth and development
- UNIT – IV Fundamentals in Social-Cultural Anthropology.  
(a) Culture, Society, Community, Group, Institution  
(b) Human Institution:-  
Family: Definition, types and function of family  
Marriage: Definition, forms of marriage and its functions  
Kinship: Definition, types and functions  
Religion: Theories on the origin of religion  
(c) Basic techniques of data collection :  
Observation , Schedule, Questionnaire, Geneology
- UNIT – V Fundamentals in Archaeological Anthropology.  
(a) Tool typology & Technology: Paleolithic, Mesolithic & Neolithic  
(b) Cultural evolution: Broad outlines of cultures (Stone age to metal age)  
(c) Dating techniques in archaeology

  
20/06/19

## **B.A. /B.Sc. – First Year**

**Session: 2019-20**

Name of the Subject :- Anthropology  
Paper :- Second  
Name of the Paper :- PHYSICAL/ BIOLOGICAL ANTHROPOLOGY

Total Marks : 50

Pass Marks : 17

### **Syllabus**

- UNIT – I      Meaning, scope, History of Physical Anthropology & its applied aspects  
Theories of organic evolution: Lamarckism, Neo-lamarckism, Darwinism, Neo-darwinism & Synthetic theory of evolution
- UNIT – II      Position of Man in animal kingdom, Classification of living primates, Comparative anatomy of Man and Apes (with special reference to skull, pelvis, dentition and long bones)
- UNIT – III      Fossil evidence of human evolution: Ramapithecus, Australopithecus, Pithecanthropus, Sinanthropus, Neanderthal, Cromagnon, Grimaldi man, Chancelade man.
- UNIT – IV      Concept of Race: Race formation and Criteria of racial classification, UNESCO Statement, Racial element in India, Major races of the world.
- UNIT – V      Human Genetics:  
a.      Structure of Chromosome, DNA & RNA  
b.      Mendelian principle.  
c.      Types of Inheritance in Human

  
20/06/19

**B.A./B.Sc. – First Year**


**Session : 2018-19**

Name of the Subject :- Anthropology  
Paper :- Practical  
Name of the Paper :- OSTEOLOGY AND CRANIOMETRY

Total Marks : 50

Pass Marks : 17

- I. Identification of bones of human Skeleton. Sketching and labeling of various norms of skull, Overview of Pectoral & Pelvic girdles, Femur & Humerus bone
- II. Craniometry :-
  1. Maximum Cranial length.
  2. Maximum Cranial Breadth.
  3. Maximum frontal Breadth.
  4. Bizygomatic Breadth.
  5. Nasal Height.
  6. Nasal Breadth
  7. Minimum frontal breadth
  8. Bimaxillary Breadth.
  9. Maximum Biorbital Breadth
  10. Length of magnum foramen.
- III. Craniometric indices :
  1. Cranial Index
  2. Nasal Index

  
20/06/19



**HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**  
**Syllabus for B.A. / B.Sc. Course, 2019-20**  
**Subject: Statistics**

Each year of B.A. /B.Sc. I, II, III shall have two theories and one practical course. All the Theory as well as Practical Examinations will be of 3 hours duration. In each practical examination 10% marks shall be fixed for viva –voce and 20% marks for practical record.

**Scheme of Examination**

	<b>Title of the paper</b>	<b>MAX. Marks</b>
<b>B.A./B.Sc. I</b>	<b>Paper-I</b> (Code No. 0803): <b>Probability I</b>	50
	<b>Paper-II</b> (Code No. 0804): <b>Descriptive Statistics I</b>	50
	<b>Paper III: Practical-</b> Based on Theory Papers I & II	50
	<b>Total</b>	<b>150</b>
<b>B.A./B.Sc. II</b>	<b>Paper-I</b> (Code No. 0853): <b>Statistical Methods</b>	50
	<b>Paper-II</b> (Code No. 0854): <b>Sampling Theory and Design of Experiments</b>	50
	<b>Paper III: Practical-</b> Based on Theory Papers I & II	50
	<b>Total</b>	<b>150</b>
<b>B.A./B.Sc. III</b>	<b>Paper I</b> (Code No. 0907): <b>Applied Statistics</b>	50
	<b>Paper II</b> ( Code No. 0908): <b>Statistical Quality Control and Computational Techniques</b>	50
	<b>Paper III: Practical-</b> Based on Theory Papers I & II	50
	<b>Total</b>	<b>150</b>

**B.A. /B.Sc. –I**  
**Subject-Statistics**  
**Paper – I ( Paper Code-0803)**  
**PROBABILITY THEORY**

**Unit-I**

Important concepts in probability: Random experiment: trial, sample point and sample space, event, Operations of events, concepts of mutually exclusive and exhaustive events. Definition of probability: classical and relative frequency approach. Richard Von Misses, Cramer and Kolmogrove approaches to probability, merits and demerits to these approaches, any general idea to be given. Discrete probability space, Properties of probability based on axiomatic approaches, Independence of events, Conditional probability, total and compound probability rules, Baye's theorem and its applications.

**Unit-II**

Random variables: Definition of discrete random variable (rv); probability mass function (pmf) and cumulative distribution function (cdf). Joint pmf of several discrete rvs. Marginal and conditional pmfs. Independence of rvs. Idea of continuous random variables, probability density function, illustration of random variables and its properties. Expectation of a random variable and its properties -moments, measures of location and dispersion, skewness and kurtosis, Moment generating function, raw and central moments, Probability generating function (pgf) and, their properties and uses.

**Unit-III**

Standard univariate discrete distributions: degenerate, discrete uniform, hypergeometric, Poisson, geometric and negative binomial distributions. Marginal and conditional distributions, Distributions of functions of discrete rvs, reproductive property of standard distributions.

**Unit-IV**

Univariate continuous distributions and their properties: Uniform, Beta, Gamma, Exponential, Normal, Cauchy, Lognormal. Moment generating function (mgf) : its properties and applications. Tchebycheff's inequality and applications, statements and applications of weak law of large numbers and central limit theorems.

**Unit-V**

Four short notes, one from each unit will be asked. Students have to answer any two.

**REFERENCES**

1. Bhat B.R., Srivankataramana T. and Rao Madhav K.S. (1997): Statistics; A Beachners Vol. II, New Age International (P) Ltd.
2. Chung, K.L. (1979). Elementary Probability Theory with Stochastic Processes, Springer International Student Edition.
3. Edward P.J., Ford J.S. and Lin (1974): Probability for Statistical Decision-Marketing. Prentice Hall
4. Goon A.M., Gupta M.K. and Dasgupta B. (1999): Fundamentals of Statistics, Vol. I, World Press, Calcutta
5. Mood A.M., Grabill F.A. and Bose D.C. (1974): Introduction to the theory of Statistics, Mc. Graw Hall.

### **ADDITIONAL REFERENCES:**

6. Cook, Cramer and Clark (): Basic Statistical Computing, Chapman and Hall.
7. David Stirzaker (1994). Elementary Probability, Cambridge University Press.
8. Feller, W. (1968). An Introduction to Probability Theory and its Applications, Wiley.
9. Hoel P.G. (1971): Introduction to Mathematical Statistics
10. Mayer P.L. (1970): Introductory Probability and Statistical Applications, Addition Wesley
11. Mukhopadhyay, P. (1996). Mathematical Statistics, New Central Book Agency, Calcutta.
12. Parzen, E. (1960). Modern Probability Theory and its Applications, Wiley Eastern.
13. Pitman, Jim (1993). Probability, Narosa Publishing House.

**Paper – II( Paper Code-0804)**  
**DESCRIPTIVE STATISTICS**

**Unit - I**

Origin and Development of statistical importance, uses and limitations of Statistics. Types of Data: Concepts of a statistics population and sample from a population; qualitative and quantitative data; nominal and ordinal data; cross sectional and time series data; discrete and continuous data; frequency and non-frequency data.

Collection and Scrutiny of Data; Primary data – designing a questionnaire and a schedule; checking their consistency. Secondary data – their major sources including some government publications. Complete enumeration, controlled experiments, observational studies and sample surveys. Scrutiny of data for internal consistency and detection of errors of recording. Ideas of cross-validation.

Presentation of Data: Construction of tables with one or more factors of classification. Diagrammatic and graphical representation of non-frequency data. Frequency distributions, cumulative frequency distributions and their graphical and diagrammatic representation – column diagram, histogram, frequency polygon and ogives. Stem and leaf chart. Box plot.

**Unit -II**

Analysis of Quantitative Data: Univariate data: Concepts of central tendency or location, and their measures; arithmetic, geometric and harmonic mean, median and mode.

**Unit -III**

Dispersion and relative measures of dispersion, skewness and kurtosis, and their measures including those based on quartiles and moments. Sheppard's corrections for moments for grouped data (without deviation).

**Unit -IV**

Bivariate data: Scatter diagram. Product moment correlation coefficient and its properties. Coefficient of determination. Correlation ratio. Concepts of regression. intra - class correlation coefficient with equal and unequal group sizes. Rank correlation – Spearman's and Kendall's measures. Correlation index. Principle of least squares. Fitting of linear and quadratic regression and related results. Fitting of curves reducible to polynomials by log and inverse transformation. Multivariate data: Multiple regression, multiple correlation and partial correlation in 3 variables. Their measures and related results.

**Unit V**

Four short notes, one from each unit will be asked. Students have to answer any two.

**REFERENCES**

1. Bhat B.R.,Srivankataramana T. and Rao Madhav K.S. (1997): Statistics; A Beachners Vol. II, New Age International (P) Ltd.
- 2.Croxtan FE, Cowden DJ and Klein S: Applied General Statistics (1973): Prentice Hall of India.
- 3.Goon A.M., Gupta M.K., Dasgupta B. Fundamentals of Statistics, Vol. 1(1991) & Vol. 2(2001). World Press, Calcutta.
- 5.Gupta V.K. and Kapor S.C. : Fundamentals of Mathematical Statistics S. Chand and Sons.

**ADDITIONAI REFERENCES:**

- 6.Cook, Cramer and Clark (): Basic Statistical Computing, Chapman and Hall.
7. Mood A.M., Grabill F.A. and Bose D.C.(1974): Introduction to the theory of Statistics, McGraw Hill.
- 8.Snedecor GW and Cochran WG: Statistical Methods (1967) : Iowa State University Press.
- 9.Spiegel, MR (1967): Theory & Problems of Statistics (1967): Schaum's Publishing Series.

## **Paper III**

### **Practical: Practical Based on Paper I & II**

1. Presentation of data by Frequency tables, diagrams and graphs.
2. Calculation of Measures of Central Tendency, dispersion , skewness and kurtosis
3. Product Moment Correlation and Correlation Ratio
4. Fitting of Curves by the least square method
5. Regression of two variables
6. Spearman's Rank correlation Coefficient
7. Multiple regression of three variables
8. Multiple correlation and partial correlation
9. Evaluation of probabilities using addition and multiplication theorems, conditional probabilities and Bayes theorems
10. Exercises on mathematical expectations and finding measures of central tendency, dispersion, skewness and kurtosis of univariate probability distributions
11. Fitting of univariate and conditional distributions

**DEFENCE - STUDIES**  
**PAPER - I**  
**INDIAN MILITARY HISTORY M.M. 50**  
**(paper code - 0817)**

**AIM :** The main idea behind this paper is to give a conceptual background about the events and factors which influenced course of history and helped in developing the art of war in India.

**Note :** Questions will be set from each unit, There will be only internal choice.

**UNIT-1** 1. The definition and scope of Defence Studies and its relationship with other subjects.

2. Art of war of Epic and Puranic period.
3. Comparative study of Indo-Greek art of war with special reference to the Battle of Hydaspes 326 B.C.
4. Mauryan Military system and art of war.

**UNIT-2** 1. Kautilya's Philosophy of war.

2. Gupta's military system and art of war.
3. Military system of Harshavardhan.
4. Decline of Chariots and Importance of Elephant and Cavalry.

**UNIT-3** 1. Mughal military system.

2. Rajput and Turk pattern of warfare with special reference to Battle of Somnath and Battle of Tarain up to 12th century A.D.
3. Causes of the fall of Rajput Military system.
4. Army organization during Sultanate period.
5. Battle of Panipat 1526 A.D. and Battle of Haldighati 1576 A.D.

**UNIT-4** 1. Maratha Military system.

2. Warfare of Shivaji.
3. Battle of Assaye 1803 A.D.
4. Sikh Military system.
5. Battle of Sobraon 1846 A.D.

**UNIT-5** 1. 1857 Liberation Movement.

2. Reorganizations of Indian Army under the Crown.
3. Nationalization of Indian Army after independence.
4. Military reforms of Lord Kitchener's.

**READING LIST :**

- |                                       |   |               |
|---------------------------------------|---|---------------|
| 1. Military System of Ancient India   | : | B.K. Majumdar |
| 2. Generalship of Alexander the Great | : | J.F.C. Fuller |
| 3. Kautilya Arthashastra              | : | K.P. Kanbale  |
| 4. Military history of India          | : | J.N. Sarkar   |

**PAPER - II**  
**DEFENCE MECHANISM OF THE MODERN STATE**  
**(paper code - 0818)**

**AIM :** To enable students to appreciate the importance of higher political direction in the formulation of national defence policy and roles as political and military leadership in furthering national security.

**Note :** Question will be from each unit, there will be only internal choice.

**UNIT-1** 1. Evolution of National defence policy.

2. Inter dependence of Foreign, Defence and Economics policies.
3. Higher defence organization of U.S.A., U.K. and RUSSIA.
4. Higher defence organization of CHINA, PAKISTAN and NATO.

**UNIT-2** 1. Higher defence organization in India.

2. Powers of President and relation to Armed forces.
3. Parliament and the Armed forces.
4. Defence (Political affair) committee of the cabinet. Its composition, methods of working during war and peace.
5. National Defence Council and its Valiant.

**UNIT-3** 1. Organization of Ministry of Defence.

2. Organization of Army head quarter.
3. Organization of Naval head quarter.
4. Orgatiization of Air head quarter.

**UNIT-4** 1. Organization and role of Para-militaty forces - B.S.F., I.T.B.P., C.I.S.F. etc.

2. Organization and role of Intelligence Agencies - RAW, CBI, CID., IB etc.
3. Military Intelligence.
4. Role of N.C.C. in preparing youth for Defence services.

**UNIT-5** 1. Organization of Civil - defence.

2. Importance and role of civil defence during war and peace.
3. Air-Raid signal and precaution before and after bombardment.
3. Role of Indian armed forces in war and peace.

**READING LIST :**

1. Indian Army, A Sketch of its History & : E.H.E. Choen  
Organisation :
2. Defence Organization in India : Venkateshwarm

## **PRACTICAL**

**M.M. : 50**

There shall be practical examination of 3 hours duration and carrying 50 marks. The distribution of marks shall be as follows -

- |                                   |             |
|-----------------------------------|-------------|
| 1. Exercises based on Map reading | : 20 Marks  |
| 2. Exercises based on models      | : 10 Marks  |
| 3. Sessional Work and Record      | : 10 Marks  |
| 4. Viva-Voce                      | : 10 Marks, |

## **PART - A**

### **ELEMENTARY MAP READING**

1. Maps- Definition, types, Marginal Information.
2. Conventional signs - Military and Geographical.
3. Direction and cardinal points.
4. Types of North, Angle of Convergence.
5. Study of Liquid compass, its parts, various tactical uses and preparation of Night navigation chart.
6. service Protractor and its uses.
7. To find North by Compass, Watch, Sun, Stars etc.
8. Bearing and interconversion of bearing.
9. Setting of Map.
10. Grid System.

## **PART - B**

### **RECOGNITION & ELEMENTARY STUDY OF FOLLOWING MODELS**

1. equivalent Rank and Badges of Indian Army, Navy and Air Force.
2. Famous Armoured vehicles used in war.
3. Weapons used in Infantry.
4. Various Ships of Indian Navy.
5. Famous Air-Crafts Used by Air-Force.

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**INDUSTRIAL CHEMISTRY**  
**PAPER - I**  
**INDUSTRIAL ASPECTS, OF ORGANIC & INORGANIC**  
**CHEMISTRY**

(paper code - 0821)

**UNIT-1** 1.1 Nomenclature Generic names, Trade names.

1.2 Raw Materials for Organic compounds :-

Petroleum, natural gas, Fractionation of Crude oil.

**UNIT-2** 2.1. Petroleum :- Cracking, reforming Hydroforming isomerisation.

2.2. Coal :- Types, Structure, Properties, distillation of coal, chemicals derived there from.

**UNIT-3** 3.1. Renewable natural resources :- Cellulose, starch, properties, modification, important industrial chemicals derived from them, Alcohol and alcohol based chemicals, Oxalic acid, Furfural.

3.2. Basic metallurgical operations :- Pulverisation, calcination, Roasting, refining.

**UNIT-4** 4.1 Physico chemical principles of extraction of:- Iron, Copper, Lead, Silver, Sodium, Aluminium, Magnesium, Zinc, Chromium.

**UNIT-5** Inorganic materials of Industrial Importance :- Their availability, forms, structure and modification. Alumina, Silica, Silicates, Clays, Mica, Carbon, Zeolites.

**BOOKS :**

1. Coal Conversion, E.J. Hoggman, The Engeron Co., Lavamie Wyoming, U.S.A.
2. Introduction of Petroleum Chemicals, H. Steiner, Pergamon Press.
3. From Agrocarbon to Petrochemicals, L.F. Hatch & S. Matarm, Gulf Publishing Co., Houston.
4. Cellulose : Its Chemistry & Technology, Hall A.G.
5. Methods in Carbohydrate Chemistry, Vol. 3 - Cellulose, Whistler, R.L.
6. Chemistry of Cellulose, Heuser, E.
7. Chemistry & Industry of Starch, Kerr, R.W.
8. Modified Starches : Properties & Uses, Wurzburg, O.B.
9. Principles of Extractive Metallurgy, Herbashi, Vol. I & II.
10. Theory of Metallurgical Processes, Volsky, A. & Sergievskaya, F.
11. Text book of Metallurgy, Bailey, A.R.
12. Clays, H. Reis, John Wileys & Sons.
13. Unit Processes of Extractive Metallurgy, Peele, Elsevier Publication.
14. Industrial Chemistry, Reigel, Reinhold Publication.



**PAPER - II**  
**INDUSTRIAL ASPECTS OF PHYSICAL CHEMISTRY**  
**MATERIAL AND ENERGY BALANCE**  
**(paper code - 0822)**

**UNIT-1** Surface. chemistry and Interfacial Phenomena Adsorption Isotherm, Sols, Gels, Emulsions, Micoemulsions, micelles, Aerosols, Effect of surfactants, Hydrotropes.

**UNIT-2** Calalysts :- Introduction, Types, Homog-eneous and Heterogeneous, Basic Principles, Mechanisms factors affecting the performance, Introduction to phase transfer catalysis

**UNIT-3** 3.1. Enzyme catalysed reactions - Rate model, Industrially important reactions.

3.2. Material Balance without chemical Reactions:- flow diagram formaterial balance, simple material with or without recycle or by-pass for chemical engineering opera-tions such as distillation, crystallisation, evaporation, extraction, etc.

**UNIT-4** 4.1. Dimensions and Units :- Basic. chemical calculations -Atomic weight, molecular, weight, equivalent weight, mole composition of (i) liquid mixt'ure & (ii) gaseous mixture.

4.2. Material balance involving chemical reaction :- concept of limiting reactant, con-version, yield liquid phase reaction, gas phase reactions with/without recycle or by-pass.

**UNIT-5** Energy Balance :- Heat capacity of p-ure gases and gaseous mixtures at constant pres sures. Sensible heat changes. in liquids, Enthalpy changes.

**BOOKS :**

1. Aersol, Science & Technology, Shephered, H.R.
2. Catalysisir :Heterogeneous & Homogeneous, Delmon, Elbevier Scienu Publication.
3. Catalysisir, Science & Technology, Anderson, J.
4. Catalysisir in Micelller & Macromolecular systems, Fendler & Fendler.
5. Phase Transfer Catalysis, Principle & Techniques, Strles, C.
6. Surgace Chemistry, J.J. Bikermann, Academic Press.
7. Physical Chemistry of Surfaces by A.W. Admson.
8. Storchimetry, B.I. Bhalt & S.M. Vora.
9. Chamical Process Principle - Part I, B.A. Hougen, K.M. Watson & R.A. Ragats, Asia Publi-cation.



**PAPER - III**  
**UNIT OPERATIONS IN CHEMICAL INDUSTRY AND UTILITIES,**  
**FLUID FLOW AND HEAT TRANSPORT IN INDUSTRY**  
**(paper code - 0823)**

**UNIT-1** 1.1. Distillation - Introduction; Batch and continuous distillation, separation of azeo-tropes, plate columns & packed columns.

1.2. Absorption - Introduction, Equipments- Packed columns, spray columns, bubble columns, packed bubble columns, mechanically, agitated contractors.

**UNIT-2** 2.1 Evaporation - Introduction, Equipments - short tube (standard) evaporator, forced circulation evaporators, falling film evaporators, climbing film (Upward flow) evaporators, wiped (agitated) film evaporator.

2.2 Filtration - Introduction, filter media and filter aids, Equipments- Plate and frame, filter press, nutch filter, rotatory drum filter, sparkler filter, candle filter, bag filter, cen-trifuge.

2.3 Drying - Introduction, free moisture, bound. moisture, drying curve, Equipments tray dryer, rotatory dryer, flash drater, fluid bed dryer, drum dryer, spray dryer.

**UNIT-3** 3.1 Utilities in chemical Industry

Fuel - Types of fuels -advantages and disadvantages, combustion of fuels, calorific value. specification for fuel oil.

Boilers - Types of.-boilers and their functioning.

Water - Specifications for industrial use, various water treatments.

Steam - Generation and use.

Air - Specifications for Industrial use processing of air.

**UNIT-4** Fluid Flow : Fans, blowers, compressors, vacuum pumps, ejector. Pumps :-

Reciprocating pumps,, Gear pumps,, centrifugal pumps.

**UNIT-5** Heat Exchangers -: Shell and Tube type; finned tube heat exchangers, plate heat ex-changers, refrigeration cycles.

**BOOKS :**

1. Introduction Chemical Engineering, W.L. Badger, J.J. Banchero, McGraw Hill.
2. Unit Operations in Chemical Engineering, W.L. McCabe & J.C. Smith, McGraw Hill.
3. Chemical Engineer's Hand Book, J.H. Perry, McGraw Hill.
4. Unit Operations - I & II, D.D. Kale, Pune Vidyarthi Griha Prakashan, Pune.
5. Unit Operations of Chemical Engineering, Vol. I, P. Chattopadhyay, Khanna Publishers, Delhi.



## PRACTICAL

### Duration of Examination :

04 Hrs.

Discription of marks	Experiment	:	30 marks
	Viva	:	05 marks
	Sessional	:	05 marks
	Project	:	40 marks
	<b>Total</b>	:	<b>80 marks</b>

### EXPERIMENTS TO BE PERFORMED :

1. Simple laboratory techniques crystallisation, Fraction Crystallisation, Distillation, Fractional distillation Boiling Point.Diagram.
2. Extraction Processes- Phase diagram, partition<sub>HSO<sub>4</sub>O</sub>-efficient.
3. Preparation of standard solutions- Primary<sup>2</sup> and<sup>4</sup> secondary standards, Determination of- and H<sub>3</sub>PO<sub>4</sub> in a mixture.
4. Calibration of Thermometres.
5. Acquaintance with safety measures in a laboratory Hazards of Chemicals.
6. Depression and elevation in.b.p./m.p. of solids and liquids.
7. Chromatography-column, Paper, Thin layer.
8. Ore analysis dolomite, limestone, -calcite, Analysis of alloys such as cupro-nickel.
9. Determination of Physical Constants  
Refractive -index, surface tension, Effect of surfactants, on surface tension, viscosity- Fluids, Polymer solutions effect of additives on viscosity, optical rotation.
10. Study, experimenfs/demonstration experiments.

**Note :** Any two experiments have to be carried out by the students in the Examination. A Mini mum of 60% of the'experiments have to be conducted by the students.

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Abhinav Abhishek Abhishek Divyanshu Pratibha l  
24.7.2017 24.7.17 24/7/17 24/7/17 24.7.17

**B. SC. PART - I**  
**COMPUTER SCIENCE**  
**PAPER - I**  
**COMPUTER FUNDAMENTALS**  
**PAPER CODE - 0805**

**MAX MARKS - 50**

**Note:- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.**

**UNIT-I CLASSIFICATION AND ORGANISATION OF COMPUTERS**

History of computer, Generation of computer, calculator vs computer. Digital and Analogue computers and its evolution. Major components of digital computers, Memory addressing capability of CPU. Word length and processing speed of computers, Microprocessors, Single chip Microcomputer, Large and small computers, Users interface, hardware, software and firmware, multiprogramming multiuser system, Dumb smart and intelligent terminals, computers Network and multiprocessing LAN parallel processing, Finn's classification of computers control flow and data flow computers.

**UNIT-II CENTRAL PROCESSING UNIT**

Parts of CPU-ALU control unit, Registers; Architecture of Intel 8085 microprocessor, Instruction for Intel 8085 microprocessor, Instruction Word size, Various addressing mode, Interrupts some special control signals, Instruction cycle fetch and execute operation, Timing Diagram, Instruction flow and data flow.

**UNIT-III MEMORY**

Memory hierarchy, Primary and Secondary Memory, Cache memory, Virtual Memory, Direct Access storage devices (DASD) Destructive and Non-destructive Readout, Program and data memory, Memory Management Unit (MMU) PCMCIA cards and Slots.

**UNIT-IV I/O DEVICE**

I/O devices-KeyBoard, Mouse, Monitor, Impact and Non-Impact Printers, Plotters, Scanner, other Input/output devices: Scan method of Display, Raster Scan, Vector Scan, Bit Mapped Scan, CRT Controller, I/O Port, Programmable and Non Programmable I/O port, Inbuilt I/O ports, Parallel and Serial ports, USB, IEEE 1394, AGP, Serial data transfer scheme, Microcontroller, Signal Processor, I/O processor, Arithmetic Processor.

**UNIT-V SOFTWARE AND PROGRAMMING TECHNIQUES**

Application and System Software: Introduction, Example, Difference etc. Introduction to Open Source Software such as Unix/Linux (Ubuntu), Liber office etc. Introduction to Machine Language Assembly Language and High Level Language; Programming Techniques, Stack Subroutine, Debugging of programs, Macro Program Design Software Development, Flow Chart, Multiprogramming, Multiuser, Multitasking Protection, Operating system and Utility programs Application packages

The bottom of the page contains four handwritten signatures and dates. From left to right: 1. A signature that appears to be 'Alhama' with the date '19/6/19' below it. 2. A signature that appears to be 'M...' with the date '19/6/19' below it. 3. A signature that appears to be 'K. Dubey' with the date '19/6/19' below it. 4. A signature that appears to be 'P. Paul' with the date '19/6/19' below it.

## TEXT BOOK

1. Computer Fundamentals, P.K. Sinha, BPB Publication, Sixth Edition.
2. Computer Fundamentals Architecture and Organization, B. Ram, New Age International Publishers, Fifth Edition.
3. Fundamentals of Computers, V. Rajaraman, PHI Sixth Edition.
4. Computers Today, Donald H. Sanders, McGraw-Hill Third Edition.
5. IBM PC and Clones, B. Govindarajulu, McGraw-Hill Second Edition.
6. UNIX Concepts and Applications, Sumitabha Das, Tata McGraw-Hill Fourth Edition.

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**B. SC. PART - I**  
**COMPUTER SCIENCE**  
**PAPER - II**  
**PROGRAMMING IN C LANGUAGE**  
**PAPER CODE - 0806**

**MAX MARKS - 50**

**Note :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.**

**UNIT-I**

**Fundamentals of C Programming** - Overview of C : History of 'C', Structure of 'C' program. Keywords, Tokens, Datatypes, Constants, Literals and Variables, Operators and Expressions: Arithmetic operators, Relational operator, Logical operators, Expressions, Operator: operator precedence and associativity, Type casting, Console I/O formatting, Unformatted I/O functions: getch(), getchar(), getche(), getc(), putc(), putchar().

**UNIT-II**

**Control Constructs:** If-else, conditional operators, switch and break, nested conditional branching statements, loops: For, do.while, while, for, Nested loops, break and continue, goto and label, exit function.

**Functions:** Definition, function components: Function arguments, return value, function call statement, function prototype. Type of function Scope and lifetime of variable. Call by value and call by reference. Function using arrays, function with command line argument. User defined function: maths and character functions, Recursive function.

**UNIT-III**

**Array:** Array declaration, one and two dimensional numeric and character arrays. Multidimensional arrays.

**String:** String declaration, initialization, and string manipulation with/without using library function.

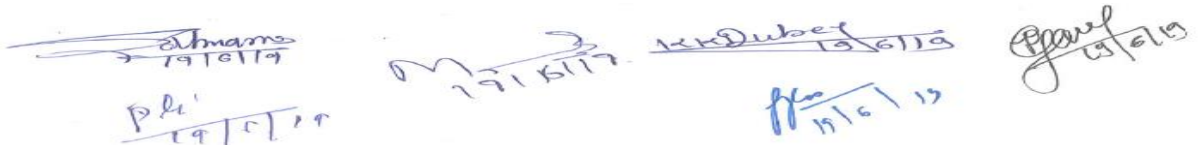
**Structure, Union & Enum- Structure:** Basics, declaring structure and structure variable, typedef statement, array of structure, array within structure, Nested structure; passing structure to function, function returning structure. **Union:** basics, declaring union and union variable, **Enum:** declaring enum and enum variable.

**UNIT-IV**

**Pointers:** Definition of pointers, Pointer declaration, Using & and \* operators. Void pointer, Pointer to pointer, Pointer in math expression, Pointer arithmetic, Pointer comparison, Dynamic memory allocation functions—malloc, calloc, realloc and free, Pointers vs. Arrays, Arrays of pointer, pointer to array, Pointers to functions, Function returning pointer, Passing function as Argument to function, Pointer to structure, Dynamic array of structure through pointer to structure.

**UNIT-V**

**File Handling and Miscellaneous Features-** File handling: file pointer, File accessing functions: fopen, fclose, fputc, fgetc, fprintf, fscanf, fread, fwrite, feof, fflush, rewind, fseek, ferror. File handling through command line argument. Introduction to C preprocess or #include, #define, conditional compilation directives: #if, #else, #elif, #endif, #ifndef etc.

The bottom of the page contains four handwritten signatures and dates. From left to right: 1. Signature 'Alhama' with date '19/6/19' below it. 2. Signature 'M...' with date '19/6/19' below it. 3. Signature 'K. Dubey' with date '19/6/19' below it. 4. Signature 'G...' with date '19/6/19' below it.

## TEXTBOOKS

1. Programming in ANCH. Balagurusamy c Tata McGraw-Hill third edition.
2. Let Us C, Yashwant Kanetkar Infiniti science Press, 8th edition.
3. Mastering C, K.R. Venugopal Tata McGraw-Hill.
4. The C Programming Language, Brian W. Kernighan, Dennis, M Ritchie, Prentice Hall Second Edition.
5. Application programming in ANSI C, R. Johnsonbaugh, Martins Kalin, Macmillan Second Edition.
6. The Spirit of C Mullish Cooper, Jaico Publishing House.
7. How to solve it by computer, R.G. Dromeypearson edition.

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P. Paul  
19/6/19



## **ELECTRONICS EQUIPMENT MAINTENANCE**

### **PAPER - I**

### **PRINCIPLES OF ELECTRONICS**

**(paper code - 0809)**

**UNIT-1** General information : Symbol, colour code, types (Such as carbon, metal film, thin-film thick-film, wire-wound), Variable resistors potentiometers (logarithmic linear multi-turn wire wound rheostat).

Physical properties : Temperature dependence (Thermistor), Light Dependence (LDR),

Voltage Dependence (VDR). technical specification wattage and working voltages. Methods of measurement of resistance: very low to very high values.

**INDUCTORS** : General Information: symbol, Types such as air core, iron core, ferrite core, choking inductors (Coil), frequency response of an inductor.

Method of measurement of inductances: using universal bridges design and fabrication rules.

**CAPACITORS** : General information : symbol, colour code, types of capacitors such as

Air, paper, Electrolytic, Mica, Tantalum Polystyrene, fixed and variable capacitors. Measurement of Capacitance: universal bridge. application areas.

**BATTERIES** : Dry Cells, Lead-Acid Accumulators, Nickel Cadmium cells, standard cells, principles, Specifications.

**FUSES** : Fast and Slow Fuses, Pilot Lamps.

**PCB** : Types of PCB, layout techniques, cables and connectors for PCB

**UNIT-2 TRANSFORMERS**: General information- principle, types of transformer such as single phase, auto mains and isolation transformers. Frequency dependence of transformer theory. (Audio, IF and RF), Design of mains transformers and CVT.

**RELAYS** : General information: symbol, types of relays, such as reed electromagnets. Specifications, rating, application areas.

**MICROPHONES AND LOUDSPEAKERS** : General information: frequency response, input and output Impedance, power rating, directionality (omni and uni-directional). Application areas.

**TRANSDUCERS** : Commonly used transducers, LDR., thermistors thermocouples, photodiodes, photo transistors, IR detectors LDR.

**UNIT-3 SWITCHES, CABLE AND CONNECTORS :** Spdl, dpdl, band switches, touch switches, thumpwheel switches, micro switches, specifications, application areas.

**NETWORK THEOREMS :** Kirchoffs current and voltage law, -maximurr. power transfer,

**THEOREMT :** bevenins theorem, norton's theorem, super position theorem.

**LCR AND WAVESHAPING CIRCLITS :** Serial and parallal response, idea of black Nix., qwivalent circuits. Idea of two terminal and two part network, eqi&alent cirowits. Integra-tion, differer lation using R.C. circuits, *chpping clampaig*.

**UNIT-4 NUMBER SYSTEMS :** Introduction to decimal bmiazy, octal floca decial, number system interconversions of decimals binary and BCD number. Binary arithmetic and Boolean algebr& Boolean axiom, D Morgan's theorms-statement vanfication and applications.

**LOGIC GATES :** Posifive and Negative logic, different logic gate, such as AND, OR NOT, NAI, NOF, EXOR, symbol and truth tables. Inverting a non-inverting suffers.

**LOGIC.FAMILIES :** TTL, ECL & CMOS parameters like power dissipation, speed, sup-ply requirements, logic level, fan in, fan out noise half addar, full addar, half subtulor.

**UNIT-5 COMBINATIONAL CIRCUITS :** Encioder-decoder sequenfial circuits, flip flops (As,K,,D,I,N,S) -shift, registers, counte% Semiconductors memory.

**PAPER - II**  
**ELECTRONIC DEVICES, COMPONENTS & ASSEMBLIES**  
**(paper code - 0810)**

**UNIT-1 INTRODUCTION- TO SEMI CONDUCTORS**

**ENERGY BAND DIAGRAM:** conductors, semiconductor, insulation, intrinsic and extrinsic semiconductors (P.N. type), diffused junctions, depletion layer, barrier potential.

**JUNCTION DIODES :** Rectifying diode, forward and reverse bias characteristics, switching diode, varactor diode, photo diode. light emitting diode, IR sources and detector optical isolators, Zener diode, Tunnel diode, tunnel diode.

**BIPOLAR JUNCTION TRANSISTORS :** Basic working principle (qualitative), characteristics, Basic configurations and biasing. Operating point, load line, biasing for stabilization of operating point.

**UNIT-2 JFET & MOSFET:** Basic working principle (qualitative), characteristics  
Pinch-off voltage,

**UNI JUNCTION TRANSISTORS :** Basic working principle (qualitative), characteristics applications, as a switch.

**POWER CONTROL DEVICES :** Four layer diode (PNPN), Silicon controlled rectifier (SCR) triac, diac, principle & characteristics.

**AMPLIFIERS :** Different terms used in amplifiers, such as signal source, input output, voltage and current gain power gain, - decibel, input and output impedance.

Classification according to the frequency response, RC coupled, class A common emitter Amplifier, Introduction to the class & operation

**FEED BACK IN AMPLIFIER :** Effect of negative feedback on amplifier performance.

**UNIT-3 POWER AMPLIFIER :** Transformer coupled equivalent circuit only in brief, class A, class B. class AB and class C the constant power hyperbola, the AC load line input and output considerations, determination of Non-linear distortion.

**PUSH-PULL AMPLIFIERS :** Phase splitter circuits, complementary push-pull, thermal runaway, Heat sinks.

Class B and C resonant load amplifiers, graphical class C analysis, **resonant** load requirements.

**OPERATIONAL AMPLIFIER :**

Basic, idea of an OPAMP with black box concept inverting and noninverting inputs, virtual ground

Parameters such as input impedance, output impedance, open loop gain, measurements of parameters.

Qualitative description of OPAMP as inverting and non inverting amplifier, summing and difference amplifier, comparator and linear integrators, instrumentation amplifier.

**UNIT-4 OSCILLATORS :** Positive feedback, Barkhausen criteria, phase shift oscillators, Wein bridge oscillators Tuned oscillators, Hartley, Colpitts-oscillators, crystal oscillator.

**POWER SUPPLIES :** Regulated power supply, Zener regulated power supply series and shunt regulated power supply, block diagram of IC 723, regulated supply of IC 723.

Three terminal ICs power supply. Study of power supply. w.r. to variation of load and input voltage.

**SWITCHED MODE POWER SUPPLY :** Design principle, and application. **IC 555 :** Operations and applications.

**UNIT-5 MODULATION :** AM and FM : Principles, modulation, index, modulation, bandwidth, balanced modulator,

**DEMODULATION :** Am and Fm detectors diode detectors, ratio detector, balanced de-modulator'.

Introduction to communication systems, basic principles and operation of communication system.

# Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

Session 2019-20

June 2019 onwards

Class: B.Sc. Electronics

## Scheme of Examination

Paper Code	Course Opted	Title of Course	Theory	Practical	Grand Total	Minimum Passing Marks
First Year						
ELB-101	Core Course	Network Analysis And Analog Electronics	50		100	33
ELB-102	Core Course	Linear and Digital Integrated Circuits	50			
ELB-103P	Core Course Practical/Tutorial	Networks Analysis and Analog Electronics Lab	25	50	50	17
ELB-104P	Core Course Practical/Tutorial	Linear and Digital Integrated Circuits Lab	25			
Second Year						
ELB-201	Core Course	Communication Electronics	50		100	33
ELB-202	Core Course	Microprocessor and Microcontrollers	50			
ELB-203P	Course Practical/Tutorial	Communication Electronics Lab	25	50	50	17
ELB-204P	Course Practical/Tutorial	Microprocessor& Microcontroller Lab	25			
Third Year						
EL301	Skill Enhancement Course	Industrial Electronics	50		100	33
EL302	Skill Enhancement Course	Mobile Application Programming and Introduction to VHDL	50			
EL303P	Skill Enhancement CoursePractical	Industrial Electronics Lab	25	50	50	17
EL304P	Skill Enhancement Course Practical	Mobile Application Programming and Introduction to VHDL Lab	25			

# **B . S c . P a r t I**

## **ELECTRONICS**

### **Paper-I**

#### **ELB-101: NETWORK ANALYSIS AND ANALOG ELECTRONICS**

**Theory:**

**Maximum Marks 50**

#### **Unit-1**

**Basic Circuit Concepts:** Voltage and Current Sources, Review of Resistors, Inductors, Capacitors. Circuit Analysis: Kirchhoff's Current Law (KCL), Kirchhoff's Voltage Law (KVL),

**AC Circuit Analysis:** Sinusoidal Voltage and Current, Definition of Instantaneous, Peak, Peak to Peak, Root Mean Square and Average Values. AC applied to Series RC and RL circuits: Impedance of series RC & RL circuits. AC applied to Series and parallel RLC circuit, Series and Parallel Resonance, condition for Resonance, Resonant Frequency, Bandwidth, and significance of Quality Factor (Q).

**Passive Filters:** Low Pass, High Pass.

**Network Theorems:** Principal of Duality, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Reciprocity Theorem, Millman's Theorem, Maximum Power Transfer Theorem. AC circuit analysis using Network theorems.

#### **Unit-2**

**Junction Diode and its applications:** PN junction diode (Ideal and practical)-constructions, Formation of Depletion Layer, Diode Equation and I-V characteristics. Idea of static and dynamic resistance, dc load line analysis, Quiescent (Q) point. Zener diode, Reverse saturation current, Zener and avalanche breakdown. Rectifiers- Half wave rectifier, Full wave rectifiers (center tapped and bridge), circuit diagrams, working and waveforms, ripple factor and efficiency. Filter-Shunt capacitor filter, its role in power supply, output waveform, and working. Regulation- Line and load regulation, Zener diode as voltage regulator, and explanation for load and line regulation.

#### **Unit-3**

**Bipolar Junction Transistor:** CE, CB Characteristics and regions of operation, Transistor biasing, DC load line, operating point, thermal runaway, idea about stability and stability factor. Voltage divider bias, circuit diagrams and their working.

**Field Effect Transistors:** JFET, Construction, Working and Characteristics. MOSFET, Construction, Working and Characteristics.

**Power Devices:** UJT, Construction, Working and Characteristics. SCR, Diac, Triac, Construction, Working and Characteristics and Applications.

## Unit-4

**Amplifiers:** Transistor biasing and Stabilization circuits- Fixed Bias and Voltage Divider Bias. Thermal runaway, stability and stability factor  $S$ . Transistor as a two port network, h-parameter equivalent circuit. Small signal analysis of single stage CE amplifier. Input and Output impedance, Current and Voltage gains. Class A, B and C Amplifiers.

**Cascaded Amplifiers:** Two stage RC Coupled Amplifier and its Frequency Response.

## Unit-5

**Feedback in Amplifiers:** Concept of feedback, negative and positive feedback, advantages of negative feedback (Qualitative only).

**Sinusoidal Oscillators:** Barkhausen criterion for sustained oscillations. Phase shift, Wein bridge, Crystal and Colpitt's oscillator. Determination of Frequency and Condition of oscillation.

### Reference Books:

- [1] Electric Circuits, S. A. Nasar, Schaum's outline series, Tata McGraw Hill (2004)
- [2] Electrical Circuits, M. Nahvi & J. Edminister, Schaum's Outline Series, Tata McGraw-Hill (2005)
- [3] Electrical Circuits, K.A. Smith and R.E. Alley, 2014, Cambridge University Press
- [4] Network, Lines and Fields, J.D. Ryder, Prentice Hall of India.
- [5] Electronic Devices and Circuits, David A. Bell, 5<sup>th</sup> Edition 2015, Oxford University Press.
- [6] Electronic Circuits: Discrete and Integrated, D.L. Schilling and C. Belove, Tata McGraw Hill
- [7] Electrical Circuit Analysis, Mahadevan and Chitra, PHI Learning
- [8] Microelectronic circuits, A.S. Sedra, K.C. Smith, A.N. Chandorkar, 2014, 6<sup>th</sup> Edn., Oxford University Press.
- [9] J. Millman and C. C. Halkias, Integrated Electronics, Tata McGraw Hill (2001)
- [10] J. J. Cathey, 2000 Solved Problems in Electronics, Schaum's outline Series, Tata McGraw Hill (1991)

## Paper- II

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### ELB-102: LINEAR AND DIGITAL INTEGRATED CIRCUITS

**Theory:**

**Maximum Marks 50**

#### Unit-1

**Operational Amplifiers (Black box approach):** Characteristics of an Ideal and Practical Operational Amplifier (IC 741), Open and closed loop configuration, Frequency Response. CMRR. Slew Rate and concept of Virtual Ground.

**Applications of Op-Amps:** (1) Inverting and non-inverting amplifiers, (2) Summing and Difference Amplifier, (3) Differentiator, (4) Integrator, (5) Wein bridge oscillator, (6) Comparator and Zero-crossing detector, and (7) Active low pass and high pass, Butterworth filter (1<sup>st</sup> order only).

#### Unit-2

**Number System and Codes:** Decimal, Binary, Octal and Hexadecimal number systems base conversions. Representation of signed and unsigned numbers, BCD code. Binary, octal and hexadecimal arithmetic; addition, subtraction by 2's complement method, multiplication.

**Logic Gates and Boolean algebra:** Truth Tables of OR, AND, NOT, NOR, NAND, XOR, XNOR, Universal Gates, Basic postulates and fundamental theorems of Boolean algebra.

#### Unit-3

**Combinational Logic Analysis and Design:** Standard representation of logic functions (SOP and POS), Minimization Techniques (Karnaugh map minimization up to 4 variables for SOP). Arithmetic Circuits: Binary Addition. Half and Full Adder. Half and Full Subtractor, 4-bit binary Adder/Subtractor.

**Data processing circuits:** Multiplexers, De-multiplexers, Decoders, Encoders. Clock and Timer (IC 555): Introduction, Block diagram of IC 555, Astable and Monostable multivibrator circuits.

#### Unit-4

**Sequential Circuits:** SR, D, and JK Flip-Flops. Clocked (Level and Edge Triggered) Flip-Flops. Preset and Clear operations. Race-around conditions in JK Flip-Flop. Master-slave JK Flip-Flop.

**Shift registers:** Serial-in-Serial-out, Serial-in-Parallel-out, Parallel-in-Serial-out and Parallel-in-Parallel-out Shift Registers (only up to 4 bits).

**Counters (4 bits):** Ring Counter. Asynchronous counters, Decade Counter Synchronous Counter.



## Unit-5

D-A and A-D Conversion: 4 bit binary weighted and R-2R D-A converters, circuit and working, Accuracy and Resolution. A-D conversion characteristics, successive approximation ADC. (Mention of relevant ICs for all).

### Reference Books:

- [1] OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, 4th edition, 2000, Prentice Hall
  - [2] Operational Amplifiers and Linear ICs, David A. Bell, 3rd Edition, 2011, Oxford University Press.
  - [3] Digital Principles and Applications, A.P. Malvino, D.P. Leach and Saha, 7th Ed., 2011, Tata McGraw
  - [4] Fundamentals of Digital Circuits, Anand Kumar, 2nd Edn, 2009, PHI Learning Pvt. Ltd.
  - [5] Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
  - [6] Digital Systems: Principles & Applications, R.J. Tocci, N.S. Widmer, 2001, PHI Learning.
  - [7] Thomas L. Floyd, Digital Fundamentals, Pearson Education Asia (1994)
  - [8] R. L. Tokheim, Digital Principles, Schaum's Outline Series, Tata McGraw- Hill (1994)
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**ELECTRONICS LABORATORY**  
**ELB 103P: NETWORK ANALYSIS AND ANALOG ELECTRONICS LAB**  
(Hardware and Circuit Simulation Software) **Max.Marks:25**

*The scheme of practical examination will be as follows-*

<b>Experiment</b>	<b>--</b>	<b>30</b>
<b>Viva</b>	<b>--</b>	<b>10</b>
<b>Sessional</b>	<b>--</b>	<b>10</b>
<b>Total</b>	<b>--</b>	<b>50</b>

***AT LEAST 06 EXPERIMENTS FROM THE FOLLOWING BESIDES #1***

1. To familiarize with basic electronic components (R, C, L, diodes, transistors), digital Multimeter, Function Generator and Oscilloscope.
2. Measurement of Amplitude, Frequency & Phase difference using Oscilloscope.
3. Verification of (a) Thevenin's theorem and (b) Norton's theorem.
4. Verification of (a) Superposition Theorem and (b) Reciprocity Theorem.
5. Verification of the Maximum Power Transfer Theorem.
6. Study of the I-V Characteristics of (a) p-n junction Diode, and (b) Zener diode.
7. Study of (a) Half wave rectifier and (b) Full wave rectifier (FWR).
8. Study the effect of (a) C- filter and (b) Zener regulator on the output of FWR.
9. Study of the I-V Characteristics of UJT and design relaxation oscillator..
10. Study of the output and transfer I-V characteristics of common source JFET.
11. Study of Fixed Bias and Voltage divider bias configuration for CE transistor.
12. Design of a Single Stage CE amplifier of given gain.
13. Study of the RC Phase Shift Oscillator.
14. Study the Colpitt's oscillator.

**Reference Books:**

1. Electrical Circuits, M. Nahvi and J. Edminister, Schaum's Outline Series, Tata McGraw-Hill (2005)
2. Networks, Lines and Fields, J.D.Ryder, Prentice Hall of India.
3. J. Millman and C. C. Halkias, Integrated Electronics, Tata McGraw Hill (2001)
4. Allen Mottershead, Electronic Devices and Circuits, Goodyear Publishing Corporation.

**ELECTRONICS LAB**  
**ELB 104P: LINEAR AND DIGITAL INTEGRATED CIRCUITS LAB**  
**Max.Marks:25**

At least 04 experiments each from section A, B and C

***Section-A: Op-Amp. Circuits (Hardware)***

1. To design an inverting amplifier using Op-amp (741,351) for dc voltage of given gain
2. (a) To design inverting amplifier using Op-amp (741,351) & study its frequency response  
(b) To design non-inverting amplifier using Op-amp (741,351) & study frequency response
3. (a) To add two dc voltages using Op-amp in inverting and non-inverting mode  
(b) To study the zero-crossing detector and comparator.
4. To design a precision Differential amplifier of given I/O specification using Op-amp.
5. To investigate the use of an op-amp as an Integrator.
6. To investigate the use of an op-amp as a Differentiator.
7. To design a Wien bridge oscillator for given frequency using an op-amp.
8. To design a circuit to simulate the solution of simultaneous equation and 1<sup>st</sup>/2<sup>nd</sup> order differential equation.
9. Design a Butterworth Low Pass active Filter (1<sup>st</sup> order) & study Frequency Response
10. Design a Butterworth High Pass active Filter (1<sup>st</sup> order) & study Frequency Response
11. Design a digital to analog converter (DAC) of given specifications.

***Section-B: Digital circuits (Hardware)***

1. (a) To design a combinational logic system for a specified Truth Table.  
(b) To convert Boolean expression into logic circuit & design it using logic gate ICs.  
(c) To minimize a given logic circuit.
2. Half Adder and Full Adder.
3. Half Subtractor and Full Subtractor.
4. 4 bit binary adder and adder-subtractor using Full adder IC.
5. To design a seven segment decoder.
6. To design an Astable Multivibrator of given specification using IC 555 Timer.
7. To design a Monostable Multivibrator of given specification using IC 555 Timer.
8. To build Flip-Flop (RS, Clocked RS, D-type and JK) circuits using NAND gates.
9. To build JK Master-slave flip-flop using Flip-Flop ICs
10. To build a Counter using D-type/JK Flip-Flop ICs and study timing diagram.
11. To make a Shift Register (serial-in and serial-out) using D-type/JK Flip-Flop ICs.

**Section-C: SPICE/MULTISIM simulations for electronic circuits and devices**

1. To verify the Thevenin and Norton Theorems.
2. Design and analyze the series and parallel LCR circuits
3. Design the inverting and non-inverting amplifier using an Op-Amp of given gain
4. Design and Verification of op-amp as integrator and differentiator
5. Design the 1<sup>st</sup> order active low pass and high pass filters of given cutoff frequency
6. Design a Wein's Bridge oscillator of given frequency.
7. Design clocked SR and JK Flip-Flop's using NAND Gates
8. Design 4-bit asynchronous counter using Flip-Flop ICs
9. Design the CE amplifier of a given gain and its frequency response.

### **Reference Books**

1. Digital Principles and Applications, A.P. Malvino, D.P. Leach and Saha, 7th Ed., 2011, Tata McGraw
  2. OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, 4<sup>th</sup> edn., 2000, Prentice Hall
  3. R. L. Tokheim, Digital Principles, Schaum's Outline Series, Tata McGraw- Hill (1994)
  4. Digital Electronics, S.K. Mandal, 2010, 1<sup>st</sup> edition, McGraw Hill
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**B.Sc. Part-I**  
**INFORMATION TECHNOLOGY**  
**PAPER-I**  
**FUNDAMENTAL OF IT, COMPUTER AND PC SOFTWARE**  
**(PAPER CODE-0824)**

**NOTE : The Question paper setter is advised to prepare unit wise question with the provision of internal choice**

**MAX MARKS : 50**

**UNIT-I INFORMATION TECHNOLOGY**

Concept of IT and information system, Application of IT (In Business, Education Medicine Science Governance and Agriculture) Impact of IT on society E and industry, Legal and Ethical aspect of IT, Security and Threats in IT, M-Commerce, Virtual reality, latest trend in IT, future of IT.

**UNIT-II COMPUTER NETWORK**

**BASIC CONCEPT OF COMPUTER NETWORK** Internet concept LAN, MAN, WAN Topology, Protocol, Transmission mode Communication Process Required element of data communication.

**WIRELESS COMMUNICATION** Mobile Internet GPS, 3G, 4G Wi-Fi Bluetooth infrared radio frequency microwave.

**SOCIAL NETWORK** Evolutions of social network site (YouTube, Facebook, LinkedIn Twitter) Advantages and Disadvantage of social networking sites.

**UNIT-III MS WORD**

Introduction word processing (MS-Word) Advantage of word processing, Introduction and Installation Editing a file using paragraph styles, Newspaper style columns using macros advanced word processing, Headers and Footers, Finding text setting up printer Mail merge and other applications, mathematical calculator, table handling.


**UNIT-IV MS-EXCEL**

Introduction to spreadsheets (MS-EXCEL), Definition and advantage of electronics worksheet, Working on spread sheets range and related operations, Setting saving and retrieving worksheets Inserting, Deleting, Copying and Moving of data cells, Inserting and deleting rows and column, protecting Cells Printing a worksheet, erasing a worksheet in Graphs creations, Type of graphs, Creating a chart sheet 3D, Columns charts, Moving and changing the size of chart, Printing the chart.

**UNIT-V MS POWERPOINT AND MS ACCESS**

**MS-POWERPOINT:** Presenting with Power point: Creating presentation working with slides, Different type of slides, Settings page layout, Selecting background and applying designs, Adding graphics to slide, Adding sound and movie, Creating chart and graph, Playing a slide show, slide transition, Advancing slide, Setting time, Rehashing timing, Animating slide, Animating objects, Running the show from window.

**MS ACCESS:** Creating table in access define data type Manipulating records.

The bottom of the page contains four handwritten signatures and dates. From left to right: 1. A signature that appears to be 'Shamane' with the date '19/01/19' below it. 2. A signature that appears to be 'M...' with the date '19/01/19' below it. 3. A signature that appears to be 'K. K. Dubey' with the date '19/01/19' below it. 4. A signature that appears to be 'P. K. Singh' with the date '19/01/19' below it.

## TEXTBOOKS

1. Computer fundamental R.K.Sinha BPB Publication Sixth edition.
2. Introduction to Information Technology V Raja Raman PHI Second Edition.
3. Computer Networks Forouzan Tata McGraw Hill Second Edition.
4. Microsoft Office 2007 fundamentals L Story D walls.
5. MS Office, S.S.Srivastava Firewall media.

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**B. SC. PART - I**  
**INFORMATION TECHNOLOGY**  
**PAPER - II**  
**PRAMMING IN C LANGUAGE**

**MAX MARKS - 50**

**Note :-** The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

**UNIT-I**

**Fundamentals of C Programming** - Overview of C: History of 'C', Structure of 'C' program. Keywords, Tokens, Datatypes, Constants, Literals and Variables, Operators and Expressions : Arithmetic operators, Relational operator, Logical operators, Expressions, Operator: operator precedence and associativity, Typecasting, Console I/O formatting, Unformatted I/O functions: getch(), getchar(), getche(), getc(), putc(), putchar().

**UNIT-II**

**Control Constructs** : If-else, conditional operators, switch and break, nested conditional branching statements, loops: do...While, while, for, Nested loops, break and continue, goto and label, exit function. **Functions**:-definition, function components: Function arguments, return value, function call statement, function prototype. Type of function Scope and lifetime of variable. Call by value and call by reference. Function using arrays, function with command line argument. User defined function: Maths and character functions, Recursive function.

**UNIT-III**

**Arrays, Strings and Functions: Array**:-Array declaration, One and Two dimensional numeric and character arrays. Multidimensional arrays.

**String**:-String declaration, initialization and string manipulation with/without using library function.

**Structure, Union & Enum- Structure**: basics, declaring structure and structure variable, typedef statement, array of structure, array within structure, Nested structure; passing structure to function, function returning structure. **Union**: basics, declaring union and union variable. **Enum** : declaring enum and enum variable.

**UNIT-IV**

**Pointers**: Definition of pointers, pointer declaration, using & and \* operators. Void pointer, pointer to pointer, Pointer in math expression, Pointer arithmetic, pointer comparison, dynamic memory allocation functions—malloc, calloc, realloc and free, pointers vs Array, Arrays of pointer, Pointer to array, Pointers to function, function returning pointer, passing function as argument to function, Pointer to structure, Dynamic array of structure through pointer to structure.

**UNIT-V**

**File Handling and Miscellaneous Features**- File handling: file pointer, file accessing functions, fopen, fclose, fputc, fgetc, fprintf, fscanf, fread, fwrite, eof, fflush, rewind, fseek, ferror. File handling through command line argument. Introduction to C preprocessor #include, #define, Conditional compilation directives: #if, #else, #elif, #endif, #ifndef etc.

**TEXTBOOKS**

1. Programming in ANSI C. E. Balagurusamy c Tata McGraw-Hill third edition.
2. Let Us C, Yashwant Kanetkar Infiniti science Press, Eighth edition.
3. Mastering C, K.R. Venugopal Tata McGraw-Hill.
4. The C Programming Language, Brian W. Kernighan, Dennis, M Ritchie, Prentice Hall Second Edition.
5. Application programming in ANSI C, R. Johnsonbaugh, Martins Kalin, Macmillan Second Edition.
6. The Spirite of C Mullish Cooper, Jaico Publishing House.
7. How to solve it by computer, R.G. Dromey person edition.

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## INDUSTRIAL MICROBIOLOGY

Paper	Title	Time	Marks
First	General Microbiology, Tools and Techniques	3 hrs.	50
Second	Molecular Biology, Biochemistry and Microbial Genetics	3 hrs.	50
	PRACTICAL (including sessionals)	4 hrs.	50 (40+10)

### PAPER -

#### GENERAL MICROBIOLOGY, TOOLS AND TECHNIQUES

M.M.50

#### I (paper code - 0826)

- UNIT-1** History and development of Industrial Microbiology. Contributions of Antony van Leeuwenhoek, Louis Pasteur, Robert Koch, Edward Jenner, Waksman, Alexander Fleming.
- UNIT-2** General characteristics and structure of Bacteria, Cyanobacteria, Fungi, Actinomycetes, Mycoplasmas, Viruses.
- UNIT-3** Microscopy - Invention of Microscope, Compound microscope, Dark field, Fluorescent, Phase contrast and Electron microscope.
- UNIT-4** Method of sterilization, culture media and isolation techniques. Methods of preservation of microbial cultures.
- UNIT-5** Basic principles and usage - pH meter, Densitometer, Colorimeter, Spectrophotometry, Fluorimetry, Centrifugation - Principles and applications. Usage of Fermentation.

### PRACTICALS

The Practical works will, in general be based on the prescribed syllabus in theory and the candidates will be required to show the knowledge of the following :

1. Preparation of media, autoclaving and sterilization of glassware.
2. Isolation of Phytopathogens.
3. Isolation of Microorganisms from soil and water : Bacteria, Fungi, and Algae.
4. Purification of microbial cultures.
5. Camera Lucida Drawing.
6. Standard Plate count.
7. Hemacytometer.
8. Chromatographic techniques : Separation of amino acids by paper and thin layer chromatography.
9. Measurement of pH of fruit juice.
10. Estimation of carbohydrate by colorimeter.

#### BOOK RECOMMENDED :

1. General Microbiology, Vol. II by Power and Daganawala.
2. Microbiology by Pelczar, Reid and Chan.
3. General Microbiology by Davis and Harper.
4. A Treatise on Media and Methods Used in Bacteriological Techniques by V. Iswaran.
5. Introductory Mycology by C.J. Alexopoulos & Mims.
6. Microbiology by P.D. Sharma.

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**PAPER - II**  
**MOLECULAR BIOLOGY, BIOCHEMISTRY AND MICROBIAL GENETICS**  
**(paper code - 0827)**

**M.M. 50**

- UNIT-1** Nucleic Acids - Structure of DNA and RNA(s), Replication of DNA, Synthesis of RNAs and their types, Genetic code, Concept of genes.
- UNIT-2** Molecular Biology - Translation and Protein Synthesis, Operon Concept, CAMP CAP (Catabolic activator protein), Gene expression in Prokaryotes, Lac-Operon. Gene regulation in Eukaryotes (Britton-Davison Model of Gene Expression).
- UNIT-3** Genetic recombination in Bacteria - Transformation, Transduction and conjugation, Genetic Mapping, Extrachromosomal genetic material, Plasmids, Cosmids, Transposons, Overlapping genes, Silent genes and their evolutionary significance. Mutation -Molecular mechanism of mutation, Chemical and Physical Mutagens, Repair of Mutation Damage.
- UNIT-4** Biochemistry - Classification of carbohydrates, Chemical structure and property of starch, Cellulose, Glycogen, Synthesis of Purines & Pyrimidine. Lipids - Saturated and unsaturated fatty acids, Biosynthesis of fatty acids, Distribution and functions of lipids in microorganisms, Degradation of lipids by  $\alpha$ -oxidation and  $\omega$ -oxidation, Lipid peroxidation.
- UNIT-5** Enzymes - Classification. Co-enzymes, Cofactors, Mechanism of enzyme action, Competitive and non-competitive inhibition. Allosteric regulations of enzymes, isoenzymes, factors contributing to catalytic efficiency of enzymes.

Amino acids - Classification of essential amino acids based on polarity. Acid-base properties and solubilities. Amino acid sequencing of proteins; Primary, Secondary and Tertiary structure.

**PRACTICAL**

The Practical work will, in general, be based on the syllabus prescribed in theory and the candidates will be required to show the knowledge of the following -

1. Isolation of antibiotic resistant bacteria.
2. Estimation of alkaline phosphatase activity.
3. Measurement of  $\alpha$ -amylase activity in extra-cellular fraction of microbial cultures.
4. Estimation of glycogen in bacterial cells.
5. Measurement of cellulase activity by Viscometric technique.
6. Determination of cellulase and amylase activity by reducing sugar assay test.
7. Isolation of DNA.



**BOOK RECOMMENDED :**

1. General Microbiology, Vol. 1 by Power & Dagainawala.
2. Bicrobial Biochemistry by Moat.
3. Principles of Biochemistry by Lehninger.
4. Outline of Biochemistry by Cohn and Stumph.
5. Biochemistry by Harper.
6. Text book of Biochemistry by Rama Rao.
7. Text book of Biochemistry by O.P. Agrawal.

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**BIO CHEMISTRY**  
**PAPER-I**  
**BIOMOLECULES**  
**(paper code - 0832)**

**M.M. 50**

**UNIT-I**

Introduction to Biochemistry, water as a biological solvent, weak acids and bases, pH, buffers, Henderson-Hasselbalch equation, physiological buffers, fitness of the aqueous environment for living organisms.

**CARBOHYDRATES**

Structure of monosaccharides. Stereoisomerism and optical isomerism of sugars.

Reactions of aldehyde and ketone groups. Ring structure and anomeric forms, mutarotation. Reactions of sugar due to hydroxyl groups. Important derivatives of monosaccharides, disaccharides and trisaccharides (structure, occurrence and functions of important ones). Structure occurrence and biological importance of monosaccharides, oligosaccharides and polysaccharides e.g. Cellulose, Chitin, agar, algenic acids, pectins, proteoglycans, sialic acids, blood group polysaccharides, glycogen and starch. Bacterial cell wall polysaccharides etc. Glycoproteins.

**UNIT-II Lipids**

Definition and classification. Fatty acids : introduction, classification, nomenclature, structure and properties of saturated and unsaturated fatty acids. Essential fatty acids, prostaglandins. Triacylglycerols: nomenclature, physical properties. chemical properties and characterization of fats - hydrolysis, saponification value, rancidity of fats,

Reichert-Meissel number and reaction of glycerol. Biological significance of fats. Glycerophospholipids (lecithins, lysolecithins, cephalins, phosphatidyl serine, phos-phatidyl inositol, plasmalogens), sphingomyelins, glycolipids - cerebroside, ganglio-side. Properties and functions of phospholipids, isoprenoids and sterols.

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### UNIT-III Proteins

Introduction, classification based on solubility, shape, composition and functions.

Amino acids: common structural features, stereo-isomerism and RS system of designating optical isomers, classification and chemical properties, titration of amino acids, separation of amino acids. Essential amino acids.

Peptides: structure of peptide bond, chemical synthesis of polypeptides - protection and deprotection of N-terminal, and C-terminal ends and functional groups in the side-chains, formation of peptide bonds, condensing agents, strategy of chemical synthesis, Merrifield solid-phase peptide synthesis. Determination of the amino acid sequence of a polypeptide chain, specific chemical and enzymatic cleavage of a polypeptide chains and separation of peptides. Protein structure: levels of structure in protein architecture, primary structure of proteins, secondary structure of proteins helix and pleated sheets, tertiary structure of proteins, forces stabilizing the tertiary structure and quaternary structure of proteins. Denaturation and renaturation of proteins. Behaviour of proteins in solutions, salting in and salting out of proteins.

Structure and biological functions of fibrous proteins (keratins, collagen and elastin), globular proteins (hemoglobin, myoglobin), lipoproteins, metalloproteins, glycoproteins and nucleoproteins.

**UNIT-IV** Nature of genetic material: evidence that DNA is the genetic material, Composition of RNA and DNA, generalized structural plan of nucleic acids, nomenclature used in writing structure of nucleic acids, features of DNA double helix. Denaturation and annealing of DNA, structure and roles of different types of RNA Size of DNA in procaryotic and eucaryotic cells, central dogma of molecular biology, Gene, Genome, chromosome.

### UNIT-V Porphyrins

Porphyrins: Porphyrin nucleus and classification of porphyrins. important Metalloporphyrins occurring in nature. Detection of porphyrins spectrophotometrically and by fluorescence. Bile pigments - chemical nature and their physiological significance.

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## PAPER - II

(paper code - 0833)

### BIOPHYSICAL AND BIOCHEMICAL TECHNIQUES

M.M. 50

#### UNIT-I Concepts of Bioenergetics

Principles of thermodynamics and their applications in biochemistry - introduction, thermodynamic system, thermodynamic state functions, first and second laws of thermodynamics, concept of free energy, standard free energy, determination of  $\Delta G$  for a reaction, relation between equilibrium constant and standard free energy change, biological standard state and standard free energy change in coupled reactions.

Biological oxidation-reduction reactions - introduction, redox potentials, relation between standard reduction potentials and free energy change (derivations and numericals included). High-energy phosphate compounds - introduction, phosphate  $^{32}\text{P}$ ,  $^{35}\text{S}$ ,  $^{14}\text{C}$  and  $^3\text{H}$  group transfers-free energy of hydrolysis of ATP and sugar phosphates along with reasons for high  $\Delta G$ .

#### UNIT-II Hydrodynamic Methods

Sedimentation - sedimentation velocity, preparative and analytical ultracentrifugation techniques. determination of molecular weight by hydrodynamic methods (derivations excluded and numericals included).

##### Measurement of pH

Principles of glass and reference electrodes, types of electrodes, complications of pH measurement (dependence of pH on ionic strength, electrode contamination and sodium error) and use of pH paper.

#### UNIT-III Radioisotopic Techniques

Types of radioisotopes used in Biochemistry, units of radioactivity measurements, techniques used to measure radioactivity (gas ionization and liquid scintillation counting), nuclear emulsions used in biological studies (pre-mounted, liquid and stripping), isotopes commonly used in biochemical studies-Autoradiography. Biological hazards of radiation and safety measures in handling radioisotopes. Biological application.

#### UNIT-IV Chromatography

General principles and applications of :

1. Adsorption chromatography
2. Ion-exchange chromatography
3. Thin-layer chromatography
4. Molecular-sieve chromatography
5. Hydrophobic chromatography
6. Gas-liquid chromatography
7. HPLC
8. Affinity chromatography
9. Paper chromatography

  
The bottom of the page features six handwritten signatures, each followed by a date. From left to right, the signatures and dates are: 1. A signature (possibly 'A. Bhatnagar') with the date '24.7.2017'. 2. A signature (possibly 'A. Bhatnagar') with the date '24.7.17'. 3. A signature (possibly 'A. Bhatnagar') with the date '24.7.17'. 4. A signature (possibly 'A. Bhatnagar') with the date '24.7.17'. 5. A signature (possibly 'A. Bhatnagar') with the date '24.7.17'. 6. A signature (possibly 'A. Bhatnagar') with the date '24.7.17'.

### **Electrophoresis**

Basic principles of agarose electrophoresis, PAGE and SDS-PAGE, Two-dimensional electrophoresis, its importance. Isoelectrofocussing.

### **UNIT-V Spectroscopic Techniques**

Beer-Lambert law, light absorption and its transmittance, determination and application of extinction coefficient, application of visible and UV spectroscopic techniques (structure elucidation and numericals excluded).  
Principle and application of NMR, ESR, Mass spectroscopy. Fluorescent and emission spectroscopy.

### **Immunological Techniques**

Immunodiffusion, immunoelectrophoresis, radioimmunoassay, ELISA, immunofluorescence.

### **PRACTICAL**

**M.M. 50**

1. Preparation of standard buffers and determination of pH of a solution.
2. Qualitative tests for :
  - a. Carbohydrates
  - b. Proteins and amino acids
  - c. Lipids
3. Determination of saponification value and iodine number of fats.
4. Estimation of ascorbic acid.
5. Titration curve for amino acids and determination of pK value;
6. Verification of Beer-Lambert's law.
7. Estimation of
  - i) Carbohydrate by anthrone method.
  - ii) Blood glucose by the methods (a) Folin-Wu, (b) Nelson-Somogyi
8. Estimation of amino acids by ninhydrin method.
9. Isolation and assay of glycogen from rat liver.
10.
  - i) Extraction of total lipids by Folch method
  - ii) Estimations of food adulterant.
11. Estimation of DNA and RNA.
12. Separation of sugars using paper chromatography.



# **Syllabus of Biotechnology**

**(B. Sc. I Year)**

**Session**

**2019-2020**

**2020-2021**

  
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**HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**

**B.Sc.-I**

**BIOTECHNOLOGY**

**PAPER – I**

**BIOCHEMISTRY, BIOSTATISTICS AND COMPUTERS**

**UNIT-I**

1. Introduction to Biochemistry: History, Scope and Development.
2. Carbohydrates: Classification, Structure and Function of Mono, Oligo and Polysaccharides.
3. Lipids: Structure, Classification and Function.

**UNIT –II**

1. Amino acids and Proteins: Classification, Structure and Properties of amino acids, Types of Proteins and their Classification and Function.
2. Enzymes: Nomenclature and Classification of enzyme, Mechanism of enzyme action, Enzyme Kinetics and Factors affecting the enzymes action. Immobilization of enzyme and their application.

**UNIT –III**

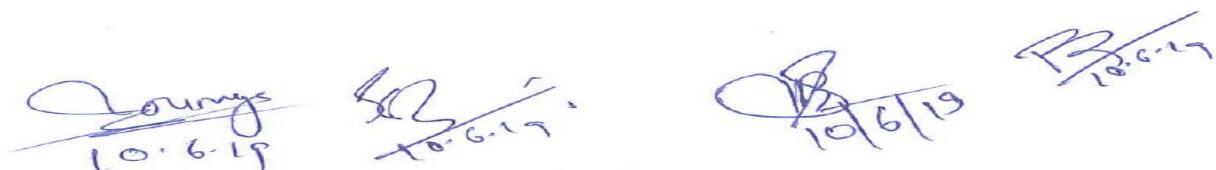
1. Hormones: Plant Hormone-Auxin and Gibberellins and Animal Hormone-Pancreas and Thyroid.
2. Carbohydrates, Proteins and Lipid Metabolism - Glycolysis, Glycogenesis, Glyconeogenesis, Glycogenolysis and Krebs cycle. Electron Transport Chain and  $\beta$ -oxidation of Fatty acids.

**UNIT-IV**

1. Scope of Biostatistics, Samples and Population concept, Collection of data-sampling techniques, Processing and Presentation of data.
2. Measures of Central Tendency: Mean, Median and Mode and Standard Deviation.
3. Probability Calculation: Definition of probability, Theorem on total and compound probability.

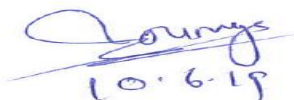
**UNIT-V**

1. Computers - General introduction, Organization of computer, Digital and Analogue Computers and Computer Algorithm.
2. Concept of Hardware and Software, Input and Output Devices.
3. Application of computer in co-ordination of solute concentration, pH and Temperature etc., of a Fermenter in operation and Internet application.



## List of Books

1. Nelson and Cox (2005) Principles of Biochemistry, Fourth Edition
2. Todd and Howards Mason (2004) Text book of Biochemistry, Fourth Edition
3. Lubert Stryer and Berg ((2004) Biochemistry, Fifth Edition
4. Diana Rain, Marni Ayers Barby - (2006) Textbook on Q level Programming. 4th Edition.
5. Karl Schwartz: (2006) Guide of Micro Soft. Marina Raod, 4th Edition.
6. E Balaguruswamy by Programming in BASIC (1991).
7. RC Campbell by Statistics for Biologists. .
8. P Cassel et al by Inside Microsoft Office,
9. Statistical Methods, GW Snedecor and WG Cochran.
10. AC Wardlaw by Practical Statistics for Experimental Biologists,
11. JHZar by Bio-statistical analysis
12. RR Sokal FJ Rohlf by Introduction to Biostatistics
13. L Y Kun (2003) Microbial Biotechnology: Principles and applications
14. Khan and Khanum (1994) Fundamental of Biostastics

  
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**B.Sc.-I**  
**BIOTECHNOLOGY**  
**PAPER-II**  
**CELL BIOLOGY, GENETICS AND MICROBIOLOGY**

**UNIT-I**

1. Concept of life, Cell as a basic unit of living system and Cell theory.
2. Diversity of Cell shape and size.
3. Prokaryotic cell structure: Function and ultra structure of cell (Gram positive and Gram negative Bacteria), Plasma membrane, Flagella, Pilli, Endospore and Capsule.
4. Eukaryotic cell: Plant cell wall and Plasma membrane.

**UNIT-II**

1. Cytoplasm: Structure and Functions of Endoplasmic reticulum, Ribosome, Golgi complex, Lysosomes, Nucleus, Mitochondria and Chloroplast.
2. Cytoskeleton: Microtubules, Microfilaments and Intermediate filaments.
3. Cell division: Mitosis and Meiosis.
4. Programmed Cell Death.

**UNIT-III**

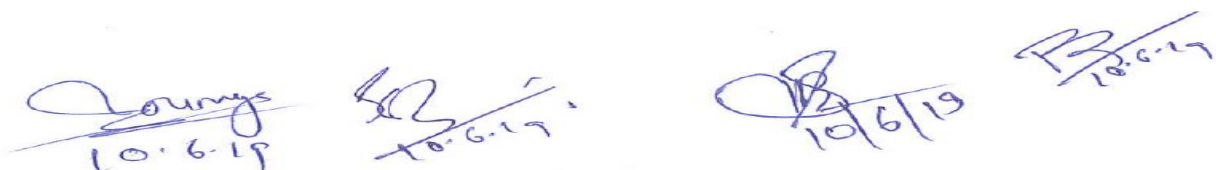
1. Mendel's Laws of Inheritance.
2. Linkage and Crossing over.
3. Chromosome variation in number and structure: Deletion, Duplication, Translocation, Inversion and Aneuploidy, Euploidy (Monoploidy and Polyploidy and its importance).

**UNIT-IV**

1. History, Scope and Development of Microbiology.
2. Basic techniques of Microbial Culture
3. Microbial Growth & Nutrition of Bacteria: Isolation, media sterilization- physical and chemical agents, pure culture-pour plate method, streak plate method and spread plate method.
4. General features and Economic importance of Fungi, Algae and Protozoa etc.

**UNIT-V**

1. Bacterial Reproduction: Conjugation, Transduction and Transformation.
2. Mycoplasma – History, Classification, Structure reproduction & Diseases.
3. Viruses – Basic features, Structure, Classification, Multiplication, Bacteriophages (Morphology, life cycle, infection and medicinal importance)



## List of Books

1. C.B. Power- Cell biology, First Edition (2005), Himalaya Publishing House.
2. Gereld Karp - Cell and molecular biology, 4th Edition (2005)
3. P.K. Gupta - Cell and molecular biology, Second Edition (2003), Restogi publications.
4. C.B., Oowar - Cell biology, Third Edition (2005) Himalaya Publishing Hosue.
5. S.S. Purohit - Microbiology : Fundamentals and Applications, 6th Edition (2004)
6. R.C. Dubey and D.K. Maheshwari: Practical Microbiology. S.Chand Publication.
7. R.C. Dubey and D.K. Maheshwari, Microbiology (2006). S.Chand Publication.
8. Tortora, Funke and Case - Microbiology, An introduction, sixth Edition (1995), Benjamin/Cummings Publishing Company.
9. Prescott, Harley and Klein - Microbiology, Third Edition, Wm. C. Brown Publishers (1996).
10. P. Chakraoborthy - Textbook of microbiology, Second Edition (2007).
11. Prescott, Harley and Klein - Microbiology. Third Edition. Wm. C. Brown.
12. Microbial Genetics, David Freifelder, John F Cronan, Stanley R Maloy, Jones and Bartlett Publishers.
13. Elements of Human Genetics. I.I. cavalla-Sfoeza, WA Benjamin Advanced Book Program.
14. S.K Jadhav and P.K. Mahish (2018) Prayogtmak Jaivprodyogiki awam Sukshmjivigyan- Chhattisgarh Hindi Granth Academy, Raipur.

  
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## **List of Practical's**

### **MICROBIOLOGY AND BIOCHEMICAL TECHNIQUES**

- (1) Laboratory rules, Tools, Equipment and Other requirements in Microbiological laboratory.**
- (2) Micrometry – Use of ocular & stage Micrometer.**
- (3) Counting of bacteria by counting chamber, by plate count.**
- (4) Preparation of media and cultivation techniques:**
  - (a) Basic liquid media (broth)
  - (b) Basic Solid media, (agar slants and deep tubes)
  - (c) Demonstration of selective and differential media
  - (d) Isolation and enumeration of micro organisms
  - (e) Isolation from air and Soil
- (5) Smears and staining methods:**
  - (a) Preparation of bacterial smear
  - (b) Gram Negative & Positive staining
- (6) Methods of obtaining pure cultures**
  - (a) Streak plate method
  - (b) Pure plate method
  - (c) Spread plate method
  - (d) Broth cultures
- (7) Growth & Biochemical techniques**
  - (a) Determination of bacterial growth curve
  - (b) Amylase production test
  - (c) Cellulose production test
  - (d) Estimation of Sugar in given solution
  - (e) Extraction and separation of lipids
  - (f) Estimation of proteins
  - (h) Mitosis and Meiosis
- (8) Biostatistics:**
  - (a) By Manual and by computer.
  - (b) Problems on mean, mode and median.

  
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## SCHEME OF PRACTICAL EXAMINATION

Time – 4 hrs.

M. M.: 50

1. Experiment based on culture of micro-organisms	15 Marks
2. Bacterial growth/Staining techniques	10 Marks
3. Biochemical techniques	05 Marks
4. Bio statistics	05 Marks
5. Spotting	05 Marks
6. <i>Viva – Voce</i>	05 Marks
7. Record/Sessional	05 Marks

  
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# SYLLABUS

2016-2017



PT. RAVISHANKAR SHUKLA UNIVERSITY  
RAIPUR

CHHATTISGARH

**SYLLABUS FOR 2016-17**

**M. Sc. ZOOLOGY**

Semester	Paper	Title	External marks	Internal marks	Credit
<b>First JULY-DEC, 2016</b>	I	Biosystematics, Taxonomy and Biodiversity	80	20	4
	II	Structure and Function of Invertebrates	80	20	4
	III	Population Genetics and Evolution	80	20	4
	IV	Tools & Techniques in Biology	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
<b>Second JAN-JUNE, 2017</b>	I	Molecular Cell Biology and Biotechnology	80	20	4
	II	General Physiology and Endocrinology	80	20	4
	III	Development Biology	80	20	4
	IV	Quantitative Biology and Computer Application	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
<b>Third JULY-DEC, 2017</b>	I	Comparative Anatomy of Vertebrates	80	20	4
	II	Animal Behaviour	80	20	4
	III	Environment Physiology and Population Ecology	80	20	4
	IV	Immunology and	80	20	4



		Parasitism			
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
	<b>Compulsory</b>				
<b>Fourth JAN-JUNE, 2018</b>	I	Biochemistry	80	20	4
	II	Neurophysiology	80	20	4
	<b>Optional papers (Group I)*</b>				
	I	Fish (ichthyology) structure and function	80	20	4
	II	Cell biology	80	20	4
	III	Entomology	80	20	4
	IV	Wild life conservation	80	20	4
	V	Biology of Vertebrate immune system	80	20	4
	<b>Optional paper (Group II)*</b>				
	I	Pisciculture and economic importance of fishes (Ichthyology)	80	20	4
	II	Cellular organization and molecular organization	80	20	4
	III	Applied entomology	80	20	4
	IV	Environment and Biodiversity conservation	80	20	4
	V	Molecular endocrinology and reproductive technology	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course I (Based on paper III & IV)	80	20	2
<b>Total</b>			<b>1920</b>	<b>480</b>	<b>80</b>

\* Student has choice to opt. for one paper each (special paper) from group I & group II.

\*Each theory paper will have 5 questions of equal marks. First question will encompass all the four units without any internal choice, whereas rest questions will be unit wise with internal choice.

UGC guideline should be strictly followed for animal dissections. Animal dissections can be performed by using alternate methods like clay modeling.

\*\*The respective teachers on each paper will ensure the internal evaluation by a class test and a seminar/ poster presentation of 10 marks each and submit the foil and counter foil to the HOD by the end the activity.

## **M. Sc. ZOOLOGY FIRST SEMESTER**

### **PAPER – I BIOSYSTEMATICS, TAXONOMY AND BIODIVERSITY**

(There will be 5 questions of equal marks. First question will encompass all the four units without any internal choice, whereas rest questions will be unit wise with internal choice).

#### **UNIT-I**

- Definition and basic concepts of biosystematics and taxonomy.
  - Historical resume of systematics.
  - Importance and applications of biosystematics in biology

Trends in biosystematics concepts of different conventional and newer aspects

- Chemotaxonomy
- Cytotaxonomy
- Molecular taxonomy

#### **UNIT-II**

Dimensions of speciation and taxonomic characters

- Mechanisms of speciation in panmictic and apomictic species
- Species concepts and species category.
- Theories of biological classification.
- Taxonomic characters and different kinds.

#### **UNIT-III**

- Procedure keys in taxonomy.
  - Taxonomic procedures-taxonomic collections, preservation, curation
  - Taxonomic keys-different kinds of taxonomic keys, their merits and demerits.
  - Process of typification and different Zoological types.
  - International code of Zoological Nomenclature (ICZN)

#### **UNIT-IV**

- Biodiversity

- Types of Biodiversity
- Hot spots of Biodiversity
- Threats to Biodiversity
- Conservation of Biodiversity
- Evaluation of biodiversity indices

6.1 Shannon-Weiner index.

### **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **Biosystematics & Taxonomy**

**Dr.R.C.Tripathi**, University Book House JAIPUR.

- **Theory & Practice of Animal Taxonomy**  
**V.C. Kapoor**, 5th Edition Oxford & IBH Publishing Co.
- **Principle of Animal Taxonomy**  
**G.G. Simpson**, Oxford & IBH Publishing Co.
- **Elements of Taxonomy**  
**Earnst Mayer**
- **Biodiversity**  
**E.O. Vilson**, Acadmic Press Washington
- **The Biology of Biodiversity** **M. Kato**,  
Springer
- **Molecular Markers - Natural History & Evolution** **J.C. Avise**

### **M.Sc. ZOOLOGY FIRST SEMESTER**

#### **PAPER-II: STRUCTURE & FUNCTION OF INVERTEBRATES**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### **UNIT-I**

- Organization of coelom
  - Acoelomates and Pseudocoelomates
  - Coelomates: Protostomia and Deuterostomia.
- Locomotion

- Flagellar and ciliary movement in Protozoa.
- Hydrostatic movement in Coelenterata, Annelida and Echinodermata.

## UNIT-II

- Nutrition and Digestion
  - Patterns of feeding and digestion in Protozoa
  - Filter feeding in polychaeta.
- Respiration
  - Organs of respiration Gills, lungs and trachea.
  - Respiratory pigments.

## UNIT-III

- Excretion
  - Organs of excretion.
  - Excretion and osmoregulation
- Nervous System
  - Primitive nervous system: Coelenterata and Echinodermata.
  - Advanced Nervous system: Annelida, Arthropoda (Crustacea and insecta) and Mollusca (Cephalopoda)

## UNIT-IV

- Invertebrate larvae
- Larval forms of free-living and parasitic invertebrates
- Minor Phyla
  - Organization and general characters of (Ctenophore, Rotifera, Ectoprocta, Endoprocta)

## **SUGGESTED READING MATERIALS (ALL LATEST EDITION)**

- **Invertebrate Structure and function:-**  
E.J.W. Barrington English language Book society UK.
- **Invertebrate Zoology:**  
Robert Barnes IVth Edition Holt Saunders International Edition Japan.
- **The Cambridge Natural History Vol 1 - 9.**  
S F Harmer, A.E. Shipley.  
Todays & Tomorrows Book agency, New Delhi India.
- **A Text book of Zoology Invertebrate:**  
Parker Hasvell, Marshall & Williams. AITBS  
Publishing & Distributers, Delhi
- **The Invertebrates Vol. 1 - 9**  
Libbic Henrietta Hyman, McGraw Hill Book Company

## **M. Sc. ZOOLOGY FIRST SEMESTER**

### **PAPER-III: POPULATION GENETICS & EVOLUTION**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### **UNIT-I**

- Concepts of evolution and theories of organic evolution: Lamarckism, Darwinism and Synthetic theory of evolution
- Evidences of evolution: anatomical, embryological, palaeontological, physiological and Bio-chemical

#### **Unit-II**

- Hardy-Weinberg law of genetic equilibrium
- Detailed account of destabilizing forces.
- Natural selection
  - Mutation
  - Genetic drift
  - Meiotic drive
- Phenotypic variation

#### **UNIT-III**

- Patterns and mechanisms of reproductive isolation
- Phylogenetic and biological concepts of species
- Gene Evolution, Evolution of gene families
- Factors affecting human disease frequency

#### **UNIT-IV**

- Origin of higher categories
- Micro-and Macro-evolution
- Evolution of horse, elephant, camel, man

### **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **Gene & Evolution**  
Jha A.P. John Publication, New Delhi
- **Evolution & Genetics**  
Merrel D.J. Holt rinchert & Wiston INC.
- **The Genetics & Origin of Species**  
Dobzhansky, Columbia University Press.
- **Evolution**

Dobzhansky, Ayala F.J., Stebbins G.L. & Valentine J.M.  
Surjeet Publication New Delhi.

- **Species Evolution - The Role of Chromosomal Change**  
King M. Cambridge University Press. Cambridge
- **A Primer of Population Genetics**  
Hartl D.L. Suinaer Associates INC, Massachusetts
- **Evolutionary Genetics**  
Smith J.M. Oxford University Press, New York
- **Evolutionary Biology**
- Futuyama D.J. Suinaer Associates INC publishers,  
Dunderland
- **Evolution**  
Strikberger M.W. Johns & Bartett Publishers, Boston London

## **M. Sc. ZOOLOGY FIRST SEMESTER**

### **PAPER-IV: TOOLS & TECHNIQUES IN BIOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### **UNIT-I**

- Principles and application of
  - Ultracentrifugation
  - Electrophoresis
  - Chromatography (various types)
  - Lambert-Beers Law and colorimetry and spectrophotometry
  - Flow cytometry.

#### **UNIT-II**

- Principles and Application of
  - Light Microscopy and micrometry
  - Phase Contrast microscopy
  - Interference microscopy
  - Fluorescence microscopy
  - Transmission Electron microscopy.
  - Scanning Electron microscopy.

#### **UNIT-III**

- Assay
- Chemical assays
- Biological assays-in vivo and in vitro

- Principles of cytological and cytochemical techniques
  - Fixation: chemical basis of fixation by formaldehyde, glutaraldehyde, chromium salts, mercury salts, osmium salts, alcohol and acetone
  - Chemical basis of staining of carbohydrate, protein lipids and nucleic acids.

#### **UNIT-IV**

- Principle and techniques of
  - Nucleic acid hybridization and cot curve
  - Sequencing of proteins and nucleic acids
- Freeze techniques
- Media preparation and sterilization
- Inoculation and growth monitoring

#### **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **Introduction to Instrumental Analysis**
  - **Robert Braun**, McGraw Hill International Edition
- **A biologist guide to principles and techniques of practical biochemistry**
  - **K Wilson and K. H. Goulding** ELBs Edition
- **Instrumentation**
  - **Upadhyay and Nath**, Meerut Publications
- **Instrumentation and Techniques**
  - **R.C. Bajpayee**, Himalayan Publications

#### **M. Sc. ZOOLOGY FIRST SEMESTER**

#### **LAB COUSE-I: (PRACTICAL BASED ON PAPER I & II)**

- **Biosystematics and Taxonomy**
  - Study of biodiversity among various invertebrates and vertebrates (Listing of all the animals found in and around your house and also try to find out their Zoological names).
  - Collection of various insect species.
  - Visits to a local animal park or zoo to identify and study the captive fauna and preparation of report.
  - Study of adaptive characteristics of various invertebrates and vertebrates in different climate.
  - Taxonomic key formation and conversion.
  - Study of biodiversity in grassland and pond water by using Shannon -Weiner index

- Other exercise related to theory paper
- **Structure and function of invertebrates**
  - Identification, classification and study of distinguishing features of important representatives from various groups (Protozoa to Hemichordata).
  - Study of permanent prepared slides (from Protozoa to Hemichordata).
  - Dissection by using alternate methods like clay modeling : Reproductive, Excretory, nervous and haemocoelomic systems of leech.
  - Dissection by using alternate methods like clay modeling: Reproductive system of cockroach; general anatomy, nervous and reproductive systems of grasshopper; nervous system of crab; nervous and reproductive systems of scorpion.
  - Dissection by using alternate methods like clay modeling: Nervous system of Mytilus, Sepia and Aplysia, general anatomy of Aplysia.
  - Study of sections of the arm of a starfish; general anatomy of a Holothurian; Aristotle's lantern of a sea urchin complete as well as disarticulated parts of the Aristotle's lantern.
  - Permanent preparations of different materials to be provided for study.
  - Wonder invertebrates
  - Other exercise related to theory paper.
- \* UGC guideline should be followed.

#### EXAMINATION SCHEME

Based on paper I	35 marks
Based on paper II	35 marks
Viva	10 marks
Sessional (Internal)	20 mark
<b>Total</b>	<b>80+20 (100)</b>

#### **M. Sc. ZOOLOGY FIRST SEMESTER LAB COUSE-II: (PRACTICAL BASED ON PAPER III & IV)**

- **Population genetics and evolution**
  - Problems on genetics (complete and incomplete linkage; dominance, sex-linked inheritance) Demonstration of Hardy-Weinberg law
  - Preparation of human chromosomes map, demonstration of chromosomal deficiencies.
  - Experiments based on population genetics, pedigree analysis.
  - Study of evolution of horse by way of models.
  - Study of evolution through homologous and analogous organs.
  - Other exercises related to theory paper.



- **Tools and techniques in biology**

- Parts study, principles and use of following instruments for different techniques:
  - pH meter: Determination of pH of different soil and water samples.
  - Spectrophotometer: Preparation of absorption spectrum.
  - Chromatography: Paper and thin layer chromatography.
  - Centrifuge: Extraction proteins and carbohydrates from tissues.
  - Electrophoresis: Paper and gel electrophoresis.
  - Microscope: Parts study and principles of various microscopes.
  - Demonstration of cryostat.
  - Other exercise related to theory paper.

#### EXAMINATION SCHEME

Based on paper III	35 marks
Based on paper IV	35 marks
Viva	10 marks
Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

### M. Sc. ZOOLOGY SECOND SEMESTER

#### PAPER – I: MOLECULAR CELL BIOLOGY AND BIOTECHNOLOGY

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### UNIT-I

- Biomembranes
  - Molecular composition and arrangement  
Transport across membrane
  - Structure and function  
Mitochondria
  - Golgi complex  
Lysosome  
Ribosome

## **UNIT-II**

- DNA replication
- Transcription
- Translation
  - Genetic code
  - Mechanisms of initiation, elongation and termination
  - Regulation of translation

## **UNIT-III**

- Genome organization
  - Chromosomal organization: morphological and structural types.
  - Non-coding DNA
- Molecular mapping of genome
  - Genetic and physical maps
  - Polymerase Chain Reaction (PCR) and blotting techniques
  - Molecular markers in genome analysis.

## **UNIT-IV**

- Transgenic animals and knock-outs
  - Production and applications
  - Embryonic stem cells
- Application of genetic engineering
  - Medicine
  - Agriculture
  - Industry

### **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **MOLECULAR CELL BIOLOGY**

**Lodish, W.H. Freeman & Co. NewYork**

- **Lehninger PRINCIPLES OF BIOCHEMISTRY,**

**Fourth Edition - David L [1]. Nelson, Michael M. Cox**

- **MOLECULAR CELL BIOLOGY**

**Lodish M. Baltimore, Scientific American books**

- **ESSENTIALS OF CELL & MOLECULAR BIOLOGY**

**Roberties & Roberties**, Halt Saunders International Edition.

- **CELL & MOLECULAR CELL BIOLOGY**

**Gerald Karp**, Willey & Sons Co.

- **MEDICAL CELL BIOLOGY**

**Flickinger E.J. Brown J.C.** Halt Saunders International Edition.

- **CELL BIOLOGY**

**Powar C.B.** Himalaya Publishing House

## **M. Sc. ZOOLOGY SEMESTER - II**

### **PAPER – II: GENERAL PHYSIOLOGY AND ENDOCRINOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### **UNIT-I**

- Digestion and Metabolism
  - General organization of alimentary canal
  - Mechanism of digestion
  - Mechanism of absorption
- Gas Exchange and Acid-base Balance
  - Oxygen and Carbon dioxide transport in blood
  - The role of hemoglobin
  - Regulation of body pH

#### **UNIT-II**

- Muscle Function and Movement
  - Anatomy of muscle
  - Mechanism of muscle contraction
  - Regulation of muscle contraction
- Nervous System
  - Neurons and membrane excitation
  - Action potentials

- Synapses and neurotransmitters

### **UNIT III**

- Sensory Transduction
  - Auditory receptors
  - Chemoreceptor: taste and smell
  - Vision and Photoreception
- Thermoregulation and Cold Tolerance
  - Heat balance and exchange
  - Endotherms Vs Ectotherms
  - Torpor, hibernation and aestivation

### **UNIT-IV**

- Endocrinology
  - Structure and functions of endocrine glands (Pituitary, pineal, pancreas, adrenal, thyroid etc.)
  - Biosynthesis of hormones (thyroid and gonadal)
  - Hormones and Reproduction

### **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- Comparative vertebrate Endocrinology – by **Gorbman & Bern**
- Human Physiology – by **Dr. C. C. Chatterjee**
- Comparative Endocrinology – by **Barrington**
- Applied Animal Endocrinology – by **Squires**
- **Endocrinology** – Basic & Clinical principles - by **Melmed & Cohn**

### **M. Sc. ZOOLOGY SEMESTER - II**

### **PAPER – III: DEVELOPMENT BIOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

### **UNIT-I**

- Oogenesis
  - Differentiation and growth of oocytes.
  - Organization of egg cytoplasm and egg cortex.
  - Vitellogenesis
- Spermatogenesis
  - Differentiation and ultra structure of sperm
  - Capacitation

### **UNIT-II**

- Fertilization
  - Biological role of fertilization.
  - Basic requirements of fertilization.
  - Activation of egg metabolism
  - Biochemistry of fertilization
- Cleavage
  - Characteristics and mechanisms of cleavages

### **UNIT-III**

- Formative movements
- Fate maps
  - Utility and comparative topographical relationship of the Presumptive areas in early embryos of
    - Amphioxus
    - Fishes
    - Amphibian
    - Birds
- Differentiation

### **UNIT-IV**

- Cell and tissue interactions in development
  - Primary embryonic induction

- Competence
- Concept of organizer
- Metamorphosis
- Teratology

### **SUGGESTED READINGS MATERIALS**

- **Animal Gametes –**

Vishmanath, Asia Publishing House

- **Foundation Of Embrology –**

Bradley M.Patten, McGraw Publication

- **Fertilization In Animals –**

Brain Dale, Arlond Heiniman, Gulab Vazerani Publication

- **Development Biology -**

N.J. Berril, Tata McGraw Hill Publication N. Delhi

- **Embryology Of Vertebrates -**

Nelson

### **M. Sc. ZOOLOGY SEMESTER - II**

#### **PAPER – IV: QUANTITATIVE BIOLOGY AND COMPUTER APPLICATION**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### **UNIT-I**

- Introduction to digital computer and application
  - Basic knowledge of hardware and software
  - CPU (Central Processing Unit)
  - Input and Output devices
  - Auxiliary storage system

- Operating system and Binary number system

## **UNIT-II**

- Computer application
  - Introduction to MS office
    - Word
    - Excel
    - Power point
- Computer application in biostatistics
- Simple computation and elementary knowledge of flow chart

## **UNIT-III**

- Types of biological data
- Representation of data
- Sample and sampling
- Measures of central tendency
- Measures of dispersion
- Hypothesis testing: Null and alternate hypothesis

## **UNIT-IV**

- Tests of significance
  - Chi-square test
  - Student's t-test
- Analysis of Variance
- Simple linear regression
- Correlation
- Probability distribution: normal and binomial

## **SUGGESTED READING MATERIALS**

Bataschelet. E. Introduction to mathematics for site scientist springer-verlag, berling  
-Lenderen D. Modelling in behavioral ecology. Chapman & Hall London U.K.

• Snedecor, G.W. and W.G. Cochran, statistical methods, Affiliated East, West Press  
New Delhi (Indian ed.)

• Murray, J.D. Mathematical Biology, Springer Verlag Berlin

• Pelon, E.C. The interpretation of ecological data : A primer on classification  
and ordination.

A. Lewis . Biostatistics

• B.K. Mahajan Methods in Biostatistics

• J.D. Murray Mathematical Biology

• Georgs & Wilians Startical method

## **M. Sc. ZOOLOGY SEMESTER – II**

### **LAB COURSE – I: (PRACTICAL BASED ON PAPER I & II)**

#### **• Molecular biology and Biotechnology**

- Isolation of DNA/RNA
- Study of mitochondria from buccal epithelium by staining with supravital stains.
- Culture of amoeba, paramecium, euglena.
- Study of cell division mitosis/meiosis by squash and smear preparation of root tip and cockroach/grasshopper testis.
- Study of giant chromosome in the salivary gland of Chironomous larvae or Drosophila. .
- Study of Barr body and human chromosome.
- Culture and study of drosophila.
- Preparation of culture media and culture of bacteria.
- Other exercise related to theory paper.

#### **• General physiology and endocrinology**

- Estimation of RBC, hemoglobin, hematocrit/PVC, blood group and Rh factor blood clotting time.
- Determine the blood pressure of man.
- Determination of urea, glucose and ketone bodies in urine.
- Demonstration of osmosis.
- Dissection by using alternate methods like clay modeling and exposure of major endocrine glands in an experimental animals.
- Study of histology of endocrine glands in different animal types through permanent slides and microtomy.
- Other exercise related to theory paper.

### **EXAMINATION SCHEME**

Exercise based on paper I	35 marks
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Exercise based on paper II	35 marks
Viva	10 marks

Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

**M. Sc. ZOOLOGY SEMESTER – II**  
**LAB COURSE-II: (PRACTICAL BASED ON PAPER III & IV)**

• **Development biology**

- Study of slides of development of frog.
- Study of development of Hen's egg, by cover glass window method, staining and mounting of blastodisc.
- Study of caudal regeneration in Teleost (Meal time effect).
- Study of embryological slides: spermatogenesis, oogenesis, histology of gonads.
- Study of effect of NaF/urea on growth of fish fingerlings.
- Study of effect of thyroid hormone on metamorphosis of tadpole
- Other exercises related to theory paper

• **Quantitative biology and computer application**

- Preparation of frequency tables and graphs.
- Calculation of standard deviation, variance and standard error of mean.
- Calculation of probability and significance between means using t-test, Chi-square test, ANOVA
- Calculation of correlation, regression and probability distribution.
- Computer software use for computational tasks, data presentation, design task and communication
- Other exercises related to theory paper.

EXAMINATION SCHEME

Exercise based on paper III	35 mark
Exercise based on paper IV	35 mark
Viva	10 mark
Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

## **M. Sc. ZOOLOGY SEMESTER - III**

### **PAPER-I: COMPARATIVE ANATOMY OF VERTEBRATES**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise) with internal choice.

#### **UNIT-I**

- Origin of Chordates
- Amphibians, Reptiles, Birds and Mammals.
- Classification of Vertebrates
  - Amphibians
  - Reptiles
  - Birds
  - Mammals.

#### **UNIT-II**

- Vertebrate integument and its derivatives.
  - General structure and functions of Integument.
  - Structure and functions of glands, scales, horns, claws, nails, hoof, feather and hair.
- . Skeletal system in vertebrates.
  - .Comparative account of (i) Jaw suspensorium, (ii) Limbs and Girdles.

#### **UNIT-III**

- . Respiration in Vertebrates.
  - .Comparative account of respiratory organs (structure and functions).
- Circulation in Vertebrates.
  - Structure and function of blood.
  - Evolution of heart.
  - Evolution of aortic arches.

#### **UNIT-IV**

- . Nervous System – Central, Peripheral and Autonomic.
  - Sense organs.
  - . Comparative account of Sensory Receptors.
- Evolution of Urinogenital system in vertebrates.

### **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **Vertebrate life** :- William N. Ferland, F. Harvey pough, Tom J Gode, John B. Heiser
- Collier MacNille International edition
- **Chordate morphology** :-Malcom Jollie
- Reinhold Publishing Corporation NewYork
- **Chordate –Structure & Function** :- Arnold G. Khage, B.E. Fry Johanson
- Mc Millan Publishing Co. INC. NewYork
- **Comparative Animal Physiology** :- Orosser
- Satish Book Enterprises, Agra
- **The Vertebrate Body** :- Alfred Sherwood Romer
- Vakils, Feffer & Simons Publications Ltd.

## **M. Sc. ZOOLOGY SEMESTER – III**

### **PAPER-II: ANIMAL BEHAVIOUR**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise) with internal choice.

#### **UNIT- I**

- . Historical perspectives- Ethology
- Behavioural patterns
- Innate behaviour
- Biological rhythms
  - Types of biological rhythm
  - Biological clock

#### **UNIT- II**

- Communications
  - Auditory
  - Visual
  - Chemical
- Learning and Memory

- Conditioning
- Habituation
- Reasoning
- Reproductive behaviour.

### **UNIT-III**

#### Orientation

- Echolocation in bats
- Bird migration and navigation.
- Fish migration.
- Neural and hormonal control of behaviour

### **UNIT-IV**

.Hormonal effect on behavioural patterns.

- Social behaviour
  - Social organization in insects and primates
  - Schooling in fishes and Flocking in birds
  - Homing, territoriality, dispersal
  - Altruism
  - Host–parasite relation

### **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **ANIMAL BEHAVIOR – Mc Farland** (English Language Book Society)
- **ANIMAL BEHAVIOR – Arora M.P.** (Himalaya Publishing House, Mumbai)
- **ANIMAL BEHAVIOR - Reena Mathur** (Rastogi Publications, Meerut)

### **M. Sc. ZOOLOGY SEMESTER – III**

### **PAPER – III: ENVIRONMENT PHYSIOLOGY AND POPULATION ECOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

### **UNIT – I**

Population dynamics:

- Demography, life table, reproductive rates, reproductive values

- Population growth, exponential, non overlapping
- Stochastic and time lag models of population growth
- Population density
- Population evolution
- Community dynamics: Characteristics, development and classification

## **UNIT-II**

- Adaptations
  - Levels of adaptation.
  - Mechanisms of adaptation.
- Adaptations to different environments.
  - Marine, shores and estuaries.
  - Freshwater.
- Terrestrial Life.

## **UNIT-III**

- Stress Physiology
  - Basic concepts of environmental stress and strain, Concept of elastic and plastic strain.
  - Stress avoidance, stress tolerance and stress resistance.
  - Acclimatization, acclimation and adaptation.
  - Endothermic and physiological mechanism of regulation of body temperature.

## **UNIT -IV**

- Stress physiology in different conditions
  - Osmoregulation in aqueous and terrestrial habitats.
  - Physiological response to oxygen deficient stress.
  - Physiological response to body exercise.
  - Effect of meditation and yoga

### **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

**ECOLOGY** with special reference to animal & man

**S. Charles, Kendeigh** Prentice hall of India Pvt. Ltd. New Delhi

- **ELEMENTS OF TROPICAL ECOLOGY**

- **Yanney Ewusie** (English language Book Society, Heine mann educational book publication)

- **FUNDAMENTALS OF ECOLOGY**

- **Odum P.**

- **ANIMAL PHYSIOLOGY, MECHANISM AND ADAPTATION -**

**Eckert, R., W,H, Freeman and Co.**

- **BIOCHEMICAL ADAPTATION -**

**Hochachka, P.W, and Somero S.N, Princeton, New Jersey**

- **ANIMAL PHYSIOLOGY: ADAPTATION AND ENVIRONMENT.-**

**Schiemidt Nielsen, Cambridge**

- **GENERAL & COMPARATIVE ANIMAL PHYSIOLOGY**

**Hoar W.S. Princeton Hall of India**

- **ENVIRONMENTALPHYSIOLOGY**

**Willmer, P.G. Stone & Johansan I, Blackwell Science Oxford**

**M. Sc. ZOOLOGY SEMESTER – III**

**PAPER – IV: IMMUNOLOGY AND**

**PARASITISM**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

**UNIT-I**

- Cells of immune system
- B-Lymphocytes, T-lymphocytes, Null Cells

- Mononuclear cells
- Granulocytic cells (Neutrophils, Eosinophils and Basophils)
- Mast cells
- Dendritic cells
- Organs of immune system
- Primary lymphoid organs (Thymus, bone marrow)
- Secondary lymphoid organs (Lymph nodes, spleen, mucosal associated lymphoid tissue, cutaneous associated lymphoid tissue)

## UNIT-II

- Immunoglobulin structure and function
- Molecular structure of Ig, Light chain and Heavy chain
- Immunoglobulin classes
- IgG
- IgM
- IgE
- IgD

Monoclonal antibodies

## UNIT-III

- Antigens

Immunogenicity

- Contribution of the immunogens.
- Contribution of Biological system.
  - Antigen - Antibody Interaction
- Antibody affinity and activity
- Cross reactivity
- Agglutination reactions

- Precipitation Reaction
  - Vaccine
- Active and passive immunization
- Whole organism vaccine
- Recombinant vector vaccines
- DNA vaccines

#### **UNIT-IV**

- Immune system in Health disease
- Immune response to infectious disease
- Immune response in cancer
  - Pathophysiology of parasitic infection
    - Viral infections
    - Bacterial infection
    - Helminths infection
- AIDS

#### **SUGGESTED READING MATERIALS**

- **Immunology**
  - **Kuby, W.H. Froeman USA**
- **Fundamental of Immunology**
  - **W. Paul,**
- **Essential Immunology**
  - **I.M. Roitt, ELBs Edition**
- **Immunology**
  - **Richard M. Hyde, Robert A. Patnode, A Wiley Medical Publications**



- **Reproductive Physiology**

- **Gayton,**

### **M. Sc. ZOOLOGY SEMESTER – III**

#### **LAB COURSE-I: (PRACTICAL BASED ON PAPER I & II)**

- **Comparative anatomy of Vertebrates**

- Identification, classification and study of distinguishing features of important representatives, museum specimens and slides (Protochordates and Chordates)
- Comparative studies of integumentary, skeleton and reproductive system of major vertebrate classes.
- Dissections by using alternate methods like clay modeling: fowl/snake cranial nerves
- Wonder vertebrates
- Other exercise related to theory paper.

- **Animal Behaviour**

- To study the phototactic response in earthworm or grain/pulse pest.
- To study the geotaxis behaviour of earthworm.
- To study the food preference and cleaning behaviour of housefly.
- To study the food preference in tribolium or grain/pulse pests.
- To study the web construction and habituation in spider.
- Estimation of body temperature and pulse rate on daily time scale.
- Estimate the time perception among various individuals at two different time points on daily time scale.
- Determination of effect of time on schooling behaviour in fish.
- Toxicological response of fish opercular and surfacing activity.

#### **EXAMINATION SCHEME**

Based on paper I	35 mark
Based on paper II	35 mark
Viva	10 mark
Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

## M. Sc. ZOOLOGY SEMESTER – III

### LAB COURSE-II: (PRACTICAL BASED ON PAPER III & IV)

- **Immunology and Parasitism**

- Dissection of primary and secondary immune organs from fish/fowl- Preparation and study of cell suspension from spleen (spleenocytes) of fish / fowl.
- Total and differential counting of leucocytes.
- Protein estimation by Lowry's method in normal and infected blood sample.
- Determination of Blood group.
- Study of permanent slides (for spotting); thymus, lymph nodes, spleen, bone marrow, types of cells squamous, cuboidal, columnar, epithelial cells, blood cells, nerve cells, muscles cells, connective tissue of various types, adipose tissue, mitotic and meiotic chromosomes and their different phases cancer cells of various types etc.
- Study of parasites in fish
- Study of various parasites through slides and specimen.
- Other exercises related to theory paper.

- **Environmental Biology, Population ecology**

- Study of biotic community in a pond/grassland ecosystem.
- Study of population growth rate (curve) in protozoan culture.
- Population dynamics of *Tribolium* sp.
- Study of biogeochemical cycles by way of models.
- Visit to some natural habitats and man made habitats to study the human impact on environment.
- Water analysis for fresh and waste water (Dissolve oxygen and chloride).
- Other exercises related to theory paper.

### EXAMINATION SCHEME

Based on paper III	35 mark
Based on paper IV	35 mark
Viva	10 mark
Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

## M. Sc. ZOOLOGY SEMESTER – IV

## **PAPER– I (Compulsory) BIOCHEMISTRY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise) with internal choice.

### **UNIT-I**

- Properties of Proteins
  - Structure and properties of amino acids.
  - Classification of proteins.
  - Structure of proteins.
  - Biological Functions of Proteins.
  - Protein Metabolism.

### **UNIT-II**

- Carbohydrates
  - Classification of carbohydrates.
  - Structure and Functions of Carbohydrates.
  - Carbohydrate metabolism.
- Lipid
  - Lipid structure and functions
  - Lipid metabolism.

### **UNIT-III**

- Vitamins
  - Water and Fat soluble vitamins,
  - Chemistry, occurrence and physiological role.
- Enzymes
  - Classification and nomenclature.
  - Mechanism of action
  - Regulation of enzyme activity and functions of Co-enzymes.

### **UNIT-IV**

- Nucleic acid
  - Chemistry of DNA.
  - Chemistry of RNA.
  - Biological importance of nucleic acids.
  - Nucleoproteins.
  - Metabolism of nucleic acids.

### **Suggested Reading**

**Lehninger Principles of Biochemistry, Fourth Edition**

David L. Nelson, Michael M. Cox  
Publisher: W. H. Freeman

- **Biochemistry**  
Donald Voet, Hardcover: 1616 pages,  
Publisher: Wiley; 3 edition
- **Principles of Biochemistry With a Human Focus**  
Reginald H. Garrett, Charles M. Grisham  
  
Publisher: Brooks Cole
- **The Molecular Basis of Cell Cycle and Growth Control**  
  
Gary S. Stein (Editor), Renato Baserga, Antonio Giordano, David T. Denhardt,  
Publisher: Wiley-Liss
- **Experiments in Biochemistry: A Hands-On Approach**  
Shawn O. Farrell, Ryan T. Ranallo,  
Publisher: Brooks Cole

## **M. Sc. ZOOLOGY SEMESTER – IV**

### **PAPER II (Compulsory) NEUROPHYSIOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise) with internal choice.

#### **UNIT - I**

- Physiological role of neurosecretory cells
- Histological structure of neurons and neuroglial cells
- Physiological properties of neural fibres
- Synapsis and synaptical transmission
- Myoneural junction and neuromuscular transmission
- Degeneration and regeneration of nerve fibre

#### **UNIT - II**

- Nerve fibre, peripheral nerves, receptors and effector endings, dermatomes and muscle activity
- The spinal cord and the ascending and descending tracts
- The cranial and spinal nerves

### **UNIT - III**

- The fore brain, brain stem, the cerebellum
- The meninges and cerebrospinal fluid
- Peripheral nervous system

### **UNIT - IV**

- Autonomic nervous system; sympathetic and para-sympathetic nervous system with special comparison to hormonal mechanism of transmission through autonomic nervous system
- Reflex action; varieties, characteristics, unconditional reflex, electrophysiology of spinal reflexes
- Sensation
- Electro encephalography and its physiological basis.

### **Suggested Reading**

- The Brain: Our Nervous System by Seymour Simon
- Mass Action in the Nervous System by Walter J. Freeman
- Human Anatomy and Physiology with Interactive Physiology 10-System Suite, 8th Edition by Elaine N. Marieb and Katja N. Hoehn (Jan 10, 2010)
- Neuroanatomy by H.G. Snell
- Clinical Neurophysiology-Guide for Authors - Elsevier
- Foundations of Cellular Neurophysiology (Bradford Books): Daniel Johnston,

### **M.Sc. ZOOLOGY SEMESTER – IV**

#### **Optional papers**

- The following optional papers are being suggested as below
- OPTIONAL (SPECIAL PAPER) GROUP 1

- Fish (ichthyology) structure and function

Or

- Cell Biology

Or

- Entomology

Or

- Wild life conservation

Or

- Biology of vertebrates immune system

#### OPTIONAL (SPECIAL PAPER) GROUP 2

- Pisci culture and economic importance of fishes (Ichthyology)

Or

- Cellular organization and molecular organization

Or

- Applied entomology

Or

- Environment and Biodiversity conservation

Or

- Molecular endocrinology and reproductive technology

\*\* Student has choice to opt for one paper each (special paper) from group 1 and group 2

#### **M.Sc Zoology**

#### **Semester-IV**

Paper- III A (optional paper)

Ichthyology (Fish) Structure and Function

##### Unit-1

- Origin and evolution of fishes
- Classification of fishes as proposed by Berg
- Fish integument
- Locomotion
- Alimentary canal and digestion

##### Unit-2

- Accessory respiratory organs
- Air bladder and its functions
- Weberian ossicles their homologies and functions
- Excretion and osmoregulation
- Acoustico-lateral line system

##### Unit-3

- Luminous organs
- Colouration in fishes
- Sound producing organs
- Deep sea adaptations
- Hill stream adaptations

#### Unit-4

- migration in fishes
- Sexual cycle and fecundity
- parental care in fishes
- Early development and hatching
- Poisonous and venomous fishes.

### **M.Sc Zoology**

#### **Semester-IV**

#### Paper- III B (Optional)

#### Cell Biology

#### Unit-1

- Molecular organization of eukaryotic chromosomes : structure of nucleosome particles and higher order compaction of mitotic chromosomes, chromatin remodeling
- specialized chromosomes: structural organization and functional significance of polytene chromosomes
- DNA methylation and DNA Aase-1 Hypersensitivity in relation to gene activity and chromatin organization.
- specialized chromosomes II : structural organization and functional significance of lampbrush chromosome.
- Organisation and significance of heterochromatin.

#### Unit-2

- Structural organization of Eukaryotic genes, interrupted genes and overlapping genes and their evolution
- Gene families: organization, evolution and significance
- Transposable genetic elements of prokaryotes and eukaryotes Gene imitation

and molecular mechanism of occurrence of mutation repair mechanism

- Organisation of eukaryotic transcriptional machinery promoter enhancers transcription factors polymerase activators and repressors.
- DNA binding domains of transcription apparatus zinc finger steroid receptors hemeo domains HILIX-loop, Helix and Leucine Zipper.

#### Unit-3

- Eukaryotic transcription of Eukaryotic transcriptional control.
- Environmental modulation of gene activity (stress response) stress genes and stress proteins
- Molecular basis of thalasemias muscular dystrophy cystic fibrosis
- DNA rearrangement

- Amplification during development with special response to
- Ciliates
- Chlorine gene
- 58 RNA genes

#### Unit-4

- Drosophila development
- Cleavage
- Gastrulation

Origin of Anterior –Posterior (Maternal effect genes and segmentation genes)

- Drosophila development II origin of dorsal ventral polarity
- Basic idea of homeotic selector genes and homeotic mutation
- Basic idea of organization of homeoboxes
- Evolutionary significance of homeoboxes

#### Suggested Reading Materials:

- Robertis, De and Robertis Cell and molecular biology Lea and Febiger.
- Watson Hopkins Roberts Steitz Weiner, Molecular Biology of the Gene the Benjamin, Cummings Publishing Company inc.
- Bruce A; Roberts Bray Lewis Raff Roberts Watson Molecular Biology of the Cell, Garland Publishing inc.
- Watson Gilman Witkowski Zoller Recombinant DNA Scientific American Books.
- Karp Gerald Cell Biology.
- Lewin B., Genes VII.
- King Cell Biology.
- Kaniel L. Hartl, Elizabeth W. Jones. Genetics Principles and Analysis, Jones and Bartlett Publishers.
- Kuby, Immunology, W.H. Freeman and Company.
- Roitt Male Snustad Immunology.

### **M.Sc. Zoology Semester-IV**

Paper- III C (Optional)

Entomology

#### Unit-1

- Insect head types and modification as per their habit and habitat
- Modification of mouth parts and feeding behaviour
- Structure types and function of antennae
- Hypothetical wing venation
- Structure of cuticle and pigment

#### Unit-2

- Sclerotisation and tanning of the cuticle
- Structure of alimentary canal and Physiology of digestion
- Malpighian tubules – anatomical organization , Transport mechanism



- Structure of circulatory system
- Cellular elements in the haemolymph

#### Unit-3

. Cell mediated and humoral immunity

Structure of compound eye and Physiology of Vision

- Sound Production in insect
- Structure and function of endocrine glands
- Pheromones

#### Unit-4

- Embryonic membranous up to the formation of blastoderm
- Metamorphosis
- Insecticide effects on CNS
- Important pest of Soybean Modern concept of pest management

Suggested Reading Materials:

- The Insect: Structure and function by R.F. Chapman
- Comparative Insect physiology, Biochemistry and Pharmacology .Vol :1-13. Edited by G.A. Kerkut and L.I. Gilbert.
- Entomophagous Insect by Clausen
- Entomology by Gilbert
- Principles of Insect Physiology by Wigglesworth.
- Fundamentals of Entomology by Elzinga
- Hand book of economic Entomology for South India by Ayyar.
- Insect cytogenetics by R.E.F.Symposium.
- Insects and plants by Sting, Lawton and southwood.
- Insect and hygiene by Busvine.
- Insect Physiology by Wigglesworth.
- Insect morphology by Mat Calf and Flint
- Applied Agricultural Entomology by Dr. Lalit Kumar Jha

**M.Sc Zoology**

**Semester-IV**

Paper- III D (Optional)

Wild Life Conservation

#### Unit-1

- Wild life -
- Values of wild life - positive and negative.
- Our conservation ethics.
- Importance of conservation.
- Causes of depletion.
- World conservation strategies.
- Habitat analysis, Evaluation and management of wild life.
- Physical parameters - Topography, Geology, Soil and water.
- Biological Parameters - food, cover, forage, browse and cover estimation.
- Standard evaluation procedures - remote sensing and GIS.
- Management of habitats -
- Setting back succession.
- Grazing logging.
- Mechanical treatment.
- Advancing the successional process.
- Cover construction.
- Preservation of general genetic diversity.

## Unit-2

- Population estimation.
- Population density, Natality, Birth rate, Mortality, fertility schedules and sex ratio computation.
- Faecal analysis of ungulates and carnivores - Faecal samples, slide preparation, Hair identification, Pug marks and census method.
- National Organization.
- Indian board of wild life.
- Bombay Natural History Society.
- Voluntary organization involved in wild life conservation.
- Wild life Legislation - Wild Protection act - 1972, its amendments and implementation.
- Management planning of wild life in protected areas.
- Estimation of carrying capacity

## Unit-3

- Eco tourism / wild life tourism in forests.
- Concept of climax persistence.
- Ecology of perturbation.
- Management of excess population & translocation.
- Bio- telemetry.
- Care of injured and diseased animal.

#### Unit-4

- Quarantine.
- Common diseases of wild animal.
- Protected areas National parks & sanctuaries, Community reserve.
- Important features of protected areas in India.
- Tiger conservation - Tiger reserve in M.P, in India.
- Management challenges in Tiger reserve.

#### Suggested Reading Materials:

- Gopal Rajesh : Fundamentals of wild life management
- Agrawal K.C : Wild life India
- Dwivedi A.P (2008) : Management wild life in India
- Asthana D.K : Environment problem and solution
- Rodgers N.A & Panwar H.S : Planning of wild life / Protected area Network in India  
vol. the report, wild life Institute of India Dehradun.
- Odum E.P : Fundamentals of Ecology
- Saharia V.B : Wild life in India
- Tiwari S.K : Wild life in Central India
- E.P Gee : Wild life of India
- Negi S.S : Wild life conservation (Natraj Publishers)

### **M.Sc Zoology** **Semester-IV**

#### Paper- III E (Optional)

#### Biology of vertebrate immune system

##### Unit-1

- Tissues of Immune system- Primary lymphoid organs, structure and functions (Thymus and Bursa of Fabricius)
- tissues of Immune system- Secondary lymphoid organs, structure and functions (Spleen, lymphnode and Payers patches)
- Antigen processing
- Antigen presentation

##### Unit-2

- T-cell lineage and receptors
- T-cell activation
- B-cell lineage and receptors
- B-cell activation
- Immunoglobulin structure, Biological and physical properties of immunoglobulin
- Gene model for Immunoglobulin gene structure

### Unit-3

- Generation of antibody diversity ( Light and heavy chain)
- Immunization
- Immediate type of hypersensitivity reaction of Anaphylectic type-1.
- Antibody dependent cytotoxic type II reaction.
- Complex mediated type III reaction

### Unit-4

- Delayed type cell mediated hypersensitivity type IV reaction.
- Enzyme linked immunosorbent assay (ELISA) technique and its applications.
- Immunofluorescence technique (Direct & Indirect and Sandwich antibody labelling techniques .
- Immunodiffusion techniques ( Mancini and Ouchterlony immunodiffusion techniques) Monoclonal antibody technology (Hybridoma technology)

## **M.Sc Zoology**

### **Semester-IV**

#### Paper- IV A (Optional)

#### Pisciculture and Economic Importance of Fishes (Ichthyology)

### Unit-1

- Collection of fish seed from natural resources and transportation of fish seed.
- Breeding in fish, Bundh breeding and Induced breeding.
- Types of ponds required for fresh water fish culture farms.
- Management of fish farm.
- Physiochemical factors of freshwater for fish farming.

### Unit-2

- Composite fish culture
- Prawn culture and pearl industries in India.
- Fisheries resources of C.G.
- Riverine fisheries.

### Unit-3

- Coastal fisheries in India
- Offshore and deep sea fishery's in India
- Role of fisheries in rural development
- Sewage fed fisheries

### Unit-4

- Methods of fish preservation
- Marketing of fish in India.
- Economic importance and by product of fishes

- Fish disease.

#### Suggested Reading Materials:

##### Paper III A & IV A

- JR. Norman - The History of fishes.
- Nagaraja Rao - An introduction to fisheries.
- Lagler Ichthyology.
- Herclen Jones Fish migration.
- Marshal The life of fishes.
- Thomas - Diseases of fish.
- Greenwood - Inter relationship of fishes.
- Gopalji, Srivastava - Freshwater fishes of U.P. and Bihar.
- Brown -Physiology of fishes Vol. I & II.
- Hoar and Randall -Fish physiology of fishes Vol. 1 & IX.
- Gunther Sterba C.N.H.-Freshwater fishes of the world
- W. Lanham -The Fishes.
- G.V. Nikolsky -The ecology of Fishes,
- Borgstram -Fish as food Vol. I & II.
- Nilsson -Fish physiology -Recent Advances.
- P.B. Myle and J.J. Cech Fishes An Introduction to Ichthyology.
- Carl E. Bond -Biology of fishes.
- M. Jobling -Environmental Biology of fishes.
- Santosh Kumar & Manju Ternbhre -Fish and Fisheries.
- S.K. Gupta -Fish and Fisheries
- K.P. Vishwas -Fish and Fishries.
- Jhingan -Fish and Fishries.

#### **M.Sc Zoology**

##### **Semester-IV**

##### Paper- IV B (Optional)

##### Cellular Organization and Molecular Organization.

##### Unit-1

- General organization and characterizes of viruses (Examples SV 40 and HIV).
- Yeast : Structure, reproduction and chromosome organization: Basic ides of its applications as vectors for gene cloning.
- Molecular organization of reoiratory chain assemblies, ATP / ADP Translocase and F0F1 AT pase.
- Cell cycle: Cell cycle control in mammalian cells and xenopus.
- Cytochemistry of Golgin complex and its role in cell seretion.,

## Unit-2

- Peroxisomes and targeting of peroxysmal proteins.
- Nucleolus: Structure and Biogenesis and functions of lysosomes.
- Intracellular digestion : Ultra structure and function of lysosomes.
- Synthesis and targeting of mitochondrial proteins.
- Secretory pathways and translocation of secretory proteins across the EPR membrane.

## Unit-3

- Genome complexity: C- value [paradox and cot value].
- DNA sequences of different complexity.
- Difference between normal cells and cancer cells.
- Biochemical changes.
- Cytoskeleton changes.
- Cell surface changes.
- Genetic basis of human cancer

## Unit-4

- Chromosomal abnormalities in human cancer.
  - General idea of oncogenes and proto oncogenes.
  - Oncogenesis and cancer.
  - Transforming Agents.
  - Tumor Suppressor genes.
  - Receptor – Ligand interaction and signal transduction.
- Cross – talk among various signaling pathways.

## Suggested Reading Materials:

- DeRobertis and De Robertis Cell and Molecular Biology. Lea and Febiger.
- We Watson Hopking reberts steits, Weiner molecular biology of the gene, the Benjamin / Cummings Publishin Company Inc.
- Bruce alberts, Bray, Lewis, Raff, Roberts, Watson molecular Biology of the cell garland publishing inc.
- P.K. Gupta, Molecular Cell Biology Rastogi Publication.
- Watson Gilman Witkowski, Zoller Recominant D.N.A. scientific American Books.
- Gerald Karp. Cell Biology.
- Lewin B. Genes VII.
- King Cell Biology.
- Baniel L. Hartl Elizabeth W. Jones, Genetics Principles and analysis . Jones and Bartlett Publisher.
- Lodish, Berk Zipursky, Matsudaira Baltimore Darnell Molecular Cell Biology W.H.Freeman and company.
- J. Travers Immunology current Biology limited.

- Kubey Immunology W.H. Freeman and Company.
- Riott, Male snustad Principles of genetics john weley and sons Inc.

## **M.Sc Zoology**

### **Semester-IV**

#### Paper- IV C (Optional)

### Applied Entomology

#### Unit-1

Classification according to imms

- Classification of apterygota upto families.
- Classification of following insect orders  
(a) orthoptera (b) hemiptera (c) diptera.
- Classification of following insect order  
(a) hymenoptera (b) lepidoptera (c) coleoptera
- Collection and preservation of insects.

#### Unit-2

- Insect pest-Management strategies and tools
- Biological control, Genetic control, Chemical control
- Pests of Cotton
- Pests of sugarcane
- Pests of paddy
- Pests of stored food grains
- Pests of citrus fruits and mango
- Pests of pulses
- House hold insect pests

#### Unit-3

- Insects in relation to forensic science
- Insects migration, population fluctuation and factors
  - Insects of medical and veterinary importance
- Ecological factors affecting the population and development of Insects

#### Unit-4

- Mulberry and non mulberry sericulture
- Apiculture
- Lac culture
- Insects as human food for future.

## **M.Sc Zoology Semester-IV**

### **Paper- IV D (Optional)**

#### **Environment & Biodiversity Conservation**

##### **Unit I**

- Basic concept of Environmental Biology Scope and Environmental Science
- Biosphere and Biogeochemical cycles.
- Environmental monitoring and impact assessment.
- Environmental and sustainable development.
- Water conservation, rain water harvesting, water shed management.

##### **Unit II**

- Cause, effects and remedial measure of Air pollution, Water pollution.
- Noise, radioactive and thermal pollution.
- Agriculture pollution
- Basic concepts of Bioaccumulation.
- Solid waste management.

##### **Unit III**

###### **Global warming and disaster management**

- Cause of global warming
- Impact of global warming – acid rains and ozone depletion, green house effect.
- Control measures of global warming
- Afforestation (b) reduction in the use of CFCS
  - Disaster management -floods, earthquake, Cyclones landslides.
- Environmental legislation.

##### **Unit IV**

###### **Natural Resources:- Forest**

-

- Use and over exploitation of forests.
- Timber extraction.

###### **Land**

- Land degradation. Landslides.
- Soil-ersion and desertification.

###### **Water**

- Use and over utilization of surface and ground

water



- Floods. Drought dams- benefits and problems

#### Mineral

- Use and exploitation ,
- Environmental effect of extracting and using mineral resources

#### Food

- World food problem
- Effects of modern agriculture and overgrazing

#### Energy

- Conventional and nonconventional energy resources.
- Using of alternate energy sources
- Role of an individual in conservation of natural resources

#### Equitable use of resources for sustainable life

- Biodiversity crisis – habitat degradation poaching of wild life.
- Socio economic and political causes of loss of biodiversity.
- In situ and exsitu conservation of biodiversity
- Value of biodiversity.

#### Suggested Reading Materials:

##### Paper III D & IV D

- Arora : Fundamentals of environmental biology
- Anathakrishnan : Bioresources ecology
- Bottain : Environmental studies
- Bouhey : Ecology of populations
- Clark : Elements of ecology
- Dowdoswell : An introduction to animal ecology
- Goldman : Limnology
- Kormondy : Concepts of ecology
- May : Model ecosystems
- Odum : Ecology
- Perkins : Ecology
- Simmons : Ecology of estuaries and costal water
- Pawlosuske : Physico-chemical methods for water
- South Woods : Ecological methods
- Trivedi and Goel : Chemical and biological methods for water pollution studies
- Willington : Fresh water biology
- Wetzel : Limnology
- Welch : Limnology Vols. I-II

**M.Sc Zoology**  
**Semester-IV**

Paper- IV E (Optional)

Molecular Endocrinology and Reproductive Technology

UNIT-1

- Definition and scope of molecular endocrinology.
- Chemical nature of Hormones-
- Protein & polypeptides.
- Amino acid derivative
- Steroids
- Phospholipids derivative
- (tissue hormones)
- Purification and characterization of Hormones.

UNIT-2

- Receptor.
- Membrane Receptor.
- Nuclear Receptor.
- Orphan Receptor
- G-Protein
- Nuclear Receptor

UNIT-3

- Hormone – Transduction
- G-Protein & Cyclic Nucleosides.
- Calcium calmoduline & phospholipids.
- Miscellaneous Second Messengers.
- Phosphorylation & other non transcriptional effect of Hormones.
- Genetic control of formation of Hormone.
- Transcription.
- Post transcription.
- Translation.
- Post translation
- Secretion of Hormone.

UNIT-4

- Multiple ovulation and embryo transfer Technology.
- Study of estrous cycle by vaginal smear technology
- Surgical technique-

- Castration
- Ovariectomy
- Vasectomy
- Tuectomy
- Laprotomy.

**Suggested Reading Materials:**

- Benjamin Lewim – Genes VII/ VIII, oxford University press.
- Lodish etal- Molecular Cell Biology.
- Zarrow, M.X., Yochin J.M. and Machrthy, J.L. – Experimental Endocrinology.
- Chatterji C.C.- Human Physiology (Vol- II).
- Bentley, P.J. – Comparative Vertebrate endocrinology.
- Hadley Mac. E.- Endocrinology.
- Chinoy, N.J. Rao, M.V., Desarai, K.J. and High land, H.N. – Essential techniques in reproductively physiology and Endocrinology.
- Norris, D.O. – Vertebrate Endocrinology.

**M.Sc. ZOOLOGY – IV SEMESTER  
LAB COURSE-I (COMPULSARY)**

**PAPER- I BIOCHEMSTRY**

1. Estimation of antioxidant enzymes.
2. Estimation of amylase.
3. Estimation of protein by Lowry method.
4. Estimation of Oil in seeds.
5. Estimation of Carbohydrate by anthrone reagent.
6. Other exercise related to theory paper.

**PAPER- II NEUROPHYSIOLOGY**

1. Study of slides of nervous system.
2. Neck nerve of squirrel by using alternate methods like clay modeling.
3. Study of Brain through MODAL.
4. Study of Cranial nerve of Bird, Amphibian, Reptile and Mammals by using alternate methods like clay modeling.
5. Other exercise related to theory paper.

**EXAMINATION SCHEME**

Based on paper I	35 marks
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Based on paper II	35 marks
Viva	10 marks
Sessional (Internal)	20 mark
<b>Total</b>	<b>80+20 (100)</b>

**M.Sc. SEMESTER-IV  
LAB COURSE-II  
OPTIONAL (SPECIAL PAPER) GROUP 1**

**PAPER-III(A) FISH (ICHTHYOLOGY) STRCTURE AND FUNCTION**

1. Anatomy of various organ systems and mounting of fish materials
2. Cranial nerves of teleost fishes: *Wallago* , *Mystus*, *Labeo* and other fishes by using alternate methods like clay modeling
3. Osteology of fish: Scoliodon, carps, catfishes, murrels etc.
4. Accessory respiratory organs of air breathing fish by using alternate methods like clay modeling
5. Study of histological (permanent) slides
6. Study of museum specimens of the concerned group
7. Other exercise related to theory paper.

**PAPER –III(B) CELL BIOLOGY**

1. Study of mitosis from onion root tip.
2. Study of meiosis in grasshopper testis.
3. Study of polytene chromosome in Dipteran Larvae.
4. Demonstration of Barr-Body in Human Check cell.
5. Estimation of DNA.
6. Estimation of RNA.
7. Other exercise related to theory paper.

**PAPER –III(C) ENTOMOLOGY**

1. Anatomy of common grasshopper, cockroach, honey bee, wasp and dysdercus, mylabris, belestoma (Giant water Bugs) by using alternate methods like clay modeling.
2. Dissection by using alternate methods like clay modeling and exposure of:
  - (i) Sting apparatus of honey bee and wasp.
  - (ii) Tympanal organs of grasshoppers.
  - (iii) Testes of cockroach
  - (iv) Aristae of house fly.
  - (v) Different types of mouthparts of insects.

- (vi) Different types of wings and antennae of insects.
- (vii) Tentorium of grasshoppers.
- 3. Identification and comment on insects of different orders and families.
- 4. Identification with the help of keys of common insects from different orders and families.
- 9. Other exercise related to theory paper.

### **PAPER-III(D) WILD LIFE CONSERVATION**

1. Anatomy of (by using alternate methods like clay modeling):
  - (a) Toad / Frog.
  - (b) Lizard / Snake / Turtle.
  - (c) Pigeon / Parrot.
  - (d) Rat / Squirrel.
2. Ecological survey of National Parks and Sanctuaries.
3. Mounting : Permanent preparation of parts of internal organs.
4. Study of slides of different microscopic structure.
5. Identification of wild animal species as objects of museum and zoo and specimens of photographs.
6. Osteology of wild animals.
7. Ecological comments on wild species of different niche and habits. Candidates would be required to keep records of exercise in laboratory, field types, sanctuaries and parks of importance and collections.
8. Other exercise related to theory paper.

### **PAPER-III(E) BIOLOGY OF VERTEBRATE IMMUNE SYSTEM**

1. Dissection by using alternate methods like clay modeling of primary and secondary immune organs from mice:
  - a. Preparation of single cell suspension from bone marrow and spleen (spleenocytes) of mice.
  - b. Cell counting and viability testing of the spleenocytes prepared.
2. Preparation and study of phagocytosis by splenic/peritoneal macrophages.
3. Raising polyclonal antibody in mice, serum collection and estimating antibody titre in serum by following methods:
  - a. Ouchterlony (double diffusion) assay for Antigen -antibody specificity and titre.
  - b. ELISA
4. Antibody purification from the serum collected from immunized mice: affinity purification/chromatography.
5. Immunoelectrophoresis.
6. Demonstration of Western blotting:
  - a. Protein estimation by Lowry's method /Bradford's method
  - b. SDS-PAGE.
  - c. Immunoblot analysis.

7. Other exercise related to theory paper

### **OPTIONAL (SPECIAL PAPER) GROUP 2**

#### **PAPER –IV(A) PISCICULTURE AND ECONOMIC IMPORTANCE OF FISH (ICTHYOLOGY)**

1. Systematic identification of freshwater fishes with particular reference to C.G.
2. Age determination with the help of scales / otolith
3. Pigmentary behaviour in fish
4. Qualitative zooplankton analysis
5. Nutrient analysis of water
6. Analysis of gut contents
7. Microtomy of fish materials
8. Other exercise related to theory paper

#### **PAPER-IV(B) CELLULAR ORGANIZATION AND MOLECULAR ORGANIZATION**

1. Histochemical demonstration of Mitochondria
2. Histochemical demonstration of Golgi complex
3. Histochemical demonstration of Lactate dehydrogenase
4. Histochemical demonstration of Succinate dehydrogenase
5. Isolation and characterization of Nuclei from liver
6. Isolation and characterization of Mitochondria
7. Isolation of DNA from any tissue
8. Separation of lipids using thin layer chromatography
9. Separation of various proteins using column chromatography
10. Study of metaphase chromosomes from rat bone marrow
11. G banding of metaphase chromosomes
12. C- banding of metaphase chromosomes
13. Estimation of Mitotic Index
14. Measurement of cell size using oculometer.
15. Other exercise related to theory paper

#### **PAPER- IV(C) APPLIED ENTOMOLOGY**

1. Insect collection and preservation for systematic studies
2. Identification of different insects upto orders
3. Identification of insects upto families of economically important insect orders
4. Identification of insects upto species: Mosquitoes, honeybees, stored grain beetles, aquatic insects, important crop and household pests
5. Analysis of honey and its quality control
6. Field studies of insects to understand their habit, habitat environmental impact, beneficial and harmful activities etc.
7. Study of beneficial insects, benefits derived from them and useful products
8. Study of destructive insects, damage caused by them and damaged products
9. Study of insecticidal formulations and insect control appliances

10. Experiments on insect control like LC-50 /LD-50, knock down and recovery effect, repellency/antifeedance tests, percentage damage tests for leaf eating insects, and stored grain pests
11. Other exercise related to theory paper

#### **PAPER- IV(D) ENVIRONMENT AND BIODIVERSITY CONSERVATION**

- (i) Environmental hazards, destruction of habitat and extrication of species causes and preventive measures.
- (ii) Environmental planning of rural and urban development.
- (iii) Management of soil resources.
- (iv) UNESCO's role in ecology, earth summit, SARC, ED trust fund.
- (v) Biodiversity, its significance and conservation measures.
- (vi) Role of biodiversity in species development.
- VII. Other exercise related to theory paper

#### **PAPER- VI(E) MOLECULAR ENDOCRINOLOGY AND REPRODUCTIVE TECHNOLOGY**

1. Chromatography method (separation of Androgen & Progesterone).
2. Bioassay of  $\alpha$ -Ketosteroids.
3. Bioassay of Gonadotropins.
4. Study of slide related to endocrine glands.
5. Estimation of cholesterol.
6. Estimation of catecholamine.
7. Dissection by using alternate methods like clay modeling of endocrine glands.
8. Other exercise related to theory paper.

#### **EXAMINATION SCHEME**

Based on paper III	35 marks
Based on paper IV	35 marks
Viva	10 marks
Sessional (Internal)	20 mark
<b>Total</b>	<b>80+20 (100)</b>

# HEMCHANDYADAV VISHWAVIDYALAYA, DURG (C.G.)

Website - [www.durguniversity.ac.in](http://www.durguniversity.ac.in), Email - [durguniversity@gmail.com](mailto:durguniversity@gmail.com)



## SCHEME OF EXAMINATION & SYLLABUS of

### M.Sc. (Physics) Semester Exam

UNDER  
FACULTY OF SCIENCE  
Session 2019-20

(Approved by Board of Studies)  
Effective from June 2019

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## Syllabus for M.Sc. Physics (Semester System)

### **Semester – I (2019-2020)**

Paper – I	: Mathematical Physics
Paper – II	: Classical Mechanics
Paper – III	: Electrodynamics & Plasma Physics
Paper – IV	: Electronics
Laboratory Course I-A	: General & Optics
Laboratory Course I-B	: Electronics

### **Semester – II (2019-2020)**

Paper – I	: Quantum Mechanics - I
Paper – II	: Statistical Mechanics
Paper – III	: Electronic & Photonic Devices and Optical Modulators
Paper – IV	: Computational Methods & Programming
Laboratory Course I-A	: Numerical Analysis & Computer Programming
Laboratory Course I-B	: Digital Electronics & Microprocessor

### **Semester – III (2019-2020)**

Paper – I	: Quantum Mechanics - II
Paper – II	: Atomic & Molecular Physics
Paper – III	: Solid State Physics - I
Paper – IV	: (A) Astronomy & Astrophysics - I (B) Electronics (Communication) - I (C) Physics of Nano-material - I (D) Space Physics - I
Laboratory Course III-A	: Material Science & General
Laboratory Course III-B	: Astronomy & Astrophysics <b>OR</b> Electronics (Communication <b>OR</b> Physics of Nano-material <b>OR</b> Space Physics



### **Semester – IV (2019-2020)**

Paper – I	: Nuclear & Particle Physics
Paper – II	: Laser Physics and Applications
Paper – III	: Solid State Physics - II
Paper – IV	: (A) Astronomy & Astrophysics - II (B) Electronics (Communication) - II (C) Physics of Nano-material - II (D) Space Physics - II

Project Work

The Syllabus for M.Sc. Physics (Semester System) is hereby approved by the members of the Board of Studies.



## M. Sc. - PHYSICS

M.Sc. in Physics is a full time 2-year (4-semesters course). There will be four theory papers, and two laboratory courses/project in each semester. In each semester, there will be two internal examinations/assessments. Semester-wise course structure along with distribution of marks is given below:

### Semester I

Name of the Paper	Marks					Credits
	Theory		Internal		Total	
	Max	Min	Max	Min		
1. Mathematical Physics	80	16	20	04	100	4
2. Classical Mechanics	80	16	20	04	100	4
3. Electrodynamics & Plasma Physics	80	16	20	04	100	4
4. Electronics	80	16	20	04	100	4
A : General & Optics	-		-		100	2
Laboratory Course I-B : Electronics	-		-		100	2
<b>Total Marks</b>	<b>600</b>					<b>20</b>

**Total Marks for Semester I = 600 & Credit = 20**

### Semester II

Name of the Paper	Marks					Credits
	Theory		Internal		Total	
	Max	Min	Max	Min		
1. Quantum Mechanics-I	80	16	20	04	100	4
2. Statistical Mechanics	80	16	20	04	100	4
3. Electronic & Photonic Devices and Optical Modulators	80	16	20	04	100	4
4. Computational Methods & Programming	80	16	20	04	100	4
Laboratory Course II-A : Numerical Analysis & Computer Programming	-		-		100	2
Laboratory Course II-B : Digital Electronics & Microprocessor	-		-		100	2
<b>Total Marks</b>	<b>600</b>					<b>20</b>

**Total Marks for Semester II = 600 & Credit = 2**



### Semester III

Name of the Paper	Marks				Credits	
	Theory		Internal			Total
	Max	Min	Max	Min		
1. Quantum Mechanics-II	80	16	20	04	100	4
2. Atomic & Molecular Physics	80	16	20	04	100	4
3. Solid State Physics-I	80	16	20	04	100	4
4. (A) Astronomy & Astrophysics-I (B) Electronics (Communication)-I (C) Physics of Nano-material-I (D) Space Physics-I	80	16	20	04	100	4
Laboratory Course III-A Materials Science & General	-		-		100	2
Laboratory Course III-B : Astronomy & Astrophysics <b>OR</b> : Electronics (Communication) <b>OR</b> : Physics of Nano-material <b>OR</b> : Space Physics	-		-		100	2
<b>Total Marks</b>	<b>600</b>					<b>20</b>

**Total Marks for Semester III = 600 & Credit = 20**

### Semester IV

Name of the Paper	Marks					Credits
	Theory		Internal		Total	
	Max	Min	Max	Min		
1. Nuclear & Particle Physics	80	16	20	04	100	4
2. Laser Physics and Applications	80	16	20	04	100	4
3. Solid State Physics -II	80	16	20	04	100	4
4. (A) Astronomy &Astrophysics-II (B) Electronics(Communication)-II (C) Physics of Nano-material-II (D) Space Physics-II	80	16	20	04	100	4
Project Work	-		-		200	4
<b>Total Marks</b>	<b>600</b>					<b>20</b>

**Total Marks for Semester IV = 600 & Credit = 20**

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## In Each Semester

MAXIMUM MARKS TOTAL	PASS PER	
	TH.	PR.
600	36	36

In semester IV, Project work in Solid State Physics/ Astronomy & Astrophysics/ Electronics/ Physics of Nano-materials/ Space Physics will lead to specialization in the respective area. It will be primarily based on research oriented topics. On completion of the project, student will submit project report in the form of dissertation which will be examined by an external examiner. The examination of project work shall consist of (a) Presentation and (b) comprehensive viva-voce.

### Marks-distribution for Laboratory Courses and Project Work:

(a) Laboratory courses (Semesters I-III):

Sessional	: 20Marks
Viva	: 20Marks
Experiment	: 60Marks

(b) Project Work (Semester IV):

Report–Dissertation	: 60 Marks
Presentation	: 100 Marks
Comprehensive viva-voce	: 20 Marks
Internal assessment	: 20 Marks

**Note:** Paper IV of both Semesters III and IV is a major elective course. Student has to opt for any one of the courses: (A) or (B) or (C) or (D). The commencement of any one of the major elective paper is subjected to the availability of basic infrastructural facilities viz. expert faculty, laboratory etc.



**Detailed Course Content**  
**Semester – I**  
**(2019-2020)**  
**PAPER-I: MATHEMATICAL PHYSICS**

**Unit-I:** Vector space and Matrices, Linear independence, Bases, dimensionality, Inner product, Linear transformation, matrices, Inverse, Orthogonal and Unitary matrices, Independent element of a matrix, Eigen values and Eigen Vectors, Diagonalization, Complete orthonormal sets of functions.

**Unit-II:** Complex Variables: Cauchy- Riemann condition, analytic functions, Cauchy's theorem, Cauchy integral formula, Laurent series, singularities, residue theorem, contour integration, evaluation of definite integrals, problems.

**Unit-III:** Differential equations, first order differential equation, second order differential equation with constant coefficients, second order linear ODEs with variable coefficients, Solution by series expansion, nonhomogeneous differential equations and solution by the method of Green's functions.

**Unit-IV:** Special functions, Legendre, Bessel, Hermite and Laguerre functions with their physical applications, generating functions, orthogonality conditions, recursion relations,

**Unit-V:** Integral transforms, Fourier integral and transforms, inversion theorem, Fourier transform of derivatives, convolution theorem, Laplace Transform(LT), LT of Derivatives, Inverse LT, Fourier series; properties and applications, discrete Fourier transform.

**TEXT AND REFERENCE BOOKS**


1. Mathematical Methods for Physics, by G. Arfken.
2. Matrices and Tensors for Physicist, by A. W. Joshi.
3. Advanced Engineering Mathematics, by E. Kroyazig.
4. Special Functions, by E. B.Rainville.
5. Special Functions, by W.W.Bell.
6. Mathematical Method for Physicist and Engineers, by K. F. Relly, M. P. Hobson and S. J.Bence
7. Mathematics for Physicists, By Marry L.Boas.

## Paper - II: CLASSICAL MECHANICS

- Unit-I** Preliminaries, Newtonian mechanics of one and many particle systems, Conservation laws, Constraints & their classification, Principle of virtual work, Generalized coordinates, D'Alembert's principle and Lagrange's equations, Velocity-dependent potentials and dissipation function, Simple applications of the Lagrangian formulation, Hamilton's principle, Lagrange's equations from Hamilton's principle, Conservation theorems and Symmetry properties, Energy function and the conservation of energy.
- Unit-II** The Hamiltonian formulation of mechanics, Legendre transformations and the Hamilton's equations of motion, Cyclic coordinates and Conservation Theorems, Hamilton's equations from Hamilton's principle, The principle of least action, Simple applications of the Hamiltonian formulation.
- Unit-III** Canonical transformations with examples, The harmonic oscillator, Poisson's brackets, Equations of motion and conservation theorems in the Poisson Bracket formulation. Hamilton-Jacobi (HJ) theory: The HJ equation for Hamilton's principal function, Harmonic oscillator as an example of the HJ method, The HJ equation for Hamilton's characteristic function, The action-angle variables
- Unit –IV** The Central force: Two-body central force problem and its reduction to the equivalent one-body problem, The equations of motion and first integrals, The equivalent one-dimensional problem and classification of orbits, The differential equation of the orbit, Closure and stability of orbits, The Kepler problem, Scattering in a central force field: Rutherford scattering.
- Unit – V** Rigid body dynamics, The Euler angles, Euler's theorem on the motion of a rigid body, Rate of change of a vector, The Coriolis force, Angular momentum and Kinetic energy of motion about a point, The Euler equations of motion of rigid bodies. Formulation of the problem of small oscillations, The Eigen-value equation and the principal axis transformation, Frequencies of free vibration and normal coordinates, Free vibration of linear triatomic molecule.

### TEXT AND REFERENCE BOOKS

1. Classical Mechanics, By N.C. Rana and P.S. Joag (Tata McGraw-Hill, 1991)
2. Classical Mechanics, by H. Goldstein (Addison Wesley, 1980)
3. Classical Mechanics, by H. Goldstein, C Poole & J Fafko (Pearson Education, Inc, 2002)
4. Mechanics, by A. Sommerfeld, (Academic press, 1952)
5. Introduction to Dynamics by Perceival and D. Richaeds (Cambridge university, press, 1982).

The image shows three handwritten signatures in blue ink. The first signature on the left is 'J. Rana'. The middle signature is 'P. S. Joag'. The signature on the right is 'D. Richaeds' with a small 'myra' written below it.

### **Paper-III: ELECTRODYNAMICS & PLASMA PHYSICS**

- Unit-I** Maxwell's equations, vector and scalar potentials and the wave equation, Gauge transformations, Lorenz gauge, Coulomb gauge, Green function for the wave equation, four-vectors, mathematical properties of the space-time in special relativity, matrix representation of Lorentz transformation, covariance of electrodynamics, transformation of electromagnetic fields.
- Unit-II** Radiation by moving charges, Lienard-Wiechert potential and fields for a point charge, total power radiated by an accelerated charge- Larmor's formula and its relativistic generalization, angular distribution of radiation emitted by an accelerated charge, radiation emitted by a charge in arbitrary extremely relativistic motion, distribution in frequency and angle of energy radiated by accelerated charge.
- Unit -III** Bremsstrahlung: emission from single-speed electrons, thermal Bremsstrahlung emission and absorption, Synchrotron radiation: spectrum of synchrotron radiation, spectral index for power law electron distribution, transition from Cyclotron to Synchrotron emission, Cherenkov radiation
- Unit-IV** Plasma: definition, Debye shielding phenomenon and criteria for plasma, motion of charged particles in electromagnetic field; Uniform E & B fields, Electric field drift, Non-uniform magneto static field, Gradient B drift, Parallel acceleration and magnetic mirror effect, Curvature drift, adiabatic invariants.
- Unit-V** Elementary concepts of plasma kinetic theory, the Boltzmann equation, the basic plasma phenomena, plasma oscillations. Fundamental equations of magneto- hydrodynamics (MHD), Hydrodynamics Waves; Magneto sonic and Alfvén waves, Magnetic viscosity and magnetic pressure, plasma confinement schemes.

#### **REFERENCE BOOK:**

1. Jackson, classical electrodynamics.
- 2 Rybicki & Lightman: Radiative Processes in Astrophysics
- 2 Panofsky and Phillips: Classical electricity and magnetism.
- 3 Bittencourt, Plasma physics.
- 4 Chen: Plasma physics.

The bottom of the page features several handwritten signatures and initials in blue ink. On the left, there is a signature that appears to be 'J. M. J.' followed by a large, stylized signature that looks like 'M. J. P.'. In the center, there is a signature that looks like 'R. M. J.' followed by a large, stylized signature that looks like 'R. J.'. On the right, there is a signature that looks like 'M. J. P.' followed by a large, stylized signature that looks like 'M. J. P.'.



## Paper - IV: ELECTRONICS

- Unit-I** Operational Amplifier- Basic Op. Amp. Differential amplifier, the emitter coupled Difference Ampl, Transfer characteristics of a Diff. Ampl., an example of an IC Op.-Amp., off set error voltage and currents, measurement of Op.-Amp. Parameters, frequency response of Op-amp. Linear analog systems: Basic Op.-Amp. Applications, Analog integration and differentiation, Electronic analog computation, Non-linear analog systems: Comparators, Wave form generators.
- Unit-II** Combinational Logic –Basic logic gates: OR, AND and NOT gates, NOR and NAND gates, Boolean algebra, DeMorgan's theorems, exclusive OR gate, characteristics of logic families, saturated logic families: RTL, DCTL, non-saturated logic families: TTL and ECL, Unipolar logic families.
- Unit -III** Sequential Logic, Flip-flops: RS Flip-flop, level clocking, Edge triggered Flip Flops, D Flip flops. JK Flip-flops, J.K. master slave Flip-flops, Registers: buffer, shift and control shift registers, counters: ripple synchronous & ring counters, tri - state registers, Buffer: controlled buffer Register, Bus organized structure, Latch, multiplexer, De multiplexer, decoder, ALU Memories: RAM, ROM, PROM, EPROM, A/D and D/A converters.
- Unit-IV** Microprocessors – Building concept of microprocessors, developing inside of microprocessor , Instruction codes ,Instruction Register ,Introducing RESET Pin, Introducing on chip oscillator, Interfacing I/O devices, Introducing Interrupt lines :Stack, Push, Pop operation ,delay in servicing interrupts, multiply interrupts, location for interrupts .Introducing slow and fast data transfer, Status of microprocessor, interrupt pins, General purpose Register, flag Register, Increment/decrement register. Features of 8085 microprossor. Pin diagram of 8085, block diagram of 8085. CPU of a microprocessor, timing and control, system timings and interrupt timings of 8085, registers in 8085, interfacing memory and I/O devices- a preliminary ideas. Number system, Floating Point notation.
- Unit - V** Instructions set of 8085, types of instructions- Data transfer group, Arithmetic logic, branch group, stack I/O machine control group, addressing mode of Intel 8085, examples of Assembly language programs of 8085, summing of two 8-bit numbers to result a 16-bit number, summing two 16-bit number, multiplying two 8-bit number to result a 16-bit product, block transfer of data from one memory block to other, BCD to hexadecimal data, finding the largest number in a series.



### Text and reference books:

1. Integrated Electronics: J.Millman R.C.C. Halkias.
2. Electronics devices and circuit theory, by Robert Boylested and Louis Nashdaky PHI, New Delhi-110001,1991.
3. Operational amplifier linear integrated circuits, by Romakanth A. GayakwadPHI, second edition1991.
4. Digital computer electronics- An introduction tomicrocomputers-A.P.Malvino.
5. Digital finances and applications, by A.P. Malvino and Donald P.Leach,Tata McGraw Hill company, New Delhi 1993.
6. Microprocessor architecture, programming applications with 8085/8086 by Ramesh S.Gaonkar, Willey-Eastern limited1987.
7. Introduction to microprocessors – A.P.Mathur (TataMcGraw).
8. Microprocessors-Theory and applications- M.Hafiquizzaman (Prenticehall).
9. Microprocessors fundamentals- SchanmiOutling Service AuthorPocerL.Tokheim.
10. Integrated circuits : K KBotkar( Khannapublications)
11. Digital Electronics : R P Jain ( Tata McGrawHill)
12. Microprocesss : BRam
13. 8-bit microprocessor : V.J.Vibhute& P.B. Borole(Tecn-Max Publication,Pune)

*Handwritten signatures and initials in blue ink, including "Jain", "R.P.", "V.J.", and "P.B.", likely representing the authors or reviewers of the document.*

## Laboratory Course

### Lab I-A: General & Optics (Any ten)

1. Determination of band gap of semiconductor by four probmethod.
2. Measurement of Hall Coefficient of given semiconductor: identification of type of semiconductor and estimation of charge carrier concentration.
3. Determination of wavelength of mercury light by constant deviation spectrometer using Hartmann formula.
4. Ultrasonic velocity in a liquid as a function of temperature using ultrasonic interferometer.
5. Experiment on transmission line (A) Determination of characteristics impedance, (B) Study of voltage distribution.
6. Determination of the Curie temperature of ferromagnetic material.
7. Determination of forbidden gap of a diode by plotting reverse saturation current as a function of temperature.
8. Determination of operating voltage and study the characteristics of a GM tube.
9. Determination of operating voltage of a GM tube and determine the linear absorption coefficient.
10. Determination of operating voltage of a GM tube and verify inverse-square law.
11. Determination of short half-life of a given source which can be obtained from a mini generator or produced with a neutron source by activation.
12. X-ray diffraction by Telexometer.
13. Determination of ionization potential of Lithium/Mercury.
14. Determination of  $e/m$  of electron by Normal Zeeman Effect using Feby-Perot Etalon.
15. Determination of Dissociation energy of iodine ( $I_2$ ) Molecule by photography, the absorption bands of  $I_2$  in the visible region.
16. Measurement of wavelength of He-Ne Laser light using a ruler and thickness of thin wire by the laser.
17. To study Faraday Effect using He-Ne Laser.

### Lab I-B: Electronics (Any ten)

1. Design & Study of Regulated Power supply.
2. Study of Transistor Amplifiers in CE, CB, and CC modes.
3. Study of Transistor Bias Stability.
4. Study of Astable, Monostable and Bistable Multivibrator.
5. Study of Silicon Controlled Rectifier.
6. Experiment of Uni – Junction Transistor and its application.
7. Experiment of FET and MOSFET characterization and application as an amplifier.
8. Study of Differential. Amplifier.
9. Basic Logic gates and verification of their Truth-Tables.
10. Combinational logic gates and verification of De-Morgan's Theorem.
11. Study of Basic Operational Amplifier(741).
12. Study of Opto- Electronics Devices.



**Semester – II**  
**(2019-2020)**

**PAPER - I: QUANTUM MECHANICS-I**

- Unit - I** Inadequacy of classical mechanics, Planck's quantum hypothesis and radiation law, Photoelectric effect, De-Broglie's theory. Schrödinger equation, continuity equation, Ehrenfest theorem, admissible wave functions, stationary states, one-dimensional problems; potential well and barriers, Schrödinger equation for harmonic oscillator and its solution, uncertainty relations, states with minimum uncertainty product.
- Unit –II** Superposition principle, general formalism of wave mechanics, representation of states and dynamical variables, commutation relationship, completeness and normalization of Eigen functions, Dirac-delta function, Bra & Ket notation, matrix representation of an operator, harmonic oscillator and its solution by matrix method, Heisenberg equation of motion.
- Unit -III** Angular momentum in quantum mechanics, commutation relationships, Eigen values, Spin angular momentum, Pauli's matrices, addition of angular momentum, Clebsch-Gordon coefficients.
- Unit – IV** Central force problem, spherically symmetric potentials in three dimensions, separation of wave equation, parity, three-dimensional square-well potential and energy levels, the hydrogen atom; solution of the radial equation, energy levels and stationary state wave functions, discussion of bound states, degeneracy.
- Unit –V** Time- independent perturbation theory, non-degenerate case, first order and second perturbations with the example of an oscillator, degenerate cases, removal of degeneracy in second order, Zeeman effect without electron spin, first-order Stark effect in hydrogen, perturbed energy levels, correct Eigen function, occurrence of permanent electric dipole moments.

**TEXT AND REFERENCE BOOKS:**

1. L.I. Schiff: quantum mechanics (McGraw-Hill).
2. S. Gasiorowicz, Quantum Physics(Wiley).
3. Landau and Lifshitz : Non-relativistic quantum mechanics.
4. B.Craseman and Z.D.Powell: quantum mechanics (Addison Wesley)
5. A.P. Messiah: Quantum Mechanics.
6. J.J. Sakurai : Modern Quantum Mechanics.
7. Mathews and Venkatesan : Quantum Mechanics.



## PAPER – II: STATISTICAL MECHANICS

- Unit-I** Foundation of statistical mechanics: macroscopic and microscopic states, contact between statistical and thermo dynamical quantities, physical significance of  $\Omega(N, V, E)$ , the classical gas, entropy of mixing and Gibb's paradox, phase space of classical system, Liouville's theorem and its consequences, quantum states and phase space.
- Unit- II** Elements of ensemble theory – A system in micro canonical, canonical, and grand canonical ensembles, partition functions, physical significance of statistical quantities, example of classical system, energy and energy-density fluctuations and mutual correspondence of various ensembles.
- Unit -III** Formulation of quantum statistics – Quantum mechanical ensemble theory, density matrix, statistics of various quantum mechanical ensembles, system composed of indistinguishable particles.  
Theory of simple gases –Ideal gas in various quantum mechanical ensemble, Maxwell-Boltzmann, Bose-Einstein, Fermi-Dirac distributions, statistics of occupation number.
- Unit - IV** Ideal Bose and Fermi gases -Thermodynamic behavior of an ideal Bose gas, Bose-Einstein condensation and, elementary excitations in liquid helium II, Thermodynamic behavior of an ideal Fermi gas, the electron gas, nonrelativistic and relativistic degenerate electron gas, theory of white dwarf stars.
- Unit -V** Statistical Mechanics of interacting systems – the method of cluster expansion for a classical gas, Virial expansion of the equation of state. Theory of phase transition – general remark on the problem of condensation, Fluctuations: thermodynamic fluctuations, Spatial correlation in a fluid Brownian motion: Einstein Smoluchowski theory of Brownian motion.

### TEXT & REFERENCE BOOKS –

1. R. K. Pathria, Statistical Mechanics (Pergamon Press).
2. L. D. Landau & E. M. Lifshitz (Butter worth and Heinemann Press).
3. Federick Reif, Fundamental of statistical and thermal physics (McGraw-Hill publishers).
4. Kerson Huang, Statistical Mechanics (Wiley Eastern).



### **PAPER –III: ELECTRONIC & PHOTONIC DEVICES AND OPTICAL MODULATORS**

- Unit– I** Special Bipolar devices: Thyristors- the four-layer diodes and their basic characteristics, Schottky diode, three terminal thyristor, Diac & Triac, SCR, UJT, Field controlled Thyristors.
- Unit- II** Unipolar Devices : JFET, MESFET and MOSFET, basic structure, working and device I-V characteristics, small signal equivalent circuit for Microwave performance Introduction to MIS and MOS diodes, charge coupled devices (CCDs), basic structure and working principle , MOSFET-basic device characteristics, types of MOSFET.
- Unit-III** Special Microwave Devices: Tunnel diode and backward diode- basic device characteristics, IMPATT diodes and their static and dynamic characteristics, Transfer electron devices- transferred electron effect, Gunn diodes.
- Unit-IV** Photonic Devices: Radiative transitions, LEDs, Visible and infrared SC lasers; Photo detectors; Photo conductor, & Photodiode, Solar cells, Solar radiation and ideal conversion efficiency, p-n junction solar cells, Hetero junction. Interface thin film solar cells.
- Unit -V** Optical Modulators and Display Devices: Modulation of light- Birefringence, Optical activity, Electro-optic, Magneto-optic and Acoustic- optic effects, Materials exhibiting these properties, Non-linear optics. Display devices: Luminescence, Photo-luminescence, Electro-luminescence, Liquid crystal displays, Numeric displays.

#### **TEXT & REFERENCE BOOKS-**

1. Semiconductor Devices – Physics and Technology, by S M Sze, Wiley (1985)
2. Introduction to semiconductor device, M.S. Tyagi, John Wiley and sons
3. Measurement, Instrumentation and experimental design in physics and engineering by M.Sayer and A.Mansingh, Prentice Hall India 2000
4. Optical electronics by Ajay Ghatak and K.Thyagarajah, Cam.Univ.Press.
5. Opto electronics – An introduction: J.Wilson and JFB Hawkes (Eastern Economy Edition).
6. Optical Communications: J.H. Franz and V.K. Jain (Narosa).



## **PAPER – IV: COMPUTATIONAL METHODS AND PROGRAMMING**

- Unit-I** Methods for determination of zeroes of linear and nonlinear algebraic equations and transcendental equations, convergence of solutions. Solution of simultaneous linear equations, Gaussian elimination, pivoting, iterative method, matrix inversion.
- Unit –II** Finite differences, interpolation with equally spaced and unevenly spaced points, curve fitting, polynomial least squares and cubic spline fitting. Numerical differentiation and integration, Newton-Cotes formulae, error estimates, Gauss method.
- Unit –III** Numerical solution of ordinary differential equations, Euler and Runge-Kutta methods, predictor-corrector method, elementary ideas of solutions of partial differential equations.
- Unit- IV** Elementary information about digital computer principles, compilers, interpreters and operating systems (Windows/Linux) Fortran programming, flow charts, integers and floating point arithmetic, expressions, built in functions.
- Unit-V** Executable and non-executable statements, assignments, control and input-output statements, subroutines and functions; The statement functions, main features of functions and subroutines, subprogram, function subprogram, overall structure of FORTRAN program, external statement, subroutine subprogram, common statement, equivalence statement, operations with files-open and close statement, Format statements, field specifications.

### **TEXT AND REFERENCE BOOKS**

1. Sastr: Introductory Methods of Numerical Analysis.
2. Rajaraman: Numerical Analysis.
3. Antia: Numerical methods.
4. Raja Raman: FORTRAN programming.

The image shows four handwritten signatures in blue ink, arranged horizontally. The first signature is on the left, followed by a second, then a third, and a fourth on the right. The signatures are stylized and appear to be of the same person or a group of people.



## Laboratory Course

### Lab II-A: Numerical Analysis & Computer Programming (Any ten)

1. To solve simultaneous Linear equation by Gauss Elimination method.
2. To calculate the root of a transcendental equation by Newton – Raphsons method.
3. Solving the system of linear simultaneous equation by Gauss Serdel method.
4. Numerical Integration by Simpson's 1/3Rule.
5. Solving simultaneous Linear equation by Gauss-Jordon method.
6. Solution of Differential equation by Euler's Method.
7. To invert a given matrix by Gauss-Jordon Method.
8. Solution of Differential equation by Runga Kutte Method.
9. To fit the given data in a straight line by linear regression Method.
  - a) WAP to find the Largest of n number of series.
  - b) To calculate the standard deviation of a given set of data.
10. To write a program to compute the complex roots of a given polynomial of  $N^{\text{th}}$  degree by Graffe's Method.
11. To write a program to compute the Eigen values of a given matrix.
12. To integrate a given function by: (a) Trapezoidal method or by (b) Gauss Quadrature.
13. To find solutions of Ist order, ordinary differential equation by Taylor method

### Lab II-B: Digital Electronics & Microprocessor (Any ten)

1. Study of R-S, D/T, J-K Flip-Flops.
2. Study of counters: Ripple, Mode 3, Mode 5 counters.
3. Study of Shift Register.
4. Study of R-2R D/A Converter.
5. Study of Random Access Memory (RAM) Read Only Memory.(ROM)
6. Study of A/D Converter.
7. Experiment with Microprocessor:-I
  - (a) Convert BCD in to HEXADECIMPL
  - (b) To transfer group of data blocks from one location to another location.
8. Experiment with microprocessor: -II
  - (a) To write programs for addition of two 1 byte data giving results of 2 bytes.
  - (b) To write programs for multiplication of two 1 byte data giving results of 2 bytes.
9. (a) To add 2 16-BIT numbers stored in locations from x xxx to x xxx + 3 and add them store the results from x xxx + 4 to x xx x+6 memory location
  - (b) To find the largest of n numbers of a series.
10. To arrange N numbers in an ascending orders.
11. Experiments with Microprocessor.
  - (a) Convert BCD in to binary and vice-versa.
  - (b) To transfer group of data blocks from one location to another location.
  - (c) To write programs for addition of two 1 byte data giving result of 2 byte data
  - (d) To write programs for multiplication of two 1 byte data giving result of 2 byte data.
12. Logic gate study DTL and RTL.
13. Study of adder/Subtractor.





**Semester – III**  
**(2019-2020)**

**PAPER –I: QUANTUM MECHANICS -II**

- Unit-I** Variational method, expectation value of energy, application to excited states, ground state of He-atom, Zero point energy of one dimensional harmonic oscillator, Vander-waals interaction, the W.K.B. approximation, approximate solutions, asymptotic nature of the solution, solution near turning point, connection formulae, energy levels of a potential well and quantization rule.
- Unit-II** Theory of scattering: differential and total scattering cross section, wave mechanical picture of scattering & the scattering amplitude, Green's functions and formal expression for scattering amplitude, The Born approximation and its validity, Partial wave analysis, asymptotic behavior of partial waves and phase shifts, optical theorem, scattering by a square well potential, scattering by a hard sphere, scattering by a Coulomb potential.
- Unit - III** Time-dependent perturbation theory, first order perturbation, Harmonic perturbation, Fermi's Golden rule, Ionization of a H-atom, absorption and induced emission, Selection rules. Identical particles, symmetric and anti-symmetric wave functions
- Unit - IV** Relativistic quantum mechanics, formulation of relativistic quantum theory, the Klein-Gordon equation; plane wave solutions, charge and current densities, The Dirac equation for a free particle, matrices alpha and beta, Lorentz covariance of the Dirac equation, free particle solutions and the energy spectrum, charge and current densities.
- Unit-V** The spin of the Dirac particle, Dirac particle in electromagnetic fields and the significance of the negative energy state, Dirac equation for a central field: Spin angular momentum, approximate reduction, spin –orbit energy, separation of equation, the hydrogen atom, classification of energy levels and negative energy states.

**TEXT AND REFERENCE BOOKS –**

1. L.I. Schiff: Quantum Mechanics(McGraw-Hill).
2. S.Gasiorowicz: Quantum Physics(Wiley).
3. Landau and Lifshitz : QuantumMechanics.
4. B.Craseman and Z.D.Powell : Quantum Mechanics (AddisonWesley)
5. A.P. Messiah: QuantumMechanics.
6. J.J. Sakurai: Modern QuantumMechanics.
7. Mathews and Venkatesan: QuantumMechanics.
8. Bjorken and Drell :Relativstic QuantumMechanics.



## PAPER –II: ATOMIC AND MOLECULAR PHYSICS

- Unit-I** Quantum states of one electron atoms-atomic orbitals, Hydrogen spectrum, spin-orbit(l-s) interaction energy, fine structure of hydrogen spectrum including l-s interaction and relativistic correction, spectra of alkali elements, fine structure in alkali spectra, penetrating and non-penetrating orbits, intensity rules.
- Unit-II** Pauli's principle, equivalent and non-equivalent electrons, ground state(basic level of different elements), two electron systems, interaction energy in L-S. and J-J. Coupling, Hyperfine structure, line broadening mechanisms (general ideas).
- Unit – III** Normal and anomalous Zeeman effect, early discoveries and developments, vector models of one electron system in a weak magnetic field, magnetic moment of a bound electron, magnetic interaction energy, selection rules, intensity rules, Paschen-Back(PB) effect – principal series effect, Zeeman and PB effects in hydrogen, Stark effect- discovery, Stark effect in Hydrogen, orbital model, weak and strong effect in Hydrogen.
- Unit-IV** Types of molecules: linear and diatomic molecules, symmetric top, asymmetric top and spherical top molecules. Rotational spectra of diatomic molecules: rigid rotator model, energy levels, Eigen functions, spectrum, comparison with observed spectrum and non-rigid rotator model, Intensities of spectral lines, microwave spectrometer, Raman spectrum; classical and quantum theory of Raman Effect, pure rotational Raman spectrum.
- Unit-V** Vibrational spectra of diatomic molecules: simple harmonic model, energy levels and spectrum, comparison with observed spectrum and anharmonic model, Vibrating rotators, Interaction of rotations and vibrations, fine structures and P-Q-R branches, IR spectrometer, Vibrational Raman spectrum, Vibrational rotational Raman spectrum.

### TEXT AND REFERENCE BOOKS:

1. Introduction to atomic spectra - H.E. White(T).
2. Fundamentals of molecular spectroscopy – C.N. Banwell and E.M McCash(T).
3. Spectroscopy vol. I, II and III – Walker and Straughner.
4. Introduction to Molecular spectroscopy – G.M.Barrow.
5. Spectra of diatomic molecules –Herzberg.
6. Molecular spectroscopy – Jeanne L.Mc-Hale.
7. Molecular spectroscopy – J.M.Brown.
8. Spectra of atoms and molecules–P.F.Bemath.
9. Modern spection copy, J.M.Holias.



## **PAPER – III: SOLID STATE PHYSICS-I**

### **Unit- I: Electrons in Solids and Electronic Properties**

Energy bands: nearly free electron model, origin of energy gap and its magnitude, Bloch function, Kronig-Penny model, Wave equation of electron in periodic potential, restatement of Bloch theorem, crystal moment of an electron, solution of Central equation, Kronig-Penny model in reciprocal space, empty lattice Approximation, approximate solution near zone boundary, Number of orbitals in a band, metals and insulators.

### **Unit -II: Fermi surfaces and metals**

Effect of temperature on F-D distribution, free electron gas in three dimensions. Different zone schemes, reduced and periodic zones, construction of Fermi surfaces, nearly free electrons, electron, hole, open orbits, Calculation of energy bands, Tight binding, Wigner-Seitz, cohesive energy, pseudo potential methods. Experimental methods in Fermi surface studies, quantization of orbits in a magnetic field, de Haas van Alphen Effect, External orbits, Fermi surface of copper.

### **Unit- III: Crystal vibration and thermal properties**

Lattice dynamics in monoatomic and diatomic lattice: two atoms per primitive basis, optical and acoustic modes, quantization of elastic waves, phonon momentum, inelastic neutron scattering by phonons, Anharmonic crystal interactions-thermal expansion, thermal conductivity, thermal resistivity of phonon gas, umklapp processes, imperfections.

### **Unit –IV: Electron-Phonon interaction- superconductivity**

Experimental survey: occurrence of superconductivity, Destruction of superconductivity by magnetic field, Meissner effect, heat capacity, energy gap, MW, and IR properties, isotope effect. Theoretical survey : thermodynamics of superconducting transition, London equation, Coherence length, Cooper pairing due to phonons, BCS theory of superconductivity, BCS ground state, flux quantization of superconducting ring, duration of persistent currents, Type II superconductors, Vortex states, estimation of  $H_{c1}$  and  $H_{c2}$ , single particle and Josephson superconductor tunneling, DC/AC Josephson effect, Macroscopic quantum interference. High temperature superconductors, critical fields and currents, Hall number, fullerenes ring.

### **Unit – V: Semiconductor crystals**

Band gap, equation of motion, physical derivation of equation of motion, holes, effective mass, physical interpretation of effective mass, effective masses of semiconductors Si and Ge, intrinsic carrier concentration, intrinsic mobility, impurity conductivity, donor and acceptor states, thermal ionization of donors and acceptors, thermo-electric effects.



### TEXT AND REFERENCE BOOKS:-

1. C. Kittel: Introduction to Solid State Physics (Wiley and Sons).
2. J.M.Ziman: Principles of theory of solids (Cambridge Univ.Press).
3. Azaroff: X-ray crystallography.
4. Weertman and weertman : Elementary Dislocation Theory.
5. Verma and Srivastava: Crystallography for Solid State Physics.
6. Azeroff and Buerger: The Power Method.
7. Buerger: Crystal Structure Analysis.
8. Thomas: Transmission Electron Microscopy.
9. Omar: Elementary solid state physics.
10. Ashcroft and Mermin: Solid State Physics.
11. Chalking and Lubensky: Principles of Condensed Matter Physics.
12. Madelung: Introduction to solid state theory.
13. Callaway: Quantum theory of solid state physics.
14. Huang: Theoretical Solid State Physics.
15. Kittel: Quantum theory of solids.

*Dr. M. F. B.*  
*Dr. A. B.*  
*Dr. A. B.*

## **PAPER –IV (A): ASTRONOMY AND ASTROPHYSICS-I**

- Unit - I** Stars-apparent magnitudes, Colour index, Spectral classification, Stellar distances, Absolute magnitude, The H-R diagram of stars.  
Stellar interiors: The basic equations of stellar structure, Hydrostatic equilibrium, Thermal equilibrium, Virial Theorem, Energy sources, Energy transport by radiation and convection, Equation of state
- Unit - II** Formation and evolution of stars: Inter stellar dust and gas, Formation of protostars, Pre-main sequence evolution, Post main sequence evolution and Evolution on the main sequence for low and high mass stars, Late stages of evolution, Fate of massive stars, Supernovae and its characteristics.
- Unit – III** End states of stars, degenerate states, White dwarfs, and Chandrasekhar limit, Neutron stars and Pulsars, Black holes.  
Binary stars and their classification, close binaries, Roche Lobes, Evolution of semidetached systems: Algols, Cataclysmic variables and X-ray binaries.
- Unit - IV** Solar Physics: Physical Characteristics of sun, Photosphere: Limb darkening, Granulation, Faculae, Solar Chromosphere and Corona, Prominences, Solar Cycle and Sunspots, Solar Magnetic Fields, Theory of Sunspots, Solar flares, solar wind, Helioseismology.
- Unit - V** Observational and Conceptual foundations of Newtonian gravity and General Theory of Relativity(GR), Principle of Equivalence, Metric tensor, Covariant differentiation, Riemann curvature tensor, Geodesics.  
Stress- Energy tensor, Einstein's field equations, Schwarzschild metric, Particle trajectories in Schwarzschild space- time, Precession of Perihelion, Gravitational red-shift and bending of light.

### **TEXT AND REFERENCE BOOKS:**

1. Astrophysics for Physicists, Arnab Rai Choudhuri, Camb. University Press, 2010.
2. Modern Astrophysics, B.W. Carroll and D.A. Ostlie, Addison-Wealey Pub.Co.
3. Introductory Astronomy and Astrophysics, M.Zeilik and S.A. Gregory, 4<sup>th</sup> edition, Saunders collegepublishing.
4. Theoretical Astrophysics, vol. – II: Stars and stellar systems, T. Padmanabhan, Cambridge universitypress.
5. The Physical Universe: An introduction to astronomy, F.Shu, Mill valley : University science books.



## Paper – IV (B) ELECTRONICS (Communication)-I

### Unit - I      **Microwave devices**

Klystron ,magnetron & traveling wave tubes ,velocity modulation ,basic principal of two cavity klystrons & relex klystrons ,principle of operation of magnetrons ,helix traveling wave tubes.

### Unit - II      **Microwave wave guides & components**

(Wave modes) rectangular wave guides: solution of wave equation in rectangular coordinates, TE modes in rectangular wave guides, TM modes in rectangular wave guides, excitations of modes in rectangular wave guides.

Circular wave guides: solutions of wave equation in Cylindrical coordinates, TE modes in Circular wave guides, TM modes in Circular wave guides, TEM modes in Circular wave guides, excitations of modes in Circular wave guides.

### Unit - III      **Microwave cavities:** rectangular cavity resonator, circular –cavity resonator & semi –circular –cavity resonators Q- factor of a cavity resonator.

#### **Transferred Electrons devices (TEDs)**

Gunn effect diodes, principle of operation, modes of operations, read diodes, IMPATT diodes, TRAPATT diodes.

Microwave communications: advantages of microwave transmission, loss in free space, propagation of microwave, components of antennas used in MW communication system.

### Unit - IV      **Radar system:**

Radar block diagram & operation, radar frequencies ,pulse consideration, radar range equation ,derivation of radar range equation ,minimum detectable single receiver noise ,signal to noise ratio ,integration of radar pulses ,radar cross sections ,pulse reflections frequency ,antenna ,parameters ,systems losses & propagation losses ,radars transmitters receivers ,antennas displays

### Unit - V      **Satellite communication**

Orbital Satellite, geostationary satellite, orbital patterns ,look angles ,orbital spacing , satellite system ,link modules.

## REFERENCEBOOKS

- 1) "Microwaves" by K.L. Gupta Wiley Estern Ltd.Delhi.
- 2) Advanced Electronic communication system by Wayne Toms Physics education.
- 3) Principle of communication of system-by Toub & Schilling: 2nd ed. TMH 1994
- 4) Communication system: by Siman Haykin, 3rd ed. John Wiley & sons inc. 1994.
- 5) Microwave devices & circuits by : Samuel, Y. Liao.
- 6) Electronic communication: George Kennedy.



## **Paper IV (C) PHYSICS OF NANO MATERIALS - I**

### **Unit-I: Nano Materials**

Properties of Nano-Particles: Metal Nano-clusters: Magic Numbers, theoretical modeling of nanoparticles, geometric and electronic structure, Reactivity, Fluctuations, magnetic clusters, Bulk to Nano transition. Semiconducting nanoparticles: optical properties, Photo fragmentation, Columbic Explosion. Rare gas and molecular clusters: Inert-Gas Clusters, Superfluid Clusters, Molecular Clusters. Methods of Synthesis: RF Plasma, Chemical Methods, Thermolysis, Pulsed Laser Methods.

### **UNIT II: Carbon Nanostructures**

Carbon Molecules: Nature of Carbon Bonds, New Carbon Structures. Carbon Clusters: Small Carbon Clusters, Discovery of  $C_{60}$ , Structure of  $C_{60}$  and its Crystal, Alkali-Doped  $C_{60}$ , Superconductivity in  $C_{60}$ , Larger and Smaller Fullerenes, Other Bucky balls. Carbon Nanotubes: Fabrication, structure, Electrical Properties, Vibrational Properties, Mechanical Properties. Applications of Carbon Nanotubes: Field Emission and Shielding, Computers, Fuel Cells, Chemical Sensors, Catalysis, Mechanical Reinforcement.

### **UNIT III: Bulk Nanostructured Materials**

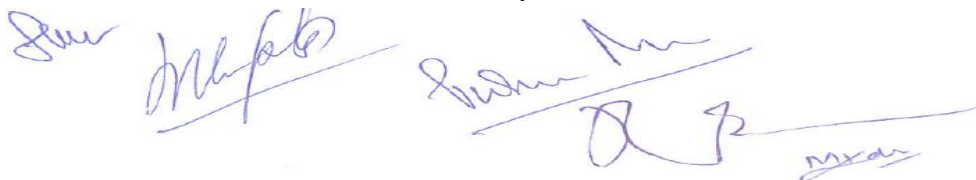
Solid Disordered Nanostructures: Methods of Synthesis, Failure Mechanisms of Conventional Grain-Sized Materials, Mechanical Properties, Nanostructured Multilayers, Electrical Properties, Other Properties, Metal Nano cluster Composite Glasses, Porous Silicon. Nanostructured Crystals: Natural Nano crystals, Computational Prediction of Cluster Lattices, Arrays of Nanoparticles in Zeolites, Crystals of Metal Nanoparticles, Nanoparticle Lattices in Colloidal Suspensions, Photonic Crystals. Nanostructured Ferromagnetism: Basics of Ferromagnetism, Effect of Bulk Nano structuring of Magnetic Properties, Dynamics of Nano magnets, Nano pore Containment of Magnetic Particles, Nano carbon Ferro magnets, Giant and Colossal Magneto resistance, Ferro fluids.

### **UNIT IV: Quantum Wells, Wires, and Dots**

Preparation of Quantum Nanostructures, Size and Dimensionality Effects: Size Effects, Conduction Electrons and Dimensionality, Fermi Gas and Density of States, Potential Wells, Partial Confinement, Properties Dependent on Density of States. Excitons, Single- Electron Tunneling, Applications: Infrared Detectors, Quantum Dot Lasers. Superconductivity.

### **UNIT V: Self-Assembly and Catalysis**

Self-Assembly: Process of Self-Assembly, Semiconductor Islands, Monolayers. Catalysis: Nature of Catalysis, Surface Area of Nanoparticles, Porous Materials, Pillared Clays, Colloids.





## TEXT AND REFERENCE BOOKS

1. Nanostructures & Nanomaterials: Synthesis, Properties & Applications: Guozhang Cao.
2. Introduction to Nanotechnology: Charles P. Poole Jr and Franks J.Qwens.
3. Handbook of Analytical instruments, R.S.Khandpur
4. Nano materials: Synthesis properties ,characterization and application: A.S Edelstein and R.CCammaratra
5. Nanotechnology, Kohlr,Michael.
6. X-ray diffraction procedures, H. P. Klung andL.E.Alexander
7. The Powder Method IV. Azaroff and M. J.Buerger
8. Elements of X-ray diffraction, B.D.Cullity
9. Differential Thermal Analysis,R.C.Mackenzie
10. Thermal Methods of Analysis,W.W.Wendlandt
11. Synthesis, Functionalization and Surface treatment of Nanoparticles :MaricIsbella andBuraton
12. Encyclopedia of Nanotechnology, H.S.Nalwa
13. Handbook of Nanotechnology: Bhushan(Ed), Springer Verlag, New York(2004).
14. Nanostructures and Nanomaterials- Synthesis properties and Applications by Guozhong Cao (Empirical College Press World Scientific Pub.,2004).
15. Nanocomposite Science and Technology, Ajayan, Schadler andBraun
16. Fullerene & Carbon nanotubes, DresselShaus
17. Carbon Nanotubes,Elizer
18. Physical properties of CNT,Saito
19. Carbon nanotechnology, LimingDai
20. Nanotubes and nanowires, CNR Rao and Govindaraj RCSPublishing.
21. Nanotechnology in Biology and Medicine: Methods, Devices and Application by Tuan Vo-Dinh, CRC press,2007.
22. An Introduction to Quantum Computing Phillip Kaye, Raymond Laflamme, Michele Mosca
23. The Physics of Quantum Information: Quantum Cryptography, Quantum Teleportation, Quantum Computation by Dirk Bouwmeester, Artur K. Ekert, Anton Zeilinger
24. Problems And Solutions in Quantum Computing And Quantum Information Yorick Hardy Willi-HansSteeb

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## **PAPER –IV (D): SPACE PHYSICS - I**

### **Unit-I: Solar Physics**

Physical Characteristics of sun, Source of solar energy, thermonuclear reaction and building up of higher elements, Description of solar internal and external layers, Photosphere: Limb darkening, Granulation, Faculae, Solar Chromosphere and Corona, Heating of the solar chromosphere and corona, Prominences, Solar Cycle and Sunspots, Solar Magnetic Fields, Theory of Sunspots, Solar flares, Solar wind, Coronal mass ejections, Helioseismology.

### **Unit-II: Planetary System**

Solar planetary system, Major characteristics of the Planets, Atmospheric Composition, Planetary magnetism, Magnetic fields, Magnetic dipole, Asteroids, Comets, Extra Solar Planets, Magnetic fields of Extra Solar Planets

### **Unit-III: Celestial Mechanics**

Time and Coordinate system: Celestial Sphere, Solar Time, Sidereal Time, Julian Date, Right Ascension and Declination, Azimuth and Elevation, galactic coordinates, WGS 84 coordinate system. GPS – operation, accuracy, time and position information.

### **Unit-IV: Space and Observational tools**

Electromagnetic bands of observation: radio, infrared, optical, UV, X-ray and Gamma-ray windows. Ground-based, balloon-borne and satellite-borne telescopes, Resolution of Instruments and Limitations, Optical telescopes, Photometers, Spectrographs, CCDs, Polarimeters. Radio telescopes - interferometry, X-ray and Gamma-ray detectors, Neutrino and Cosmic Ray astronomy, Radar.

### **Unit-V: Space Missions**

Planetary Exploration, Early spacecraft visits to the moon, Unmanned Lunar landers; The Apollo program - man on the moon – instruments and experiments, Lunar structures; Exploration of Mercury, Venus, Mars - the Red Planet – Structure of Mars, Martian atmosphere; ice at the poles, Martian landscapes: linear features, volcanoes, and impact craters; exotic terrains; Study of Planetary moons with space missions, The Cassini-Huygens Mission, The Deep Impact Mission. Search for extra-terrestrial life – SETI experiments.



### **Text and Reference Books**

1. Solar System Astrophysics, J. C. Brandt and P. W. Hodge
2. Introduction to Experimental Physics, W. B. Fretter.
3. The Magnetic Field of the Earth, Roland T. Merrill, Michael W. Mc Elhinny, Phillip L. Mcfadden, Academic Press
4. Physics of Geomagnetic Phenomena, Vol. I and II, S. Matsushita. and W. H. Campbell, Academic Press
5. Earth's Magnetospheric Process, Ed. B. M. Mc Cormac, D. Reidel Publishers
6. Physics of the Magnetosphere, Eds. R. L. Corovillano, J. T. McCaulley and H. Radosky, D. Reidel Publishers
7. Solar System Plasma Physics, Vol. I, II and III, Eds. C. F. Kennel, L. J. Lanzenrutti and E. N. Parker
8. Dynamics of the Geomagnetically Trapped Radiation ( Physics and Chemistry in Space, Vol II)
9. Solar Terrestrial Physics, Ed. E. R. Dyer, D. Reidel Publishers
10. Solar Magneto-Hydrodynamics, E.R. Priest; D Reidel, 1982
11. R.C. Smith, Observational Astrophysics; CUP, 1995.
12. C.R. Kitchin, Astrophysical Techniques; Adam Hilger, 1984.
13. Digital Image Processing, R. C. Gonzales and R. E. Woods, 2nd Ed, Pearson India, 2002
14. Satellite Meteorology, S. Q. Kidder and T. H. Von der Haar, Academic Press, 1995
15. Lecture Notes on Satellite Meteorology, Vol 1 and 2, SAC, Ahmedabad
16. Remote Sensing and Image Interpretation, T. M. Lillesand and R. W. Kieffer, John Wiley, 2002
17. Fundamentals of Space Systems, V. L. Pisacane and R. C. Moore, Oxford University Press, 1994
18. Fundamentals of Remote Sensing, George Joseph, 2003
19. Processing Remote Sensing Data, M. C. Girgand and C. Girgand, Oxford-IBH, 1999
20. Quantitative Remote Sensing of Land Surfaces, Shunlin Liang, Wiley Inter science, 2004
21. Scale in Remote Sensing and GIS, D. A. Quattrachi and M. F. Goodchild
22. Theory of Satellite Orbits in an Atmosphere, King-Hele Desmond, Butterworths, 1964
23. Uncertainty in Remote Sensing and GIS, Ed: G. M. Foddy and P. M. Atkinson
24. Remote Sensing by George Joseph
25. Concepts in Space Sciences Edited by R.R. Daniel
26. Mathematical Principles of Remote Sensing by A. Milman



27. An Introduction to Ionosphere and Magnetosphere, J. A. Ratcliffe
28. Solar System Astrophysics, J. C. Brandt and P. W. Hodge
29. Plasma Diagnostic Techniques, R. H. Huddlestone and S. L. Leonard
30. Introduction to Experimental Physics, W. B. Fretter
30. High Vacuum Techniques, J. Yarwood
31. Plasma Diagnostics, Vol. I, O. Anciollo and D. L. Flamm
32. The Earth's Ionosphere: Plasma Physics and Electrodynamics, Michael C. Kelley, Academic Press
33. Ionospheric Techniques and Phenomena, A. Giraud and M. Petit, D. Reidel Publish.
34. Physics of Geomagnetic Phenomena, Vol. I and II, S. Matsushita and W. H. Campbell, Academic Press
35. Introduction to Ionospheric Physics, H. Risbeth and H. Garriot, Academic Press
36. Space Weather, Physics and Effects by Volker Bothmer and Ioannis A. Depli Springer
37. Aerospace Environment by T. Beer
38. Free flight of a rocket By Gantmaker
39. Orbital Mechanics, Ed. Vladimir A. Chobotov, AIAA Edn Series
39. Introduction to Celestial Mechanics, S. W. McCusky, Addison-Wesley
40. Fundamentals of Astrodynamics, R. R. Bates et al, Dover
41. Orbital Motion, A. E. Roy, Adam Hinglar Ltd
42. Orbital Methods in Astrodynamics, P. R. Escobal, John Wiley
43. Fundamentals of Astrodynamics, R. R. Bates et al, Dover
44. Orbital Motion, A. E. Roy, Adam Hinglar Ltd
45. Design of Orbital Flights, J. Johnson et al., McGraw Hill
46. Modern Astrophysics, B. W. Carroll and D. A. Ostlie, Addison-Wesley
47. The Physical Universe, F. Shu, University Science Books
48. The Physics of Astrophysics, Vol. I and II, F. Shu, University Science Books
49. Theoretical Astrophysics, Vol. I, II and III, T. Padmanabhan, Cambridge Uni. Press
50. The Physics of Fluids and Plasmas, Arnab Rai Choudhuri, Cambridge Uni. Press
51. Astrophysical Concepts, M. Harwit, Springer-Verlag
52. Galactic Astronomy, J. Binney and M. Merrifield, Princeton University Press
53. Galactic Dynamics, J. Binney and S. Tremaine, Princeton University Press
54. Quasars and Active Galactic Nuclei, A. K. Kembhavi and J. V. Narlikar, Cambridge University Press
55. An Introduction to Active Galactic Nuclei, B. M. Peterson

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### Lab III-A: Materials Science & General

At least ten experiments should be performed from the following list of experiments or parallel level experiment depending upon the facilities available.

1. To determine activation energy of ionic/superionic solid by Temperature depended conductivity measurement.
2. To study Electron Spin(ESR) Resonance in DPPH (Diphenyl Pricyl Hydrazy) sample.
3. To study I-V characteristics of photovoltaic solar cell and find the efficiency.
4. To study the decay of photoconductivity of given sample and find out trap depth.
5. Study of decay of photoluminescence of a given sample.
6. Measurement of electrical conductivity using Impedance Spectroscopy technique.
7. To determine drift velocities of  $\text{Ag}^+$  ion in AgI from temperature dependence of ionic transference number study.
8. Electrical conductivity of Ball milled/Mechano-chemical synthesized materials.
9. Determination of strength of a given radioactive source.
10. Study of complete spectra of radioactive sources, and study of photo peak efficiency of NaI(Tl) crystal for different energy gamma rays.
11. Structural analysis of powder sample by XRD and particle size determination using Scherrer's formula.
12. FTIR studies of solid samples.
13. Mechanoluminescence of sucrose crystals.
14. Thermoluminescence of irradiated samples.
15. Study of Op-Amp.-IC-741 is inverting/ Non inverting amplifier and draw frequency response curve.
16. Construction of Schmitt triggers using IC-741 and study of its characteristics.
17. Study of Astable and monostable Multi Vibrator using IC555.
18. Digital electronics experiments on bread board using IC-7400.

### Lab III-B: Astronomy & Astrophysics

1. Study of Quasar.
2. Study of the orbit of a visual binary Star.
3. Determine the mass of Saturn & its rotational velocity.
4. Verification of Hubble's law and determination of Hubble's constant.
5. Identification of element from Fraunhofer spectrum of the sun.
6. Study of sunspots.
7. Study of light curves of Cepheid variable stars.
8. Study of Proper motion of stars.
9. Determination of Pulsar period and distance.
10. Photo-electric photometry of Pleiades star cluster.
11. Study of expansion of the universe and calculate the age of the Universe.



**OR III -B: Electronics**

- (1) Experiments with microprocessor. (a) Convert BCD in to binary & vice versa.
- (b) To transfer group of data blocks from one location to another location.
- (c) To write programme for addition & subtraction.
- (d) To write programme for multiplication & division.
- (2) Logic gate study DTL & RTL.
- (3) To study & verify the Demorgan's Theorem.
- (4) Study of Adder/Subtractor.
- (5) Study of Encoder & Decoder.
- (6) Study of Multiplexer & DEMUX multiplexer
- (7) Study of digital to analog converter.
- (8) Study of analog to digital converter.
- (9) Study of 4-bit Counter/ ripple Counter.
- (10) Study of left/right shift register.
- (11) Study of read only memory.
- (12) Study of Random Access Memory.
- (13) Study of Phase locked loop.
- (14) Study of BCD to seven segments Decoder.
- (15) Study of modulation & demodulation.
- (16) Optical fiber based experiment.
- (17) Microwave characterization and measurements.

**OR III -B: Physics of Nano-material**

- (1) Synthesis of II-IV semiconductor nanoparticles by Wet chemical method.
- (2) Synthesis of nanoparticles ( $\text{ZrO}_2$ ) by Combustion method.
- (3) Synthesis of nanoparticles by Sol-gel method.
- (4) Synthesis of nanoparticles by Ball milling method.
- (5) Synthesis of Quantum cells structures using vacuum coating unit.
- (6) Synthesis of nanoparticles using Solid state reaction method.
- (7) Measurement of band gap energy and size of the nano particle of II-IV semiconductor using absorption spectrophotometer.
- (8) To make the peak analysis of IR transmission spectra of nanoparticle using FTIR spectrometer.
- (9) Study of effect of capping agent on the size of the nanoparticle during synthesis.
- (10) To determine the average particle size of nano materials by XRD using Scherrer's formula.
- (11) To determine the Hall coefficient and carrier type for a semiconducting nanoparticles.
- (12) To determine the Band gap of a given semiconductor using Four probe method from room temperature to  $100^\circ\text{C}$ .
- (13) To determine the average size of nanoparticles using Zetasizer.
- (14) To measure the change of dielectric constant and dielectric loss of nanoparticle with the change of signal frequency by impedance analyzer.
- (15) To characterize the mechanical properties by tensile testing.
- (16) To estimate the particle size by SEM.
- (17) To perform electron diffraction analysis from TEM image.
- (18) To do roughness analysis of nanostructured sample using AFM.



### **OR III -B: Space Physics**

1. The flow of energy out of the Sun.
2. Study of Sun-spot.
3. Astrometry of asteroids.
4. Study of expansion of the universe and calculate the age of the Universe.
5. Identification of element from Fraunhofer spectrum of the sun.
7. The transit of Venus and Mercury.
8. Jupiter's Moon and speed of light.
9. Determination of Pulsar period and distance.
10. Photo-electric photometry of Pleiades star cluster.
11. The large scale structure of the Universe.

*San* *Mhpb* *San* *DP* *myar*

**Semester – IV**  
**(2019-2020)**

**PAPER – I: NUCLEAR AND PARTICLE PHYSICS**

- Unit-I Nuclear Interactions:** Nucleon-nucleon interaction, Two-nucleon system, The ground state of the deuteron, Tensor forces, Nucleon-nucleon scattering at low energy, Scattering length, Effective range theory, Spin dependence of nuclear forces, Charge independence and charge symmetry of nuclear forces, Iso-spin formalism, Exchange forces, Meson theory of nuclear forces and the Yukawa interaction.
- Unit-II Nuclear Reactions:** Reaction energetics: Q-equation and threshold energies, Reactions cross sections, Resonance: Breit-Wigner single-level formula, Direct and compound nuclear reactions, Formal reaction theory: Partial wave approach and phase shifts, Scattering matrix, Reciprocity theorem,
- Unit-III Nuclear Decay:** Beta decay, Fermi's theory of beta decay, Shape of the beta spectrum, Total decay rate, Angular momentum and parity selection rules, Comparative half-lives, Allowed and forbidden transitions, Selection rules, Parity violation, Two component theory of neutrino decay, Detection and properties of neutrino  
Gamma decay, multiple transitions in nuclei, Angular momentum and Parity selection rules, internal conversion, nuclear isomerism.
- Unit – IV Nuclear models:** Liquid drop model, Bohr-Wheeler theory of fission, Shell Model, Experimental evidence for shell effects, Single particle shell model, Spin-orbit interaction and magic numbers, Analysis of shell model predictions, Magnetic moments and Schmidt lines, Collective model of Bohr and Mottelson.
- Unit - V Elementary particle Physics:** The fundamental interactions, Classification of elementary particles, Leptons and Hadrons, Symmetries, groups and conservation laws, SU(2) and SU(3) multiples and their properties, Quark model, Properties of Quarks, the standard model.

**TEXT AND REFERENCE BOOKS:**

1. A. Bohr and B.R. Mottelson, Nuclear structure, vol. 1 (1969) and vol.2, Benjamin, Reading, A, 1975.
2. Kenneth S. Kian, Introductory Nuclear Physics, Wiley, New York, 1988.
3. Ghoshal, Atomic and Nuclear Physics vol.2.
4. P.H. Perking, Introduction to high energy physics, Addison-Wesley, London, 1982.
5. Shriokov Yudin, Nuclear Physics vol.1 & 2, Mir Publishers, Moscow, 1982.
6. D. Griffiths, introduction to elementary particles, harper and row, New York, 1987.
7. H.A. Enov, introduction to Nuclear Physics, Addison-Wesley, 1973.
8. G.E. Brown and A.D. Jackson, Nucleon-Nucleon interaction North-hall and Amsterdam, 1976.
9. S.D. Benedetti, Nuclear interaction, John Willey and sons, New York, 1964.



10. M.K. Pal, theory of Nuclear structure, affiliated East West, Madras,1982.
11. Y.R. Waghmare, introductory nuclear physics, Oxford, IBH, Bombay,1981.
12. J.M. Longo, elementary particles, McGraw Hill, New York,1971.
13. R.R. Roy and B.P. Nigam, Nuclear Physics, Wiley- Eastern Ltd.1983.

*For M.K. Pal*  
*For Y.R. Waghmare*  
*For J.M. Longo*  
*For R.R. Roy and B.P. Nigam*



## PAPER – II LASER PHYSICS AND APPLICATIONS

### Unit-I Laser Characteristics–

Spontaneous and stimulated emission, Einstein's quantum theory of radiation, theory of some optical processes, coherence and monochromaticity, kinetics of optical absorption, line broadening mechanism, Basic principle of lasers, population inversion, laser pumping, two & three level laser systems, resonator, Q-factor, losses in cavity, threshold condition, quantum yield.

### Unit – II Laser Systems

Solid state lasers- the ruby laser, Nd: YAG laser, ND: Glass laser, semiconductor lasers – features of semiconductor lasers, intrinsic semiconductor lasers, Gas laser - neutral atom gas laser, He-Ne laser, molecular gas lasers, CO<sub>2</sub> laser, Liquid lasers, dye lasers and chemical laser.

### Unit-III Advances in laser Physics

Production of giant pulse -Q-switching, giant pulse dynamics, laser amplifiers, mode locking and pulling, Non-linear optics, Harmonic generation, second harmonic generation, Phase matching, third harmonic generation, optical mixing, parametric generation and self-focusing of light.

**Unit –IV** Multi-photon processes; multi-quantum photoelectric effect, Theory of two-photon process, three- photon process, second harmonic generation, parametric generation of light, Laser spectroscopy: Rayleigh and Raman scattering, Stimulated Raman effect, Hyper-Raman effect, Coherent anti-stokes Raman Scattering, Photo-acoustic Raman spectroscopy.

**Unit – V** Laser Applications – ether drift and absolute rotation of the Earth, isotope separation, plasma, thermonuclear fusion, laser applications in chemistry, biology, astronomy, engineering and medicine.  
Communication by lasers: ranging, fiber Optics Communication, Optical fiber, numerical aperture, propagation of light in a medium with variable index, pulse dispersion.

### TEXT AND REFERENCE BOOKS:

1. Laud, B.B.: Lasers and nonlinear optics, (New AgeInt.Pub.1996).
2. Thyagarajan, K and Ghatak, A.K.: Lasers theory and applications (Plenum press, 1981).
3. Ghatak, A.K. and Thyagarajan, K : Optical electronics (Cambridge Univ. Press 1999).
4. Seigman, A.E.: Lasers ( Oxford Univ. Press 1986)
5. Maitland, A. and Dunn, M.H. : Laser Physics (N.H.Amsterdam,1969).
6. Hecht, J. The laser Guide book (McGraw Hill, NY,1986).
7. Demtroder, W.: Laser Spectroscopy (Springe series in chemical physics vol.5, Springer-Verlag, Berlin,1981).
8. Harper, P.G. and Wherrett B.S. (Ed.): Non-linear-optics (Acad.press,1977).



## PAPER – III: SOLID STATE PHYSICS- II

### Unit- I: **Plasmon's, Polaritons**

Dielectric function of the electron gas, Plasma optics, Dispersion relation for EM wave, Transverse optical modes in Plasma, Transparency of Alkali metals in the ultraviolet, Longitudinal Plasma oscillations, Plasmon, electrostatic screening and screened Coulomb potential, Mott metal-insulator transition, screening and phonons in metals, Polaritons, LST relation.

### Unit –II: **Dielectric and ferroelectrics**

Maxwell's equations, polarization, macroscopic electric field, depolarization field,  $E_1$ ; local electric field at an atom, Lorentz field  $E_2$ , fields of dipoles inside cavity  $E_3$ ; dielectric constant and polarizability, electronic polarizability; structural phase transition; ferro-electric crystals, classification; displacive transition, soft optical phonons, Landau theory of phase transitions, first and second order transition, antiferro-electricity, ferro- electric domain, piezoelectricity, ferro-elasticity, optical ceramics.

### Unit –III: **Magnetism**

General ideas of dia- and para- magnetisms, quantum theory of paramagnetism, rare earth ions, Hund rule, iron group ions, crystal field splitting, quenching of orbital angular momentum, spectroscopic splitting factor, van vleck temperature dependent paramagnetism, Cooling by isentropic demagnetization, nuclear demagnetization, paramagnetic Susceptibility of conduction electrons.

### Unit –IV: **Ferromagnetism and anti-ferromagnetism**

Ferromagnetic order, Curie point and exchange integral, temp dependence of saturation magnetization, saturation magnetization at absolute zero; magnons, quantization of spin waves, thermal excitation of magnons; neutron magnetic scattering, Ferrimagnetic order, Curie temp and susceptibility of ferrimagnets, iron garnets. Antiferromagnetic order, susceptibility below neel temp, antiferromagnetic magnons, ferromagnetic domains.

### Unit – V: **Optical Processes & Excitons and defects**

Optical reflectance, excitons, Frenkel and Mott-Wannier excitons, Alkali Halides and Molecular crystals Defects: lattice vacancies, Schottkey and Frenkel point effects, colour centers, F and other centers, Line defect. Shear strength of single crystals, dislocations- edge and screw dislocations, Burger vectors, Stress fields of dislocations, low angle grain boundaries, dislocation densities, dislocation multiplication and slip, strength of alloys, dislocations and crystal growth, hardness of materials.




## TEXT AND REFERENCE BOOKS

1. C. Kittel: Introduction to Solid State Physics (Wiley and Sons).
2. J.M. Ziman: Principles of theory of solids (Cambridgeuniv. press).
3. Azaroff : X-ray crystallography.
4. Weertman and weertman : Elementary Dislocation Theory.
5. Verma and Srivastava: Crystallography for Solid State Physics.
6. Azeroff and Buerger: The Power Method.
7. Buerger: Crystal Structure Analysis.
8. Thomas: Transmission Electron Microscopy.
9. Omar: Elementary solid state physics.
10. Aschroft and Mermin : Solid State Physics.
11. Chalking and Lubensky: Principles of Condensed Matter Physics.
12. Madelung : Introduction to solid state theory.
13. Callaway: Quantum theory of solid state physics.
14. Huang: Theoretical Solid State Physics.
15. Kittel: Quantum theory of solids.

*Dr. M. P. B.*  
*Dr. P. B.*  
*Dr. P. B.*

## **PAPER –IV (A): ASTRONOMY AND ASTROPHYSICS - II**

- Unit– I** The Milky Way Galaxy: Structure of the Milky way, Oort's theory of galactic rotation, Dynamics of the spiral arms, Distribution of Interstellar matter, Central regions of the Milky way. Normal Galaxies: Classification of galaxies, Hubble sequence: Elliptical, Lenticulars and Spiral galaxies, and their properties, Distribution of light and mass in galaxies, Brightness profiles, Distribution of gas and dust in galaxies.
- Unit- II** Active galaxies: Active Galactic Nuclei (AGNs), Seyfert galaxies, BL Lac Objects, Radio galaxies: General properties, Superluminal motion, Quasars: Properties and Energy requirements, Nature of quasar redshifts, Supermassive black hole model and Unified model of AGNs.
- Unit- III** Cosmology: Cosmological principle, Observational support and other arguments to support cosmological principle, Fundamental observers and co-moving frame, Robertson-Walker line element (without derivation), Observational features of Robertson-Walker space time e.g. Red shift etc, Models of the universe, Friedmann models, Quantitative predictions of FRW model, Quantitative solutions, Open and closed universes, Hubble's law, Angular size, Source counts, Models with the cosmological constant, Steady state cosmology.
- Unit- IV** Relics of the big bang, the early universe, Thermodynamics of the early universe, Thermal History, Primordial neutrinos, Helium synthesis and other nuclei, Microwave background, the very early universe, the formation of structures in the Universe, Jeans Mass, Growth Rate, Recombination era, Onset of matter dominated era.
- Unit- V** Observations of the cosmological significance, Measurement of Hubble's constant, Anisotropy of local large - scale velocity fields, Age of the universe, Abundance of light nuclei, Dark matter, the redshift-magnitude relation, Number counts of extragalactic objects, The variation of angular sizes with distance.

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### TEXT AND REFERENCE BOOKS:

1. Astrophysics for Physicists, Arnab Rai Choudhuri, Cambridge University Press, 2010.
2. Modern Astrophysics, B.W. Carroll and D.A. Ostlie, Addison-Wesley Pub. Co.
3. Introductory Astronomy and Astrophysics, M. Zeilik and S.A. Gregory, 4th edition, Saunders college publishing.
4. Theoretical Astrophysics, vol. – II: Stars and stellar systems, T. Padmanabhan, Cambridge university press.
5. The Physical universe: An introduction to astronomy, F. Shu, Millvalley: University science books.
6. Textbook of astronomy and astrophysics with elements of cosmology, V.B. Bhatia, Pb -New Delhi, Narosa publishing house.
7. The new cosmos, A. Unsold and B. Baschek, Newyork, Springer Velas.
8. Quasars and active galactic neuclei, A.K. Kembhavi and J.V. Narlikar, Cambridge university press.
9. Modern Astrophysics, B.W. Carroll and D.A. Ostlie, Addison Wesley publish.co.
10. Introductory astronomy and astrophysics, M. Zeilik and S.A. Gregory, 4 th edition, Saunders college publishing.
11. Theoretical Astrophysics, vol. I: Astrophysical processes T. Padmanabhan, Cambridge university press.
12. Introduction to cosmology, J.V. Narlikar, 3 rd edition, Cambridge uni. press.
13. Structure formation in the universe, T. Padmanabhan, Cambridge University, press.
14. General relativity and cosmology, J.V. Narlikar-Delhi: Macmil. Comp. of India Ltd.
15. Galactic Astronomy: Binney and Merrifield.

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## Paper – IV (B) Electronics II (Communication)

- Unit-I Digital communications**  
Pulse modulation systems, Sampling Theorem, Low pass & Band pass signal, PAM- Channel BE for PAM signal, Natural Sampling, Flat-top sampling, Signal through holding, Quantization of signals, quantization error.
- Unit-II Digital modulation techniques**  
PCM, Differential PCM, Delta modulation, Adaptive, delta modulation (CVSD). BPSK, DPSK, QPSK, PSK, QASK, BFSK, FSK, MSK
- Unit-III Mathematical representation of noise**  
Sources of noise, Frequency domain representation of noise, Effect of filtering on the probability density of Gaussian noise, Spectral component of noise, Effect of a filter on the power spectral density of noise, Superposition of noise, Mixing involving noise, linear filtering, Noise bandwidth, Quadrature component of noise, Power spectral density of  $n_c(t)$   $n_s(t)$  & their time derivatives.
- Unit-IV Data Transmission I**  
Base band signal receiver, Probability of error optimum filter, White noise: Matched filter & probability of error, Coherent reception correlation, PSK, FSK, Non-Coherence detection on FSK, Differential PSK, QASK, Calculation of error probability for BPSK, BFSK, QPSK.
- Unit-V Data Transmission II**  
Noise in pulse code & delta modulation system, PCM transmission, Calculation of quantization noise output signal power, Effect of thermal noise, output signal to noise ratio in PCM, DM, Quantization noise in DM, output signal power, DM output signal to quantization noise ratio, effect of thermal noise in delta modulation, output signal to noise ratio in DM

### Text and Reference Books:

- 1) "Microwaves" by K.L. Gupta Wiley Eastern Ltd. Delhi.
- 2) Advanced Electronic communication system by Wayne Tomasi Physics education.
- 3) Principle of communication of system-by Toub & Schilling: second edition TMH 1994
- 4) Communication system: by Simon Haykin, third edition John Wiley & sons inc. 1994.
- 5) Microwave devices & circuits by: Samuel, Y. Liao.
- 6) Electronic communication: George Kennedy.



## **Paper – IV (C) PHYSICS OF NANO MATERIALS- II**

### **UNIT I: Synthesis of Nano-materials**

Top-down & Bottom-up approaches: Kinetically confined synthesis of nanoparticles: micro emulsion and spray pyrolysis. Template based synthesis: Electrochemical deposition, Physical Vapour deposition, Chemical Vapour deposition, Electron Beam Lithography (EBL), X-ray Lithography (XRL).

Chemical Route synthesis of Nanomaterials: Chemical precipitation and co- precipitation, Chemical Bath Deposition (CBD), Sol-gel, Combustion technique.

### **UNIT II: Characterization of Nano-materials (a)**

X- ray Diffraction (XRD), powder and single crystal Diffraction, X-ray fluorescence (XRF), X ray photoelectron spectroscopy (XPS), Energy Dispersive X-ray analysis (EDAX), Thermo analytic Methods: Thermo Gravimetric Analysis (TGA), Differential Scanning Calorimetry (DSC), Differential Thermal Analysis(DTA).

### **UNIT III: Characterization of Nano-materials (b)**

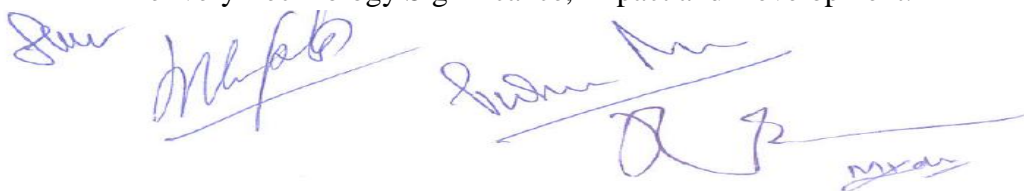
Scanning Tunneling Microscopy (STM), Contact and non-contact Atomic Force Microscopy (AFM), Conductive AFM. Scanning Electron Microscopy (SEM), Transmission electron microscopy (TEM), High resolution TEM Field emission SEM. Spectrophotometer: UV-Vis spectrophotometers, IR spectrophotometers, Fourier Transform Infrared Radiation (FTIR), Photoluminescence (PL), electroluminescence and thermoluminescence spectroscopy.

### **UNIT IV: Applications of Nano-materials**

Quantum wells, wires and dots. Organic Semiconductors, Organic Light Emitting Diodes (OLEDs), self-assembly of complex organic molecules, molecular switches, thermochromic switches, Motor molecules and biomimetic components, charge transfer complexes, molecular connections, contact issues, conducting polymers, light emitting polymers, polymer-polymer heterostructures, plastic FETs, photodiodes & solar cells, Nano Robotics: Nano robots and NEMS, Sensors and actuators, Artificial molecular machines, Biomotors, Other Nano machines, Propulsion, Control, Communication, Programming and coordination.

### **UNIT V: Nano Sensors and Biomedical applications**

**Nanosensors:** Gas sensors, Pollution sensor, Photo sensor, Temperature sensor, IR detector, Biosensor, nanomaterial gas discharge devices, CNT based fluid velocity sensor. Nanoparticle in Drug delivery, Targeting Legends, Cancer Treatment, Mediated Delivery of Sirna, Nanonephrology, Nanosystems in Inflammation, Targeting Macrophages to Control Inflammation, Tissue Regeneration, Growth And Repair, Tissue Bioengineering, Future Understanding for Treatment, nanosurgery, Drug Delivery Technology Significance, Impact and Development.





## References: Books/ Research Monographs

1. Nanostructures & Nanomaterials: Synthesis, Properties & Applications: Guozhang Cao.
2. Introduction to Nanotechnology: Charles P. Poole Jr and Franks J. Qwens.
3. Handbook of Analytical instruments, R.S. Khandpur
4. Nano materials: Synthesis properties ,characterization and application: A.S Edelstein and R.CCammaratra
5. Nano electronicsand Nanosystems, Karl Goser, Peter Glosekotter, Jan Dienstuhl.,
6. Springer,2004
7. Nanomaterial Systems Properties and Application, A.S.Eldestein and R.C.Cammarata.
8. Handbook of Nanotechnology: Bhushan(Ed), Springer Verlag, New York(2004).
9. Nanocomposite Science and Technology, Ajayan, Schadler and Braun
10. Piezoelectric Sensors: Force, Strain, Pressure, Acceleration and Acoustic Emission
11. Sensors, Materials and Amplifiers, G. Gautschi.
12. Block Copolymers in Nanoscience Massimo Lazzari
13. Supramolecular Chemistry, Jonathan W. Steed, Jerry L. Atwood
14. Nanotechnology: Importance and Application by M.H. Fulekar, IK International, 2010.
15. Nanotechnology in Biology and Medicine: Methods, Devices and Application by Tuan Vo-Dinh, CRC press,2007.
16. Nano system characterization tools in the life sciences by Challa Kumar. Wiley- VCH,
17. 2006.
18. Nanolithography M.Gentili etal.(edits),Springer.
19. Environanotechnology by Mao Hong fan, Chin-pao Huang, Alan E Bland, Z Honglin
20. Wang, RachidSliman, Ian Wright. Elsevier,2010.
21. Nanotechnologies, Hazards and Resource efficiency by M. Steinfeldt, Avon Gleich, U. Petschow, R. Haum. Springer, 2007.
22. Nanotechnology: Health and Environmental risk by Jo Anne Shatkin. CRC press, 2008.
23. An Introduction to Quantum Computing Phillip Kaye, Raymond Laflamme, Michele
24. Mosca
25. The Physics of Quantum Information: Quantum Cryptography, Quantum
26. Teleportation, Quantum Computation by Dirk Bouwmeester, Artur K. Ekert,Anton
27. Zeilinger
28. Problems and Solutions in Quantum Computing And Quantum Information Yorick Hardy Willi-HansSteeb





## **PAPER –IV (D): SPACE PHYSICS – II**

### **Unit I: Glimpse of Universe**

Universe - description, origin, its evolution, age and size; Stars—birth, life, death, spectral analysis, stellar composition - element synthesis in stars, Exotic stars- novae, supernovae, pulsars, black holes and gamma ray bursts; Galaxies; Starbursts and Active Galactic Nucleus; Evidence for the Big Bang; Cosmic Background Radiation; Expansion Models; Dark Matter and Energy Recent innovations about the concept of Universe: Dark Energy and an accelerating universe

### **Unit II: Spacecraft & Satellites**

Satellite orbits and attitude: principles of satellite motion, Kepler's laws, orbital elements, satellite attitude and its control, types of orbits, polar and geostationary, earth and Sun-synchronous, orbit optimization, viewing geometry, launch vehicles and spacecraft, rocket propulsion concepts such as solid, hybrid, liquid, nuclear and antimatter. Rocket motors and their design, flight stability and recovery systems, stability and control system.

### **Unit III: Remote Sensing**

Sensors and systems: visible, infrared, water vapour and microwave sensors, sensor characteristics, sensor materials, passive and active sensors, scanning radiometers, spectral signatures.

Satellite data processing: satellite data acquisition, satellite communications, data collection platforms, earth station, image processing, geometric and radiometric corrections, image navigation, registration, image enhancement techniques, noise removal methods, histogram methods, density slicing, image classification.

Applications of remote sensing in earth resources management, agriculture, forestry, water resources and disaster mitigation

### **Unit IV: Solar Wind and Interactions**

The ionospheric layers D, E, F and their formation, effect of radiation on earth's atmosphere, photochemical processes, Geomagnetic and magnetic coordinates, poles, measurement of geomagnetic field components, micro pulsation indices, variations of geomagnetic field, quiet and disturbed variations, geomagnetic storms, equatorial and auroral phenomena.

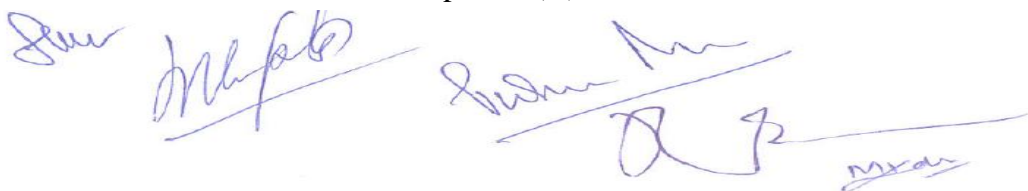
Solar wind, model of solar winds, interaction in the interplanetary medium and with the planets. Magnetosphere: interaction of solar wind with the geomagnetic field and formation of the magnetospheric tail, storm and sub-storm phenomena, Van Allen radiation belts

### **Unit V: Space Weather**

Space Weather Effects on Communication, Space Weather Effects on Power Grids, Space Radiation Protection, Effects on Spacecraft's hardware and Operations, Effects on Satellite Navigation, Forecast of Space Weather.

### **Text and Reference Books**

Same as mentioned in Semester III, Paper IV (D)



# **HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**

Website - [www.durguniversity.ac.in](http://www.durguniversity.ac.in), Email - [durguniversity@gmail.com](mailto:durguniversity@gmail.com)



## **SCHEME OF EXAMINATION & SYLLABUS of M.A./M.Sc.(Mathematics) Semester Exam UNDER FACULTY OF SCIENCE Session 2019-20**

**(Approved by Board of Studies)  
Effective from June 2019**

M.A./M.Sc. (MATHEMATICS)  
(Semester-I) 2019-20

There shall be five papers. Each paper shall have 100 marks. **Overall tally of marks will be 500.**

Paper	Description	Theory	Sessional	Practical	Total Marks
I	Advanced Abstract Algebra (I)	80	20	-	100
II	Real Analysis (I)	80	20	--	100
III	Topology	80	20	--	100
IV	Advanced Complex Analysis (I)	80	20	--	100
V	Advanced Discrete Mathematics (I)	80	20	--	100

  
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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## M.Sc./M.A. Course (First Semester)

### PAPER -I

## Advanced Abstract Algebra (I)

Max. Marks 80

- Unit-I** Groups - Normal and Subnormal series. Composition series. Jordan-Holder theorem. Solvable groups. Nilpotent groups.
- Unit-II** Field theory- Extension fields. Algebraic and transcendental extensions. Separable and inseparable extensions. Algebraically closed fields.
- Unit-III** Perfect fields. Finite fields. Primitive elements. Normal extensions, Splitting field.
- Unit-IV** Automorphisms of extensions. Galois extensions. Fundamental theorem of Galois theory.
- Unit-V** Solution of polynomial equations by radicals. Insolvability of the general equation of degree 5 by radicals.

### Books Recommended:

1. P. B. Bhattacharya, S. K. Jain, S. R. Nagpaul: Basic Abstract Algebra, Cambridge University press
2. I. N. Herstein: Topics in Algebra, Wiley Eastern Ltd.
3. Vivek Sahai and Vikas Bist: Algebra, Narosa Publishing House, 1999.

### References

1. M. Artin, Algebra, Prentice -Hall of India, 1991.
2. P. M. Cohn, Algebra, Vols. I, II & III, John Wiley & Sons, 1982, 1989, 1991.
3. N. Jacobson, Basic Algebra, Vols. I, W.H. Freeman, 1980 (also published by Hindustan Publishing Company).
4. S. Lang, Algebra, 3rd edition, Addison-Wesley, 1993.
5. I. S. Luther and I. B. S. Passi, Algebra, Vol. I-Groups, Vol.II-Rings, Narosa Publishing House (Vol.I-1996, Vol. II-1999)
6. D. S. Malik, J. N. Mordeson, and M. K. Sen, Fundamentals of Abstract Algebra, Mc Graw-Hill, International Edition, 1997.
7. Qazi Zameeruddin and Surjeet Singh : Modern Algebra
8. I. Stewart, Galois theory, 2nd edition, Chapman and Hall, 1989.
9. J. P. Escofier, Galois theory, GTM Vol.204, Springer, 2001..
10. Fraleigh , A first course in Algebra Algebra, Narosa, 1982.



# M.Sc./M.A. Course (First Semester)

## PAPER-II

### Real Analysis (I)

Max. Marks 80

- Unit-I** Sequences and series of functions, pointwise and uniform convergence, Cauchy criterion for uniform convergence, Weierstrass M-test, Abel's and Dirichlet's tests for uniform convergence, uniform convergence and continuity, definition and simple properties of Riemann-Stieltjes integral, uniform convergence and Riemann-Stieltjes integration, uniform convergence and differentiation, Weierstrass approximation theorem.
- Unit-II** Power series, uniqueness theorem for power series, Abel's and Tauber's theorems. Rearrangements of terms of a series, Riemann's theorem.
- Unit-III** Functions of several variables, linear transformations, Derivatives in an open subset of  $\mathbb{R}^n$ , Chain rule, Partial derivatives, interchange of the order of differentiation, Derivatives of higher orders, Taylor's theorem, Inverse function theorem, Implicit function theorem.
- Unit-IV** Jacobians, extremum problems with constraints, Lagrange's multiplier method, Differentiation of integrals.
- Unit-V** Partitions of unity, Differential forms, Stoke's theorem.

#### Recommended Books:

1. Principle of Mathematical Analysis by Walter Rudin (3rd edition) McGraw-Hill, Kogakusha, 1976, International student edition.
2. Real Analysis by H. L. Roydon, Macmillan Pub. Co. Inc. 4th Edition, New York. 1962.



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## References

1. T. M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
2. Gabriel Klambauer, Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975.
3. A. J. White, Real Analysis; an introduction, Addison-Wesley Publishing Co., Inc., 1968.
4. G. de Barra, Measure Theory and Integration, Wiley Eastern Limited, 1981.
5. E. Hewitt and K. Stromberg. Real and Abstract Analysis, Berlin, Springer, 1969.
6. P. K. Jain and V.P. Gupta, Lebesgue Measure and Integration, New Age International (P) Limited Published, New Delhi, 1986 Reprint 2000).
7. I. P. Natanson, Theory of Functions of a Real Variable. Vol. I, Frederick Ungar Publishing Co., 1961.
8. Richard L. Wheeden and Antoni Zygmund, Measure and Integral: An Introduction to Real Analysis, Marcel Dekker Inc. 1977.
9. J. H. Williamson, Lebesgue Integration, Holt Rinehart and Winston, Inc. New York. 1962.
10. A. Friedman, Foundations of Modern Analysis, Holt, Rinehart and Winston, Inc., New York, 1970.
11. P. R. Halmos, Measure Theory, Van Nostrand, Princeton, 1950.
12. T. G. Hawkins, Lebesgue's Theory, of Integration: Its Origins and Development, Chelsea, New York, 1979.
13. K. R. Parthasarathy, Introduction to Probability and Measure, Macmillan Company of India Ltd., Delhi, 1977.
14. R. G. Bartle, The Elements of Integration, John Wiley & Sons, Inc. New York, 1966.
15. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1969.
16. Inder K. Rana, An Introduction to Measure and Integration, Narosa Publishing House, Delhi, 1997.
17. Walter Rudin, Real & Complex Analysis, Tata McGraw-Hill Publishing Co. Ltd. New Delhi, 1966.



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# M.Sc./M.A. Course (First Semester)

## PAPER-III

### Topology

Max. Marks 80

- Unit-I** Countable and uncountable sets. Infinite sets and the Axiom of Choice. Cardinal numbers and its arithmetic. Schroeder-Bernstein theorem. Cantor's theorem and the continuum hypothesis. Zorn's lemma, well-ordering theorem. Definition and examples of topological spaces. Closed sets. Closure. Dense subsets. Neighbourhoods. Interior, exterior and boundary. Accumulation points and derived sets. Bases and sub-bases. Subspaces and relative topology.
- Unit-II** Alternate methods of defining a topology in terms of Kuratowski Closure Operator and Neighborhood Systems. Continuous functions and homeomorphism. First and Second Countable spaces. Lindelof's theorems. Separable spaces. Second countability and separability.
- Unit-III** Separation axioms; their Characterizations and basic properties. Urysohn's lemma, Tietze extension theorem.
- Unit-IV** Compactness. Continuous functions and compact sets. Basic properties of Compactness. Compactness and finite intersection property. Sequentially and countably compact sets. Local compactness and one point compactification. Stone-Cech compactification.
- Unit-V** Compactness in metric spaces. Equivalence of compactness, countable compactness and sequential compactness in metric space. Connected spaces. Connectedness on the real line. Components. Locally connected spaces.

#### Recommended Books:

1. James R. Munkres, Topology, A First Course, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
2. K. D. Joshi, Introduction to General Topology, Wiley Eastern Ltd., 1983.



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## References

1. J. Dugundji, Topology, Allyn and Bacon, 1966 (reprinted in India by Prentice Hall of India Pvt. Ltd.).
2. George F. Simmons, Introduction to Topology and modern Analysis, McGraw-Hill Book Company, 1963.
3. J. Hocking and G. Young, Topology, Addison-Wiley Reading, 1961.
4. J. L. Kelley, General Topology, Van Nostrand, Reinhold Co., New York, 1955.
5. L. Steen and J. Seebach, Counter examples in Topology, Holt, Rinehart and Winston, New York, 1970.
6. W. Thron, Topologically Structures, Holt, Rinehart and Winston, New York, 1966.
7. N. Bourbaki, General Topology Part I (Transl.), Addison Wesley, Reading, 1966.
8. R. Engelking, General Topology, Polish Scientific Publishers, Warszawa, 1977.
9. W. J. Pervin, Foundations of General Topology, Academic Press Inc. New York, 1964.
10. E. H. Spanier, Algebraic Topology, McGraw-Hill, New York, 1966.
11. S. Willard, General Topology, Addison-Wesley, Reading, 1970.
12. Crump W. Baker, Introduction to Topology, Wm C. Brown Publisher, 1991.
13. Sze-Tsen Hu, Elements of General Topology, Holden-Day, Inc. 1965.
14. D. Bushaw, Elements of General Topology, John Wiley & Sons, New York, 1963.
15. M. J. Mansfield, Introduction to Topology, D. Van Nostrand Co. Inc. Princeton, N. J., 1963.
16. B. Mendelson, Introduction to Topology, Allyn & Bacon, Inc., Boston, 1962.
17. C. Berge, Topological Spaces, Macmillan Company, New York, 1963.
18. S. S. Coirns, Introductory Topology, Ronald Press, New York, 1961.
19. Z. P. Mamuzic, Introduction to General Topology, P. Noordhoff Ltd., Groningen, 1963.
20. K. K. Jha, Advanced General Topology, Nav Bharat Prakashan, Delhi.



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**M.Sc./M.A. Course (First Semester)**  
**PAPER-IV**

**Complex Analysis (I)**

Max. Marks 80

- Unit-I** Complex integration, Cauchy-Goursat. Theorem. Cauchy's integral formula. Higher order derivatives. Morera's Theorem. Cauchy's inequality and Liouville's theorem. The fundamental theorem of algebra. Taylor's theorem. Laurent's series. Isolated singularities. Meromorphic functions.
- Unit-II** Maximum modulus principle. Schwarz lemma. The argument principle. Rouché's theorem Inverse function theorem.
- Unit-III** Residues. Cauchy's residue theorem. Evaluation of integrals. Branches of many valued functions with special reference to  $\arg z$ ,  $\log z$  and  $z^a$ .
- Unit-IV** Definitions and examples of conformal mapping Bilinear transformations, their properties and classifications.
- Unit-V** Spaces of analytic functions. Hurwitz's theorem. Montel's theorem Riemann mapping theorem.

**Recommended Books:**

1. Complex Analysis by L.V.Ahlfors, McGraw - Hill, 1979.
2. J. B. Conway, Functions of one Complex variable, Springer-Verlag, International student-Edition, Narosa Publishing House, 1980.



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## References

1. H. A. Priestly, Introduction to Complex Analysis, Clarendon Press, Oxford 1990.
2. Complex Function Theory By D.Sarason
3. Liang-shin Hahn & Bernard Epstein, Classical Complex Analysis, Jones and Bartlett Publishers International, London, 1996.
4. S. Lang, Complex Analysis, Addison Wesley, 1977.
5. D. Sarason, Complex Function Theory, Hindustan Book Agency, Delhi, 1994.
6. Mark J. Ablowitz and A.S. Fokas, Complex Variables: Introduction and Applications, Cambridge University press, South Asian Edition, 1998.
7. E. Hille, Analytic Function Theory (2 Vols.) Gonn & Co., 1959.
8. W. H. J. Fuchs, Topics in the Theory of Functions of one Complex Variable, D.Van Nostrand Co., 1967.
9. C. Caratheodory, Theory of Functions (2 Vols.) Chelsea Publishing Company, 1964.
10. M.Heins, Complex Function Theory, Academic Press, 1968.
11. Walter Rudin, Real and Complex Analysis, McGraw-Hill Book Co., 1966.
12. S. Saks and A.Zygmund, Analytic Functions, Monografic Matematyczne, 1952.
13. E. C. Titchmarsh, The Theory of Functions, Oxford University Press, London.
14. W. A. Veech, A Second Course in Complex Analysis, W.A. Benjamin, 1967.
15. S.Ponnusamy, Foundations of Complex Analysis, Narosa Publishing House, 1997.



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**M.Sc./M.A. Course (First Semester)**  
**PAPER-V**  
**Advanced Discrete Mathematics (I)**

Max. Marks 80

- Unit-I** Formal Logic-Statements. Symbolic Representation and Tautologies. Quantifiers, Predicates and Validity. Propositional Logic. Semigroups & Monoids-Definitions and Examples of Semigroups and monoids (including those pertaining to concatenation operation).
- Unit-II** Homomorphism of semigroups and monoids. Congruence relation and Quotient Semigroups. Subsemigroup and submonoids. Direct Products. Basic Homomorphism Theorem.
- Unit-III** Lattices-Lattices as partially ordered sets. Their properties. Lattices as Algebraic Systems. Sublattices, Direct products, and Homomorphisms. Some Special Lattices e.g., Complete, Complemented and Distributive Lattices. Boolean Algebras-Boolean Algebras as Lattices. Various Boolean Identities. The Switching Algebra example. Subalgebras,
- Unit-IV** Direct Products and Homomorphisms. Join-Irreducible elements, Atoms and Minterms. Boolean Forms and Their Equivalence. Minterm Boolean Forms, Sum of Products Canonical Forms. Minimization of Boolean Functions. Applications of Boolean Algebra to Switching Theory (using AND, OR & NOT gates). The Karnaugh Map Method.
- Unit-V** Grammars and Languages-Phrase-Structure Grammars. Rewriting Rules. Derivations. Sentential Forms. Language generated by a Grammar. Regular, Context-Free, and Context Sensitive Grammars and Languages. Regular sets, Regular Expressions and the Pumping Lemma. Kleene's Theorem. Notions of Syntax Analysis, Polish Notations. Conversion of Infix Expressions to Polish Notations. The Reverse Polish Notation.



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**Recommended Books:**

1. Elements of Discrete Mathematics by C. L. Liu, McGraw-Hill Book Co.
2. J. P. Tremblay & R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill Book Co., 1997.

**References**

1. J. L. Gersting, Mathematical Structures for Computer Science, (3<sup>rd</sup> edition), Computer Science Press, New York.
2. Seymour Lipschutz, Finite Mathematics (International) edition (1983), McGraw-Hill Book Company, New York.
3. S. Wiitala, Discrete Mathematics-A Unified Approach, McGraw-Hill Book Co.
4. J. E. Hopcroft and J. D. Ullman, Introduction to Automata Theory, Languages & Computation, Narosa Publishing House.
5. C. L. Liu, Elements of Discrete Mathematics, McGraw-Hill Book Co.
6. N. Deo. Graph Theory with Application to Engineering and Computer Sciences. Prentice Hall of India
7. K. L. P. Mishra and N. Chandrashekar, Theory of Computer Science PHI(2002)



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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## M.A. /M.Sc. (MATHEMATICS) (Semester-II)

**2019-20 & Onward**

There shall be five theory papers. Each paper shall have 100 marks.

**Overall tally of marks will be 500.**

Paper	Description	Theory	Sessional	Practical	Total Marks
I	Advanced Abstract Algebra (II)	80	20	-	100
II	Real Analysis (II)	80	20	--	100
III	General and Algebraic Topology	80	20	--	100
IV	Advanced Complex Analysis (II)	80	20	--	100
V	Advanced Discrete Mathematics (II)	80	20	--	100

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## M.Sc. /M.A. Course (Second Semester)

### PAPER-I

### Advanced Abstract Algebra (II)

Max. Marks 80

- Unit-I** Modules - Cyclic modules. Simple modules. Semi-simple modules. Schuler's Lemma. Free modules. Noetherian and Artinian modules and rings-Hilbert basis theorem. Wedderburn Artin theorem. Uniform modules, primary modules, and Noether-Lasker theorem.
- Unit-II** Linear Transformations - Algebra of linear transformation, Singular and non singular transformation, characteristic roots and vectors, matrices and linear transformations.
- Unit-III** Canonical Forms - Similarity of linear transformations. Invariant subspaces. Reduction to triangular forms. Nilpotent transformations. Index of nilpotency. Invariants of a nilpotent transformation. The primary decomposition theorem. Jordan blocks and Jordan forms.
- Unit-IV** Smith normal form over a principal ideal domain and rank. Fundamental structure theorem for finitely generated modules over a Principal ideal domain and its applications to finitely generated abelian groups.
- Unit-V** Rational canonical form. Generalised Jordan form over any field.

#### Books Recommended:

1. P. B. Bhattacharya, S.K.Jain, S.R.Nagpaul : Basic Abstract Algebra, Cambridge University press
2. I. N. Herstein : Topics in Algebra, Wiley Eastern Ltd.
3. Qazi Zameeruddin and Surjeet Singh : Modern Algebra



## References

1. M. Artin, Algebra, Prentice -Hall of India, 1991.
2. P. M. Cohn, Algebra, Vols. I, II & III, John Wiley & Sons, 1982, 1989, 1991.
3. N. Jacobson, Basic Algebra, Vols. I & II, W. H. Freeman, 1980 (also published by Hindustan Publishing Company).
4. S. Lang, Algebra, 3rd edition, Addison-Wesley, 1993.
5. I. S. Luther and I.B.S. Passi, Algebra, Vol. I-Groups, Vol.II-Rings, Narosa Publishing House (Vol.I-1996, Vol. II-1999)
6. D. S. Malik, J.N. Mordeson, and M.K. Sen, Fundamentals of Abstract Algebra, Mc Graw-Hill, International Edition, 1997.
7. K. B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
8. S. K. Jain, A. Gunawardena and P.B Bhattacharya, Basic Linear Algebra with MATLAB, Key College Publishing (Springer-Verlag), 2001.
9. S. Kumaresan, Linear Algebra, A Geometric Approach, Prentice-Hall of India, 2000.
10. Vivek Sahai and Vikas Bist, Algebra, Narosa Publishing House, 1999.
11. I. Stewart, Galois Theory, 2nd edition, Chapman and Hall, 1989.
12. J. P. Escofier, Galois Theory, GTM Vol. 204, Springer, 2001.
13. T. Y. Lam, Lectures on Modules and Rings, GTM Vol. 189, Springer-Verlag, 1999.
14. D. S. Passman, A Course in Ring Theory, Wadsworth and Brooks/Cole Advanced Books and Software, Pacific groves. California, 1991.
15. Fraleigh, A first course in Algebra, Narosa, 1982.



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**M.Sc./M.A. Course (Second Semester)**  
**PAPER-II**

**Real Analysis (II)**

Max. Marks 80

- Unit-I** Definition and existence of Riemann-Stieltjes integral, Properties of the Integral, integration and differentiation, the fundamental theorem of Calculus, integration of vector-valued functions, Rectifiable curves.
- Unit-II** Lebesgue outer measure. Measurable sets. Regularity. Measurable functions. Borel and Lebesgue measurability. Non-measurable sets. Integration of Non-negative functions. The General integral. Integration of Series.
- Unit-III** Measures and outer measures, Extension of a measure. Uniqueness of Extension. Completion of a measure. Measure spaces. Integration with respect to a measure. Riemann and Lebesgue Integrals.
- Unit-IV** The Four derivatives. Lebesgue Differentiation Theorem. Differentiation and Integration.
- Unit-V** Functions of Bounded variation. The  $L^p$ -spaces. Convex functions. Jensen's inequality. Holder and Minkowski inequalities. Completeness of  $L^p$ , Convergence in Measure, Almost uniform convergence.

**Recommended Books:**

1. Principle of Mathematical Analysis by W. Rudin
2. Real Analysis by H. L. Roydon



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## References

1. T. M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi, 1985.
2. Gabriel Klambauer, Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975.
3. A. J. White, Real Analysis; an introduction, Addison-Wesley Publishing Co., Inc., 1968.
4. G. de Barra, Measure Theory and Integration, Wiley Eastern Limited, 1981.
5. E. Hewitt and K. Stromberg. Real and Abstract Analysis, Berlin, Springer, 1969.
6. P. K. Jain and V.P. Gupta, Lebesgue Measure and Integration, New Age International (P) Limited Published, New Delhi, 1986 Reprint 2000).
7. I. P. Natanson, Theory of Functions of a Real Variable. Vol. 1, Frederick Ungar Publishing Co., 1961.
9. Richard L. Wheeden and Antoni Zygmund, Measure and Integral: An Introduction to Real Analysis, Marcel Dekker Inc. 1977.
10. J. H. Williamson, Lebesgue Integration, Holt Rinehart and Winston, Inc. New York. 1962.
11. A. Friedman, Foundations of Modern Analysis, Holt, Rinehart and Winston, Inc., New York, 1970.
12. P. R. Halmos, Measure Theory, Van Nostrand, Princeton, 1950.
13. T. G. Hawkins, Lebesgue's Theory, of Integration: Its Origins and Development, Chelsea, New York, 1979.
14. K. R. Parthasarathy, Introduction to Probability and Measure, Macmillan Company of India Ltd., Delhi, 1977.
15. R.G. Bartle, The Elements of Integration, John Wiley & Sons, Inc. New York, 1966.
16. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1969.
17. Inder K. Rana, An Introduction to Measure and Integration, Norosa Publishing House, Delhi, 1997.



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**M.Sc./M.A. Course (Second Semester)**  
**PAPER-III**

**General and Algebraic Topology**

Max. Marks 80

- Unit-I** Tychonoff product topology in terms of standard sub-base and its characterizations. Projection maps.
- Unit-II** Product spaces, separation axioms connectedness (Tychonoff's theorem). Compactness, product spaces Countability in product spaces.
- Unit-III** Embedding and metrization. Embedding lemma and Tychonoff embedding. The Urysohn metrization theorem. Metrization theorems and Paracompactness-Local finiteness. The Nagata-Smirnov metrization theorem. Paracompactness. The Smirnov metrization theorem.
- Unit-IV** Nets and filter. Topology and convergence of nets. Hausdorffness and nets. Compactness and nets. Filters and their convergence. Canonical way of converting nets to filters and vice-versa. Ultra-filters and Compactness.
- Unit-V** The fundamental group and covering spaces-Homotopy of paths. The fundamental group. Covering spaces. The fundamental group of the circle and the fundamental theorem of algebra.


**Recommended Books:**

1. James R. Munkres, Topology, A First Course, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
2. K. D. Joshi, Introduction to General Topology, Wiley Eastern Ltd., 1983.



## References

1. J. Dugundji, Topology, Allyn and Bacon, 1966 (reprinted in India by Prentice Hall of India Pvt. Ltd.).
2. George F. Simmons, Introduction to Topology and modern Analysis, McGraw-Hill Book Company, 1963.
3. J. Hocking and G Young, Topology, Addison-Wiley Reading, 1961.
4. J. L. Kelley, General Topology, Van Nostrand, Reinhold Co., New York, 1995.
5. L. Steen and J. Seebach, Counter examples in Topology, Holt, Rinehart and Winston, New York, 1970.
6. W. Thron, Topologically Structures, Holt, Rinehart and Winston, New York, 1966.
7. N. Bourbaki, General Topology Part I (Transl.), Addison Wesley, Reading, 1966.
8. R. Engelking, General Topology, Polish Scientific Publishers, Warszawa, 1977.
9. W. J. Pervin, Foundations of General Topology, Academic Press Inc. New York, 1964.
10. E. H. Spanier, Algebraic Topology, McGraw-Hill, New York, 1966.
11. S. Willard, General Topology, Addison-Wesley, Reading, 1970.
12. Crump W. Baker, Introduction to Topology, Wm C. Brown Publisher, 1991.
13. Sze-Tsen Hu, Elements of General Topology, Holden-Day, Inc. 1965.
14. D. Bushaw, Elements of General Topology, John Wiley & Sons, New York, 1963.
15. M. J. Mansfield, Introduction to Topology, D. Van Nostrand Co. Inc. Princeton, N.J., 1963.
16. B. Mendelson, Introduction to Topology, Allyn & Bacon, Inc., Boston, 1962.
17. C. Berge, Topological Spaces, Macmillan Company, New York, 1963.
18. S. S. Coirns, Introductory Topology, Ronald Press, New York, 1961.
19. Z. P. Mamuzic, Introduction to General Topology, P. Noordhoff Ltd., Groningen, 1963.
20. K. K. Jha, Advanced General Topology, Nav Bharat Prakashan, Delhi.



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**M.Sc./M.A. Course (Second Semester)**  
**PAPER-IV**

**Advanced Complex Analysis (II)**

Max. Marks 80

- Unit-I** Weierstrass' factorisation theorem. Gamma function and its properties. Riemann Zeta function. Riemann's functional equation. Runge's theorem. Mittag-Leffler's theorem.
- Unit-II** Analytic Continuation. Uniqueness of direct analytic continuation. Uniqueness of analytic continuation along a curve. Power series method of analytic continuation Schwarz Reflection Principle. Monodromy theorem and its consequences.
- Unit-III** Harmonic functions on a disk. Harnack's inequality and theorem. Dirichlet Problem. Green's function.
- Unit-IV** Canonical products. Jensen's formula. Poisson-Jensen formula. Hadamard's three circles theorem. Order of an entire function. Exponent of Convergence. Borel's theorem. Hadamard's factorization theorem.
- Unit-V** The range of an analytic function. Bloch's theorem. The Little Picard theorem. Schottky's theorem. Montel Caratheodory and The Great Picard theorem. Univalent functions. Bieberbach's conjecture (Statement only) and the " $1/4$ -theorem.

**Recommended Books:**

1. L. V. Ahlfors, Complex Analysis, McGraw - Hill, 1979.
2. J. B. Conway, Functions of one Complex variable, Springer-Verlag, International student-Edition, Narosa Publishing House, 1980.



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## References

1. H. A. Priestly, Introduction to Complex Analysis, Clarendon Press, Oxford 1990.
2. Liang-shin Hahn & Bernard Epstein, Classical Complex Analysis, Jones and Bartlett Publishers International, London, 1996.
3. S. Lang, Complex Analysis, Addison Wesley, 1977.
4. Mark J. Ablowitz and A.S. Fokas, Complex Variables: Introduction and Applications, Cambridge University press, South Asian Edition, 1998.
5. E. Hille, Analytic Function Theory (2 Vols.) Gonn & Co., 1959.
6. W. H. J. Fuchs, Topics in the Theory of Functions of one Complex Variable, D. Van Nostrand Co., 1967.
7. C. Caratheodory, Theory of Functions (2 Vols.) Chelsea Publishing Company, 1964.
8. M. Heins, Complex Function Theory, Academic Press, 1968.
9. Walter Rudin, Real and Complex Analysis, McGraw-Hill Book Co., 1966.
10. S. Saks and A. Zygmund, Analytic Functions, Monografic Matematyczne, 1952.
11. E.C Titchmarsh, The Theory of Functions, Oxford University Press, London.
12. W. A. Veech, A Second Course in Complex Analysis, W.A. Benjamin, 1967.
13. S. Ponnusamy, Foundations of Complex Analysis, Narosa Publishing House, 1997.
14. D. Sarason, Complex Function Theory, Hindustan Book Agency, Delhi, 1994.



**M.Sc./M.A. Course (Second Semester)**  
**PAPER-V**  
**Advanced Discrete Mathematics (II)**

Max. Marks 80

- Unit-I** Graph Theory-Definition of (Undirected) Graphs, Paths, Circuits, Cycles, & Subgraphs. Induced Subgraphs. Degree of a vertex. Connectivity. Planar Graphs and their properties. Trees. Euler's Formula for connected planar Graphs. Complete & Complete Bipartite Graphs. Kuratowski's Theorem (statement only) and its use.
- Unit-II** Spanning Trees, Cut-sets, Fundamental Cut -sets, and Cycle. Minimal Spanning Trees and Kruskal's Algorithm. Matrix Representations of Graphs. Euler's Theorem on the Existence of Eulerian Paths and Circuits.
- Unit-III** Directed Graphs. In degree and Out degree of a Vertex. Weighted undirected Graphs. Dijkstra's Algorithm.. strong Connectivity & Warshall's Algorithm. Directed Trees. Search Trees. Tree Traversals.
- Unit-IV** Introductory Computability Theory-Finite State Machines and their Transition Table Diagrams. Equivalence of finite State Machines. Reduced Machines. Homomorphism.
- Unit-V** Finite Automata. Acceptors. Non-deterministic Finite Automata and equivalence of its power to that of Deterministic Finite Automata. Moore and mealy Machines. Turing Machine and Partial Recursive Functions.

**Recommended Books:**

1. Elements of Discrete Mathematics By C. L. Liu
2. Graph Theory and its application By N. Deo
3. Theory of Computer Science By K. L. P. Mishra and N. Chandrashekar



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## References

1. J. P. Tremblay & R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill Book Co., 1997.
2. J. L. Gersting, Mathematical Structures for Computer Science, (3rd edition), Computer Science Press, New York.
3. Seymour Lipschutz, Finite Mathematics (International) edition 1983), McGraw-Hill Book Company, New York.
4. S. Wiitala, Discrete Mathematics-A Unified Approach, McGraw-Hill Book Co.
5. J. E. Hopcroft and J. D. Ullman, Introduction to Automata Theory, Languages & Computation, Narosa Publishing House.
6. C.L Liu, Elements of Discrete Mathematics, McGraw-Hill Book Co.
7. N. Deo. Graph Theory with Application to Engineering and Computer Sciences. Prentice Hall of India.



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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## M.A./M.Sc. (MATHEMATICS) (Semester-III) 2020-21 & Onward

There shall be five theory papers. Two compulsory and three optional. Each paper shall have 100 marks. Out of these five papers, the paper which has theory and practical both, the theory part shall have 70 marks and practical part shall have 30 marks. **Overall tally of marks in theory and practical will be 500.**

Paper	Description		Theory	Sessional	Practical	Remark
Compulsory Papers						
I	Integration Theory and Functional Analysis (I)		80	20	--	--
II	Partial Differential Equations & Mechanics (I)		80	20	--	--
Optional Papers						
III	A	Fundamentals of Computer Science ( Object Oriented Programming and Data Structure)	70	--	30	For regular students only
	B	General Relativity and Cosmology (I)	80	20	--	--
	C	Fuzzy Set Theory & Its Applications (I)	80	20	--	--
	D	Mathematical Biology (I)	80	20	--	--
IV	A	Operations Research (I)	80	20	--	--
	B	Wavelets (I)	80	20	--	--
V	A	Programming in C (with ANSI Features) (I)	70	--	30	For regular students only
	B	Graph Theory (I)	80	20	--	--
	C	Algebraic Number Theory (I)	80	20	--	--



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# **HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**

## **M.Sc./M.A. Course (Third Semester)**

### **PAPER -I**

#### **Integration Theory and Functional Analysis (I)**

Max. Marks 80

#### **Integration Theory:**

**Unit-I** Signed measure. Hahn decomposition theorem, mutually singular measures. Radon-Nikodym theorem. Lebesgue decomposition. Riesz representation theorem. Extension theorem (Caratheodory).

**Unit-II** Lebesgue-Stieltjes integral, product measures, Fubini's theorem. Differentiation and Integration. Decomposition into absolutely continuous and singular parts.

**Unit-III** Baire sets. Baire measure, continuous functions with compact support. Regularity of measures on locally compact spaces. Integration of continuous functions with compact support, Riesz-Markoff theorem.

#### **Functional Analysis :**

**Unit-IV** Normed linear spaces. Banach spaces and examples. Quotient space of normed linear spaces and its completeness, equivalent norms. Riesz Lemma, basic properties of finite dimensional normed linear spaces and compactness.

**Unit-V** Weak convergence and bounded linear transformations, normed linear spaces of bounded linear transformations, dual spaces with examples.

#### **Books Recommended :**

1. P. R. Halmos, Measure Theory, Van Nostrand, Princeton, 1950.
2. B. Choudhary and S.Nanda, Functional Analysis with Applications. Wiley Eastern Ltd. 1989.
3. H. L. Royden, Real Analysis, Macmillan Publishing Co. Inc., New York, 4<sup>th</sup> Edition, 1993.



## References

1. S. K. Berberian, Measure and integration, Chelsea Publishing Company, New York, 1965.
2. G. de Barra, Measure Theory and Integration, Wiley Eastern Limited, 1981.
3. P. K. Jain and V.P. Gupta, Lebesgue Measure and Integration, New Age International (P) Limited, New Delhi, 2000.
4. Richard L. Wheeden and Antoni Zygmund, Measure and Integral : An Introduction to Real Analysis, Marcel Dekker Inc. 1977.
5. J. H. Williamson, Lebesgue Integration, Holt Rinehart and Winston, Inc. New York. 1962.
6. T. G. Hawkins, Lebesgue's Theory of Integration: Its Origins and Development, Chelsea, New York, 1979.
7. K. R. Parthasarathy, Introduction to Probability and Measure, Macmillan Company of India Ltd., Delhi, 1977.
8. R. G. Bartle, The Elements of Integration, John Wiley & Sons, Inc. New York, 1966.
9. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1967.
10. Inder K. Rana, An Introduction to Measure and Integration, Narosa Publishing House, Delhi, 1997.
11. Walter Rudin, Real & Complex Analysis, Tata McGraw-Hill Publishing.
12. Edwin Hewitt and Korl Stromberg, Real and Abstract Analysis, Springer-Verlag, New York.
13. Edwin Hewitt and Kenneth A. Ross, Abstract Harmonic Analysis, Vol. 1, Springer-Verlag, 1993.
14. G. Bachman and L. Narici, Functional Analysis, Academic Press, 1966.
15. N. Dunford and J.T. Schwartz, Linear Operators, Part I, Interscience, New York, 1958.
16. R. E. Edwards, Functional Analysis, Holt Rinehart and Winston, New York, 1965.
17. C. Goffman and G. Pedrick, First Course in Functional Analysis, Prentice Hall of India, New Delhi, 1987.
18. P. K. Jain, O.P. Ahuja and Khalil Ahmad, Functional Analysis, New Age International (P) Ltd. & Wiley Eastern Ltd., New Delhi, 1997.
19. R. B. Holmes, Geometric Functional Analysis and its Applications, Springer-Verlag, 1975.
20. K.K. Jha, Functional Analysis, Students' Friends, 1986.
21. L. V. Kantorovich and G.P. Akilov, Functional Analysis, Pergamon Press, 1982.
22. E. Kreyszig, Introductory Functional Analysis with Applications, John Wiley & Sons, New York, 1978.
23. B. K. Lahiri, Elements of Functional Analysis, The World Press Pvt. Ltd., Calcutta, 1994.
24. A. H. Siddiqui, Functional Analysis with Applications, Tata McGraw-Hill Publishing Company Ltd. New Delhi



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25. B. V. Limaye, Functional Analysis, Wiley Eastern Ltd.
26. L. A. Lustenik and V.J. Sobolev, Elements of Functional Analysis, Hindustan Publishing Corporation, New Delhi, 1971.
27. G. F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill Book Company, New York, 1963.
28. A. E. Taylor, Introduction to Functional Analysis, John Wiley and Sons, New York, 1958.
29. K. Yosida, Functional Analysis, 3<sup>rd</sup> edition Springer-Verlag, New York, 1971.
30. J. B. Conway, A Course in Functional Analysis, Springer-Verlag, New York, 1990.
31. Walter Rudin, Functional Analysis, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1973.
32. A. Wilansky, Functional Analysis, Blaisdell Publishing Co., 1964.
33. J. Tinsley Oden & Leszek F. Dernkowicz, Applied Functional Analysis, CRC Press Inc., 1996.

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**M.Sc./M.A. Course (Third Semester)**  
**PAPER -II**  
**Partial Differential Equations and Mechanics (I)**

Max. Marks 80

**Partial Differential Equations**

**Unit-I** Examples of PDE. Classification. Transport Equation-Initial value Problem. Non-homogeneous Equation, Laplace's Equation-Fundamental Solution, Mean Value Formulas, Properties of Harmonic Functions, Green's Function, Energy Methods.

**Unit-II** Heat Equation-Fundamental Solution, Mean Value Formula, Properties of Solutions, Energy Methods. Wave Equation-Solution by Spherical Means, Non-homogeneous Equations, Energy Methods.

**Analytical Dynamics:**

**Unit-III** Generalized coordinates. Holonomic and Non-holonomic systems. Scleronomic and Rheonomic systems. Generalized potential. Lagrange's equations of first kind. Lagrange's equations of second kind. Uniqueness of solution. Energy equation for conservative fields. Hamilton's variables. Donkin's theorem. Hamilton canonical equations. Cyclic coordinates. Routh's equations.

**Unit-IV** Poisson's Bracket. Poisson's Identity. Jacobi-Poisson Theorem. Motivating problems of calculus of variations, Shortest distance. Minimum surface of revolution. Brachistochrone problem. Isoperimetric problem. Geodesic. Fundamental lemma of calculus of variations. Euler's equation for one dependent function and its generalization to (i) 'n' dependent functions, (ii) higher order derivatives. Conditional extremum under geometric constraints and under integral constraints.



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## Gravitation:

**Unit-V** Attraction and potential of rod, disc, spherical shells and sphere.  
Surface integral of normal attraction (application & Gauss' theorem).  
Laplace and Poisson equations. Work done by self attracting systems. Distributions for a given potential. Equipotential surfaces.  
Surface and solid harmonics. Surface density in terms of surface harmonics.

## Books Recommended:

1. L. C. Evans, Partial Differential Equations, Graduate Studies in Mathematics, Volume 19, AMS, 1998.
2. F. Gantmacher, Lectures in Analytic Mechanics, MIR Publishers, Moscow, 1975.
3. R. C. Mondal, Classical Mechanics, Prentice Hall of India
4. S. L. Loney, An Elementary Treatise on Statics, Kalyani Publishers, New Delhi, 1979.

## References

1. Books on Partial differential equation by I.N. Sneddon, F. John, P. Prasad and R. Ravindran, Amarnath etc.
2. A. S. Ramsey, Dynamics Part II, The English Language Book Society and Cambridge University Press, 1972.
3. H. Goldstein, Classical Mechanics (2nd edition), Narosa Publishing House, New Delhi.
4. I. M. Gelfand and S.V. Fomin, Calculus of Variations, Prentice Hall.
5. Narayan Chandra Rana & Pramod Sharad Chandra Joag, Classical Mechanics, Tata McGraw Hill, 1991.
6. Louis N. Hand and Janet D. Finch, Analytical Mechanics, Cambridge University Press, 1998.
7. A. S. Ramsey, Newtonian Gravitation, The English Language Book Society and the Cambridge University Press.



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**M.Sc./M.A. Course (Third Semester)**  
**PAPER-III (A)**  
**Fundamentals of Computer Science-Theory and Practical**  
**(Object Oriented Programming and Data Structure)**

Max. Marks. 100  
(Theory-70 +Practical-30)

- Unit-I** Object Oriented Programming-Classes and Scope, nested classes, pointer class members; Class initialization, assignment and destruction.
- Unit-II** Overloaded functions and operators; Templates including class templates; class inheritance and virtual functions.
- Unit-III** Data Structures-Analysis of algorithms, q, W, O, o, w notations ; Sequential and linked representations, Lists, Stacks, and queues;
- Unit-IV** Trees: Binary tree- search tree implementation, B-tree (concept only);
- Unit-V** Sorting: Insertion sort, shell sort, quick-sort, heap sort and their analysis; Hashing-open and closed.

**Books Recommended :**

1. S. B. Lipman, J. Lajoi: C++ Primer, Addison Wesley.
2. B. Stroustrup; The C++ Programming Language, Addison Wesley.
3. C. J. Date : Introduction to Database Systems, Addison Wesley.
4. C. Rithie: Operating Systems-Incorporating UNIX and Windows, BPB Publications.
5. M. A. Weiss, Data Structures and Algorithm Analysis in C++, Addison Wesley.

**Practical Examination Scheme**

Max. Marks – 30	Time Duration – 3 Hrs.
Practical (two)	20 Marks( 10 marks each)
Viva	05 Marks
Sessional	05 Marks



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**M.Sc./M.A. Course (Third Semester)**  
**PAPER-III (B)**  
**General Relativity & Cosmology (I)**

Max Marks – 80

- Unit-I** General Relativity-Transformation of coordinates. Tensors. Algebra of Tensors. Symmetric and skew symmetric Tensors. Contraction of tensors and quotient law. Riemannian metric. Parallel transport. Christoffel Symbols. Covariant derivatives, intrinsic derivatives and geodesics.
- Unit-II** Riemann Christoffel curvature tensor and its symmetry properties. Bianchi identities and Einstein tensor. Review of the special theory of relativity and the Newtonian Theory of gravitation.
- Unit-III** Principle of equivalence and general covariance, geodesic principle, Newtonian approximation of relativistic equations of motion. Einstein's field equations and its Newtonian approximation.
- Unit-IV** Schwarzschild external solution and its isotropic form. Planetary orbits and analogues of Kepler's Laws in general relativity. Advance of perihelion of a planet. Bending of light rays in a gravitational field, gravitational redshift of spectral lines. Radar echo delay.
- Unit-V** Energy-momentum tensor of a perfect fluid. Schwarzschild internal solution. Boundary conditions. Energy momentum tensor of an electromagnetic field. Einstein-Maxwell equations. Reissner-Nordström solution.



## REFERENCES:

1. C. E. Weatherbum, An Introduction to Riemannian Geometry and the tensor Calculus, Cambridge University Press, 1950.
2. H. Stephani, General Relativity: An Introduction to the theory of the gravitational field, Cambridge University Press, 1982.
3. A. S. Eddington, The Mathematical Theory of Relativity, Cambridge University Press, 1965.
4. J. V. Narlikar, General Relativity and Cosmology, The Macmillan Company of India Limited, 1978.
5. R. Adiev, M. Bazin, M. Schiffer, Introduction to general relativity, McGraw Hill Inc., 1975.
6. B. F. Schutz, A first course in general relativity, Cambridge University Press, 1990.
7. S. Weinberg, Gravitation and Cosmology: Principles and applications of the general theory of relativity, John Wiley & Sons, Inc. 1972.
8. R. K. Sachs and H. Wu., General Relativity for Mathematician, Springer Verlag, 1977.
9. J. L. Synge, Relativity: The general theory. North Holland Publishing Company, 1976.



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**M.Sc./M.A. Course (Third Semester)**  
**PAPER-III (C)**  
**Fuzzy Set Theory and Its Applications (I)**

Max Marks – 80

**UNIT-I** Fuzzy sets-Basic definitions,  $\alpha$ -level sets. Convex fuzzy sets. Basic operations on fuzzy sets. Types of fuzzy sets. Cartesian products, Algebraic products. Bounded sum and difference, t-norms and t-conorms.

**UNIT-II** The Extension Principle- The Zadeh's extension principle. Image and inverse image of fuzzy sets. Fuzzy numbers. Elements of fuzzy arithmetic.

**UNIT-III** Fuzzy Relations on Fuzzy sets, Composition of Fuzzy relations. Min-Max composition and its properties.

**UNIT-IV** Fuzzy equivalence relations. Fuzzy compatibility relations. Fuzzy relation equations. Fuzzy graphs, Similarity relation.

**UNIT-V** Possibility Theory-Fuzzy measures. Evidence theory. Necessity measure. Possibility measure. Possibility distribution. Possibility theory and fuzzy sets. Possibility theory versus probability theory.

**REFERENCES :**

1. H. J. Zmmemann, Fuzzy set theory and its Applications, Allied Publishers Ltd. New Delhi, 1991.
2. G. J. Klir and B. Yuan- Fuzzy sets and fuzzy logic, Prentice-Hall ol India, New Delhi, 1995.



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**M.Sc./M.A. Course (Third Semester)**  
**PAPER-III (D)**  
**Mathematical Biology (I)**

Max. Marks - 80

**UNIT-I**

**Population Dynamics**

Malthusian growth model, Logistic equation, model of species competition, Linear and Nonlinear First Order Discrete Time Models, Biology of Insect Population Dynamics, Model for Insect Population Dynamics with Competition, Differential Equation Models.

**UNIT-II**

**Age Structured Population Dynamics**

Evolutionary Aspects, Harvesting and Fisheries, Metapopulations, Delay Effects, Fibonacci's Rabbits, golden ratio, Age-structured Population's in Discrete Time, continuous age-structured populations, Euler-Lotka Equations.

**UNIT-III**

**Population Dynamics of Interacting Species**

Host-parasitoid Interactions, Lotka-Volterra Prey-predator Equations, Modelling the Predator Functional Response, Ecosystems Modelling, Interacting Metapopulations, Competition, Predation, Predator-mediated Coexistence of Competitors, Effects of Habitat Destruction.

**UNIT-IV**

**Population Genetics and Evolution**

Mendelian Genetics in Populations with Non-overlapping Generations, Haploid genetics, Spread of a favored allele, Mutation-selection balance, Diploid genetics, Sexual reproduction, Spread of a favored allele, Mutation-selection balance, Heterosis, Frequency-dependent selection, Linkage equilibrium, Random genetic drift, Evolution of the Genetic System.

**UNIT-V**

**Infectious Disease**

Simple Epidemic and SIS Diseases, SIR Epidemics, SIR epidemic disease model, SIR Endemics, SIR endemic disease model, No Disease-related Death, Including Disease-related Death, Vaccination, Evolution of virulence, Vector -borne Diseases, Basic Model for Macroparasitic Diseases.

**Recommended Books**

1. Jeffrey R. Chasnov, Mathematical Biology, Lecture Notes for MATH(365), The Hong Kong University of Science and Technology (2010)
2. Nicholas F. Britton, Essential Mathematical Biology, Springer-Verlag (2003)
3. J.D.Murray, Mathematical Biology I. An Introduction, Springer-Verlag (2002) 3<sup>rd</sup> Edition.
4. J. D. Murray, Mathematical Biology II. Spatial Models and Biomedical Application, Springer-Verlag (2003) 3<sup>rd</sup> Edition.



**M.Sc./M.A. Course (Third Semester)**  
**PAPER -IV (A)**  
**Operations Research (I)**

Max. Marks 80

- Unit-I** Operations Research and its Scope. Necessity of Operations Research in Industry. Linear Programming-Simplex Method. Theory of the Simplex Method. Duality and Sensitivity Analysis.
- Unit-II** Other Algorithms for Linear Programming-Dual Simplex Method.
- Unit-III** Parametric Linear Programming. Upper Bound Technique. Interior Point Algorithm. Linear Goal Programming.
- Unit-IV** Transportation and Assignment Problems.
- Unit-V** Network Analysis-Shortest Path Problem. Minimum Spanning Tree Problem. Maximum Flow Problem. Minimum Cost Flow Problem. Network Simplex Method. Project Planning and Control I with PERT-CPM.

**Books Recommended :**

1. F. S. Hillier and G.J. Ueberman. Introduction to Operations Research (Sixth Edition), McGraw Hill International Edition, Industrial Engineering Series, 1995. (This book comes with a CD containing tutorial software).
2. G. Hadley, Linear Programming, Narosa Publishing House, 1995.
3. G. Hadley, Nonlinear and Dynamic Programming, Addison-Wesley, Reading Mass.
4. H. A. Taha, Operations Research -An introduction, Macmillan Publishing Co., Inc., New York.
5. Kanti Swarup, P.K. Gupta and Man Mohan, Operations Research, Sultan Chand & Sons, New Delhi
6. Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali, Linear Programming and Network flows, John Wiley & Sons, New York, 1990.



## References

1. S. S. Rao, Optimization Theory and Applications, Wiley Eastern Ltd., New Delhi.
2. Prem Kumar Gupta and D.S. Hira, Operations Research-An Introduction. S. Chandi & Company Ltd., New Delhi.
3. N. S. Kambo, Mathematical Programming Techniques, Affiliated East-West Press Pvt. Ltd., New Delhi, Madras
4. R. K. Rathy, An Introduction to Fluid Dynamics, Oxford and IBH Publishing Company, New Delhi, 1976.
5. A. D. Young, Boundary Layers, AIAA Education Series, Washington DC, 1989.
6. S. W. Yuan, Foundations of Fluid Mechanics, Prentice Hall of India Private Limited, New Delhi, 1976.
7. LINGO Systems Products (Visit website <http://www.Hndo.com/productsf.html>)
  - (i) LINGO (the linear programming solver)
  - (ii) LINGO Callable Library (the premier optimisation engine)
  - (iii) LINGO (the linear, non-linear, and integer programming solver with mathematical modelling language)
  - (i) What's Best I (the spreadsheet add-in that solves linear, non-linear, and integer problems).

All the above four products are bundled into one package to form the Solver Suite. For more details about any of the four products one has to click on its name.

- (i) Optimisation Modelling with LINGO (8" edition) by Linus Schrage.
  - (ii) Optimisation Modelling with LINGO by Unus Schrage.
- More details available on the Related Book page York, 1979.



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**M.Sc./M.A. Course (Third Semester)**  
**PAPER-IV (B)**  
**Wavelets (I)**

Max Marks – 80

- Unit-I.** Preliminaries-Different ways of constructing wavelets- Orthonormal bases generated by a single function: the Balian-Low theorem. Smooth projections on  $L^2(\mathbb{R})$ .
- Unit-II.** Local sine and cosine bases and the construction of some wavelets. The unitary folding operators and the smooth projections.
- Unit-III.** Multiresolution analysis and construction of wavelets. Construction of compactly supported wavelets and estimates for its smoothness. Band limited wavelets.
- Unit-IV.** Orthonormality. Completeness. Characterization of Lemarie-Meyer wavelets and some other characterizations. Franklin wavelets and Spline wavelets on the real line.
- Unit-V.** Orthonormal bases of piecewise linear continuous functions for  $L^2(\mathbb{T})$ . Orthonormal bases of periodic splines. Periodization of wavelets defined on the real line.

**REFERENCES:**

1. Eugenic Hernandez and Guido Weiss, A First Course on Wavelets, CRC Press, New York, 1996.
2. C. K. Chui, An Introduction to Wavelets, Academic Press, 1992.
3. I. Daubechies, Ten Lectures on Wavelets, CBS-NSF Regional Conferences in Applied Mathematics, 61, SIAM, I 1992.
4. Y. Meyer, Wavelets, algorithms and applications (Tran.by R.D. Rayan, SIAM, 1993.
5. M. V. Wickerhauser, Adapted wavelet analysis from theory to software, Wellesley, MA, A.K. Peters, 1994.



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**M.Sc./M.A. Course (Third Semester)**  
**PAPER –V (A)**  
**Programming in C (with ANSI features) Theory and Practical (I)**

Max. Marks. 100  
(Theory-70 +Practical-30)

- Unit-I** An overview of programming. Programming language, Classification. C Essentials-Program Development. Functions. Anatomy of a C Function. Variables and Constants. Expressions. Assignment Statements. Formatting Source Files. Continuation Character. The Preprocessor.
- Unit-II** Scalar Data Types-Declarations, Different Types of Integers. Different kinds of Integer Constants. Floating-Point Types. Initialization. Mixing Types. Explicit Conversions-Casts. Enumeration Types. The Void Data Type. Typedefs. Finding the Address of an object. Pointers.
- Unit-III** Control Flow-Conditional Branching. The Switch Statement. Looping. Nested Loops. The break and continue Statements. The goto statement. Infinite Loops.
- Unit-IV** Operators and Expressions-Precedence and Associativity. Unary Plus and Minus operators. Binary Arithmetic Operators. Arithmetic Assignment Operators. Increment and Decrement Operators. Comma Operator. Relational Operators. Logical Operators. Bit - Manipulation Operators. Bitwise Assignment Operators. Cast Operator. Size of Operators. Conditional Operator. Memory Operators.
- Unit-V** Arrays -Declaring an Array. Arrays and Memory. Initializing Arrays. Encryption and Decryption.



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## **Books Recommended :**

1. Peter A. Darnell and Philip E. Margolis, C: A Software Engineering Approach, Narosa Publishing House (Springer International Student Edition) 1993.
2. Samuel P. Harkison and Gly L. Steele Jr., C : A Reference Manual, 2nd Edition, Prentice Hall, 1984.
3. Brian W. Kernighan & Dennis M. Ritchie, The C Programme Language, 2nd Edition (ANSI Features), Prentice Hall 1989.

## **Practical Examination Scheme**

Max. Marks – 30

Time Duration – 3 Hrs.

Practical (two)

20 Marks( 10 marks each)

Viva

05 Marks

Sessional

05 Marks

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## **M.Sc./M.A. Course (Third Semester)**

### **PAPER-V (B)**

#### **Graph theory (I)**

Max. Marks - 80

Unit-I: Operations on graphs, matrices and vector spaces: Topological operations, Homeomorphism, homomorphism, contractions, derived graphs, Binary operations.

Unit-II: Matrices and vector spaces: Matrices and vector spaces : The adjacency matrix, The determinant and the spectrum, Spectrum properties, The incidence matrix, cycle space and Bond space, Cycle bases and cycle graphs.

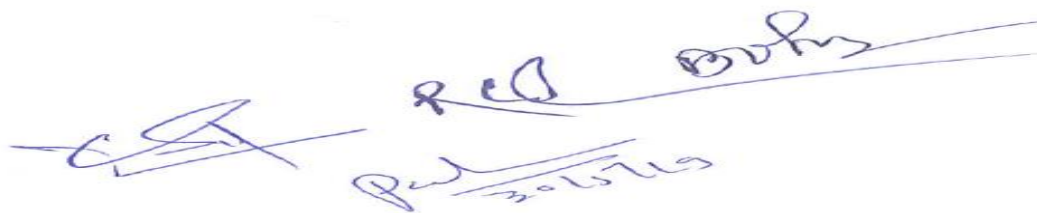
Unit-III: Colouring packing and covering: Vertex coverings, critical graphs, Girth and chromatic number, uniquely colourable graphs, edge-colourings, Face colourings and Beyond, The achromatic and the Adjoint Numbers.

Unit-IV: Combinational formulations: Setting up of combinational formulations, the classic pair of duals, Gallai, Norman-Rabin Theorems, Clique parameters, The Rosenfeld Numbers.

Unit-V: Perfect Graphs: Introduction to the "SPGC", Triangulated (Chordal) graphs, Comparability graphs, Interval graphs, permutation graphs, circular arc graphs, split graphs, weakly triangulated graphs.

#### **REFERENCES :**

1. K. R. Parthasarathy, Basic graph theory, Tata Mc graw Hill publishing company limited , 1994.
2. R. J. Wilson, Introduction to graph theory, Longman Harlow, 1985.
3. John Clark, Derek Allon Holton, A first look at graph Theory, World Scientific Singapore, 1991.
4. Frank Hararary, Graph Theory Narosa, New Delhi, 1995.
5. Ronald Gould and Benjamin Cummins, Graph Theory, California.
6. Narsingh Deo, Graph Theory with applications to Engineering and Computer Science, Prentice-Hall of India Private Limited, New Delhi, 2002.



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# M.Sc./M.A. Course (Third Semester)

## PAPER-V (C)

### Algebraic Number Theory (I)

Max Marks – 80

#### UNIT-I

**Elementary Number Theory:** Primes and factorization, Division Algorithm, Congruence, Congruence and Modular Arithmetic, Euler phi function, Primitive roots of Unity, Quadratic law of Reciprocity, Arithmetical functions, Mobius Inversion Formula, The Diophantine Equations, Farey Sequences.

#### UNIT-II

**Algebraic Numbers:** Algebraic Numbers, Conjugates and Discriminants, Algebraic Integers, Integral Bases, Rings of Integers.

#### UNIT-III

**Special Fields:** Calculations for Quadratic fields, cubic fields, biquadratic fields and sextic fields.

#### UNIT-IV

**Localization:** Localization, Integral closure, Prime ideals, Chinese remainder theorem, Galois extensions. **Rings:** Dedekind rings, Discrete valuation rings, Explicit factorization of a prime.

#### UNIT-V

**Completions:** Definitions and completions, Polynomials in complete fields, Structure of complete discrete valuation ring, extension of complete fields.

#### References:

1. Serge Lange: Algebraic Number Theory, Springer-Verlag, 1986.
2. Jean-Pierre Serre: Local Fields, Springer-Verlag, 1979
3. M. Ram Murty, Jody Esmonde: Problems in Algebraic Number Theory (2<sup>nd</sup> ed.), Springer, 2005.
4. H. P. F. Swinnerton-Dyer: A Brief Guide to Algebraic Number Theory, Cambridge University Press, 2001
5. A. Frohlich, M.J. Taylor: Algebraic Number Theory, Cambridge University Press, 1991.
6. Ian Stewart, David Tall : Algebraic Number Theory and Fermat's Last Theorem (3<sup>rd</sup> ed.), A K Peters, Natick, Massachusetts, 2002.
7. Ethan D. Bolker: Elementary Number Theory, An Algebraic Approach, W. A. Benjamin, Inc., New York, 1970
8. Jurgen Neukirch: Algebraic Number Theory, Springer-Verlag, 1999
9. William Stein: Algebraic Number Theory, a Computational Approach, Cambridge University Press, 1991.
10. G. A. Jones and J. M. Jones, Elementary Number Theory, Springer, 1998.



# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## Scheme of Examination

### M.A./M.Sc. (MATHEMATICS) (Semester-IV)

#### 2020-21 & Onward

There shall be five papers. Two compulsory and three optional papers. Each paper shall have 100 marks. The paper which has theory and practical both, the theory part shall have 70 marks and practical part shall have 30 marks. **Overall tally of marks in theory and practical will be 500.**

Paper	Description		Theory	Sessional	Practical	Remark
Compulsory Papers						
I	Functional Analysis (II)		80	20	--	--
II	Partial Differential Equations & Mechanics		80	20	--	--
Optional Papers						
III	A	Operating System and Database Management System	70	--	30	For regular students
	B	Cosmology (II)	80	20	--	--
	C	Fuzzy Set Theory & Its Applications	80	20	--	--
	D	Mathematical Biology(II)	80	20	--	--
IV	A	Operations Research (II)	80	20	--	--
	B	Wavelets (II)	80	20	--	--
V	A	Programming in C (with ANSI Features) (II)	70	--	30	For regular students
	B	Graph Theory (II)	80	20	--	
	C	Algebraic Number Theory	80	20	--	



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# **HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**

## **M.Sc./M.A. Course (Fourth Semester)**

### **PAPER -I**

### **Functional Analysis (II)**

Max. Marks 80

**Unit-I** Uniform boundedness theorem and some its consequences. Open mapping and closed graph theorems.

**Unit-II** Hahn-Banach theorem for real linear spaces, complex linear spaces and normed linear spaces. Reflexive spaces. Weak Sequential Compactness. Compact Operators. Solvability of linear equations in Banach spaces. The closed Range Theorem.

**Unit-III** Inner product spaces. Hilbert spaces. Orthonormal Sets. Bessel's inequality. Complete orthonormal sets and Parseval's identity.

**Unit-IV** Structure of Hilbert spaces. Projection theorem. Riesz representation theorem. Adjoint of an operator on a Hilbert space. Reflexivity of Hilbert spaces.

**Unit-V** Self-adjoint operators, Positive, projection, normal and unitary operators. Abstract variational boundary-value problem. The generalized Lax-Milgram theorem.

### **Books Recommended :**

1. B. Choudhary and S. Nanda, Functional Analysis with Applications. Wiley Eastern Ltd. 1989.
2. H. L. Royden, Real Analysis, Macmillan Publishing Co. Inc., New York, 4th Edition, 1993.

### **References**

1. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1967.
2. Walter Rudin, Real & Complex Analysis, Tata McGraw-Hill Publishing.
3. Edwin Hewitt and Karl Stromberg, Real and Abstract Analysis, Springer-Verlag, New York.
4. Edwin Hewitt and Kenneth A. Ross, Abstract Harmonic Analysis, Vol. 1, Springer-Verlag, 1993.



5. G. Bachman and L. Narici, Functional Analysis, Academic Press, 1966.
6. N. Dunford and J.T. Schwartz, Linear Operators, Part I, Interscience, New York, 1958.
7. R. E. Edwards, Functional Analysis, Holt Rinehart and Winston, New York, 1965.
8. C. Goffman and G. Pedrick, First Course in Functional Analysis, Prentice Hall of India, New Delhi, 1987.
9. P. K. Jain, O.P. Ahuja and Khalil Ahmad, Functional Analysis, New Age International (P) Ltd. & Wiley Eastern Ltd., New Delhi, 1997.
10. R. B. Holmes, Geometric Functional Analysis and its Applications, Springer-Verlag, 1975.
11. K. K. Jha, Functional Analysis, Students' Friends, 1986.
12. L. V. Kantorovich and G.P. Akilov, Functional Analysis, Pergamon Press, 1982.
13. E. Kreyszig, Introductory Functional Analysis with Applications, John Wiley & Sons, New York, 1978.
14. B. K. Lahiri, Elements of Functional Analysis, The World Press Pvt. Ltd., Calcutta, 1994.
15. A. H. Siddiqui, Functional Analysis with Applications, Tata McGraw-Hill Publishing Company Ltd. New Delhi
16. B.V. Limaye, Functional Analysis, Wiley Eastern Ltd.
17. L.A. Lustenik and V.J. Sobolev, Elements of Functional Analysis, Hindustan Publishing Corporation, New Delhi, 1971.
18. G. F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill Book Company, New York, 1963.
19. A. E. Taylor, Introduction to Functional Analysis, John Wiley and Sons, New York, 1958.
20. K.Yosida, Functional Analysis, 3<sup>rd</sup> edition Springer-Verlag, New York, 1971.
21. J.B. Conway, A Course in Functional Analysis, Springer-Verlag, New York, 1990.
22. Walter Rudin, Functional Analysis, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1973.
23. A. Wilansky, Functional Analysis, Blaisdell Publishing Co., 1964.
24. J. Tinsley Oden & Leszek F. Demkowicz, Applied Functional Analysis, CRC Press Inc., 1996.

**M.Sc./M.A. Course (Fourth Semester)**  
**PAPER -II**  
**Partial Differential Equations and Mechanics (II)**

**Max. Marks 80**

**Partial Differential Equations**

**Unit-I** Non-linear First Order PDE-Complete Integrals, Envelopes, Characteristics, Hamilton Jacobi Equations (Calculus of Variations, Hamilton's ODE, Legendre Transform, Hopf-Lax Formula, Weak Solutions, Uniqueness), Conservation Laws (Shocks, Entropy Condition, Lax Oleinik formula, Weak Solutions, Uniqueness, Riemann's Problem, Long Time Behaviour)

**Unit-II** Representation of Solutions-Separation of Variables, Similarity Solutions (Plane and Travelling Waves, Solitons, Similarity under Scaling), Fourier and Laplace Transform, Hopf-Cole Transform, Hodograph and Legendre Transforms, Potential Functions.

**Unit-III** Asymptotics (Singular Perturbations, Laplace's Method, Geometric Optics, Stationary Phase, Homogenization), Power Series (Non-characteristic Surfaces, Real Analytic Functions, Cauchy-Kovalevskaya Theorem).

**Analytical Dynamics:**

**Unit-IV** Hamilton's Principle. Principle of least action. Poincare Cartan Integral invariant. Whittaker's equations. Jacobi's equations. Lee Hwa Chung's theorem, canonical transformations and properties of generating functions.



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**Unit-V** Hamilton-Jacobi equation. Jacobi theorem. Method of separation of variables. Lagrange Brackets. Condition of canonical character of a transformation in terms of Lagrange brackets and Poisson brackets, invariance of Lagrange brackets and Poisson brackets under canonical transformations.

### **Books Recommended :**

1. L. C. Evans, Partial Differential Equations, Graduate Studies in Mathematics, Volume 19, AMS, 1998.
2. F. Gantmacher, Lectures in Analytic Mechanics, MIR Publishers, Moscow, 1975.
3. R. C. Mondal, Classical Mechanics, Prentice Hall of India

### **References**

1. Books on Partial differential equation by IN. Sneddon, F. John, P. Prasad and R. Ravindran, Amarnath etc.
2. A. S. Ramsey, Dynamics Part II, The English Language Book Society and Cambridge University Press, 1972.
3. H. Goldstein, Classical Mechanics (2nd edition), Narosa Publishing House, New Delhi.
4. I. M. Gelfand and S.V. Fomin, Calculus of Variations, Prentice Hall.
5. Narayan Chandra Rana & Pramod Sharad Chandra Joag, Classical Mechanics, Tata McGraw Hill, 1991.
6. Louis N. Hand and Janet D. Finch, Analytical Mechanics, Cambridge University Press, 1998.



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**M.Sc./M.A. Course (Fourth Semester)**  
**PAPER-III (A)**  
**Operating System and Database Management System**  
**- Theory and Practical**

Max. Marks. 100

(Theory-70 +Practical-30)

**Unit-I** Database Systems-Role of database systems, database system architecture and data modeling.

**Unit-II** Introduction to relational algebra and relational calculus.

**Unit-III** Introduction to SQL: Basic features including views; Integrity constraints; Database design-normalization up to BCNF.

**Unit-IV** Operating Systems- Overview of operating system, user interface, processor management, memory management.

**Unit-V** I/O management, concurrency and Security, network and distributed systems.

**Books Recommended :**

1. S. B. Lipman, J. Lajoi: C++ Primer, Addison Wesley.
2. B. Stroustrup; The C++ Programming Language, Addison Wesley.
3. C. J. Date : Introduction to Database Systems, Addison Wesley.
4. C. Ritehie: Operating Systems-Incorporating UNIX and Windows, BPB Publications.
5. M. A. Weiss, Data Structures and Algorithm Analysis in C++, Addison Wesley.

**Practical Examination Scheme**

Max. Marks – 30

Time Duration – 3 Hrs.

Practical (two)

20 Marks( 10 marks each)

Viva

05 Marks

Sessional

05 Marks

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**M.Sc./M.A. Course (Fourth Semester)**  
**PAPER-III (B)**  
**Cosmology (II)**

Max Marks – 80

- Unit-I:** Cosmology-physical universe, Mach's principle, Einstein modified field equations with cosmological term.
- Unit-II:** Static Cosmological models of Einstein and De-Sitter, their derivation, properties and comparison with the actual universe.
- Unit-III:** Hubble's law. Cosmological principles. Weyl's postulate. Derivation of Robertson-Walker metric. Hubble and deceleration parameters. Redshift. Redshift versus distance relation. Angular size versus redshift relation and source counts in Robertson-Walker space-time.
- Unit-IV:** Friedmann models. Fundamental equations of dynamical cosmology. Critical density. Closed and open Universes. Age of the Universe. Matter dominated era of the Universe.
- Unit-V:** Einstein-deSitter model. Particle and event horizons. Eddington-Lemaitre models with  $\Lambda$ -term. Perfect cosmological principle. Steady state cosmology.

**REFERENCES:**

1. J. V. Narlikar, General Relativity and Cosmology, The Macmillan Company of India, 1978.
2. S. Weinberg, Gravitation and Cosmology: Principles and applications of the general theory of relativity, John Wiley & Sons, Inc. 1972.
3. J. V. Narlikar, Introduction to Cosmology, Cambridge University Press, 1993.
4. L. D. Landau and E.M. Lifshitz, The classical theory of Fields, Pergamon Press, 1980.





**M.Sc./M.A. Course (Fourth Semester)**  
**PAPER-III (C)**  
**Fuzzy Set Theory & Its Applications (II)**

Max Marks – 80

- Unit-I** Fuzzy Logic-An overview of classical logic, Multivalued logics, Fuzzy propositions. Fuzzy quantifiers. Linguistic variables and hedges. Inference from conditional fuzzy propositions, the compositional rule of inference.
- Unit-II** Approximate Reasoning-An overview of Fuzzy expert system. Fuzzy implications and their selection. Multiconditional approximate reasoning. The role of fuzzy relation equation.
- Unit-III** An introduction to Fuzzy Control-Fuzzy controllers. Fuzzy rule base. Fuzzy inference engine. Fuzzification.
- Unit-IV** Defuzzification and the various defuzzitication methods (the centre of area, the centre of maxima, and the mean of maxima methods).
- Unit-V** Decision Making in Fuzzy Environment-Individual decision making. Multiperson decision making. Multicriteria decision making. Multistage decision making. Fuzzy ranking methods. Fuzzy linear programming.

**REFERENCES :**

1. H. J. Zimmemann, Fuzzy set theory and its Applications, Allied Publishers Ltd. New Delhi, 1991.
2. G. J. Klir and B. Yuan- Fuzzy sets and fuzzy logic, Prentice-Hall ol India, New Delhi, 1995.



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# M.Sc./M.A. Course (Fourth Semester)

## PAPER-III (D)

### Mathematical Biology (II)

Max. Marks - 80

#### UNIT-I

**Tumor Modelling:** Phenomenological Models, Nutrients: the Diffusion-limited Stage, Moving Boundary Problems, Growth Promoters and Inhibitors, Vascularisation, Metastasis, Immune System Response.

#### UNIT-II

**Growth and Control of Brain Tumours:** Basic Mathematical Model of Glioma Growth and Invasion, Tumour Spread *In Vitro*: Parameter Estimation, Tumour Invasion in the Rat Brain, Tumour Invasion in the Human Brain, Modelling Tumour Resection in Homogeneous Tissue, Analytical Solution for Tumour Recurrence After Resection, Modelling Surgical Resection with Brain Tissue Heterogeneity, Modelling the Effect of Chemotherapy on Tumour Growth, Modelling Tumour Polyclonality and Cell Mutation.

#### UNIT-III


**Dynamics of Infectious Diseases:** Historical Aside on Epidemics, Simple Epidemic Models and Practical Applications, Modelling Venereal Diseases, Multi-Group Model for Gonorrhea and Its Control, Bovine Tuberculosis Infection in Badgers and Cattle, Modelling Control Strategies for Bovine Tuberculosis in Badgers and Cattle.

#### UNIT-IV

**Modelling of Immunodeficiency Virus:** AIDS: Modelling the Transmission Dynamics of the Human Immunodeficiency Virus (HIV), HIV: Modelling Combination Drug Therapy, Delay Model for HIV Infection with Drug Therapy, Modelling the Population Dynamics of Acquired Immunity to Parasite Infection, Age- Dependent Epidemic Model and Threshold Criterion, Simple Drug Use Epidemic Model and Threshold Analysis.

#### UNIT-V


**Geographic Spread and Control of Epidemics:** Simple Model for the Spatial Spread of an Epidemic, Spread of the Black Death in Europe, Brief History of Rabies, Spatial Spread of Rabies Among Foxes: Background and Simple Model, Three- Species (*SIR*) Model. Control Strategy Based on Wave Propagation into a Nonepidemic Region: Estimate of Width of a Rabies Barrier, Analytic Approximation for the Width of the Rabies, Effect of Fox Immunity on the Spatial Spread of Rabies.



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**Recommended Books**

1. Jeffrey R. Chasnov, Mathematical Biology, Lecture Notes for MATH(365), The Hong Kong University of Science and Technology (2010)
2. Nicholas F. Britton, Essential Mathematical Biology, Springer-Verlag(2003)
3. J. D. Murray, Mathematical Biology I. An Introduction, Springer-Verlag (2002) 3<sup>rd</sup> Edition.
4. J. D. Murray, Mathematical Biology II. Spatial Models and Biomedical Application, Springer-Verlag (2003) 3<sup>rd</sup> Edition.



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## **M.Sc./M.A. Course (Fourth Semester)**

### **PAPER –IV (A)**

#### **Operations Research (II)**

Max. Marks 80

**Unit-I** Dynamic Programming-Deterministic and Probabilistic Dynamic programming.

**Unit-II** Game Theory-Two-Person, Zero-Sum Games. Games with Mixed Strategies. Graphical . Solution. Solution by Linear Programming.

**Unit-III** Integer Programming-Branch and Bound Technique.

**Unit-IV** Applications to Industrial Problems-Optimal product mix and activity levels. Petroleum, Refinery operations, Blending problems, Economic interpretation of dual linear programming. Problems, Input-output analysis. Leontief system. Indecomposable and Decomposable economies.

**Unit-V** Nonlinear Programming-One/and Multi-Variable Unconstrained Optimization., Kuhn-Tucker Conditions for Constrained Optimization. Quadratic Programming. Separable Programming. I Convex Programming. Non-convex Programming.

#### **Books Recommended :**

1. F. S. Hillier and G. J. Lieberman. Introduction to Operations Research (Sixth Edition), McGraw Hill International Edition, Industrial Engineering Series, 1995. (This book comes with a CD containing tutorial software).
2. G. Hadley, Linear Programming, Narosa Publishing House, 1995.
3. G. Hadley, Nonlinear and Dynamic Programming, Addison-Wesley, Reading Mass.
4. H. A. Taha, Operations Research -An introduction, Macmillan Publishing Co., Inc., New York.
5. Kanti Swarup, P.K. Gupta and Man Mohan, Operations Research, Sultan Chand & Sons, New Delhi
6. Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali, Linear Programming and Network flows, John Wiley & Sons, New York, 1990.



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## References

1. S. S. Rao, Optimization Theory and Applications, Wiley Eastern Ltd., New Delhi.
2. Prem Kumar Gupta and D.S. Hira, Operations Research-An Introduction. S. Cliand & Company Ltd., New Delhi.
3. N. S. Kambo, Mathematical Programming Techniques, Affiliated East-West Press Pvt. Ltd., New Delhi, Madras
4. R. K. Rathy, An Introduction to Fluid Dynamics, Oxford and IBH Publishing Company, New Delhi, 1976.
5. A. D. Young, Boundary Layers, AIAA Education Series, Washington DC, 1989.
6. S. W. Yuan, Foundations of Fluid Mechanics, Prentice Hall of India Private Limited, New Delhi, 1976.
7. LINDO Systems Products (Visit websHe <http://www.Hndo.com/productsf.html>)
  - (i) LINDO (the linear programming solver)
  - (ii) LINDO Callable Library (the premier optimisation engine)
  - (iii) LINGO (the linear, non-linear, and integer programming solver with mathematical modelling language)
  - (i) What's Best ! (the spreadssheet add-in that solves linear, non- linear, and integer problems).

All the above four products are bundled into one package to form the Solver Suite. For more details about any of the four products one has to click on its name.

- (i) Optimisation Modelling with LINDO (8" edition) by Linus Schrage.
- (ii) Optimisation Modelling with LINGO by Linus Schrage. More details available on the Related Book page York, 1979.



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## M.Sc./M.A. Course (Fourth Semester)

### PAPER-IV (B)

### Wavelets (II)

Max Marks – 80

**Unit-I** Characterizations in the theory of wavelets-The basic equations and some of its applications.

**Unit-II** Characterizations of MRA wavelets, low-pass filters and scaling functions. Non-existence of smooth wavelets in  $H^2(\mathbb{R})$ .

**Unit-III Frames** - The reconstruction formula and the Balian-Low theorem for frames. Frames from translations and dilations. Smooth frames for  $H^2(\mathbb{R})$ .

**Unit-IV Discrete** transforms and algorithms-The discrete and the fast Fourier transforms. The discrete and the fast cosine transforms.

**Unit-IV** The discrete version of the local sine and cosine bases. Decomposition and reconstruction algorithms for wavelets.

### REFERENCES:

1. Eugenic Hernandez and Guido Weiss, A First Course on Wavelets, CRC Press, New York, 1996.
2. C. K. Chui, An Introduction to Wavelets, Academic Press, 1992.
3. I. Daubechies, Ten Lectures on Wavelets, CBS-NSF Regional Conferences in Applied Mathematics, 61, SIAM, I 1992.
4. Y. Meyer, Wavelets, algorithms and applications (Tran. by R.D. Rayan, SIAM, 1993.
5. M. V. Wickerhauser, Adapted wavelet analysis from theory to software, Wellesley, MA, A.K. Peters, 1994.



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**M.Sc./M.A. Course (Fourth Semester)**

**PAPER -V (A)**

**Programming in C (with ANSI features)**

**(II) Theory and Practical**

**Max. Marks. 100**

(Theory-70 +Practical-30)

**Unit-I** Storage Classes-Fixed vs. Automatic Duration. Scope. Global variables. The register Specifier. ANSI rules for the syntax and Semantics of the storage-class keywords.

**Unit-II** Pointers Pointer Arithmetic. Passing Pointers as Function Arguments. Accessing Array Elements through Pointers. Passing Arrays as Function Arguments. Sorting Algorithms. Strings. Multidimensional Arrays. Arrays of Pointers. Pointers to Pointers.

**Unit-III** Functions-Passing Arguments. Declarations and Calls. Pointers to Functions. Recursion. The main Function. Complex Declarations.The C Preprocessor-Macro Substitution. Conditional Compilation. Include Facility. Line Control.

**Unit-IV** Structures and Unions-Structures. Dynamic Memory Allocation. Linked Lists. Unions, enum Declarations.

**Unit-V** Input and Output-Streams, Buffering. The <Stdio.h> Header File. Error Handling. Opening and Closing a File. Reading and Writing Data. Selecting an I/O Method. Unbuffered I/O Random Access. The standard library for Input/Output.



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**Books Recommended:**

1. Peter A. Darnell and Philip E. Margolis, C: A Software Engineering Approach, Narosa Publishing House (Springer International Student Edition) 1993.
2. Samuel P. Harkison and Gly L. Steele Jr., C : A Reference Manual, 2nd Edition, Prentice Hall, 1984.
3. Brian W. Kernighan & Dennis M. Ritchie, The C Programme Language, 2nd Edition (ANSI Features), Prentice Hall 1989.

**Practical Examination Scheme**

Max. Marks – 30	Time Duration – 3 Hrs.
Practical (two)	20 Marks( 10 marks each)
Viva	05 Marks
Sessional	05 Marks



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## **M.Sc./M.A. Course (Fourth Semester)**

### **PAPER-V (B)**

#### **Graph theory-II**

Max. Marks - 80

Unit-I: Ramsey Theory: Perceptness-preserving operations, Forbidden Subgraph orientations, Ramsey numbers and Ramsey graphs.

Unit-II: Groups: Permutation groups, The automorphism group, graphs with given group, symmetry concepts, pseudo-similarity and stability, spectral studies of the Automorphism group.


Unit-III: Polynomials and Graph Enumeration: The colour polynomials, The chromatic polynomial, The bivariate colouring polynomials.

Unit-IV: Graph Enumeration: Co-chromatic (co-dichromatic) graphs and chromatically unique graphs, Graph Enumeration.

Unit-V: Digraphs & Networks: Digraphs, Types of connectedness, Flows in Networks, Menger's and Konig's Theorem, Degree sequences.

#### **REFERENCES:**

1. K. R. Parthasarathy, Basic graph theory, Tata Mc graw Hill publishing company limited, 1994.
2. R. J. Wilson, Introduction to graph theory, Longman Harlow, 1985.
3. John Clark, Derek Allon Holton, A first look at graph Theory, World Scientific Singapore, 1991.
4. Frank Hararary, Graph Theory Narosa, New Delhi, 1995.
5. Ronald Gould and Benjamin Cummins, Graph Theory, California.
6. Narsingh Deo, Graph Theory with applications to Engineering and Computer Science, Prentice-Hall of India Private Limited, New Delhi, 2002.



# M.Sc./M.A. Course (Fourth Semester)

## PAPER-V (C)

### Algebraic Number Theory (II)

Max Marks – 80

#### UNIT-I

**Extensions:** Decomposition and ramification, Unramified extensions, Tamely ramified extensions.

#### UNIT-II

**The Different and Discriminant:** Complementary modules, The different and ramification, The discriminant.

#### UNIT-III

**Cyclotomic Fields):** Roots of unity, Quadratic fields, Gauss sums, Relations in ideal classes, Fermat's last theorem.

#### UNIT-IV

**The Structure of Units:** Dirichlet's Unit Theorem, Units in Real Quadratic Fields, Pell's equation.

#### UNIT-V

**Zeta Functions:** The Riemann Zeta Function, Dedekind Zeta Function

#### References:

1. Serge Lang: Algebraic Number Theory, Springer-Verlag, 1986.
2. Jean-Pierre Serre: Local Fields, Springer-Verlag, 1979
3. M. Ram Murty, Jody Esmonde: Problems in Algebraic Number Theory (2<sup>nd</sup> ed.), Springer, 2005.
4. H. P. F. Swinnerton-Dyer: A Brief Guide to Algebraic Number Theory, Cambridge University Press, 2001
5. A. Frohlich, M.J. Taylor: Algebraic Number Theory, Cambridge University Press, 1991.
6. Ian Stewart, David Tall: Algebraic Number Theory and Fermat's Last Theorem (3<sup>rd</sup> ed.), A K Peters, Natick, Massachusetts, 2002.
7. Ethan D. Bolker: Elementary Number Theory, An Algebraic Approach, W. A. Benjamin, Inc., New York, 1970
8. Jurgen Neukirch: Algebraic Number Theory, Springer-Verlag, 1999
9. William Stein: Algebraic Number Theory, a Computational Approach, Cambridge University Press, 1991.

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# **HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**

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## **SCHEME OF EXAMINATION & SYLLABUS of M.A./M.Sc.(Geography) Semester Exam Session 2019-20**

**(Approved by Board of Studies)  
Effective from July 2019**

# Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

## M.A./M. Sc. GEOGRAPHY

### SEMESTER I (2019-20)

M. A. /M. Sc. Geography Semester I shall consist the following papers:

S. No.	Paper	Title	M. M.		
			Written	Inte. Asse.	Total
1.	I	Geomorphology	80	20	100
2.	II	Climatology	80	20	100
3.	III	Geographical Thought	80	20	100
4.	IV	Geography of India	80	20	100
5.	V	Practical-I : Advanced Cartography	---	---	100

1. The M. A. /M. Sc. Semester I examination in Geography shall consist of 500 marks.

There shall be four theory papers each of 100 marks and one practical of 100 marks as follows:

Paper I	Geomorphology
Paper II	Climatology
Paper III	Geographical Thought
Paper IV	Geography of India
Paper V	Practical-I: Advanced Cartography

2. The theory papers shall be of three hours duration.
3. Candidates will be required to pass separately in theory and practical examinations.
4. (a) In the practical examination the following shall be the allotment of time and marks.


(i)	Practical record	20%
(ii)	Lab work (up to three hours)	70%
(iii)	Viva on i. ii.	10%

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- (b) The external and internal examiners shall jointly submit marks.
- (c) All the candidates shall present at the time of the practical examination their practical record regularly signed by the teachers concerned.

  
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## PAPER –I (2019-20)

### GEOMORPHOLOGY

- UNIT – I Nature and scope of Geomorphology; Fundamental concepts; Interior of the earth; Earth movement: epeirogenic and orogenic movements With reference to the evolution of the Himalaya: Forces of Crustal instability, Isostasy, Geosyncline, Plate tectonic, Mountain building, Earthquake and Vulcanicity.
- UNIT – II Exogenic processes: concept of gradation; Agents and processes of gradation: weathering, wasting and erosion, aggradation; Climatic Geomorphology and morphogenetic regions; slope evolution, Arid Semi-Arid and Karst topography.
- UNIT – III Concept of Geomorphic cycle and its controversy; Dynamic of glacial and periglacial processes and resulting landforms, Complications of fluvial geomorphic cycle and resulting landforms.
- UNIT – IV Geological structure and landform: development of landscape and drainage on uniclinal, folded and domal structures and Erosion surfaces, Applied Geomorphology.

#### SUGGESTED READINGS:

1. Ahnmed, E.: Coastal Geomorphology of India.
2. Chorley, R. J.: Spatial Analysis in Geomorphology, Methuen, London, 1972.
3. Cooke R.IJ.and Doornkamp, J.C. : Geomorphology in Environmental Management. An Introduction, Clarendon press, Oxford, 1974.
4. Dury, G.H.: The Face of the Earth, Penguin Hormondsworth 1959.
5. Fairbridge, R.W. Encyclopedia of Geomorphology, Reinholdts, New York, 1968.
6. Goudie, A.: The Nature of the Environment Oxford & Blackwell, London, 1993.
7. Garner, H.F. : The Origin of landscape- A Synthesis of Geomorphology, Oxford University Press. London, 1974.
8. Holms, A.: Principles of Physical Geology, Thomas Nelson, London.
9. Mitchell, C.W.: 'l'erra.ii'i Evaluation. Longman, London, 1973.
10. Oilier, C.D. : Weathering, Longman, London, 1979.
11. Pitty, A.F.: Introduction to Geomorphology, Methuen, London, 1971.
12. Stoddart, D.R. (ed.) : Process and Form in Geomorphology, Roulledge, New York, 1996.
13. Skinner, B.J. & Porter, S.C.: The Dynamic Earth John Wiley. New York, 1995.
14. Sparks, B.W. Geomorphology, Longman, London, 1960.
15. Sharma, H.S. (cd.): Perspective in Geomorphology, Concept, New Delhi, 1980.
16. Singh, S : Geomorphology, Prayag Publication, Allahabad, 1998.
17. Steers, J.A. : The Unstable Earth Methuen, London.
18. Thornbury, W.I.). Principles of Geomorphology, John Wiloy, New York, 1960.
19. Strahler, A.N.: Physical Geography, Willey, New York.

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DR. R. Sharma

20. कौशिक,एस.डी.: भू-आकृति विज्ञान
21. नेगी, बी,एस., भू-आकृति विज्ञान
22. दयाल परमेश्वर, भू-आकृति विज्ञान
23. यादव तथा रामसुरेश., भू-आकृति विज्ञान, ग्रनयि, कानपुर
24. सिंह,सविन्द्र के, भू-आकृति विज्ञान, शारदा पुस्तक भवन, इलाहाबाद

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## PAPER - II (2019-20)

### CLIMATOLOGY

- UNIT – I Nature and scope of climatology and its relationship with meteorology; composition of atmosphere; Insolation, heat balance of the earth, stability and instability, greenhouse effect, vertical and horizontal distribution of temperature.
- UNIT – II Jet stream; General circulation in the atmosphere; Acid rain; concept of air masses and Front. EL Nino and La Nino. Monsoon winds and cyclones.
- UNIT – III The application of general principles of elementary physical and synoptic meteorology to the study and classification of climate. Climatic classification of Koeppen and Thornthwaite. Major climate of the world-tropical, temperate, desert and mountain climate.
- UNIT – IV Climatic changes during geological and historical times, evidences, possible causes, global warming, Applied climatology.

### SUGGESTED READINGS:

1. Barry, R.G. and Chorley P..1.; Atmosphere, Weather and Climate, Roulledge, London and New York, 1998.
2. Critchfield, J.H. : General Climatology, Prentice Hall, India, New Delhi, 1993.
3. Das, P.K. : Monsoons 'National Book Trust, New Delhi, 1987.
4. Fein, J.S. and Stephens, P.N. : Monsoons. Wiley Interscience, 1987.
5. India Met. Deptt : Climatological Tables of Observatories in India, Govt. of India 1968.
6. Lal, D.S. : Climatology, Chaitanya Publications, Allahabad, 1986.
7. Lydolph, P.H. : The Climate of the Earth, Rowman, 1985.
8. Menon, P.A. : Our Weather, N.B.T., New Delhi, 1989.
9. Peterson, S. : Introduction to Meteorology, McGraw Hill Book, London, 1969.
10. Robinson, P.J. and Henderson S. : Contemporary Climatology, Henlow, 1999.
11. Thompson, R.D. and Perry, A (ed.) : Applied Climatology, Principles and Practice. Routledge, London. 1997.
12. तिवारी अनिल कुमार : जलवायु विज्ञान, राजस्थान हिन्दी ग्रंथ अकादमी
13. सिंह, सविन्द्र, प्रवालिका पब्लिकेशन्स, इलाहाबाद

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DR. R. Sharma



**PAPER – III (2019-20)**  
**GEOGRAPHICAL THOUGHT**

- UNIT – I      The Field of geography, its place in the classification of science, geography as a social science, and natural science. Definition, scope and functions of geography; Geography as science of relationship, as science of areal differentiation, as spatial science, Spatial Organization, Geography and environmentalism: forms of man-nature relationship and current view; Dualism in geography; Regional Concept.
- UNIT – II      The growth of geographical knowledge from earliest times up to the 15th century. Contributions of Greek and Roman thinkers. Arab Geographers and their contributions. Geographical information in Ancient Indian literature. The dark age in Geography. The Great Age of Maritime Discovery and Exploration.
- Contributions of various schools of thought in modern Geography:
- (i)    German School                      (ii)    French School
- (iii) British School                      (iv)    American (v) Russian Schools.
- UNIT – III      Scientific explanations: routes to scientific explanation (inductive/deductive); Type of explanation: cognitive description, cause and effect, temporal, functional/ecological, systems; Laws, theories and models in geography; Quantitative revolution and philosophy of positivism.
- UNIT – IV      Responses to positivism, behaviourism and humanistic, relevance movement and radical geography; Changing paradigms; Status of Indian Geography; Future of Geography.

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DR. R. Sharma

## SUGGESTED READINGS:

1. Abler, Ronald; Adams, John S. Gold, Peler : Spatial Organization : The Geographer's view of the world. Prentice Hall, N.J. 1971.
2. Ali S.M. : The Geography of Puranas, Peoples Publishing House, Delhi, .1968.
3. Amedeo, Douglas : An Introduction to Scientific Reasonign in Geography, John Wiley, U.S.A. 1971.
4. Dikshit, R.D. (ed.): The Art & Science of Geography Rand Me Nally & Co., 1959.
5. Hartshorne, R.: Perspectives on Nature of Geography Rand Me Nally & Co., 1959.
6. Husain, M. : Evolution of Geographic Thought, Rawat Pub., Jaipur, 1984.
7. Johnston, R.J.: Philosophy and Human Geography, Edward Arnold, London, 1983.
8. Johnston, R.J.: The Future of Geography, Methuen, London, 1988.
9. Minshull, R.: The Changing Nature of Geography, Hutchinson University Library, London, 1970.
10. Ali, S. M.- Arab Geography.
11. Taylor, G.: Geography in the 20th Century.
12. Dikshit, R.D.: Geographical Thought : A Contextual History of Ideas, Prentice Hall of India, New Delhi.
13. Harvey D. : Explanation in Geography.
14. सिंह उजागर : भौगोलिक चिन्तन का विकास
15. त्रिपाठी एवं बिरले: भौगोलिक चिन्तन का विकास एवं विधितंत्र
16. कौशिक, एस.डी.: : भौगोलिक विचारधाराओं का इतिहास एव विधितंत्र
17. सिंह, जगदीश : भौगोलिक चिंतन का मूलाधार.

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DR. R. Sharma

## PAPER – IV (2019-20)

### GEOGRAPHY OF INDIA

- UNIT – I Physical and Biological elements in the Geography of India: Geological structure, relief, climate, Drainage, vegetation and soils.
- UNIT – II Agriculture: Major characteristics and problems, Impact of infrastructural and institutional factors on agriculture. Important crops-wheat, rice, cotton, sugarcane, oil-seeds, tea and coffee, Agricultural regions. Green revolution, Agro-climatic regions.
- UNIT – III Sources of power: Coal; Petroleum, Natural gas. Hydroelectricity and Atomic energy. Mineral resources with special reference to iron ore, manganese and bauxite. Industrial development with special reference to iron and steel, cement, cotton, jute, sugar and paper industries; Industrial regions.
- UNIT – IV Regional division of India: Purpose and Methodology. Major schemes of regions of India: O.H.K. Spate and R.L. Singh. Physical and cultural geography of Chhattisgarh State.

### SUGGESTED READINGS:

1. Centre for Science & Environment (1988) State of India's Environment, New Delhi.
2. Desphande C.D. India : a Regional Interpretation ICSSR & Northern Book Centre 1992.
3. Dreza, Jean & A.Martya. Sen (ed.) India Economic Development and Social opportunity Oxford University Person, New Delhi. 1996.
4. Kundu A. Raza Moonis : Indian Economy : the Regional Dimension Spectraum Publishers, New Delhi, 1992.
5. Robinson, Francis : The Cambridge Encyclopedia of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan & Maldives Cambridge University Press, London, 1989.
6. Singh R.L. (ed.) : India - A Regional Geography National Geographical Society, India Varanasi, 1971.
7. Spate OHK & ATA Learnont-India & Pakistan Methuen, London. 1967.
8. Tirtha R. & Gopal Krishna, Emerging India Reprinted by Rawat Publications, Jaipur 1996.
9. Sharma T.C. and O. Coutinho : Economic and Commercial Geography of India.
10. अग्रवाल पी.सी. भारत का भौतिक का भूगोल, एशिया प्रकाशन कं., रायपुर 2003
11. बंसल सुरेशचन्द्र : भारत का भौतिक का भूगोल, मिनाक्षी प्रकाशन , मेरठ.
12. वर्मा रामविलास, भारत : एक भौगोलिक विवेचन , भवदीय प्रकाशन श्रृंगारघाट – अयोध्या, फैजाबाद, पिन –224123, 2007

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## PAPER – V (2019-20)

### PRACTICAL I - ADVANCED CARTOGRAPHY

**Graphs and Diagrams:** Triangular graph. Logarithmic and semi logarithmic graphs, scatter graphs; climatograph. Proportional circles, spheres and cubes.

**Thematic Maps:** Choropleth maps, isolines, Flow maps, isochrones and class intervals. Morphometric Analysis: Profiles, Slope Analysis; Altimetric, and Clinographic curves; Block Diagrams.

#### SUGGESTED READING:

1. Monk house F.J. & H.R. Wilkinson: Maps and Diagrams, Methuen, London.
2. मॉक हाउस तथा विल्किन्सन (अनु.प्रो.प्रेमचन्द अग्रवाल) : मानचित्र तथा आरेख म.प्र. हिंदी ग्रंथ अकादमी
3. हीरालाल: प्रायोगिक भूगोल.
4. शर्मा, जे. पी. प्रायोगिक भूगोल,

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## M.A./M. Sc. GEOGRAPHY (2019-20)

### SEMESTER – II

M. A. /M. Sc. Geography Semester II shall consist the following papers:

S. No.	Paper	Title	M. M.		
			Written	Inte. Asse.	Total
1.	VI	Economic and Natural Resource Management	80	20	100
2.	VII	Oceanography	80	20	100
3.	VIII	Regional Development and Planning	80	20	100
4.	IX	Social Geography	80	20	100
5.	X	Practical-II : Map Projections, Map Interpretation and Surveying	---	---	100

1. The M. A./M. Sc. Semester II examination in Geography shall consist of 500 marks.

There shall be four theory papers each of 100 marks and one practical of 100 marks as follows:

Paper VI Economic and Natural Resource Management.

Paper VII Oceanography

Paper VIII Regional Development and Planning

Paper IX Social Geography

Paper X Practical-II : Map Projections, Interpretation and Surveying.


2. The theory papers shall be of three hours duration.

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3. Candidates will be required to pass separately in theory and practical examinations.
4. (a) In the practical examination the following shall be the allotment of time and marks.
- |                                      |     |
|--------------------------------------|-----|
| (i) Practical record                 | 20% |
| (ii) Lab work (up to three hours)    | 40% |
| (iii) Field work (up to three hours) | 30% |
| (iv) Viva on i, ii & iii above       | 10% |
- (b) The external and internal examiners shall jointly submit marks.
- (c) Candidates shall be examined in survey individually. They will however be allowed to take the help of a labourer each at their own expense.
- (d) All the candidates shall present at the time of the practical examination their Practical record regularly signed by the teachers concerned.

  
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## PAPER- VI (2019-20)

### ECONOMIC AND NATURAL RESOURCE MANAGEMENT

- UNIT – I Nature and scope of economic Geography; fundamental concepts in economic geography; classification of economies, sectors of economy (primary, secondary, tertiary). Meaning, nature and classification of resources, Resource appraisal: human wants and social objective, technological status and resources. Appraisal of quality and quantity of human resources, relation between population and resource, natural resources and economic development, resource adequacy and scarcity, limits to growth. Resource use, concept of absolute and relative abundance of resources, optimum, under use, misuse and over use of resources.
- UNIT – II World pattern of major natural resources: land and soils, biotic resources, water resources mineral and energy resources, oceanic resources.
- UNIT – III Classification of Industries, Theories of industrial location; case studies of selected industries; Iron and Steel; Aluminium, Chemical, Textile. Means of transport, International trade, trade blocks, globalization and Indian economy.
- UNIT– IV Conservation and management of resources; evolution of the concept, principles, philosophy and approaches to conservation, resource conservation and management methods. Policy making and resource management; sustainable development of resources.

### SUGGESTED READING:

- |   |   |  |
|---|---|--|
| Ahemd, Jaleel                           | - | Natural Resources in Low Income Contries.                |
| Bennet, II.II.                          | - | Elements of Soil Conservation.                           |
| Ciriacy, Wantrup, S.V. & Persons (eds.) | - | Natural resources: Quality & Quantity                    |
| Betall, R.C. & R.O. Buchanan            | - | Industrial Activity and Economic Geography.              |
| Edvard and Rosers                       | - | Agricultural Resources.                                  |
| Freeman, T.W.                           | - | Geography and Planning.                                  |
| Fryer, D.M.                             | - | World Economic Development.                              |
| Isard, Walter                           | - | Method of Regional Analysis.                             |
| Mehta, M.M.                             | - | Human Resource Development Planning.                     |
| Owen, O.S.                              | - | Natural Resource Conservation.                           |
| Peach, W.N. & James, A.                 | - | Zimmerman's World Resources Contenting and Conservation. |
| Parkin's, E.A. & J.R. Whitakr           | - | Our Natural Resource and their conservation.             |
| Renner, G.T.                            | - | Conservation of National Recourses.                      |
| Stamp, L.D.                             | - | Land of Britain Its use and Misue.                       |

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|--------------------------|---|---|
| Smith, G.H.(ed.)         | - | Conservation. of Natural Recourses.           |
| Symoos, L.               | - | Agriculture Geography.                        |
| Thomas W.L.(et.al.reds.) | - | Man's Role in Changing the face of the Earth. |
| Wales, H.& H.O. Lathrop  | - | The Conservation of Natural Recourses.        |
| Wheeler, T.O. et al      | - | Economic Geography, John Wiler New York 1995. |

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## PAPER – VII (2019-20)

### OCEANOGRAPHY

- UNIT – I Nature and scope of Oceanography; Distribution of land and water; Major features of ocean basins; Marine sediments. Physical and chemical properties of sea water.
- UNIT – II Interlink between atmospheric circulation and circulation pattern in the oceans, surface currents, Thermohaline, waves and tides.
- UNIT– III Marine-biological environment : Bio-geochemical cycle in the ocean. biozones, types of organisms; plankton, nekton and benthos, food and mineral resources of the sea. Major marine environments; coastal : estuary, deltas, barrier island, rocky coasts : Open : reefs, continental shelf, continental slope and deep : Pelagic environment and floor of the ocean basins.
- UNIT – IV Impact of Humans on the marine environment. Law of the sea; exclusive economic zone; marine deposits and formation of coral-reefs.

#### SUGGESTED READINGS:

1. Davis Richard J.A. : "Oceanography-An Introduction to the Marine Environment". Wm. C. Brown Iowa, 1986.
2. Duxbury, C.A. and Duxbury B. : An Introduction to the world's Oceans-C. Brown. Iowa 2nd ed., 1986.
3. Garrison, T. : "Oceanography - An Introduction to Marine Science" Books/Cole, Pacific Grove, USA, 2001.
4. Gross, M. Grant : Oceanography, a View of the earth, prantice-Hall inc, New Delhi, 1987.
5. King C.A.M. Oceanography for Geographers 1962.
6. Sharma, R. C. "The Oceans" Rajesh N. Delhi, 1985.
7. Urnmerkutty, A.N.P. Science of the Eceans and Human life, NBT, New Delhi, 1985.
8. Ornmany, F.D. : The Ocean.
9. Sharma, R. C. & M. Vital : Oceanography : A Brief Introduction kisluya Pub. New Delhi.
10. Siddartha, K.. : Oceanography : A Brief Introduction, Kislya Pub. New Delhi.
11. नेगी ,बी.एस.: जलवायु तथा समुद्र विज्ञान.
12. सिंह, सविन्द्र सिंह – समुद्र विज्ञान, प्रयाग पुस्तक भवन, इलाहाबाद (उ.प्र.) 2011
13. लाल, डी. एस – समुद्र विज्ञान,

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## PAPER – VIII (2019-20)

### REGIONAL DEVELOPMENT AND PLANNING

- UNIT – I      Regional Planning: Definition, Scope, evolution and Objectives. Region and Regionalism, Planning Regions: Concept and Delineation. Type of Regions. Central Place Theory, Concept of core and periphery Friedmann's Model of Spatial Organisation and Economic Growth.
- UNIT – II      Regional Development Theories: Development Theories of Myrdal and Hirschman, Economic and Export Base model, Frank's Theory of Under development.
- UNIT – III      Approaches and Strategies of Regional Development: Growth Pole Theory Agropolitan Development, Community Development, River Basin Planning, Metropolitan Planning (with reference to India).
- UNIT– IV      Regional Planning in India. Regional Imbalances and Inequalities, Indicators of Regional Development; Regional Policies in Five Year Plans, Centre State Relations and Multilevel Planning, Planning for special problem Regions: Hill areas, Tribal areas, Drought prone areas, Command areas and River basins. Regional development and planning in India.

#### SUGGESTED READING:

1.      Daysch, C.H.J. & others: Studies in Regional Planning.
2.      Deckinsonm R.E. : City Region and Regionalism.
3.      Freeman, E.W. : Geography arid Planning.
4.      Golksin A. : Regional Planning and Development.
5.      Keeble, L. : Principle and Practice of Town and Country Planning.
6.      Stamp L.D. : The Land of Britain : Its use and Misure.
7.      Sdasyuk. Gatina and Dengupta, P. : Economic Regionalization of India problems and Approaches.
8.      Desai, P.B. & others : Regional Perspective of Industrial and Urban Growth the case of Kanpur, Bombay, 1969.
9.      Prakash, Rao V.L. & S.P. : Regional Planning.
10.      Censuts of India : Economic and Socio Cultural Dimensions of regionalization (An Indo-USSR Collaborative Study)

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11. Friedmann J. & Alonso : Regional Development and Planning, M.I.T. Press.
12. Misra R.P. (ed.) : Regional Planning : Concept; Techniques, Policies and case studies Mysore 1969.
13. Misra, R.P. & others : Regional Development and Planning in India.
14. Timbergen : Essays on World Regional Planning.
15. Lord, W. : Methods of Regional Analysis, M.I.T., 1960.
16. Zimmerinan, E.W. : World Resources and Industries.
17. Burton & Kates : Reading in Resource Management Conservation.
18. Burton & Kates : Regional Planning in India.
19. Ahamed, Enayet : Regional Planning with particular Reference to India. Vol. I and II New Delhi.
20. Bhatt L.S. and others: Micro level planning - A Case Study of Karnal Area, Haryana (K.B. Publishing, New Delhi)
21. Bhatt LS : Regional Planning in India, Statistical Publishing Society, Calcutta, 1973.
22. Gosal GS, and G. Krishanan : Regional Disparities in levels of Socio-economic Development in Punjab, Vishal Publications Kurukshetra, 1984.
23. Chandna, R.C. : Regional Planning : A comprehensive 'Text-Kajyani Publishers.
24. Ray Choudhari, Jayasri : An Introduction to Development and Regional Planning Orient Longman.
25. Sundaram, KV (ed) Geography and Planning, Essays in honour of VLS Prakasa Rao, Concept Publishing Co., New Delhi, 1985.
26. Raza, Meomis (ed) Regional Development, Heritage Publishers, Delhi, 1988.
27. Mishra R.P. et al : Multilevel Planning, Heritage Publishers Delhi, 1980.
28. श्रीवास्तव व्ही .के. एवं अन्य : प्रादेशिक नियोजन एवं संतुलित विकास.
29. ओझा, रघुनाथः प्रादेशिक नियोजन का भूगोल,.
30. शर्मा, राजीवलोचन : प्रादेशिक एवं नगरीय नियोजन.
31. चन्द्राकर, इन्द्रमन : व्यावहारिक भूगोल, वसुन्धरा प्रकाशन, गोरखपुर, 1998.

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## **PAPER – IX (2019-20)**

### **SOCIAL GEOGRAPHY**

- UNIT– I Definition, meaning and scope of Social geography and its Nature and relationship with other Social sciences. Development of Social Geography, Approaches to the study of Social Geography.
- UNIT– II Concept of Society – Social Environment, Geographic bases of Social Formation. Social Geography of India - Social Stratification, Caste and Class. Social organization and groups, Social transformation and change in India, Religion and linguistic group of India. Evolution of Socio-Cultural Regions of India.
- UNIT – III Social well- being– meaning and indicators of Social well- being. Quality of life, Pattern and bases of rural and urban society. Deprivation and discrimination issues relating to women and under privileged groups. Cultural Realms and Cultural Region of the World.
- UNIT – IV Social development planning – meaning and importance. Public policy and social planning in India: Review of Five year Plans strategies to improve social well-being in tribal, hill, drought and flood prone Areas.

#### **SUGGESTED READINGS:**

- 1 Ahmad Aijazuddin, Social Geography, Rawat Publication, New Delhi, 1999.
- 2 De Blij. H.D. Human Geography. John Wiley and son, New York.
- 3 Dreze Jean, Amariya Sen, Economic Development and Social opportunity. Oxford University Press. New Delhi. 1996
- 4 Dubey. S.C : Indian Society. National Book Trust, New Delhi, 1991.
- 5 Gregory. D . and J. Larry (Eds.) Social. relations and spatial structures. MC Millan. 1985.
- 6 Haq. Mahbubul : Reflections on Human Development. Oxford University Press, New Delh6.
- 7 Jones, Emrys, Reading in Social Geography, Oxford University Press, Ely House, London, 1977.
- 8 Jones, Emrys and John Eyles, An Introduction to Social Geography, Oxford University Press, London, 1977.
- 9 Maione. Clarence: People of South Asia, Winston, New York, 1974.
- 10 Planning Commission, Government of India: Report on Development of Tribal areas, 1981.
- 11 Rao, M.S.A.. Urban Sociology in India, Orient Longman, 1970.
- 12 Schwartzberg Joseph : An Historical Atlas of South Asia, University of Chicago Press, (Chicago, 1978.
- 13 Sen, Amartya & Dreze Jean. Indian Development : Selected Regional Perspectives. Oxford University Pres-s, 1996

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14. Smith, David: Geography : A welfare Approach, Edward Arnold, London, 1977.
15. Sopher, David. An Expoloration of Inda, Cornell University Press, 1980.
16. Subba. Rao. Personality of India : Pre and Proto Historic foundation of India and Pakistan, M.S. University Baroda. Vadodai'a, 1958
17. मौर्य, एस.डी., सामाजिक भूगोल शारदा पुस्तक भवन, 11 युनिवर्सिटी रोड इलाहाबाद-2, 2004.

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## PAPER – X (2019-20)

### PRACTICAL II- MAP PROJECTIONS, INTERPRETATION AND SURVEYING

Map Projections: Mathematical/Graphical construction of world


projections. Interpretation of Maps: Geological Maps.

Principles and methods of topographical surveying involving the use of Theodolite and Dumpy level. Solution of problems in Surveying.


Topographical Information – International series, South east Asia Series, Indexing, Classification & Interpretation of topographical sheets.

#### SUGGESTED READINGS:

1. Davis, R. C. & E. S. Forte : Surveying : Theory and Practical.
2. Kanetkar, T.R. & S.V. Kulkarni: Surveying and leveling part I & II A.V.G. Prakashan, Poona.
3. Monkhouse F.J. & H.R. Wilkinson: Maps and Diagrams, Methuen, London.
4. मॉक हाउस तथा विल्किन्सन (अनु.प्रो.प्रेमचन्द अग्रवाल) : मानचित्र तथा आरेख म.प्र. हिंदी ग्रंथ अकादमी .
5. हीरालाल: प्रायोगिक भूगोल.

  
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## M.A./M. Sc. GEOGRAPHY SEMESTER III (2019-20)

M.A. /M. Sc. Geography Semester III shall consist the following papers:

S. No.	Paper	Title	M. M.		
			Written	Inte. Asse.	Total
1.	XI	Population Geography	80	20	100
2.	X II	Settlement Geography	80	20	100
3.	XIII (A)	Remote Sensing Techniques	80	20	100
	<b>OR</b>	<b>OR</b>			
4.	XIII (B)	Biogeography and Ecosystem	80	20	100
5.	XIV	Research Methodology	80	20	100
	XV	Practical-III : Remote Sensing and Quantitative Techniques	---	---	100

1. The M.A. /M. Sc. Semester III examination in Geography shall consist of 500 marks.

There shall be four theory papers each of 100 marks and one practical of 100 marks as follows:

- Paper XI : Population Geography  
Paper XII : Settlement Geography  
Paper XIII (A) : Remote Sensing Techniques  
**OR**  
Paper XIII (B) : Biogeography and Ecosystem  
Paper XIV : Research Methodology  
Paper XV : Practical – III: Remote Sensing and Quantitative Techniques

2. The theory papers shall be of three hours duration.  
3. Candidates will be required to pass separately in theory and practical examinations.  
4. (a) In the practical examination the following shall be the allotment of time and marks.

- (i) Practical record : 20%

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(ii) Lab work (up to Four hours) : 70%


(iii) Viva on i.& ii. Above : 10%


(b) The external and internal examiners shall jointly submit marks.

(c) All the candidates shall present at the time of the practical examination their practical record regularly signed by the teachers concerned.

  
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## SEMESTER – III (2019-20)

### PAPER - XI

#### POPULATION GEOGRAPHY

- UNIT – I Definition and scope of Population Geography. Relation of Population Geography with other subjects of social sciences. Historical development of Population Geography in western countries and in India. Sources of population data, Census and its history.
- UNIT – II Distribution of Population: The concept of population density and its types. Factors affecting population distribution. Distribution & Density of population in the world with special reference to Europe, Asia and India. Growth of population: Measure of decennial and annual rates of population growth, prehistoric and modern trends of population growth in the world. Regional aspect of population growth in India. Population theories. Demographic transition.
- UNIT– III Population composition in terms of age and sex, rural, urban residence, educational status and occupational structure. Significance of these elements in population analysis, factors affecting their composition in population, broad world patterns and detailed spatial patterns in India. Fertility and Mortality of population: Significance and factor. Indices and rates. World pattern and pattern in India. Human Development Index and its Components.
- UNIT– IV Migration of population: Causes, characteristics and types. Methods of estimating value of internal migration. Important international migrations of the world, internal migration in India: Population and Resources: Population-Resource regions. Population Regions: Concept and methods, population regions of India, population policies of India.

#### SUGGESTED READINGS:

1. Bilasborruw, Richard Ii and Daniel Hogan, Population and Deforestation in the Humid Tropics, International Union for the Scientific Study of Population, Belgium 1999.
2. Boglia, D.J. Principles in Demography, John Wiley, New York 1969.
3. Bose, Ashish et al. : Population in India's Development (1947-2000); Vikas Publishing House, New Delhi, 1974.
4. Census of India, India : A State Profile, 1991.
5. Chandna, R. C. Geography of Population, Concept, Determinants and Patterns. Kalyani

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- Publishers, New York, 2000.
6. Clarke, John I. Population Geography, Pergamon Press, Oxford, 1973.
  7. Crook, Nigel Principles of Population and Development Pergamon Press. New York 1997.
  8. Daugherty, Helen Gin, Kenneth C.W. Kammeyir, An Introduction to Population (Second Edition), The Guilford Press, New York, London, 1998.
  9. Garnier, B.J. Geography of population Longman, London. 1970.
  10. oclihar, Rajesh, The Veclic People : Their History and Geography Orient I ongman Ltd., New Delhi, 2000.'
  11. Mamoria, C.B. India's Population Problem, Kitab Mahal New Delhi, 1981.
  12. Mjtra, Ashok India's Population : Aspects of Quality and (control Vol I & 11. Abhiman Publications, New Delhi, 1978.
  13. Premi, M.K. India's Population : Heading Towards a Billion, B.R., Publishing Corporation 1991.
  14. Srinivasan, K. and M. Vlassoff, Population Development Nexus in India :Challenges for the New Millennium Lata Me Graw-Hill, New Delhi, 2001.
  15. Srinivasan K. Basic Demographic Techniques and Applications Sage, Publications, New Delhi, 1998.
  16. Sunda.ra.m K. V. a.nd Sudesh Nangia., (ed.) Population Geography, Henlage Publications, Delhi, 1986.
  17. UNDP : Human Development Report, Oxford University Press, Oxford, 2000.
  18. United Nations, Methods for Projections of urban and Rural Population No. VIII, New York, 1974.
  19. Woods R.. Population Amalysis' in Geography Longman, London, 1979.
  20. Zeiinsky Wilbur, A Prologue to Population Geography, Prentic Hall, 1966.
  21. बघेल, अनुसुइया : अनुसूचित जातियों एवं अनुसूचित जनजातियों में प्रजननता प्रतिरूप : छत्तीसगढ़ राज्य के रायपुर संभाग के विशेष संदर्भ में, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर, 2002.
  22. बघेल, अनुसुइया : शिशु मर्त्यता : सिंघई पब्लिशर्स एण्ड डिस्ट्रीब्यूटर, रायपुर, 2004.
  23. शर्मा, सरला : औद्योगिक नगरों में जनसंख्या आप्रवास (भिलाई एवं कोरबा नगर के विशेष संदर्भ में), पं.रविशंकर शुक्ल विश्वविद्यालय, रायपुर, 2002.
  24. शर्मा, सरला : छत्तीसगढ़ बेसिन में ग्रामीण शिशु मर्त्यता प्रतिरूप.. पंडा, बी.पी. : जनसंख्या भूगोल.
  25. ओझा, रघुनाथ : जनसंख्या भूगोल. हीरालाल : जनसंख्या भूगोल.
  26. चन्दना, आर.सी. : जनसंख्या भूगोल. त्रिपाठी,
  27. रामदेव : जनसंख्या भूगोल.

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## SEMESTER – III (2019-20)

### PAPER - XII SETTLEMENT GEOGRAPHY

- UNIT – I      Meaning, Objectives and Scope of Settlement Geography; Evolution, Distribution, Types and Patterns of Rural Settlements; Rural House Types; Rural Service Centers.
- UNIT – II      Evolution and growth of urban settlements; The Geographical setting of Urban Centers: Site, Situation and Location.
- UNIT – III      Rank- size-relationship; Cities as Central Places, Central Place Theory, Growth Centre Theory.
- UNIT – IV      City- Country Relationship: Umland, Rural-Urban Fringe.

#### SUGGESTED READINGS:

1. Abercrombee, Sir P. : Town and Country planning 1961.
2. Alani, Shah Manzoor : Hyderabad Secuidrabad (Twin Cities) A. study in urban geography)
3. Alam, S.M. & V.V. Tokshishevesky : Urbanization in developing countries.
4. Berry Brain .1. L. : Geographic Prospective on Urban .Systems.
5. Bresse, C. & D.F. Whiteman : An approach to Urban Planning
6. Dickinson, R.E, : City, Religion and Regionalism.
7. Gallion and Fisher : The Urban Pattern.
8. Grifitth, , J.P : A study of Urban constructions in India.
9. Gibbs : Urban Research Methods.
10. Mayor, H.M. & (.,'.1". Kohn : Readings in Urban Geography.
11. Morgan, F.W. : Ports and Harbours.
12. Mumford L. : Culture of cities.
13. Robson, W.A. : Great cities of world.
14. Robson, B.T. : Urban Growth : An approach, Methuen, London.
15. Carter, Harold : Study of Urban Geography, London, Edward Arnold, 1979.
16. Singh R.I., & K.N. Singh : Readings in Rural Settlement Geography, NGSI Varanasi, 1975.
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## SEMESTER – III (2019-20)

### PAPER – XIII (A) REMOTE SENSING TECHNIQUES

- UNIT– I Historical development of remote sensing as a technology - Relevance of remote sensing in Geography - Concepts and basics: Energy source, energy and radiation principles, energy interactions in the atmosphere and earth surface features, remote sensing systems: platform sensors and radiation records. Microwave sensing interpretation of SLAR imageries, thermal imageries.
- UNIT– II Remote Sensing Satellite: platforms LANDSAT, SPOT, NOAA, RADARSAT, IRS, INSAT: principles and geometry of scanners and CCD arrays, orbital characteristics and data products - MSS, TM, LISS I & II, SPOTPLA & MLA, SLAR.
- UNIT– III Image Processing: Types of imagery, techniques of visual interpretation, ground verification transfer of interpreted thematic information to base maps-digital processing: rectification and restoration, image enhancement - contrast manipulation, Classification: Supervised and Unsupervised, post-classification analysis and accuracy assessment.
- UNIT– IV Applications: Air photo and image interpretations, arid mapping land use and land cover, land evaluation, urban land use, landform and its processes, weather studies and studies of water resources: integration of Remote Sensing and GIS. Remote sensing and hazard management, remote sensing and environmental management.

#### SUGGESTED READINGS:

1. American Society of Photogrammetry: Manual of Remote Sensing. ASP, Falls Church V.A., 1983.
2. Barrett E.C. and L.F. Curtis : Fundamentals of Remote Sensing and Air Photo Interpretation on, Memillan, New York, 1992.
3. Compbell J.: Introduction to Remote Sension, Guilford, New York, 1989.
4. Curran, Paul J.: Principles of Remote Sensing. Longman, London, 1985.
5. Hord R.M. : Digital Image Processing of Remotely Sensed Date, Academic, New York, 1983.
6. Luder D., Aerial Photography Interpretation: Principles and Application, CcGraw Hill, New York, 1959.
7. Pratt W.K. Digital Image Processing. Wiley, New York, 1978.
8. Rao D. P. (eds.): Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hederabad, 1998.
9. Thomas M. Lollesand and Ralph W. Kefer, Remote Sensing and Image Interpretation, Wiley & sons, New York, 1994.
10. Aronoff S. Geographic Information Systems : A. Management Perspective, Publication Offiawa, 1989.
11. Burrough P.A. Principles of Geographic Information Systems for Land Reson Assessment Oxford University Press, New York, 1986.
12. Fraser Taylor D.R. Geographic information Systems. Pergamor Press, Oxford 1990.
13. Maquire D.J.M.F. Goodchild and D.W. Rhind (eds.). Geographic information System 'Principles arid Application. Taylor & Francis, Washingron, 1991.
14. Mark S. Monmonier. Computer - assisted Cartography, Prentice-Hall, Englewood Cliff, Jersey, 1982.

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15. Peuquet D. .1. and D.F.- Marble, Introductory Reading in Geographic. Information System Taylor & Francis, Washington, 1990.
16. Star J. and J. Estes, Geographic Information Systems : An Introduction, Prentice Englewood Cliff, New Jersey, 1994.
17. चौनियाल, देवी दत्त : सुदूर संवेदन एवं भौगोलिक सूचना प्रणाली.

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## PAPER – XIII (B) (2019-20)

### BIOGEOGRAPHY AND ECOSYSTEM

- UNIT– I Definition and scope of Biogeography Environment, Habitat and Plant-animal association, Biome Types.
- UNIT– II Elements of plant geography, distribution of forests and major communities. Plant successions in newly formed land forms. Zoogeography and its Environmental Relationship. Palaeo botanical and Palaeo climatological records of environmental change.
- UNIT– III Ecosystems: concept and components, Ecosystem-form and function: tropic level, ecological pyramids, ecological niche, energy and nutrients in the ecosystem, hydrological cycle, food chains and food webs. Major terrestrial ecosystems of the world: agriculture, forests, grassland and desert. Population growth and environment.
- UNIT– IV Biodiversity and its Conservation. Preservation and conservation of the ecosystem through resource management, Environment legislation. The Stockholm conference, the Earth summit, Environmental laws in India (the Wild Life Act, Water Act, Forest Act, Environment Protection Act and National Environment Tribunal Act).

#### SUGGESTED READINGS -

1. Agrawal D.P. : Man and Environment in India through Ages, Book & Books, 1992.
2. Bradshaw, M.J. : Earth and Living Planet, ELBS. London, 1979.
3. Cox, C.D. and Moore, P.D. : Biogeography : An Ecological and Evolutionary Approach 5<sup>th</sup> edn. Blackwell, 1993.

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## SEMESTER – III (2019-20)

### PAPER - XIV RESEARCH METHODOLOGY

- UNIT – I      Research Methodology-An Overview; Procedure of scientific Research, Defining Research Problem; Formulating Hypothesis; Research Design.
- UNIT – II      Methods of Data Collection: Observation, Questionnaire, Schedule and Interview; Sampling: Sampling Methods, Size of Sample;
- UNIT – III      Processing and Analysis of Data: Processing- Editing, Coding, Classification and Tabulation, Analysis – Measurement of Central Tendency, Dispersion, Correlation.
- UNIT – IV      Preparation of Research Reports: Steps, Layout and Types of Reports

1. Gaur, R. : Environment and Ecology of Early Man in Northern India R. B. Publication Corporation 1987.
2. Hoyt, J.B. Man and the Earth, Prentice Hall, U.S.A. 1992.
3. Huggett. R.J. : Fundamentals of Biogeography, Routledge, U.S. A. 1998.
4. Illes, J. : Introduction to Zoogeography, Mcmillan, London, 1974.
5. Khoshoo, T. N. and Sharma. M. (eds) : Indian Geosphere-Biosphere Har-Anand Publication, Delhi 1991
6. Lapedes, D.N.(ed) : Encyclopedia of Environmental Science, McGraw Hill, 1974.
7. Mathur H.S. : Essentials of Biogeography, Anuj Printers, Jaipur, 1998.
8. Pears, N. : Basic Biogeography, 2<sup>nd</sup> edn. Longman, London, 1985.
9. Simmons, I.G. Biogeography, Natural and Cultural, Longman, London, 1974.
10. Tivy J. : Biogeography: A Study of Plants in Ecosphere 3<sup>rd</sup> edn. Oliver and Boyd, U.S. A., 1992.
11. Ackerman, E.A. : Geography as a Fundamental Research Discipline, University of Chicago Research Papers, 1958
12. Agarwal, A. and Narain, S. : The Citizens Fifth Report. Centre for Science and Environmental, New Delhi, 1999.
13. Bertalanffy, L. : General Systems Theory, George Bragiller, New York, 1958.
14. Bodkin, E. : Environmental studies, Charles E Merrill Pub. Co., Columbus, Ohio, 1982.
15. Chandana, R.C. : Environmental Awareness, Kalyani Publishers, New Delhi, 1958.
16. Chorley, R.J. : Geomorphology and General Systems Theory, U.S.G.S. Professional Paper, 500B, 1962.
17. Eyre, S.R. and Jones, G.R.J. (eds) Geography as Human Ecology, Edwares Arnold, London, 1966.
18. Kormondy, E.J. : Concepts of Ecology, Prentice Hall, 1989.
19. Manners, I.R. and Mikesell, M.W. (eds.) Prespectives on Environment, Commission on College Geography, Publ. No. 13 Washington, D.C., 1974.
20. Nobel and Wright : Environmental Science, Prentice Hall, New York, 1996.
21. Odum, E.P.: Fundamentals of Ecology, W.B. Saunders, Philadelphia, 1971.
22. Russwurm, L.H. and Sommerville, E. (eds.) : Man's Natural Environment-A Systems Approach, Duxbury, Massachuselts, 1985.
23. Sharma, H.S. : Ranthambhore Sanctuary – Dilemma of Eco-development, Concept, New Delhi, 2000.

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24. Simmons, I.G. : Ecology of Natural Resources, Edward Arnold, London, 1981.
25. Singh S. : Environmental Geography, Prayag Publications, Allahabad, 1991.
26. Smith, R.L. : Man and his Environment : An Ecosystem Approach, Harper & Row, London, 1992.
27. U.N.E.P. : Global Environmental Outlook, U.N. Pub. , New ork, 1998.
28. World Resources Institute : World Resoources, (Latest Report) Washington.
29. कुलश्रेष्ठ, कामता प्रसाद: जैव भूगोल.

### SUGGESTED READING:

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| 1. Selltitz, C.M. Jahoda, M. Deutsch and others. | Research Methods in Social Relations, Holt, . New York, 1961.   |
| 2. Goode, W and P.K, Hatt                        | Methods in Social Research, Mc Graw Hill, .Tokyo, 1962.   |
| 3. Harvey, David                                 | . Explanation in Geography, Edward Arnold, London, 1971   |
| 4. Chorley, R.J. and P. Hagg & tt (ed)           | Models in Geography, Methuen, London, 1967.   |
| 5. Minshull, R.                                  | Introduction to Models in Geography. Longman London, 1975.  |
| 6. Sheskin, I.M.                                 | Survey Research for Geographers Scientific Publisher, Jodhpur, 1987.  |
| 7. Kothari, C. R.                                | Research Methodology : Methods and Techniques, Wishwa Prakashan, 1994.  |
| 8. Misra H.N. and V.P. Singh                     | Research Methodology in Geography: Social, Spatial and Policy Dimensions, Rawat Publications New Delhi, 1998. |
| 9. Har Prasad                                    | Research Methods and Techniques in Geography, Rawat Publications, New Delhi. 1992.                            |

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## SEMESTER – III (2019-20)

### PAPER - XV

### PRACTICAL -III

#### Remote Sensing, Interpretation of Topographical Sheets and Quantitative Techniques

1. **Principles of Photogrammetry:** - Air Photo- Stereo test, Orientation of stereo model under mirror stereoscope, Preparation of photo/line index and determination of photo scale, Use of parallax bar and determination of heights, Identification of features on aerial photo graph, Tracing of details from stereo pair, Interpretation of physical and cultural details, Preparation of Land use map pre field interpretation, Field visit for ground truthing.
2. **Remote Sensing:**– Study of satellite Image – Annotation Identification of features on FCC imageries, Tracing of details from satellite imageries, Basic Principles of Image interpretation, Interpretation of Physical and Cultural details and preparation of land use and land cover map using IRS Images. Pre field visit.

#### Statistical Techniques:

Product moment and Rank Correlation Coefficients, Linear Regression. Hypothesis Testing: Chi-Square test, t-test & F test, Sampling Techniques, Point, Line and Area Sampling.

#### SUGGESTED READINGS:

1. American Society of Photogrammetry : Manual of Remote Sensing. ASP, Falls Church V.A. 1983.
2. Barren E.C. and I...F. Clirtis : Fundamentals of Remote Sensing and Air Photo Interpretation 'on, Memillan, New York, 1992.
3. Conipbell .I. : Introduction to Remote Sension, Glinford, "New York, 1989.
4. Clirran, Paul J. : Principles of Remote Sensing. Longman, London, 1985.
5. Hord R.M. : Digital Image Processing of Remotely Sensed Date, Academic, New York, 1983
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7. Pratt W.K. Digital Image Processing. Wiley, New York, 1978.
8. Rao D. P.. (eds.) : Remote Sensing for Earth Resources, Association of Exploration Geophysicisi, Hederabad, 1998.
9. Thomas M. Lollesand and Ralph W. Keler, Remote Sensing and Image Interpretation, Wiley & sons. New York, 1994.
10. Aronoff S. Geographic Information Systems: A Management Perspective, Publication Offawa, 1989.
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12. Fraser Taylor D.R. Geographic information Systems. Pergamor Press, Oxford 1990.
13. Maquire D.J.M.F. Goodchiln and D.W. Rhind (eds.). Geographic information System Principles and Application. Taylor& Francis, Washingron, 1991.
14. Mark S. Monrnonicr. Computer-assisted Cartography, Prentice Hall, Englewood Cliff, Jersey, 1982.

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15. Peuquer D.J. and D.F. Marble, Introductory Reading in Geographic Information System Taylor & Francis, Washington, 1990.
16. Star J. and J. Estes, Geographic Information Systems; An Introduction, Prentice Eaglewood Cliff, New Jersey. 1994.

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# Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

## M.A./M. Sc. GEOGRAPHY SEMESTER IV (2019-20)

M.A./M.Sc. Geography Semester IV shall consist the following papers:

S. No.	Paper	Title	M. M.		
			Written	Int. Ass.	Total
1.	XVI	Urban Geography	80	20	100
2.	XVII	Agricultural Geography	80	20	100
3.	XVIII (A)	Geographical Information System	80	20	100
	<b>OR</b>	<b>OR</b>			
4.	XVIII (B)	Environmental Geography	80	20	100
5.	XIX	Field Work (Physical and Socio- Economic)	---	---	100
6.	XX	Practical-IV :Geographical Information System and Quantitative Techniques	---	---	100

1. The M.A./M.Sc. Semester IV examination in Geography shall consist of 500 marks.

There shall be three theory papers and one Field Work report each of 100 marks and one practical of 100 marks as follows.

S. No.	Paper	Title
1.	XVI	: Urban Geography
2.	XVII	: Agricultural Geography
3.	XVIII (A)	: Geographical Information System
	<b>OR</b>	
4.	XVIII (B)	: Environmental Geography
5.	XIX	: Field Work (Physical and Socio- Economic)
6.	XX	: Practical-IV : Geographical Information System and Quantitative Techniques

2. The theory papers shall be of three hours duration.
3. Candidates will be required to pass separately in theory and practical examinations.
4. Candidates will be required to submit their Field Report in three copies in hard bound at least one hundred pages for Valuation.
5. (a) In the practical examination the following shall be the allotment of time and marks

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| (i)   | Practical record            | 20% |
| (ii)  | Lab Work (up to Four Hours) | 70% |
| (iii) | Viva on i & ii above        | 10% |

(b) The external and internal examiners shall jointly submit marks.

(c) All the candidates shall present at the time of practical examination their practical record regularly signed by the teacher concerned.

  
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## SEMESTER – IV (2019-20)

### PAPER-XVI

#### URBAN GEOGRAPHY

- UNIT – I Definition, Objective and Scope of urban geography, General Nature of City Structure.
- UNIT – II Internal structure: Morphology and Land use. Theories of Urban Structure: The Concentric Zone Theory, the Sector Theory, the Multiple Nuclei Theory. Commercial Structure of Cities; The Central Business District (CBD),
- UNIT – III Centrifugal and Centripetal forces in Geography, Economic Base of Towns: Basic, Non-basic concept. Urban Functions: Functional Classification of Towns: Webb, Harris, and Nelson.
- UNIT – IV Contemporary Urban Issues: Urban renewal, Urban sprawl, Slums, Environmental Pollution, Urban Planning; Landuse Planning, Urban and Metropolitan Planning in India.

#### SUGGESTED READINGS:

1. Abercrombee, Sir P. : Town and Country planning 1961.
2. Alam, Shah Manzoor : Hyderabad Securdabad (Twin Cities) A. study in urban geography)
3. Alam, S.M. & V.V.Tokshishevesky : Urbanization in developing countries.
4. Berry Brain .I. L. : Geographic Prospectives on Urban .Systems.
5. Bresse, C. & D.F. Whiteman : An approach to Urban Planning
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25. बंसल सुरेश चन्द : नगरीय भूगोल.
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**SEMESTER – IV (2019-20)**  
**PAPER – XVII**  
**AGRICULTURAL GEOGRAPHY**

- UNIT – I Nature, scope, significance and development of agricultural geography. Approaches to the study of agricultural geography: Commodity, systematic and regional systems. Origin and dispersal of agriculture. Sources of agricultural data.
- UNIT – II Determinants of agricultural land use - Physical, economic, social, and technological Land holding and land tenure systems, Land reforms, land use Agriculture policy and planning. Selected agricultural concepts and their measurements; cropping pattern, crop concentration, intensity of cropping, degree of commercialization, diversification and specialization, efficiency and productivity, crop combination regions and agricultural development.
- UNIT – III Theories of agricultural location based on several multi-dimensioned factors:-Von Thunen's theory of agricultural location and its recent modifications; Whittlesey's classification of agricultural regions; land use and land capability.
- UNIT – IV Contemporary Issues: Food, nutrition and hunger, food security, drought and food-security, food aid Programmes; role of irrigation, fertilizers, insecticides and pesticides, technological know-how. Employment in the agricultural sector: landless labourers, woman, children: occupational and agricultural activities.

**SUGGESTED READINGS:**

1. Bayliss Smith, IP.: The Ecology of Agricultural Systems. Cambridge University London, 1987.
2. Berry, B.J.L et. al. : The Geography of economic Systems. Prentice Hall, New York, 1976.
3. Brown, L.R. : The Changing World Food Prospects - The Nineties and Beyond, World Watch Institute, Washington D.C., 1990.
4. Dyson, T. : Population and Food - Global Trends and Future Prospects. Routledge. London, 1996.
5. Gregor, H.P. : Geography of Agriculture. Prentice Hall, New York, 1970.
6. Grigg, D.B. : The Agricultural Systems of the World. Cambridge University Press, New York 1974.
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10. Morgan, W.B.:Agriculture in the Third World - A Spatial Analysis. Westview Boulder, 1978.

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11. Sauer, C.O. : Agricultural Origins and Dispersals,. M.I.T. Press, Mass, U.S.A., 1988.
12. Singh, J. and Dhillon, S.S. : Agricultural Geography. Tata McGraw Hill' Pub.; Delhi, 1988.
13. Tarrant, J.R. : Agricultural Geography. Wiley, New York, 1974.
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## SEMESTER – IV (2019-20)

### PAPER – XVIII (A)

#### GEOGRAPHICAL INFORMATION SYSTEM

- UNIT – I Spatial Science : Geography as a spatial science, maps and spatial information dynamics of spatial information, elements of information technology, Geographic objects and their relations definition and development of GIS, computer environment for GIS.
- UNIT – II Spatial Data: Elements of spatial data: data sources: Primary and secondary census and sample data, quality and error variations Raster and vector data structures, data conversion comparison of raster and vector data bases, methods of spatial interpolation – GIS data formats for the computer environment.
- UNIT – III GIS Technology: Coordinate system-basic principles of cartography and computer assisted cartography for GIS – remote sensing data as a data source for GIS integration of GIS and remote Sensing-GPS and GIS: technology, data generation and limitations – visualization in GIS-Digital Elevation Models (DEM and TINS).
- UNIT – IV GIS Application: GIS as a Decision Support System –expert system for GIS-basic flow chart for GIS application – GIS standard legal system and national GIS policy application of GIS in Land Information System, Urban Management, Environmental Management and Emergency Response System.

#### SUGGESTED READINGS:

1. American Society of Photogrammetry : Manual of Remote Sensing. ASP, Falls Church V.A., 1983.
2. Barrett E.C. and L.F. Curtis : Fundamentals of Remote Sensing and Air Photo Interpretation on, Memillan, New York, 1992.
3. Compbell J. : Introduction to Remote Sension, Guilford, New York, 1989.
4. Curran, Paul J. : Principles of Remote Sensing. Longman, London, 1985.
5. Hord R.M.:Digital Image Processing of Remotely Sensed Date, Academic, New York, 1983.
6. Luder D., Aerial Photography Interpretation : Principles and Application, CcGraw Hill, New York, 1959.
7. Pratt W.K. Digital Image Processing. Wiley, New York, 1978.
8. Rao D. P. (eds.) : Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hederabad, 1998.
9. Thomas M. Lollesand and Ralph W. Kefer, Remote Sensing and Image Interpretation, Wiley & sons, New York, 1994.
10. Aronoff S.Geographic Information Systems: A. Management Perspective, Publication Offiawa, 1989.
11. Burrough P.A. Principles of Geographic Information Systems for Land Reson Assessment Oxford University Press, New York, 1986.
12. Fraser Taylor D.R. Geographic information Systems. Pergamor Press, Oxford 1990.
13. Maquire D.J.M.F. Goodchild and D.W. Rhind (eds.). Geographic information System 'Principles arid Application. Taylor & Francis, Washingron, 1991.
14. Mark S. Monmonier. Computer-assisted Cartography,Prentice-Hall, Englewood Cliff, Jersey, 1982.

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15. Peuquet D. .1. and D.F.- Marble, Introductory Reading in Geographic. Information System Taylor & Francis, Washington, 1990.
16. चौनियाल, देवी दत्त,; सुदूर संवेदन एवं भौगोलिक सूचना प्रणाली.

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**SEMESTER – IV (2019-20)**  
**PAPER – XVIII (B)**  
**ENVIRONMENTAL GEOGRAPHY**

- UNIT – I      Environment: Meaning, definition, concepts and theories related to environment. Environment and its components: Classification, Characteristics and their interdependent relationship, Development of the environmental studies and their approaches: Development of environmentalism in Geography.
- UNIT – II    Environment and development. Ecological concepts; Geography as human ecology; Ecosystem: meaning definition, Concept and components. Main terrestrial ecosystems of the world-forests and agriculture.
- UNIT – III    Environmental hazards- natural and human made, environmental pollution : meaning definition, nature and types-air, water, noise and others. Ecological impacts of pollution. Resource use and ecological imbalance with special reference to soil, forests and water resources.
- UNIT – IV    Environmental Management: meaning, importance and approaches, need for environmental policy and laws. Preservation and conservation of environment through resource management (Green revolution, Chipko movement, National Parks). Environmental Actions: concept, need and importance Stockholm Conference, Earth Summit, E.I.A. definition and methods and need for EM Environmental education and People's participation.

**Suggested Readings :**

1. Agrawal, Anil and Sunita Narain. Dying Wisdom : The Fourth citizen Report. Centre for Science and Environment, New Delhi, 1998.
2. Burton I.; R.W. Kates & G.F. Whiley. The Environment as Hazards. O. U.P. New York, 1978, Carledge, Bryen. Population and the Environment, O.U.P., New York, 1995.
3. Chandna, R.C. Environmental Awareness Kalyani Punlishers, New Delhi, 1998.
4. Dawson, J. and J.C. Doornkamp, eds.: Evaluating the Human Environment. Edward Arnold, London, 1975
5. Detwyler, J.R.: Man,s impact on Environment. Pelican, 1970.
6. Edington, J.M. & M.A. Edington : Ecology and Environmental Planning. Chapmap & Hall, London, 1977.
7. Goudie, Andrew. The Human Impact on the Natural Environment, Blackwell Oxford, U.K. 1994
8. Jain, R. K., L.V. Urban and G.S. Stacy; Environmental Impact Analysis-A New Dimension in Decision-Making. Van Norstrand Reinhold Co. New York, 1977.
9. Khoshoo, T.N. Environmental Concepts and Strategies. Ashish Publishing House, New Delhi.

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11. Munn, R.E. Environmental Impact Assessment : Principles and Procedures. John Wiley & Sons, New York, 1979.
12. Narain, Sunita. The Citizen Fifth Report. Centre for Science and Environment, New Delhi 2003.
1. Mukherji, A and V. K. Agnihotri : Environment and Development. Concept Pu. Co. New Delhi, 1993.
2. Rudig Wolfgeng. Environmental Policy Edward Elger Publishing Ltd. UK. 1998.
3. Saxena, H.M. Environmental Geography. Rawat Publications, Jaipur, 1999
4. Saxena, H.M. Environmental Management. Rawat Publications, Jaipur, 2000
5. Sharma, B.L. & Puar P: Global Environmental Challenges. Rohini Books, Publishers & Distributors, Jaipur, 2004.
6. Singh, K.N. and D.N. Singh : Population Growth, Environment and Development Issues, Impacts and Responses. Environment & Development Study Centre, Varanasi, 1991.
7. Singh, R. B. and S. Mishra : Environmental Law in India : Issues and responses, Concept Pub. Co. New Delhi, 1966.
8. Singh, S. Environmental Geography. Prayag Pustak Sadan, Allahabad, 2000.
9. Smith, R.L. : Man and his Environment: An Ecosystem Approach. Harper & Row. London, 1992.
10. U.N.E.P.: Global Environmental Outlook. U.N. Pub. New York.
11. अवस्थी एन. एम. एवं आर.पी. तिवारी पर्यावरण भूगोल, मध्यप्रदेश ग्रंथ अकादमीए भोपाल ।
12. नेगी, पी. एस. : परिस्थितिकीय विकास एवं पर्यावरण भूगोल, रस्तोगी एन्ड कम्पनी, मेरठ, 1995 ।
13. रघुवंशी अरुण और चन्द्रलेखा रघुवंशी : पर्यावरण तथा प्रदूषण, मध्यप्रदेश हिन्दी ग्रंथ अकादमी, भोपाल, 1989
14. सविन्द्र सिंह : पर्यावरण भूगोल, प्रयाग पुस्तक सदन इलाहाबाद, 1993 ।
15. शर्मा, बी एल : पर्यावरण : साहित्य भवन, आगरा, 1992 ।
16. तिवारी, विजय कुमार : पर्यावरण और परिस्थितिकी, हिमालय पब्लिशिंग हाउस, दिल्ली 1998 ।
17. तिवारी, विजय कुमार, : पर्यावरण अध्ययन, हिमालय पब्लिशिंग हाउस, दिल्ली, 1998 ।

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## SEMESTER – IV, (2019-20)

### PAPER - XIX

#### FIELD WORK (PHYSICAL AND SOCIO- ECONOMIC)

UNIT – I Trace the prominent features of area to be surveyed. Identify salient landform features of selected area on a topographical sheet. Identify the landforms on the surface, while in the field. Also note the agents of erosion, transportation and deposition associated with the landforms.

UNIT – II Identity and classify the Bio-diversity in the area (Flora & fauna). Observe the relationship of various landforms, flora and fauna with land-use, settlement structure and life style of people.

#### Socio – Economic

UNIT – III Procure a cadastral map of the village/town for field mapping of the features of land-use and land quality. Procure/prepare the settlement –site map through rapid survey to map the residential, commercial, recreational (parks, playground), educational, religious and other prominent features. Conduct a socio-economic survey of the households with a structured questionnaire. Supplement the information by personal observations and perceptions.

UNIT – IV Based on observations of the land-use and results of the socio-economic enquiry of the households, prepare a critical field-survey report. Photographs and sketches, in addition to maps and diagrams, may supplement the report.

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**SEMESTER – IV, (2019-20)**

**PAPER - XX PRACTICAL-IV**

**GEOGRAPHICAL INFORMATION SYSTEM AND QUANTITATIVE  
TECHNIQUES**

**Geographical Information System**

An overview of GIS software, Elements of GIS: Data capture-verification and preprocessing-data storage and maintenance of databases-Database Management Systems: Spatial data creation, Editing the layers and table creation, Creation of non Spatial data, data manipulation, analysis (integrated analysis of spatial and attribute data, overlay analysis, neighborhood operations and connectivity functions) and spatial modeling-output format and generation. Buffer analysis, Network Analysis, Creation of DEM & TIN Generation of thematic map.

GPS – Demonstration and handling of Hand held GPS receivers, Checking and updating of existing map, Use of GPS to Check/update the existing topographical map, Ground truthing by GPS.

**Quantitative Techniques:**

Running mean, Mean centre, Nearest Neighbor Analysis; Lorenz Curve, Normal distribution curve, Probability.

**SUGESSTED READINGS:**

1. Singh, R.L. & P.K. Dutt : Elements of Practical Geography Students trends.
2. Monkhouse, F.J. & H.R. Wilkinson; Maps and Diagrams Mathuen, London.
3. Mahmood, Aslam 1971 : Statistical Methods in Geographical studies Rajesh Pub., New Delhi.
4. Gregory, S. Statistical Methods and The Geographer.
5. Hammond & McCullah 1977 : Quantitative Techniques in Geography, Clarendon Press, Oxford.
6. Fitz, Gomid, B.P. : Science in Geography, Developments in Geographical Method, Oxford University Press.
7. Yeaters, M. : An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York.
8. मॉक हाउस तथा विल्किन्सन 1976 : मानचित्र तथा आरेख, म.प्र. केदारनाथ , रामनाथ, मेरठ.
9. नेगी, डी.एस. : भूगोल में आधारभूत सांख्यिकी, केदारनाथ , रामनाथ, सेठ.
10. हीरालाल : प्रायोगिक भूगोल, किताबघर, कानपुर.
11. आर.सी. तिवारी एवं सुधाकर त्रिपाठी : अभिनव प्रयोगात्मक भूगोल, प्रयाग पुस्तक भवन, इलाहाबाद

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# **HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**

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## **SCHEME OF EXAMINATION & SYLLABUS of M.Com. (Semester Exam) UNDER**

**FACULTY OF COMMERCE**  
**Session 2019-21**

**(Approved by Board of Studies)**  
**Effective from July 2019**

**एम.कॉम. सेमेस्टर परीक्षा**  
**पाठ्यक्रम (सत्र 2019–21से लागू)**  
**M. Com. Ist Semester**

प्रश्न पत्र	प्रश्न पत्र का नाम	पूर्णांक	पेपर
प्रश्नपत्र I Paper I	प्रबंधकीय अर्थशास्त्र Managerial Economics	80+ 20	101
प्रश्नपत्र II Paper II	वृहत (उच्चतर) लेखांकन Advanced Accounting	80+ 20	102
प्रश्नपत्र III Paper III	आयकर विधान एवं लेखे (Income Tax Law and Accounts)	80+ 20	103
प्रश्नपत्र IV Paper IV	सांख्यिकीय विश्लेषण Statistical Analysis	80+ 20	104
प्रश्नपत्र V Paper V	निगमित विधि संरचना Corporate Legal Framework	80+ 20	105

**M.Com. II<sup>st</sup> Semester**

प्रश्न	प्रश्न पत्र का नाम	पूर्णांक	पेपर
प्रश्नपत्र VI Paper VI	व्यवसायिक अर्थशास्त्र Business Economics	80+20	201
प्रश्नपत्र VII Paper VII	विशिष्टिकृत लेखांकन Specialized Accounting	80+20	202
प्रश्नपत्र VIII Paper VIII	कर नियोजन एवं प्रबन्ध (Tax Planning and Management)	80+20	203
प्रश्नपत्र IX Paper IX	उच्चतर सांख्यिकी Advanced Statistics	80+ 20	204
प्रश्नपत्र X Paper X	व्यावसायिक सन्नियम Business Laws	80+ 20	205

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**M. Com. 1<sup>st</sup> Semester**  
**PAPER-I**  
**MANAGERIALECONOMICS**

M.M.80+20


**OBJECTIV:**

This course develops managerial, perspective to economic fundamentals as aids to decision making under given environmental constraints.


**COURSE INPUTS:**

- UNIT-1** Nature and Scope of Managerial, Economics: Objective of a firm; Economics theory and managerial theory; Managerial economist's role and responsibilities.
- UNIT-2** Fundamental economic concepts-incremental principle, opportunity cost principle, discounting principle. equimarginal principle.
- UNIT-3** Demand Analysis: Individual and Market demand functions Law of demand; determinants of demand; Elasticity of demand-its meaning and importance, Price elasticity; income elasticity and cross elasticity; Using elasticity in managerial decisions.
- UNIT-4** Theory of consumer Choice: Cardinal utility approach, indifference approach, revealed preference and theory of consumer choice under risk; Demand estimation for major consumer durable and non-durable products; Demand forecasting tech. technique.
- UNIT-5** Production Theory: Production function-production with one and two variable inputs, Stages of production; Economics of scale; Estimation of production function.

  
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**PAPER – II**  
**ADVANCED ACCOUNTING**

M.M.80+20

**OBJECTIVE: -**

The objective of this course is to expose students to accounting issues and practices such as maintenance of company accounts and handling accounting adjustments.

**COURSE INPTS:**

- UNIT-1** Accounting for issue, Forfeited and redemption of shares and debentures.
- UNIT-2** Final accounts and financial statements of companies.
- UNIT-3** Accounting issues relative to amalgamation and reconstruction of companies.
- UNIT-4** Accounting for holding and subsidiary companies.
- UNIT-5** Accounts relating to Liquidation of companies.

**REFERENCES.**

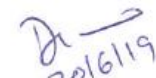
Beams, F.A.: Advanced Accounting, Prentice Hall, ,New Jersey,  
Dearden, J. and S.K. Bhattacharya : Accounting for Management,  
Vikas Publishing House, New Delhi. Engler, C.L.A Bernstein. and K.R.  
Lambert: Advanced Accounting, with Chicago. Fischer, P.M.,W.J.  
Taylor and J.A. Leer: Advanced Accounting, South-Western, Ohio.  
Gupta. R.L.: Advanced Financial Accounting, S. Chand & Co., New  
Delhi. Keiso D.E. and J.J. Weygand: Intermediate Accounting, John  
Wiley and Sons, NY. Maheshwari, S.N.: Advanced Accountancy-  
Vol.II Vikash Publishing House, New Delhi Monga, J.R. : Advanced  
Financial Accounting, Mayoor Paperbacks, Noida Narayanaswamy,  
R: Financial Accounting: A Managerial Perspective, Prentice Hall of  
India, Delhi. Neigs, R.F. : Financial Accounting. Tata McGraw Hill,  
New Delhi. Shukla, M.G. 'and T.S. Grewal: Advanced Accou'ntancy,  
Sultan Chand & Co. New Delhi. Warren, C.S. and P.E. Fess: Principles  
of Financial and Managerial Accounting, South Western, Ohio.

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### RECOMMENDED BOOKS:

1. Plekles and Duakerley	:	Accountancy
2. Wilson	:	Company Accounts
3. Diskson	:	Accountancy
4. J.R. Batlboi	:	Advanced Accounting
5. R.R. Gupta	:	Advanced Accounting
6. S.M. Shukla	:	Advanced Accounting
7. Shukla and Grewal	:	Advanced Accounting
8. H Chakravarty	:	Advanced Accounts
9. Dr. Shukla Avam Agrawal	:	Advanced Accountancy
10. Dr.S.S. Gupta	:	Advanced Accounts
11. Dr. Karim ,Dr. Khanuja & Pro. Mehata	:	Advanced Accounting
12. डॉ. करीम, डॉ. खनूजा एवं प्रो.मेहता	:	वृहत लेखाकर्म
13. जे. के. अग्रवाल तथा आर.के.अग्रवाल	:	उच्च वित्तीय एवं कम्पनी लेखांकन
14. आर.के. गुप्ता	:	उन्नत लेखांकन
15. Basu Das	:	Advanced Accounting

  
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**M. Com – 1st Semester**  
**आयकर विधान एवं लेखे (प्रश्नपत्र – III)**  
**Income Tax Law and Accounts (Paper –Third)**


M.M.:80

**OBJECTIVE**


The objective of this course is to help student Understand and conceptual framework of Income tax.

<b>Unit – I</b>	<b>Law relating to Income tax:</b> Brief study of the main provisions of the Indian Income Tax Act. Important definitions. Income exempted from tax, Residence and Tax liability.
<b>Unit – II</b>	<b>Calculation of taxable income under the head :</b> Salary and House property.
<b>Unit – III</b>	<b>Depreciation and Development allowance, Calculation of taxable Income under the head:</b> Business and Profession, capital gains, income from other sources.
<b>Unit – IV</b>	Set off and carry forward of losses, Deduction from gross total Income Calculation of taxable Income and tax of an individual, and Hindu undivided Families.
<b>Unit – V</b>	Appeals & Revisions Reference of High Court and Supreme court, offences & penalties, Income tax authorities.

  
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**M. Com – 1st Semester**  
**(Compulsory) Paper – IV**  
**STATISTIC ANALYSIS**

M.M.:80

**OBJECTIVE**

The Objective of this course is to help student learnt application of statistical tools and techniques for decision making.

- UNIT-1     **Statistics** - Definitions, Characteristics, Scope and Nature, Functions, limitations, Distrust and misuse importance & Statistical Investigations., Classification & Tabulation,**
- UNIT-2     **Data Sources:** Primary and Secondary, Primary data collection techniques, Schedule, Question naire and interview & Sources' of Secondary data.**
- UNIT-3     Dispersion, Co-efficient of variance and skewness, correlation Karl- Parsons and spearman's ranking method and Regression analysis, Two variables case.**
- UNIT-4     Probability Theory: Probability classical, relative and subjective probability, Addition and multiplication probability models - Conditional probability and Baye's Theorem.**
- UNIT-5     Probability Distributions-Bionomial, poisson and Distributions, Their characteristics and applications.**

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**M.Com-1st Semester**  
**UNDER MANAGEMENTBOARD**  
**(Compulsory)**  
**Paper – V**  
**(Paper Code)**  
**CORPORATELEGALFRAMEWORK**

M.M.:80

**OBJECTIVE**

The Objective of this course is provide knowledge of relevant provisions of various Semester laws influencing business operations.

- UNIT-1** The Companies Act, **2013** (Relevant Provisions): Definition, types of companies Memorandum of association; Articles of association; Prospectus; Share capital and membership.
- UNIT-2** Meeting sander solutions-Company management; Managerial remuneration; Winding up and dissolution of companies.
- UNIT-3** The Negotiable Instruments Act,1881-Definition, types of negotiable instruments; Negotiation; Holder and holderin due course; payment in due course;
- UNIT-4** Endorsement and crossing of cheque; Presentation of negotiable instruments.
- UNIT-5** Legal Environment for Security Markets: SESI Act. 1992-organisation and Objectives of SESI

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**M.Com. II<sup>st</sup> Semester**  
**PAPER – VI**  
**BUSINESSECONOMICS**

M.M.80+20

**OBJECTIVE:**

This course develops managerial perspective to economic fundamentals' as aids to decision making under given environmental constraints.

- UNIT-1** Cost Theory and Estimation, economic value analysis, Short and long run cost Functions-their nature, shape and inter-relationship; Law of variable proportions;- Law of returns to scale.
- UNIT-2** Price Determination under Different Market Conditions: Characteristics of different market structures; Price determination and firm equilibrium in short-run and long-run under perfect competition, monopolistic competition, oligopoly and monopoly,
- UNIT-3** Pricing Practices: Methods of price determination in practice, pricing of multiple products; price discrimination; International price discrimination and dumping; Transfer pricing.
- UNIT-4** Business Cycles: Nature and phases of the business cycle; Theories of business cycles- psychological, profit, monetary, innovation, cobweb, Samuelson and Hicks theories.
- UNIT-5** Inflation: Definition, Characteristics and types; Inflation in terms of demand and pull and cost – push factors; Effects of inflation.

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**PAPER -VII**  
**SPECIALISED ACCOUNTING**


M.M.80+20

**OBJECTIVE.**


The objective of this course-is to expose students to accounting issues and practices such as maintenance of company accounts and handling accounting adjustments.

- UNIT-1**                      Accounts of General Insurance Companies.
- UNIT-2**                      Accounts of Banking Companies.
- UNIT-3**                      Accounts of Public Utility concerns: Double Accounts System.
- UNIT-4**                      Royalty accounts.
- UNIT-5**                      Investment accounts.

  
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**M. Com – 2nd Semester**  
**कर नियोजन एवं प्रबन्ध (प्रश्नपत्र –VIII)**  
**TAX PLANNING AND MANAGEMENT**  
**(Paper –VIII)**

M.M. 0:80

**OBJECTIVE –**

This course aims at making students conversant with the concept of corporate tax planning and Indian tax laws, as also their implications for corporate management.

<b>Unit – I</b>	Calculation of taxable Income and tax of Firm and Companies.
<b>Unit – II</b>	Return of Income, Provisional Regular, Expert and emergency assessment, Re opening of assessment.
<b>Unit – III</b>	Concept of tax Planning ; Tax avoidance and tax evasions ; Tax planning with reference of location, nature and form of organization of new
<b>Unit – IV</b>	Tax planning to capital structure, decision dividend policy; Inter corporate dividends and bonus shares.
<b>Unit – V</b>	Preparation of income tax returns, Computation of Income tax, Tax deduction at source; Advance payment of tax.

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**(Compulsory)**  
**Paper-IX**  
**(Paper Code)**  
**ADVANCE STATISTICS**

M.M.:80

**OBJECTIVE**

The Objective of this course is to help student learn the application of statistical tools and techniques for decision making.

- UNIT-1** Statistical Decision Theory: Decision environment, Expected profit under uncertainty and assigning probabilities and utility theory.
- UNIT-2** Statistical Estimations. And Testory: Point and intervals timation of population Mean, proportion and variance Statistical Testing-Hypothesis and Errors, Samplesize-Large and Small Sampling test Z tests, T Tests & F Tests.
- UNIT-3** Association of Attributes: Two Attributes, consistency of data, measurement of Association of Attributes - Percentage method, Co-efficient of Association, Comparison of Actual and (you lemethod) Expected frequency's & Issusery Association.
- UNIT-4** Statistical Quality Control: Causes of Variations in quality characteristics, Quality Control Charts-purpose and logic, Process under control and out of control, warning limits, control charts for attributes – fraction defectives and number of defects, Acceptance sampling.
- UNIT-5** Interpolation and Extrapolation – Prabolic Bionomial, Newton and long rages method.

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**(Compulsory) Paper – X**  
**Business Laws**

M.M. 80

**OBJECTIVE**

The Objective of this course is providing knowledge of relevant provisions of various laws influencing business operations.

**UNIT-1** SEBI Act-1992: Organization and objectives of SEBI, Functions and Role of SEBI Rights and Power of SEBI.

**UNIT-2** MRTP Act 1969: Monopolistic Trade Practice Meaning, essentials, Restrictive Trade Practices-Meaning, Unfair trade practice, MRTP commission of offences and Penalties.

**UNIT-3** Consumer Protection Act 1986: Needs of Act, Rights of consumers, Objectives of Act., Grievance redressal Machinery, District Forum, State Commission, National Commission.

**UNIT-4** FEMA Act 1999: Objectives; Regulation and Management of FEMA, Penalties Appeal.

**UNIT-5** W.T.O.: Brief History of WTO, Objectives and Functions, Organisation, W.T.O. and India, Regional groupings, anti-dumping duties and other NTBs, Doha declaration Dispute settlement system, TRIP, TRIMS and GATS.


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**M. Com. III<sup>rd</sup> Semester**  
**(Compulsory Papers)**

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper – I प्रश्नपत्र –I	प्रबन्ध की अवधारणा (Management Concept)	80+20	301
Paper – II प्रश्नपत्र –II	संगठनात्मक व्यवहार (Organisational Behaviour)	80+20	302
Paper – III प्रश्नपत्र –III	उच्चतर लागत लेखांकन (Advance Cost Accounting)	80+20	303
Paper – IV प्रश्नपत्र –IV	प्रबंधकीय लेखांकन (Management Accounting)	80+20	304
Paper – V प्रश्नपत्र –V	प्रबंधकीय निर्णय के लिए लेखांकन (Accounting for managerial decision)	80+20	305

  
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### M.Com V<sup>th</sup> Semester

Special attention to the Students. Students are required to select any one Specialization out of four suggested below.

#### Optional – Specialization

Optional Group	–	(A)	Marketing
Optional Group	–	(B)	Management
Optional Group	–	(C)	Banking and Insurance
Optional Group	–	(D)	Taxation and Accounting
Optional Group	–	(A)	विपणन (Marketing)

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper – A I प्रश्न पत्र–A I	विपणन के सिद्धान्त (Principle of Marketing)	80+20	401
Paper – A II प्रश्न पत्र–A II	विज्ञापन एवं विक्रय प्रबन्ध (Advertising & Sales Management)	80+20	402
Paper – A III प्रश्नपत्र–A III	विपणन अनुसन्धान (Marketing Research)	80+20	403
Paper – A IV प्रश्नपत्र –A IV	अन्तर्राष्ट्रीय विपणन (International Marketing)	80+20	404

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**Optional Group- (B)**  
**प्रबन्ध (Management)**

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper – B I प्रश्न पत्र –B I	वित्तीय प्रबन्ध (Financial Management)	80+20	411
Paper – B II प्रश्न पत्र –B II	कार्मिक प्रबन्ध (Personnel Management)	80+20	412
Paper – B III प्रश्न पत्र–B III	उत्पादन प्रबन्ध (Production Management)	80+20	413
Paper – B IV प्रश्न पत्र–B IV	व्यूहरचना प्रबन्ध (Strategic Management)	80+20	414

**Optional Group-(C)**  
**बैंकिंग एवं बीमा (Banking and Insurance)**

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper – C I प्रश्न पत्र–C I	बैंकिंग व्यवहार (Banking Practices)	80+20	421
Paper – C II प्रश्न पत्र–C II	भारत में बैंकिंग संस्थाएँ (Banking Institution in India)	80+20	422
Paper – C III प्रश्न पत्र–C III	जीवन बीमा (Life Insurance)	80+20	423
Paper – C IV प्रश्न पत्र–C IV	सामान्य बीमा (General Insurance)	80+20	425

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**Optional Group-(D)**  
करारोपण एवं लेखांकन  
(Taxation and Accounting)

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper – D I प्रश्न पत्र–D I	भारत में प्रत्यक्ष कर (Direct Tax in India)	80+20	431
Paper – D II प्रश्न पत्र–D II	अप्रत्यक्ष कर (Indirect Tax)	80+20	432
Paper – D III प्रश्न पत्र–D III	सेवा के क्षेत्र में लेखांकन (Accounting in Service Sector)	80+20	433
Paper – D IV प्रश्न पत्र–D IV	लेखांकन पद्धतियाँ (Accounting Methods)	80+20	434

**Optional Group-(E)**  
व्यसायिक वातावरण एवं वित्त तथा शोध  
(Business Environment & Finance and Research)

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper – E I प्रश्न पत्र– E I	व्यसायिक वातावरण (Business Environment)	80+20	431
Paper – E II प्रश्न पत्र– E II	वित्तीय संस्थाएं (Financial Institutions)	80+20	432
Paper – E III प्रश्न पत्र– E III	शोध प्रविधि (Research Methodology)	80+20	433
Paper – E IV प्रश्न पत्र–E IV	प्रतिभूति विश्लेषण (Security Analysis)	80+20	434

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## महत्वपूर्ण नोट :

सत्र 2014-15 से एम. कॉम. प्रथम, द्वितीय एवं तृतीय सेमेस्टर में सभी प्रश्न-पत्र अनिवार्य होंगे। उक्त परीक्षा में वैकल्पिक प्रश्न-पत्र चयन की व्यवस्था नहीं होगी।

एम. कॉम. चतुर्थ सेमेस्टर में विशिष्टीकरण समूह (A), (B), (C), (D) या (E) में से किसी भी एक वैकल्पिक समूह का चयन कर उस समूह के सभी चार प्रश्न-पत्र अनिवार्य रूप से लेने होंगे।

एम. कॉम. चतुर्थ सेमेस्टर में उपरोक्त विशिष्टीकरण समूह के अतिरिक्त 50 अंक की मौखिक परीक्षा तथा 50 अंक का परियोजना प्रतिवेदन (अधिकतम 50 पृष्ठों का) तैयार करना अनिवार्य होगा। यह प्रतिवेदन वाणिज्य या प्रबन्ध विषय से सम्बन्धित होगा।

सभी प्रश्न-पत्रों में लिखित परीक्षा 80 अंकों की तथा 20 अंकों की आन्तरिक मूल्यांकन परीक्षा होगी। आन्तरिक मूल्यांकन के अंक परीक्षार्थियों की उपस्थिति, सेमीनार, शोध एवं शैक्षणिक कार्य में भागिता, इकाईवार मूल्यांकन परीक्षा आदि के आधार पर प्रदान किये जायेंगे।

आन्तरिक परीक्षा एवं बाह्य परीक्षा में प्रश्नपत्रवार न्यूनतम उत्तीर्णांक 20: होगा। जो अध्यादेश क्रमांक 170 के प्रावधानों के अनुसार बंधनकारी होगा।

### Optional Group-(E)

व्यापार पर्यावरण एवं वित्त और अनुसंधान

(Business Environment & Finance & Research)

प्रश्न पत्र	प्रश्नपत्र का नाम	पूर्णांक	पेपर कोड
Paper – E I प्रश्न पत्र– EI	व्यापार पर्यावरण (Business Environment)	80+20	431
Paper – E II प्रश्न पत्र– EII	वित्तीय संस्थाएँ (Financial Institution's)	80+20	432
Paper – E III प्रश्न पत्र–EIII	अनुसंधान क्रियाविधि ( Research Methodology )	80+20	433
Paper – E IV प्रश्न पत्र–EIV	सुरक्षा विश्लेषण (Security analysis)	80+20	434

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**M. Com. Third Semester**  
**(Compulsory Paper)**  
एम. कॉम. तृतीय सेमेस्टर  
अनिवार्य प्रश्नपत्र प्रबन्ध की अवधारणा  
(प्रश्नपत्र प्रथम)  
**MANAGEMENT CONCEPT**  
**(Paper First)**

M.M. :80

**OBJECTIVE -**

The Objective of this course is to help student understand and conceptual framework of management and organizational behaviour.

<b>Unit - I</b>	<b>Schools of Management Thought</b> : Scientific, process, human behaviour and social system school; Decisiontheory school; Quantitative and system school; Contingency theory of management; Functions of a manager.
<b>Unit - II</b>	<b>Managerial Functions</b> : Planning - concept, significance, types; Organizing - concept, principles of authority, theories, types of organizations, authority, responsibility, power, delegation, decentralization;
<b>Unit - III</b>	<b>Staffing; Directing; Coordinating; Control</b> - nature, process, and techniques.
<b>Unit - IV</b>	<b>Motivation</b> : Process of motivation; Theories of motivation - need hierarchy theory, theory X and theory Y, two factor theory, Alderfer's ERG theory, McClelland's learned need theory, Victor Vroom's expectancy theory, Stacy Adams equity theory.
<b>Unit - V</b>	<b>Group Dynamics and Team Development</b> : Group dynamics - Definition and importance, types of groups, group formation, group development, group composition, group performance factors; Principle-centered approach to team development.

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**ORGANIZATIONAL BEHAVIOUR (Paper – Second)**

M.M. : 80

**OBJECTIVE -**

The Objective of this course is to help student understand and conceptual framework of management and organizational behavior.

<b>Unit – I</b>	<b>Organizational Behaviour:</b> concept and significance; Relationship between management and organizational behaviour; Emergence and ethical perspective; Attitudes; Perception; Learning; Personality; Transactional analysis.
<b>Unit – II</b>	<b>Leadership:</b> Concept; Leadership styles; Theories - trait theory, behavioural theory, Fielder's contingency theory; Harsey and Blanchard's situational theory; Managerial grid; Likert's four systems of leadership.
<b>Unit – III</b>	<b>Organizational Conflict:</b> Dynamics and management; Sources, patterns, levels, and types of conflict; Traditional and modern approaches to conflict; Functional and difunctional organizational conflicts; Resolution of conflict.
<b>Unit – IV</b>	<b>Interpersonal and Organizational Communication:</b> Concept of two-way communication; Communication process; Barriers to effective communication; Types of organizational communication; Improving communication; Transactional analysis in communication.
<b>Unit – V</b>	<b>Organizational Development:</b> Concept; Need for change, resistance to change; Theories of planned change; Organizational diagnosis; Organizational Development intervention.

  
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**M. Com – 3rd Semester**  
उच्चतर लागत लेखांकन (प्रश्नपत्र तृतीय)  
**ADVANCED COST ACCOUNTING (Paper-Third)**


M.M.:80

**OBJECTIVE -**


This course exposes the students to the basic concepts and the tools used in cost accounting.

<b>Unit – I</b>	<b>Introduction</b> – Cost Analysis, concepts and classification, Materials control– Techniques of Materials control.
<b>Unit – II</b>	<b>Labour cost</b> – Computation and control, Overheads – Accounting and Control.
<b>Unit – III</b>	Job, Batch, Contract Costing and operating costing.
<b>Unit – IV</b>	<b>Process Costing, Joint products &amp; By – products costing.</b> Uniform costing and Estimate costing.
<b>Unit – V</b>	<b>Budgetary control</b> – Importance of budgets in accounting. Nature of budgetary control, Organization for budgetary control preparation zero base budgeting, performance budgeting. Cash Budget, Production and sales Budget.

  
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**Paper – IV**  
प्रबंधकीय लेखांकन  
**(Management Accounting)**

**OBJECTIVE:**

The objective of this course is to acquaint student with the accounting concepts, tools and techniques for managerial decisions.

**COURSE INPUTS-**

- UNIT-1** Introduction of Accounting: Management accounting as a area accounting; Objectives, nature and scope of management accounting, techniques of management accounting, difference between financial accounting, cost accounting and management accounting, Management accounting and managerial decisions; Management accountant's position, role and responsibilities.
- UNIT-2** Accounting Plan and Responsibility Centers: Meaning and significance of responsibility accounting; Responsibility centers-cost centre, profit centre and investment centre, Problems in transfer pricing, Objectives and determinates of responsibility centers.
- UNIT-3** Budgeting: Definition of Budget; Essentials of budgeting; Types of budgets functional, master etc. Fixed and flexible budget.
- UNIT-4** Standard Costing and Variance Analysis:, Standard costing as a control technique; Setting of standards and their revision; Variance analysis – meaning and importance; Kinds of variances and their uses material, labour and over head variances; Disposal: of variances; Relevance of variance analysis to budgeting and standard costing.
- UNIT-5** Marginal Costing: Concept of marginal cost; Marginal costing and absorption, costing, Marginal costing versus direct, costing;

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## REFERENCE:

Anthony, Robert: Management Accounting, Tarapore-wala, Mumbai. Barfield, Jessie, Ceily A. Raiborn and Michael R. Kenney: Cost Accounting: Traditions and Innovations, South- Western College Publishing, Cincinnati, Ohio. Decoster, Don T. and Elden L. Schafe: Management Accounting: A Decision Emphasis, John Wiley and SO, nsInc., New York.

Garrison, Ray H. and EricW. Noreen: Management Accounting, Richard D. Irwin, Chicago. Hansen, Don R. And Maryanne M. Moreen: Management Accounting, South-Western College Publishing, Cincinnati, Ohio.

Horngran, C.T., GaryL. Sundem and William O. Stratton': Introduction to Management Accounting, Prentice Hall, Delhi.

Horngren, Charles T., George Foster and Srikant M. Dalor: Cost Accounting: A Managerial Emphasis, Prentice Hall, Delhi.

Lall, B.M. and I.C. Jain: Cost Accounting: Principles and Practice, Prentice Hall, Delhi.


Pandey. I.M.: Management Accounting, Vani Publication, Delhi.

Welsch Glenn A., Ronald W. Hilton and Paul N. Gordon: Budgeting, Profit Planning and Control, Prentice Hall, Delhi


## BOOKS RECOMMENDED:

- |                                    |   |   |
|------------------------------------|---|---|
| 1. Anthony Robert N                | : | Management Accounting                           |
| 2. Gillet                          | : | Management and the account                      |
| 3. Willismore                      | : | Business, Business Budget and Budgetary Control |
| 4. Rose U. Fahri                   | : | Higher Management Control                       |
| 5. Guthmann H.G.                   | : | Analysy of finan Qial Statement                 |
| 6. Smith and Ashburn               | : | Financial and Administrative Accountancy        |
| 7. Pinkless and Duakaraley         | : | Accountancy                                     |
| 8. Manmohan A:Goyal                | : | Management Accounting                           |
| 9. जे.के. अग्रवाल, आर. के. अग्रवाल | : | प्रबंधकी लेखांकन                                |
| 10. ए.पी. गुप्ता                   | : | प्रबंधकीय लेखांकन                               |
| 11. एस.एन. माहेश्वरी               | : | प्रबंध लेखांकन                                  |
| 12. के.जी. गुप्ता                  | : | प्रबंधकीय लेखांकन                               |
| 13. एम.आर.अग्रवाल                  | : | प्रबंधकीय लेखांकन                               |
| 14. पी. मिश्रा                     | : | प्रबंध लेखांकन                                  |
| 15. डॉ.बी.पी.अग्रवाल, डॉ.मेहता     | : | प्रबंधकीय लेखाविधि                              |

  
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## **M. Com – 3rd Semester**

### **Paper – V**

प्रबंधकीय निर्णय के लिए लेखांकन

### **(Accounting for managerial decisions)**


#### **OBJECTIVE**

The objective of this course is to acquaint student with the accounting concepts, tools and techniques for managerial decisions.


#### **COURSE INPUTS-**

- UNIT-1** Break-even-analysis; Assumptions and practical applications of break- even-analysis; cost volume profit analysis, Decisions regarding sales-mix, make or buy decisions and discontinuation of a product line etc.
- UNIT-2** Analyzing financial Statements: Method, objects and ratio analysis.
- UNIT-3** Cash flow analysis and Fund flow analysis.
- UNIT-4** Contemporary Issues in Management Accounting: Value chain analysis; Activity bases costing, Quality costing, Target and lifecycle costing.
- UNIT-5** Reporting to Management: Objectives of reporting, reporting needs at different managerial levels; Types of, reports,” modes of reporting; reporting at different levels of management.

  
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## REFERENCE: -

Anthony, Robert: Management Accounting, Tarapore-wala, Mumbai. Barfield, Jessie, Ceily A. Raiborn and Michael R. Kenney: Cost Accounting: Traditions and Innovations, South-Western College Publishing, Cincinnati, Ohio. Decoster, Don T. and Elden L. Schafe: Management Accounting: A Decision Emphasis, John Wiley and Sons Inc., New York. Garrison, Ray H. and Eric W. Noreen: Management Accounting, Richard D. Irwin, Chicago. Hansen, Don R. and Maryanne M. Moreen: Management Accounting, South-Western College Publishing, Cincinnati, Ohio.

Horngran, C.T., Gary L. Sundem and William O. Stratton: Introduction to Management Accounting; Prentice. Hall, Delhi.


Horngren, Charles T., George Foster and Srikant M. Dalior: Cost Accounting: A Managerial Emphasis, Prentice Hall, Delhi. Lall, B.M. and I.C. Jain: Cost Accounting: Principles and Practice, Prentice Hall, Delhi. Pandey I.M.: Management Accounting, Vani Publication, Delhi.

Welsch Glenn A. Ronald W. Hilton and Paul N. Gordon: Budgeting, Profit Planning and Control Prentice Hall, Delhi:


## BOOKS RECOMMENDED:

Anthony Robert N.	:	Management Accounting
Gillet	:	Management and the account
Willsmore	:	Business, Business Budget and Budgetary Control
Rose U. Fahri	:	Higher Management Control .
Guthrann H.G.	:	Analysy of financial Statement
SmithandAshburn	:	Financial and Administrative Accountancy
Pink less and Duakaraley	:	Accountancy.
Manmohan A. Goyal	:	Managemeht Accounting
जे. के. अग्रवाल, आर. के. अग्रवाल	:	प्रबंधकीय लेखांकन
ए. पी. गुप्ता	:	प्रबंधकीय लेखांकन
एस. एन. माहेश्वरी	:	प्रबंध लेखांकन
के. जी. गुप्ता	:	प्रबंधकीय लेखांकन
एम. आर. अग्रवाल	:	प्रबंधकीय लेखांकन
पी. मिश्रा	:	प्रबंध लेखांकन
डॉ. बी. पी. अग्रवाल	:	डॉ. मेहता: प्रबंधकीय लेखाविधि

  
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एम.कॉम. चतुर्थ सेमेस्टर –(M. Com. Fourth Semester)

विशिष्टीकरण : (A) विपणन

**Specialization: (A) Marketing**

(1) विपणन के सिद्धान्त (प्रश्नपत्र –: A – प्रथम)

**PRINCIPLE OF MARKETING (Paper –: A - First)**

M.M.: 80

**OBJECTIVE-**


The Objective of this course is to facilitate understanding of the conceptual framework of marketing and its applications in decision making under various environmental constraints.

<b>Unit – I</b>	Introduction – Meaning, nature, scope and importance of marketing; Marketing concept and its evolution; Marketing mix; Strategic marketing planning – an overview.
<b>Unit – II</b>	Market Analysis and Selection – Marketing environment – macro and micro components and their impact of marketing decisions; Market segmentation and positioning; Buyer behavior; Consumer versus organizational buyers; Consumer decision – making process.
<b>Unit – III</b>	Product Decisions – Concept of a product; Classification of products; Major product decisions; Product line and product mix; Branding; Packaging and labeling ; Product lifecycle – strategic implications ; New product development and consumer adoption process.
<b>Unit – IV</b>	Pricing Decisions – Factors affecting price determination; Pricing policies and strategies; Discounts and rebates.
<b>Unit – V</b>	Distribution Channels and Physical Distribution Decisions – Nature, functions, and types of distribution channels; Distribution channel intermediaries; Channel management decisions; Retailing and wholesaling. Physical Distribution Management.

  
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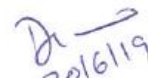
(1) विज्ञापन एवं विक्रय प्रबन्ध – (प्रश्नपत्र : A – द्वितीय)

**ADVERTISING & SALES MANAGEMENT (Paper: A – Second)**


**M.M.:80**

<b>Unit – I</b>	Introduction: Concept, Scope, Objectives and Functions of Advertising. Role of Advertising in marketing mix and the advertising process. Legal, ethical and social aspect of advertising.
<b>Unit – II</b>	Pre-launch Advertising Decision: Determination of target audience, Advertising Media and their choice. Advertising messages, Layout of advertisement and Advertising Appeal, Advertising Copy.
<b>Unit – III</b>	Promotional Management: Advertising Department, Role of Advertising Agencies and their Selection, Advertising Budget, Evaluation of Advertising Effectiveness.
<b>Unit – IV</b>	Personal Selling: Meaning and Importance of Personal Selling, - Difference between Personal Selling, Advertising and Sales Promotion. Methods and Procedure of Personal Selling.
<b>Unit – V</b>	Sales Management: Concept of Sales Management, Objectives and Functions of Sales Managements. Sales Organization, Management of Sales force and Sales force objectives, Sales force Recruitment: - Selection, Training, Compensation and Evaluation.

  
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(3) विपणन अनुसंधान (प्रश्नपत्र : A – तृतीय)  
**MARKETING RESEARCH (Paper: A – Third)**


M.M.:80

<b>Unit – I</b>	Marketing Research: An Introduction; Marketing Decisions; Marketing Research and Information System.
<b>Unit – II</b>	Marketing Research Methodology, Research Design.
<b>Unit – III</b>	Organization of Marketing Research. Specialized areas of application of marketing research.
<b>Unit – IV</b>	Specialized Techniques of Marketing Research. Motivation Research.
<b>Unit – V</b>	Advertising Research: Planning and Procedure, New Product Research.

  
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(4) अंतर्राष्ट्रीय विपणन (प्रश्नपत्र : A – चतुर्थ)

**INTERNATIONAL MARKETING (Paper : A – Fourth)**


**M.M.:80**

<b>Unit – I</b>	International Marketing; Meaning; Scope, benefits and difficulties of International Marketing: International marketing and Domestic Marketing, reasons for entering International marketing. International marketing environment; Identifying and selecting foreign market.
<b>Unit – II</b>	Foreign market entry mode: Product designing, standardization Vs. Adaptation; Branding, Packaging and Labeling.
<b>Unit – III</b>	Quality issues and after sales service; International pricing; International price quotation; payment terms and methods of payment.
<b>Unit – IV</b>	Promotion of products and services abroad: International channels of distribution; Selection and appointment of foreign sales agents. Logistic decision.
<b>Unit – V</b>	Export policy and practices in India, Trends in India's foreign trade, steps in starting export business; Export finance, documentation and procedure.

  
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विशिष्टिकरण : (B) प्रबन्ध

**Specialization: (B) Management**

(1) वित्तीय प्रबन्ध (प्रश्नपत्र – : B प्रथम)

**FINANCIAL MANAGEMENT (Paper: B -First)**

M.M.:80

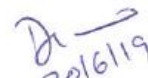
**OBJECTIVE**

The objective of this course is to help students of understand the conceptual framework of financial management, and is applications under various environmental constraints.

**COURSE INPUTS**

<b>Unit – I</b>	<b>Financial Management:</b> Meaning, nature and scope of finance; Finance functions - investment, financing and dividend decisions. <b>Capital Budgeting:</b> Nature of investment decisions; Investment evaluation criteria - net present value, internal rate of return, profitability index, payback period, accounting rate of return; NPV and IRR comparison; Capital rationing; Risk analysis in capital budgeting.
<b>Unit – II</b>	<b>Cost of Capital:</b> Meaning and significance of cost of capital; Calculation of cost of debt, preference capital, equity capital and retained earnings; Combined cost of capital (weighted); Cost of equity and CAPM.
<b>Unit – III</b>	<b>Operating and Financial Leverage:</b> Measurement of leverages; Effects of operating and financial leverage on profit; Analyzing alternate financial plans; Combined financial and operating leverage. <b>Capital structure Theories:</b> Traditional and M.M. hypotheses - without taxes and with taxes; Determining capital structure in practice.

  
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<b>Unit – IV</b>	<b>Dividend Policies:</b> Issues in dividend decisions, Walter's model, Gordon's model, M-Mhypothesis, dividend and uncertainty, relevance of dividend; Dividend policy in practice; Forms of dividends; Stability in dividend policy; Corporate dividend behavior.
<b>Unit – V</b>	<b>Management of Working Capital:</b> Meaning, significance and types of working capital; Calculating operating cycle period and estimation of working capital requirements; Financing of working capital and norms of bank finance; Sources of working capital; Factoring services; Various committee reports on bank finance; Dimensions of working capital management. Management of cash, and inventory.

  
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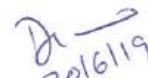
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**PERSONNEL MANAGEMENT (Paper: B – Second)**


M.M. :80

<b>Unit – I</b>	Concept, Definition, Importance & Objectives of Personnel Management, Historical Development of Personnel Management, Nature, scope planning, Philosophy and Principles of personnel Management and its relation with behavioral sciences.
<b>Unit – II</b>	Personnel policies, programmers & procedures. Personnel Department; Personnel Functions, Position of personnel Department & Organization of Personnel Management.
<b>Unit – III</b>	Man power planning Recruitment and Selection, Training & Development of Employees & Executives. Promotion, Demotion, Transfers, Absenteeism & Turnover.
<b>Unit – IV</b>	Performance Appraisal and Merit Rating, Discipline. Job evaluation Wage & Salary Administration, plans of Remuneration & Financial Rewards/Incentive payments.
<b>Unit – V</b>	Employees Fringe Benefits & Services - Safety, Health & Security programmer and welfare. Motivation and Moral.

  
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(3) उत्पादन प्रबन्ध (प्रश्नपत्र : B –तृतीय)

**PRODUCTION MANAGEMNT (Paper: B – Third)**

**M.M.:80**

<b>Unit – I</b>	Fundamentals of production management, Nature, Scope, Functions; Problems, Production and Productivity organizing for production. Types of manufacturing systems.
<b>Unit – II</b>	Production planning, Objectives, Factors affecting Production Planning. Planning future activities, forecasting. Qualitative & Quantative forecasting Methods, longrange forecasts, project planning method (P.E.R.T. and C.P.M.) Process planning System. Techniques of process planning: Assembly charts, process charts make or buy analysis.
<b>Unit – III</b>	Process design, Factors affecting design Relation with types of manufacturing plant location and layout: Factors affecting location. Types of plans layout, evaluation of alternative layout.
<b>Unit – IV</b>	Work measurement and work standards Uses of work measurement date, procedure for work measurement. Direct work measurement. Time study, activity sampling, Indirect work measurement: Syntetic timing, Predetermined motion time system, analytical estimating. Methods analysis: Areas of application, Approaches to methods design, Tools for methods analysis, works implification programme.
<b>Unit – V</b>	<b>Production Control</b> – Control functions: Routing Londing, Scheduling, Despatching, Follow up. Quality control & inspection: place of quality control in modern enterpriss, organisation of qualit control. Statistical quality control, inspection location for inspection, inspection procedure and records, Inspection devices.

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(4) व्यूह रचना प्रबन्ध (प्रश्नपत्र : B –चतुर्थ)

**STRATEGIC MANAGEMENT (Paper: B – Fourth)**

M.M.:80

<b>Unit – I</b>	<b>Concept of Strategy:</b> Defining strategy, levels at which strategy operates; Approaches to strategic decision making; Mission and purpose, objectives and goals; Strategic business unit (SBU); Functional level strategies. <b>Environmental Analysis and Diagnosis:</b> Concept of environment and its components; Environment scanning and appraisal; Organisational appraisal; Strategic advantage analysis and diagnosis, SWOT analysis.
<b>Unit – II</b>	<b>Strategy Formulation and Choice of Alternatives:</b> Strategies - modernisation, diversification, integration, Merger, take-over and joint strategies; Turnaround, divestment and liquidation strategies; Process of strategic choice-industry, competitor and SWOT analysis; Factors affecting strategic choice; Generic competitive strategies- cost leadership, differentiation focus, value chain analysis, bench marking, service blue printing.
<b>Unit – III</b>	<b>Functional Strategies:</b> Marketing, production/ operations and R & D plans and policies. Functional Strategies: Personnel and financial plans and policies.
<b>Unit – IV</b>	<b>Strategy Implementation:</b> Inter-relationship between formulation and implementation; Issues in strategy implementation; Resource allocation. <b>Strategy and Structure:</b> Structural considerations, structures for strategies; Organisational design and change.
<b>Unit – V</b>	<b>Strategy Evaluation:</b> Overview of strategic evaluation; Strategic control; Techniques of strategic evaluation and control. Global Issues in Strategic Management.

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विशिष्टीकरण: (C) बैंकिंग एवं बीमा  
**Specialization : (C) Banking and Insurance**  
(1) बैंकिंग व्यवहार – (प्रश्नपत्र : C – प्रथम)  
**BANKING PRACTICES (Paper: C – First)**

M.M.: 80

**OBJECTIVE-**

This course enables the students to know the working of the Indian banking system and fundamentals of insurance.

<b>Unit – I</b>	Bank: Concept, Functions and Services, Prohibited Business, Nature of Banking, Qualities of Banker, Bank and Customer Relationship, Concept of Customer, general Relationship, Bankers, Rights and obligations, Termination of Relationship.
<b>Unit – II</b>	Accounts of Customers: Various Customers' Accounts, Opening an account, Nomination facility, Special Types of Customers Minors, Pardanashin Women, Lunatics, Intoxicated Persons, Joint Hindu Family, Limited Companies and Non Trading Concern.
<b>Unit – III</b>	Employment of Bank Funds, Importance of Liquidity, Cash Reserve, Money at call and short notice, Investments, Statutory provisions regarding liquid Assets, Principles of lending, Types of loan, Interest Tax Act.
<b>Unit – IV</b>	Purchase/Discounting of Bills, Legal Position, Bill Market scheme, Lodgment of bills, Vaghu Working Group Report, Letters of Credit, Concept and types, Crossing and endorsements of cheque.
<b>Unit – V</b>	Securities for Advances: General Principles, Advances against Goods, Stock Exchange Securities, Real Estate, Life Policies, Fixed Deposits, Gold, Silver, Bond and Debenture. Lien and Mortgage, Types of mortgage, Hypothecation, pledge.

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(2) भारत में बैंकिंग संस्थाएँ –(प्रश्नपत्र : C – द्वितीय)

**BANKING INSTITUTION IN INDIA (Paper: C – Second)**

**M.M. :80**

<b>Unit – I</b>	<b>Indian Banking System:</b> Indigenous Bankers, Money Landers, Nationalization of commercial Bank and their Effects, Classification of Banking Institutions, Commercial Banks, Regional Rural Banks, Cooperative Banks.
<b>Unit – II</b>	<b>Development Banking in India:</b> IFCI, ICICI, SIDBI, Credit Guarantee Institutions; Export Credit Guarantee Corporation of India, Deposit Insurance and Credit Guarantee Corporation of India.
<b>Unit – III</b>	<b>R.B.I.:</b> Organization, function, Central Banking functions, Promotional functions, Control of credit by RBI, NBFC and RBI, Commercial Banks and RBI, Power of RBI.
<b>Unit – IV</b>	<b>Banking Regulation Act 1949:</b> Important features, Forms of Business of a Bank, Regulation for Capital, Control over Management, Restrictions on loans and advances winding up of a Banking Company, Amalgamation of Banks.
<b>Unit – V</b>	<b>Emerging trends in Banking Sector:</b> Narasimham Committee Report, Committee on Banking Sector Reforms, Bridge Loan and Privatization of Banks and its impact.

  
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(3) जीवन बीमा—(प्रश्नपत्र :C –तृतीय)  
**LIFE INSURANCE (Paper: C – Third)**

**M.M. :80**

<b>Unit – I</b>	<b>Life insurance:</b> introduction, History of life insurance, Utility, Object, Characteristics and importance of life insurance, procedure of getting life insurance, non – medical insurance, Insurance of sub – standard lives, insurance of female lives and Minors.
<b>Unit – II</b>	<b>Life insurance policy:</b> Conditions and kinds of Life insurance policies, some important plans of life insurance.
<b>Unit – III</b>	<b>Premium and Annuity:</b> Elements of premium; methods of premium computation, Natural premium plan, level premium plan, Gross and net premium, Loading mortality table – meaning, characteristics and importance in life insurance; Kinds of mortality table. Annuity: meaning, objects, advantages and kinds of annuity, annuity Vs Life insurance.
<b>Unit – IV</b>	Life Insurance agent and his working, settlements of Life insurance claims. Guidelines and procedures, Organisation and management of life insurance corporation of India, working and progress.
<b>Unit – V</b>	Privatization of Life insurance in India, Insurance Regulatory & Development Authority Act, 1999,-powers and functions of authority.

  
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(4) सामान्य बीमा –(प्रश्नपत्र : C –चतुर्थ)  
**GENERAL INSURANCE (Paper: C – Fourth)**

M.M. :80

<b>Unit – I</b>	<b>Introduction:</b> Origin and Development of Insurance : Advantages, Importance and Functions of Insurance, Fundamental principles of Insurance – insurable interest, utmost good faith, other principles – indemnity, subrogation, contribution, mitigating of loss warranties, Proximate cause etc.
<b>Unit – II</b>	<b>Classification and Re-insurance:</b> General Principles, various methods of re-insurance, under insurance, Over-insurance, double insurance Classification and organisation of Insurance.
<b>Unit – III</b>	<b>Marine Insurance:</b> Introduction, Evolution & Development of marine insurance. Necessary elements of marine insurance contract Peril & Scope of marine insurance. Procedure of Taking out Marine Insurance Policy, kinds of Marine insurance Policies, Computation of Marine Insurance Premiums and Returns, Marine Losses – Total loss, Actual and Constructive, Partial Loss – particular average loss and general average loss, Settlements of Claims and Recoveries, Salvage and Particular Charges.
<b>Unit – IV</b>	<b>Fire insurance:</b> Physical and moral hazards, functions of fire insurance, history of fire insurance ; principles of fire insurance, meaning of fire, characteristics of fire insurance, contract rights of insurer under a fire insurance contract, procedure of fire insurance policy, fire policy conditions, settlement of claims.
<b>Unit – V</b>	<b>Miscellaneous Insurance:</b> Personal accident Insurance, Motor, employer's liability fidelity guarantee, burglary, livestock, crop. And workmen's compensation insurance, Cattle Export Risks; Engineering; Aircraft insurance.

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विशिष्टिकरण : (D) करारोपण एवं लेखांकन  
**Specialization: (D) Taxation and Accounting**  
(1) भारत में प्रत्यक्ष कर (प्रश्नपत्र : D – प्रथम)  
**DIRECT TAX IN INDIA (Paper: D – First)**

M.M.:80

<b>Unit – I</b>	Basic Concepts and Definitions, Residential Status and Tax incidence. Exempted Income, Deemed Income, Clubbing of Income, Deductions under Section – 80.
<b>Unit – II</b>	Computation of Total Income and Tax Liabilities of Individual. Taxation on Agriculture Income.
<b>Unit – III</b>	Return of Income and Assessment, Various Types of Return, types of Assessment.
<b>Unit – IV</b>	Advance payment of Tax, Tax Deducted at Source, Penalties and Prosecution, Refund of Excess Payment.
<b>Unit – V</b>	Income Tax Authorities, Appeal and Revisions, Settlement of cases.

  
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(2) अप्रत्यक्ष कर (प्रश्नपत्र : D –द्वितीय)

**GOODS AND SERVICE TAX & CUSTOM LAW (Paper: D – Second)**


M.M. :80

<b>Unit – I</b>	Introduction of GST, Necessity of GST, Major consequences of earlier Laws, Structure of GST (SGST, CGST, UTGST & IGST), GST council, GST, Network, State Compensation Mechanism, Registration Procedure.
<b>Unit – II</b>	Taxable event- “supply” of Goods and Services, Place of Supply, Within State, Import and Export , Time of Supply, valuation for GST, Valuation Rules, Exemption From GST, Small Supplies and Composition Scheme, Classification of Goods and Services Taxability of E-Commerce
<b>Unit – III</b>	Eligible & Ineligible input tax credit Apportionments of credit and blocked Credit, Tax Credit in respect of Capital Goods. Recovery of Excess Tax Credit: Availability of tax Credit in Special Circumstance: transfer of Input Credit (Input Service Distribution): Payment of Taxes: Refund.
<b>Unit – IV</b>	Nature of customs duty, Types of customs duties, valuation for customs, duty, inclusion and exclusion, valuation under customs act, Procedures for import and export under Custom Duty.
<b>Unit – V</b>	Export incentives, Duty drawback, Powers of customs officers, penalties, confiscation of goods.

  
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Accounting in Service Sector (Paper: D – Third)


M.M.:80

<b>Unit – I</b>	Accounts of Hotel Companies – Introductions, Sources of Income, Heads of Expenditures, Cash Book, Visitor's ledger, final accounts. Accounting for Transport Undertaking – Introduction – Railways, Trams and Buses, Roadways, Shipping. Preparation of Daily Log book and final accounts (Problems on roadways only)
<b>Unit – II</b>	Accounts for Hospitals – Introduction, preparation of final accounts, capital and revenue expenditure, OPD and IPD register. Accounts of Professional people.
<b>Unit – III</b>	Accounting for educational institutions – General cashbook, Collection Ledger, Donors Register, Stock book Register, Salary and wages Register, Types of Govt. Grants and its accounting, Annual statement of accounts.
<b>Unit – IV</b>	Accounts of Co-operative Societies – Accounts of Agricultural Farms.
<b>Unit – V</b>	Government Accounting: Basic principles of government Accounting, Commercial Accounting Vs Government Accounting, Consolidated funds contingency fund and public Accounts.

  
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**Optional Group – E**  
**Paper –I: Business Environment**

**Objective**

This course develops ability to understand and scan business environment analyse opportunities and take decisions under uncertainty.

**Course Inputs**

**Theoretical Framework of Business Environment:** Concept, significance and nature of Business Environment; Elements of Business Environment- internal and external; changing dimensions of Business Environment; Techniques of environmental scanning and monitoring.

**Economic Environment of Business:** Significance and elements of economic environment; Economic systems and business environment; Economic planning in India; Government policies-Industrial Policy, Fiscal, Monetary Policy, EXIM policy; Public Sector and Economic Development; Development Banks and relevance to Indian business; Economic reforms, Liberalisation and structural adjustment programmes.

**Political and Legal Environment of Business:** Critical elements of political environment; Government and business; changing dimensions of legal environment in India; MRTP Act, FEMA and Licensing policy; Consumer Protection Act.

**Socio-Cultural Environment:** Critical elements of socio-cultural environment; Social institutions and systems; Social values and attitudes; Social groups; Middle class; Dualism in Indian society and problems of uneven income distribution; Emerging rural sector in India; Indian business system; Social Responsibility of business; Consumerism in India.

International and Technological Environment; Multinational corporations; Foreign collaborations and Indian business; Non-resident Indian and corporate sector; International economic institutions – WTO' World Bank, IMF and their importance to India; Foreign trade policies; Impact of Rupee Devaluation; Technological environment in India; Policy on research and development; Patent Laws; Technology transfer.

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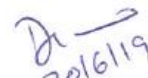
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**Optional Group – E**  
**Paper –II: Financial Institutions and Markets**

**Objective**

This course aims at providing students with an understanding of the structure, organization, and working of financial markets and institutions in India.

**Course Inputs**

**Introduction:** Nature and role of financial system: Financial system and financial markets; Financial system and economic development; Indian financial system-an overview.

**Financial Markets:** Money and Capital Market: Money market –Meaning, constituents, functions of money market; Money Market Instruments- call money, treasury bills, certificate of deposits, commercial bills, trade bills etc; Recent trends in Indian money market; Capital market-Primary and Secondary market; Depository system; Government securities market; Role of SEBI- an overview; SEBI Guidelines, Recent development.

**Development Banks:** Concept, Objectives and functions of development banks: operational and promotional activities of development banks; IFCI, ICICI, IDBI, IRBI, SIDBI, State Development Banks, State Financial Corporations.

**Unit Trust of India:** Objective, function and various schemes of UTI; Role of UTI in industrial finance.

**Mutual Funds:** Concept, performance appraisal and regulation of Mutual Funds (with special reference to SEBI guidelines); Designing and marketing of mutual funds schemes; Latest mutual fund schemes in India-an overview.

**Insurance Sector:** Objectives, role, investment practices of LIC and GIC: Insurance Regulatory and Development Authority-Role and Functions.

**Non-Banking Financial Institutions:** Concept and role of Non-Banking Financial Institution; Sources of finance; Functions of Non-Banking Financial Institution; Investment policies of Non-Banking Financial Institutions in India.

**Merchant Banking:** Concept, functions and growth; Government policy on Merchant Banking Services; (SEBI guidelines) Future of Merchant Banking in India.

**Foreign Investments:** Types, trends and implications; Regulatory framework for Foreign Investments in India.

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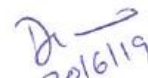
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**Optional Group – E**  
**Paper –III: Research Methodology**

**Objective**

This course aims at providing students with an understanding of the Research Methodology.

**Course Inputs**

**Research Methodology:** An Introduction, Meaning of Research, objective, nature, scope and significance of Research, Research process, criteria of good Research, Research approaches, types of Research, stages in the development of Research (steps of research), methods of Research.

**Scientific Method of Research:** Meaning and definition of Scientific research, Characteristics of scientific method, basic (elements) or steps in scientific method, limitation of scientific method.

**Nature and Role of Hypothesis in Commerce Research-** Meaning, definition of Hypothesis, characteristics of hypothesis, formation of hypothesis, function of hypothesis, dimensions of hypothesis, Sources of hypothesis, development of hypothesis, importance of hypothesis in commerce, types of hypothesis, testing of hypothesis, essential elements of a good hypothesis, difficulties in formation of hypothesis.

**Deduction and Induction Methods-** Meaning and definition of deduction method, merits and demerits of deduction method, meaning and definition of induction method, merits and demerits of induction method, distinguish between deduction and induction method.

**Research Design:** Meaning and Definition of Research Design, Characteristics of research design, subject matter of research design, steps of research design, and objectives of research design, types of research design, Exploratory research design, descriptive research design, experimental research design.

**Research Problem Selection and Identification-** Meaning and definition of problem, sources of problem, characteristics of problem-of research Identification and interpretation of problem, the situation analysis and determination of field. How to select a problem area, 7(seven)-Guiding Principles in the choice of a topic.

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**Planning and Organizing the Research Report:** -Meaning and definition of data, Collection of data, Importance of data collection, types of data sources, features, importance and limitation of data, techniques of data collection- Questionnaire, Interview Schedule.

**Sampling:** Meaning, definition of sampling, characteristics of sampling, essential concepts of sampling, planning of sampling, characteristics of a good sampling, types of sampling, merits and demerits of sampling, problem of sampling and their solutions.

**Scaling Techniques:** Meaning and need of scaling, some general problem of scaling & characteristics of a good scaling, measurement in social sciences, function of measurement Processing the data-Editing, Coding, Tabulation.

**Analysis, Interpretation, Presentation-** Meaning, definition of analysis, procedure of analysis, basic of analysis, variables of analysis, major types of analysis, Interpretation and Presentation of data-Meaning, technique of interpretation and presentation, precaution of interpretation and presentation.

**Research Report Writing:** Meaning and definition, different steps in writing report, layout of the research report, types of report, general principles of preparation of report, structure of report, language and style of report, publication of report, precaution for writing research reports.

## Reference

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Kumar Ranjeet: Research Methodology

Panneerselvam R: Research Methodology

शोध प्रविधि: बी. एल. फाड़िया

शोध प्रविधि: कुलश्रेष्ठ



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**Optional Group – E**  
**Paper –IV: Security Analysis**

**Objective**

The Objective of the course is to help students understand various issues in Security Analysis.

**Course Inputs**

**Investments:** Nature and Scope of Investment Analysis, Elements of Investment, Avenues of Investment, Approaches to Investment Analysis; Concept of Return and risk; Security Return and Risk Analysis, Measurement of return and risk.

**Financial Assets:** Types and their characteristics; sources of financial information.

**Security Markets:** Primary and Secondary Market: Primary Market- role, Functions and methods of selling securities in Primary Market; Allotment procedure; New Financial Instruments.

**Secondary market:** Role, Importance, type of Brokers, trading mechanism, Listing of Securities in Stock Exchanges, screen based trading: Depository- role and need: Depositories Act, 1996.

**Public Issue:** SEBI guidelines on Public Issue, size of issue, pricing of issue, Promoters Contribution, appointment of merchant bankers, underwriters, broker, registrar and managers, Bankers and Allotment of shares.

**Valuation of Securities:** Bonds, Debentures, Preference Shares, Equity Shares. Fundamental Analysis: Economic Analysis, Industry Analysis and Company Analysis.

**Technical Analysis:** Trends, Indicators, Indices and Moving Averages applied in Technical Analysis.

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## Reference:

Amling: Fundamentals of Investment Analysis, Prentice Hall, International Edition.

Bhalla; Investment Analysis, S. Chand & Co. Delhi.

Chandratre, K.R: Capital issue, SEBI & Listing, Bharat Publishing House , New Delhi.

Clark, James Francis: Investment Analysis and Mangement, McGraw Hill, International Edition.

Donal, E.Fisher and Ronald J. Jorden: Security Analysis and portfolio Management, Prentice Hall, New Delhi

Fabozzi, Frank J: Investment Management, Prentice Hall, International Edition

Gupta, L.C: Stock Exchange Trading in India; Society for Capital Market Research and development, Delhi.

Machi Raju, H.R: Merchant Banking: Wiley Eastem Ltd, New Delhi.

Machi Raju, H.R: Working of Stock Exchange in India; Wiley Eastem Ltd, New Delhi.

Sharpre, William F, Gordon J Alexander and J.V Bailly: Investments, Prentice Hall of India, New Delhi.

Shapre, William F: Portiolio Theory and Capital Market; McGraw Hill, New York.

Francis J. Clark: Management of Investments; McGraw Hill, New York.

  
The bottom of the page contains four handwritten signatures and dates in blue ink. From left to right: 1. A signature followed by the date '20/6/19'. 2. The initials 'SKA' followed by the date '20/6/19'. 3. A signature followed by the date '20/6/19'. 4. A signature followed by the date '20/6/19'.

# **HEMCHNAD YADAV VISHWAVIDYALAYA, DURG (C.G.)**

Website - [www.durguniversity.ac.in](http://www.durguniversity.ac.in), Email - [durguniversity@gmail.com](mailto:durguniversity@gmail.com)



## **SCHEME OF EXAMINATION & SYLLABUS of M.A. (Hindi) Semester Exam UNDER FACULTY OF ARTS Session 2019-20**

**(Approved by Board of Studies)  
Effective from June 2019**



**सत्र 2019-20 एम.ए. हिन्दी अंक विभाजन सेमेस्टर प्रणाली**

**प्रथम सेमेस्टर**

**अंक विभाजन**

	प्रश्न पत्र	बाह्य परीक्षा	आंतरिक मूल्यांकन	कुल अंक
प्रथम :	(आदिकाल एवं पूर्व मध्यकाल)	80	20	100
द्वितीय :	प्राचीन एवं मध्यकालीन काव्य	80	20	100
तृतीय :	आधुनिक काव्य-1 (छायावाद एवं पूर्ववर्ती काव्य)	80	20	100
चतुर्थ :	नाटक, एकांकी एवं चरितात्मक कृति	80	20	100
			<b>कुल</b>	<b>400 अंक</b>

**द्वितीय सेमेस्टर**

**अंक विभाजन**

	प्रश्न पत्र	बाह्य परीक्षा	आंतरिक मूल्यांकन	कुल अंक
पंचम :	(उत्तर मध्यकाल एवं आधुनिक काल)	80	20	100
षष्ठ :	मध्यकालीन काव्य	80	20	100
सप्तम :	आधुनिक काव्य-2 (प्रगतिवाद, प्रयोगवाद, नई कविता एवंसमकालीन कविता)	80	20	100
अष्टम :	उपन्यास, निबंध एवं कहानी	80	20	100
			<b>कुल</b>	<b>400 अंक</b>

**तृतीय सेमेस्टर**

**अंक विभाजन**

	प्रश्न पत्र	बाह्य परीक्षा	आंतरिक मूल्यांकन	कुल अंक
प्रथम :	साहित्य के सिद्धांत तथा अलोचना शास्त्र	80	20	100
द्वितीय:	भाषा विज्ञान	80	20	100
तृतीय:	कामकाजी हिन्दी एवं पत्रकारिता	80	20	100
चतुर्थ :	भारतीय साहित्य	80	20	100
			<b>कुल</b>	<b>400 अंक</b>

**चतुर्थ सेमेस्टर**

**अंक विभाजन**

	प्रश्न पत्र	बाह्य परीक्षा	आंतरिक मूल्यांकन	कुल अंक
पंचम:	हिन्दी आलोचना तथा समीक्षा शास्त्र	80	20	100
षष्ठ :	हिन्दी भाषा	80	20	100
सप्तम :	मीडिया लेखन एवं अनुवाद	80	20	100
अष्टम:	जनपदीय भाषा और साहित्य (छत्तीसगढ़ी)	80	20	100
			<b>कुल</b>	<b>400 अंक</b>

**टीप:-** प्रत्येक प्रश्न पत्र में 20 अंकों के आंतरिक मूल्यांकन के अंतर्गत दो आंतरिक मूल्यांकन का आयोजन अनिवार्य होगा एवं इसका मूल्यांकन विभाग के शिक्षको के द्वारा किया जावेगा तथा प्राप्तांक विश्वविद्यालय को प्रेषित किया जावेगा ।



**पाठ्य विषय:—**

**इकाई—1 हिन्दी साहित्य का इतिहास : परम्परा और पद्धति:**

हिन्दी साहित्य के इतिहास लेखन की परम्परा, साहित्येतिहास के पुनर्लेखन की समस्याएँ।  
हिन्दी साहित्य के इतिहास का काल—विभाजन और नामकरण, आदिकाल के नामकरण की समस्या।

**इकाई—2 आदिकाल:**

हिन्दी साहित्य के आदिकाल की सांस्कृतिक पृष्ठभूमि, रासो काव्य, सिद्ध नाथ एवं जैन साहित्य, लौकिक साहित्य, साहित्यिक प्रवृत्तियाँ, प्रतिनिधि रचनाकार।

**इकाई—3 पूर्व मध्यकाल (भक्ति काल), भक्ति आंदोलन :**

उद्भव और विकास, हिन्दी क्षेत्र में भक्ति आंदोलन की सांस्कृतिक पृष्ठभूमि एवं उसका विकास, भक्ति काल की प्रमुख प्रवृत्तियाँ, तथा दार्शनिक विचारधाराएँ।

**इकाई—4 भक्तिकाल की विभिन्न काव्य-धाराएँ :**

निर्गुण काव्य : ज्ञानमार्गी काव्यधारा एवं प्रेममार्गी काव्यधारा - परम्परा, प्रवृत्ति एवं उसका विकास। सगुण काव्य : कृष्ण भक्ति काव्य—धारा एवं रामभक्ति काव्य धारा- परंपरा, प्रवृत्ति एवं उसका विकास।

**टीप :-**

प्रत्येक इकाई से 02 दीर्घ उत्तरीय प्रश्न पूछे जाएंगे जिनमें से 01 प्रश्न को हल करना होगा। प्रत्येक इकाई से 02 लघु उत्तरीय प्रश्न पूछे जाएंगे। कुल 8 लघु उत्तरीय प्रश्नों में से 5 प्रश्नों को हल करना होगा। सम्पूर्ण पाठ्यक्रम से पूछे गए 15 प्रश्नों में से 10 अति लघुउत्तरीय/वस्तुनिष्ठ प्रश्नों के उत्तर देने होंगे।

**अंक विभाजन**

प्रश्न 1 —	1X 15	=	15 अंक
प्रश्न 2 —	1 X 15	=	15 अंक
प्रश्न 3 —	1 X 15	=	15 अंक
प्रश्न 4 —	1X 15	=	15 अंक
प्रश्न 5 —	लघुउत्तरीय 5 X 2	=	10 अंक
	— वस्तुनिष्ठ 10 X 1	=	10 अंक

**योग = 80 अंक**

**आंतरिक मूल्यांकन 20 अंक**

## निर्धारित पुस्तकें :-

1. हिन्दी साहित्य का इतिहास (संशोधित – आचार्य रामचंद्र शुक्ल)
2. हिन्दी साहित्य का आदिकाल – हजारी प्रसाद द्विवेदी
3. हिन्दी साहित्य का इतिहास (नेशनल पब्लिशिंग हाऊस, दिल्ली) – डॉ. नगेन्द्र
4. आदिकालीन हिन्दी साहित्य (वाराणसी विश्वविद्यालय प्रकाशन) – डॉ. शम्भूनाथ पाण्डेय
5. आदिकालीन हिन्दी साहित्य सांस्कृतिक पीठिका (हिन्दी ग्रंथ अकादमी) – डॉ. राममूर्ति त्रिपाठी
6. हिन्दी साहित्य का दुसरा इतिहास – डॉ. बच्चन सिंह
7. हिन्दी साहित्य और संवेदना का विकास—राम स्वरूप चतुर्वेदी (लोकभारती प्रकाशन)
8. हिन्दी साहित्य का सरल इतिहास – विश्वनाथ त्रिपाठी (ओरियन्ट लॉगमैन)
9. हिन्दी साहित्य उद्भव और विकास – हजारी प्रसाद द्विवेदी।

The bottom of the page features three handwritten signatures in blue ink. The first signature on the left is 'R. S.', the middle one is 'Shambhu Nath Pandey', and the right one is 'Bachchan Singh'. To the right of the middle signature, the date '11/10/06' is written.

**एम.ए. (हिन्दी) – 2019–20**  
**प्रथम सेमेस्टर**  
**प्रश्न पत्र – द्वितीय**  
**प्राचीन एवं मध्यकालीन काव्य**  
**(रासो काव्य, लौकिक काव्य एवं निर्गुण काव्य)**

योग : 80

**पाठ्य विषय:—**

व्याख्या एवं विवेचन के लिए निम्नांकित चार कवियों का अध्ययन अपेक्षित है ।

1. चंदबरदाई : पृथ्वीराज रासो, संपादक आचार्य हजारी द्विवेदी, डॉ. नामवर सिंह (पद्मावती समय)
2. विद्यापति पदावली : संपादक रामवृक्ष बेनीपुरी से प्रारंभिक 10 पद ।
3. कबीर ग्रंथावली: संपादक डॉ. श्याम सुंदर दास (50 साखियाँ तथा 15 पद) पद क्रमांक— 11, 16, 24, 26, 27, 45, 49, 64, 70, 72, 89, 93, 110, 111, 268 साखियाँ— गुरुदेव कौ अंग 1 से 10, सुमिरण कौ अंग 1 से 10, विरह कौ अंग 1 से 10, ग्यान विरह कौ अंग 1 से 5, चितावणी कौ अंग 1 से 5, माया कौ अंग 1 से 5, परचा कौ अंग 1 से 5 ।
4. मलिक मोहम्मद जायसी : पद्मावत संपादक आ. रामचंद्र शुक्ल (नागमती विरह खण्ड एवं सिंहल द्वीपखण्ड)

**टीप:—** द्रुत पाठ हेतु निम्नांकित 05 कवियों का एवं उनकी रचनाओं का अध्ययन अनिवार्य है, इन कवियों पर लघुत्तरी प्रश्न पूछे जायेंगे— अमीर खुसरों, मीराबाई, रहीम, रैदास, रसखान ।

**अंक विभाजन**

प्रश्न 1 व्याख्या	3 व्याख्या (कोई तीन)	3X10 =	30 अंक
प्रश्न2 चंदबरदाई एवं इतिहास	3 आलोचनात्मक (कोई तीन)	3X10 =	30 अंक
प्रश्न3 कबीर एवं जायसी			
प्रश्न4 (द्रुत पाठ के कवि)	5 लघु— उत्तरीय (सम्पूर्ण पाठ्यक्रम से)	5X2 =	10 अंक
10 वस्तुनिष्ठ (सम्पूर्ण पाठ्यक्रम से)		10X1 =	10 अंक
<b>योग =</b>			<b>80 अंक</b>
<b>आंतरिक मूल्यांकन</b>			<b>20 अंक</b>

**निर्धारित पुस्तकें:—**

1. डॉ. विपिन बिहारी द्विवेदी — चंदबरदाई
2. कबीर की विचारधारा — डॉ. गोविन्द त्रिगुणायन
3. प्रमुख प्राचीन कवि — डॉ. द्वारिका प्रसाद सक्सेना
4. कबीर साहित्य की परख — परशुराम चतुर्वेदी
5. जायसी की विशिष्ट शब्दावली — डॉ. इंदिरा कुमारी सिंह का विश्लेषणात्मक अध्ययन
6. मलिक मोहम्मद जायसी और उनका काव्य — डॉ. शिवसहाय पाठक
7. अमीर खुसरों और उनका साहित्य — डॉ. भोलानाथ तिवारी
8. कबीर— सं. हजारी प्रसाद द्विवेदी



**एम.ए.पूर्व (हिन्दी) 2019—20**  
**प्रथम सेमेस्टर**  
**प्रश्न पत्र — तृतीय**  
**आधुनिककाव्य—1**  
**(द्विवेदीयुगीन एवं छायावादी काव्य)**

**कुल : 80**

**पाठ्य विषय:—**

व्याख्या एवं विवेचन के लिए निम्नांकित तीन कवियों का अध्ययन अपेक्षित है ।

- इकाई 1. मैथिलीशरण गुप्त — साकेत नवम् सर्ग  
इकाई 2. जयशंकर प्रसाद — कामायनी (चिन्ता, श्रद्धा)  
इकाई 3. सूर्यकांत त्रिपाठी निराला — राम की शक्ति पूजा, सरोज स्मृति  
इकाई 4. महादेवी वर्मा — मैं नीर भरी दुःख की बदली, यह मंदिर का दीप इसे नीरव जलने दो, रूपसी तेरा केश-पाश, मधुर मधुर मेरे दीपक जल ।

**टीप:—**

द्रुत पाठ हेतु निम्नांकित 5 कवियों का अध्ययन किया जाएगा ।

श्रीधर पाठक, अयोध्या सिंह उपाध्याय "हरिऔध", मुकुटधर पांडेय, जगन्नाथ दास रत्नाकर, सुमित्रानन्दन पंत, (लघुत्तरीय प्रश्न द्रुत पाठ एवं पाठ्यक्रम से पूछे जाएंगे।)

**अंक विभाजन**

प्रश्न1— 3 व्याख्या	—	3X10	=	30 अंक
प्रश्न2— 3 आलोचनात्मक	—	3X10	=	30 अंक
प्रश्न3— 5 लघुत्तरीय (द्रुत पाठ के कवि)	—	5X2	=	10 अंक
प्रश्न4— वस्तुनिष्ठ अतिलघुत्तरीय	—	10X1	=	10 अंक

**योग = 80 अंक**  
**आंतरिक मूल्यांकन 20 अंक**



## निर्धारित पुस्तकें:—

1. साकेत एक अध्ययन— डॉ. नगेन्द्र
2. कवि निराला — आचार्य नंद दुलारे वाजपेयी
3. निराला की साहित्य साधना — डॉ. रामविलास शर्मा
4. नया साहित्य नये साधना — आचार्य नंद दुलारे वाजपेयी
5. कामायनी एक पुनर्विचार — मुक्तिबोध
6. प्रसाद का काव्य — प्रेमशंकर
7. हिन्दी साहित्य आधुनिक परिदृश्य — अज्ञेय
8. हिन्दी साहित्य का इतिहास — नगेन्द्र
9. बच्चन की कविताओं का शैलीवैज्ञानिक अध्ययन — डॉ. शीला शर्मा

Handwritten signatures and dates in blue ink. The signatures are stylized and appear to be of the individuals mentioned in the list. The dates are 11/10/06 and 11/10/06.

एम.ए. – (हिन्दी) –2019–20  
प्रथम सेमेस्टर  
प्रश्न पत्र – चतुर्थ  
आधुनिक गद्य साहित्य  
(नाटक, एकांकी एवं चरितात्मक तथा आत्मकथात्मक कृति)

पूर्णांक : 80

पाठ्य विषय :-

**इकाई –1. नाटक**

- |                |   |               |
|----------------|---|---------------|
| 1. चन्द्रगुप्त | — | जयशंकर प्रसाद |
| 2. हानूश       | — | भीष्म साहनी   |
| 3. अन्धा युग   | — | धर्मवीर भारती |

**इकाई –2. एकांकी**

- |                  |   |                     |
|------------------|---|---------------------|
| 1. रीढ़ की हड्डी | — | जगदीश चन्द्र माथुर  |
| 2. एक दिन        | — | लक्ष्मीनारायण मिश्र |
| 3. तौबे के कीड़े | — | भुवनेश्वर           |
| 4. तौलिए         | — | उपेन्द्रनाथ अशक     |

**इकाई – 3. चरितात्मक कृति**

- |                |   |                |
|----------------|---|----------------|
| 1. पथ के साथी  | — | निराला भाई     |
| 2. आवारा मसीहा | — | विष्णु प्रभाकर |
- (संक्षिप्त संस्करण)

**इकाई – 4. आत्मकथात्मक कृति**

- |                  |   |                    |
|------------------|---|--------------------|
| 1. जूटन (भाग-एक) | — | ओम प्रकाश बाल्मिकी |
|------------------|---|--------------------|

**इकाई विभाजन**

- |            |   |                                  |
|------------|---|----------------------------------|
| प्रश्न – 1 | — | व्याख्या                         |
| प्रश्न – 2 | — | नाटक                             |
| प्रश्न – 3 | — | एकांकी                           |
| प्रश्न – 4 | — | चरितात्मक कृति, आत्मकथात्मक कृति |
| प्रश्न – 5 | — | लघुउत्तरीय एवं वस्तुनिष्ठ प्रश्न |

**अंक विभाजन**

1— 3 व्याख्या	—	3X10	=	30 अंक
2— 3 आलोचनात्मक	—	3X10	=	30 अंक
3— 5 लघुउत्तरीय	—	5X2	=	10 अंक
4— वस्तुनिष्ठ अतिलघुउत्तरीय	—	10X1	=	10 अंक
योग				= 80 अंक



**निर्धारित पुस्तकें:—**

- |   |                          |
|---|--------------------------|
| 1. हिन्दी नाटक उद्भव और विकास                 | — डॉ. दशरथ ओझा           |
| 2. हिन्दी नाटक सिद्धांत और विवेचन             | — डॉ. गिरीश रस्तोगी      |
| 3. हिन्दी नाटक पुनर्मूल्यांकन                 | — डॉ. सत्येन्द्र तनेजा   |
| 4. समसामयिक हिन्दी नाटकों में चरित्र सृष्टि — | डॉ. जयदेव तनेजा          |
| 5. प्रसाद के नाटकों का शास्त्रीय अध्ययन       | — जगन्नाथ प्रसाद शर्मा   |
| 6. आधुनिक हिन्दी नाटक                         | — नगेन्द्र               |
| 7. नाटक रंगमंच और मोहन राकेश                  | — डॉ. सुरेन्द्र यादव     |
| 8. प्रसाद युगीन हिन्दी नाटक                   | — डॉ. भगवती प्रसाद शुक्ल |
| 9. प्रसाद के नाटक एवं नाट्य शिल्प             | — डॉ. शांति स्वरूप गुप्त |
| 10. नाटककार मोहन राकेश                        | — डॉ. सुन्दर लाल कथूरिया |
| 11. हिन्दी एकांकी : उद्भव और विकास            | — रामचरण महेन्द्र        |
| 12. हिन्दी रंगमंच : दषा और दिषा               | — जयदेव तनेजा            |
| 13. भष्म साहनी के उपन्यास और नाटक             | — डॉ. राकेश कुमार तिवारी |

*R. S. ... 11/10/06*



एम.ए. (हिन्दी) – 2019–20

द्वितीय सेमेस्टर

प्रश्न पत्र – पंचम (उत्तर मध्यकाल से आधुनिक काल तक)

समय 3 घंटे

पूर्णांक : 80

पाठ्य विषय:—

- इकाई 1. उत्तर मध्यकाल (रीतिकाल) काल सीमा, नामकरण, प्रवृत्तियाँ, रीतिकालीन साहित्य की विभिन्न धारायें (रीतिबद्ध, रीतिसिद्ध, रीतिमुक्त) प्रवृत्तियाँ एवं विशेषताएँ। रीतिकाल के प्रतिनिधि रचनाकार एवं रचनाएँ ।
- इकाई 2. आधुनिक काल – आधुनिक काल की सामाजिक, राजनैतिक, आर्थिक एवं सांस्कृतिक पृष्ठभूमि । सन् 1857 की राज्य क्रांति एवं पुनर्जागरण, भारतेन्दु युग और हिन्दी नवजागरण – प्रमुख साहित्यकार, साहित्य एवं साहित्यिक विषेशताएँ ।
- इकाई 3. द्विवेदी युग – प्रमुख साहित्यकार एवं साहित्यिक विषेशताएँ, छायावाद— नामकरण और प्रवृत्तियाँ, प्रमुख साहित्यकार, साहित्यिक विषेशताएँ। छायावादोत्तर काल (विभिन्न प्रवृत्तियाँ) प्रगतिवाद, नई कविता, नवगीतवाद तथा समकालीन कविता, स्वच्छन्दतावाद सामान्य परिचय ।
- इकाई 4. हिन्दी गद्य का विकास – आधुनिक काल, गद्य साहित्य के विभिन्न रूपों का उद्भव और विकास, उपन्यास व कहानी का विकास और सामान्य प्रवृत्तियाँ, निबंध का विकास और प्रवृत्तियाँ, नाटक का उद्भव और विकास— सामान्य प्रवृत्तियाँ, गीति— नाटकों का परिचयात्मक विवेचन ।
- टीप :- प्रत्येक इकाई से 02 दीर्घ उत्तरीय प्रश्न पूछे जाएंगे जिनमें से 01 प्रश्न को हल करना होगा। प्रत्येक इकाई से 02 लघु उत्तरीय प्रश्न पूछे जाएंगे। कुल 8 लघु उत्तरीय प्रश्नों में से 5 प्रश्नों को हल करना होगा। सम्पूर्ण पाठ्यक्रम से पूछे गए 15 प्रश्नों में से 10 अति लघुउत्तरीय/वस्तुनिष्ठ प्रश्नों के उत्तर देने होंगे।

अंक विभाजन

प्रश्न 1	(दीर्घ उत्तरीय)	—	1X 15	= 15 अंक
प्रश्न 2	(दीर्घ उत्तरीय)	—	1X 15	= 15 अंक
प्रश्न 3	(दीर्घ उत्तरीय)	—	1X 15	= 15 अंक
प्रश्न 4	(दीर्घ उत्तरीय)	—	1X 15	= 15 अंक
प्रश्न 5	— लघुउत्तरीय		5X 2	= 10 अंक
प्रश्न 6	— वस्तुनिष्ठ		10X 1	= 10 अंक

योग = 80 अंक

आंतरिक मूल्यांकन 20 अंक



## निर्धारित पुस्तकें :-

1. आधुनिक साहित्य की प्रवृत्तियाँ – डॉ. नामवर सिंह
2. हिन्दी साहित्य बीसवीं शताब्दी – नन्ददुलारे वाजपेयी
3. आधुनिक हिन्दी साहित्य का इतिहास – कृष्ण शंकर शुक्ल
4. गद्य की विविध विधाएँ – डॉ. बापूराव देसाई
5. हिन्दी कहानी – उद्भव और विकास – डॉ. सुरेश सिन्हा
6. हिन्दी उपन्यास की प्रवृत्तियाँ – डॉ. शशि भूषण सिंह
7. हिन्दी नाटक उद्भव और विकास – डॉ. दशरथ ओझा
8. हिन्दी साहित्य का इतिहास – आचार्य रामचन्द्र शुक्ल
9. हिन्दी साहित्य का उद्भव और विकास – आचार्य हजारी प्रसाद द्विवेदी
10. हिन्दी साहित्य की भूमिका – आचार्य हजारी प्रसाद द्विवेदी

The bottom of the page features three handwritten signatures in blue ink. The first signature on the left is 'R. S.', the middle one is 'Shashi Bhusan Singh', and the right one is 'Suresh Sinha'. Below the 'Shashi Bhusan Singh' signature, the date '11/10/06' is written.

**एम.ए. (हिन्दी) – 2019–20**  
**द्वितीय सेमेस्टर**  
**प्रश्न पत्र –षष्ठ**  
**मध्यकालीन काव्य**

समय 3 घंटे

पूर्णांक : 80

**पाठ्य विषय:-** व्याख्या एवं विवेचन के लिए निम्नांकित तीन कवियों का अध्ययन किया जाएगा।

- इकाई –1.** सूरदास –भ्रमरगीत सार – संपादक आचार्य रामचंद्र शुक्ल (50 पद) पद संख्या – 1 से 10, 21 से 30, 51 से 60, 61 से 70, 81 से 90 तक (50 पद)
- इकाई – 2.** तुलसीदास –रामचरित मानस (सुंदरकाण्ड) गीताप्रेस गोरखपुर
- इकाई – 3.** बिहारी –बिहारी रत्नाकर संपादक जगन्नाथ दास रत्नाकर (प्रारंभिक 100 दोहे)
- इकाई – 4.** द्रुत पाठ हेतु निम्नांकित 5 कवियों एवं उनकी रचनाओं का (विषय एवं शिल्पगत) ज्ञान अपेक्षित है केशव, भूषण, पद्माकर, देव, घनानंद

इन कवियों पर लघुत्तरीय प्रश्न पूछे जाएंगे।

**अंक विभाजन**

प्रश्न 1	व्याख्या	3 व्याख्या	3X10 =	30 अंक
प्रश्न 2	सूरदास, तुलसीदास	आलोचनात्मक	3X10 =	30 अंक
3				
प्रश्न 3	बिहारी एवं इतिहास विषयक	प्रश्न		
प्रश्न 4	द्रुत पाठ के कवि	5 लघुत्तरी	5X2 =	10 अंक
प्रश्न 5	वस्तुनिष्ठ प्रश्न (संपूर्ण पाठ्यक्रम से)	10 वस्तुनिष्ठ अतिलघुत्तरीय	10X1 =	10 अंक
<b>योग =</b>				<b>80 अंक</b>
<b>आंतरिक मूल्यांकन</b>				<b>20 अंक</b>

**निर्धारित पुस्तकें :-**

1. बिहारी– डॉ. विश्वनाथ प्रसाद मिश्र
2. तुलसीदास और उनका युग संदर्भ – डॉ. भगीरथ मिश्र
3. सूरदास के काव्य का मूल्यांकन – डॉ. रामरतन भटनागर
4. तुलसी साहित्य के नये संदर्भ – डॉ. एल.एन.दुबे
5. सूरदास – डॉ. हरबंस लाल वर्मा
6. तुलसीदास – प्रो. सतीश कुमार अशोक प्रकाशन नई दिल्ली
7. सूरदास – मैनेजर पाण्डेय



**एम.ए. – (हिन्दी) 2019–20**  
**द्वितीय सेमेस्टर**  
**प्रश्न पत्र – सप्तम**  
**आधुनिककाव्य-2**  
**(प्रगतिवाद, प्रयोगवाद, नई कविता एवं समकालीन कविता)**

**कुल अंक : 80**

**पाठ्य विषय–**

स.ही.वात्स्यायन अज्ञेय	–	नदी के द्वीप, असाध्यवीणा, बावरा अहेरी, कलगी बाजरे की, यह दीप अकेला, उधार, देह वल्ली, सोन मछली
ग.मा. मुक्तिबोध	–	कविता – अंधेरे में ।
नागार्जुन	–	बसन्त की अगवानी, यह तुम थी, कोयल आज बोली है, शासन की बंदूक, सिन्दूर तिलकित भाल, अकाल और उसके बाद, बादल को घिरते देखा ।
रघुवीर सहाय	–	रामदास, मेरा जीवन, हंसो-हंसो जल्दी हंसों, पानी-पानी

द्रुत पाठ हेतु निम्नांकित 5 कवियों का अध्ययन किया जायेगा ।

केदारनाथ अग्रवाल, त्रिलोचन शास्त्री, भवानी प्रसाद मिश्र, विनोद कुमार शुक्ल, धूमिल  
(लघुत्तरी प्रश्न द्रुत पाठ एवं सम्पूर्ण पाठ्यक्रम से पूछे जायेंगे)

**अंक विभाजन**

प्रश्न 1. 3 व्याख्या	–	3X10	=	30 अंक
प्रश्न 2. 3 आलोचनात्मक	–	3X10	=	30 अंक
प्रश्न 3. 5 लघुत्तरीय	–	5X2	=	10 अंक
प्रश्न 4. 10 वस्तुनिष्ठ अतिलघुत्तरीय	–	10X1	=	10 अंक
		<b>योग</b>	<b>=</b>	<b>80 अंक</b>
		<b>आंतरिक मूल्यांकन</b>		<b>20 अंक</b>



**निर्धारित पुस्तकें :-**

1. मुक्तिबोध की काव्य प्रक्रिया – अशोक चक्रधर
2. अज्ञेय का रचना संसार – डॉ. रामस्वरूप चतुर्वेदी
3. कविता की तीसरी आंख – डॉ. प्रभाकर श्रोत्रिय
4. कविता से साक्षात्कार – मलयज
5. हिन्दी साहित्य का इतिहास – डॉ. रामचन्द्र शुक्ल
6. कविता की संगत – विजय कुमार
7. कविता का अर्थात्- परमानंद श्रीवास्तव
8. नागार्जुन का रचना संसार – विजय बहादुर सिंह
9. छायावादोत्तर प्रबंध काव्यों में ऐतिहासिक, सांस्कृतिक एवं दार्शनिक तत्वों का अनुशीलन – डॉ. ज्योति पाण्डेय
10. छायावादोत्तर काव्यों की विभिन्न प्रवृत्तियों एवं उनका चैन्तनिक पक्ष – डॉ. ज्योति पाण्डेय

*R. S. ...*  
*...*  
*...*

**द्वितीय सेमेस्टर**  
**प्रश्न पत्र – अष्टम**  
**आधुनिक गद्य साहित्य (उपन्यास, निबंध एवं कहानी)**

पाठ्य विषय:-

पूर्णांक : 80

उपन्यास	—	1. गोदान	—	प्रेमचंद
		2. बाणभट्ट की आत्मकथा	—	हजारी प्रसाद द्विवेदी
निबंध	—	1. चढ़ती उमर	—	बालकृष्ण भट्ट
		2. कविता क्या है?	—	रामचंद्र शुक्ल
		3. माटी की मूर्तें	—	रामवृक्ष बेनीपुरी
		4. चन्द्रमा मनसो जातः	—	विद्यानिवास मिश्र
		5. वैष्णव की फिसलन	—	हरिशंकर परसाई
कहानी	—	1. उसने कहा था	—	चन्द्रधर शर्मा गुलेरी
		2. पुरस्कार	—	जयशंकर प्रसाद
		3. शतरंज के खिलाड़ी	—	प्रेमचंद
		4. वापसी	—	उषा प्रियम्बदा
		5. डिप्टी कलकटरी	—	अमरकांत

**अंक विभाजन**

प्रश्न 1. 3 व्याख्या	—	3X10	=	30 अंक
प्रश्न 2. 3 आलोचनात्मक प्रश्न	—	3X10	=	30 अंक
प्रश्न 3. 5 लघुत्तरीय प्रश्न	—	5X2	=	30 अंक
प्रश्न 4. 10 वस्तुनिष्ठ प्रश्न	—	10X1	=	10 अंक
		<b>योग</b>	<b>=</b>	<b>80 अंक</b>
		<b>आंतरिक मूल्यांकन</b>		<b>20 अंक</b>



### निर्धारित पुस्तकें:-

1. प्रेमचंद और उनका युग	—	रामविलास शर्मा
2. गोदान के अध्ययन की समस्याएं	—	डॉ. गोपाल राय
3. कथाकार फणीश्वरनाथ रेणु	—	चंद्रभाव सोनवठी
4. हिन्दी उपन्यास की शिल्पविधि का विकास	—	सिद्धनाथ तनेजा
5. हिन्दी उपन्यास उद्भव और विकास	—	सुरेश सिन्हा
6. प्रेमचंद : एक अध्ययन	—	राजेश्वर गुरु
7. महादेवी प्रतिनिधि गद्य रचनाएं	—	सं. रामजी पाण्डेय
8. हिन्दी निबंध के आधार स्तम्भ	—	डॉ. हरिमोहन
9. हिन्दी कहानी : उद्भव और विकास	—	सुरेश सिन्हा
10. कहानी : स्वरूप और संवेदना	—	राजेन्द्र यादव
11. कहानी : नयी कहानी	—	नामवर सिंह
12. हजारी प्रसाद द्विवेदी	—	सं. विश्वनाथ तिवारी
13. प्रेमचंद का जीवनदर्शन एवं रंगभूमि	—	डॉ. शंकर बुन्देले

The bottom of the page features three handwritten signatures in blue ink. The first signature is on the left, the second is in the middle, and the third is on the right. To the right of the second signature, the date '11/10/06' is written.

**एम.ए. – (हिन्दी) 2019–20**  
**तृतीय सेमेस्टर**  
**प्रश्न पत्र – प्रथम**  
**साहित्य के सिद्धांत तथा आलोचना शास्त्र**

पूर्णांक : 80

**पाठ्य विषय:-**

- इकाई-1 भारतीय काव्य शास्त्र  
काव्य लक्षण, काव्य हेतु, काव्य प्रयोजन और काव्य के प्रकार  
रस सिद्धांत, रस का स्वरूप, रस निष्पत्ति और साधारणीकरण, रस के अंग ।
- इकाई-2 अलंकार सिद्धांत रीति सिद्धांत, वक्रोक्ति सिद्धांत, ध्वनि सिद्धांत और औचित्य सिद्धांत
- इकाई-3 पाश्चात्य काव्य शास्त्र प्लेटो – काव्य सिद्धांत अरस्तू- अनुकरण का सिद्धांत, विरेचन सिद्धांत, लॉजाइनस-उदात्त की अवधारणा
- इकाई-4 मैथ्यू आर्नल्ड- कला की अवधारणा टी.एस. इलियट – कला की निर्व्यक्तिकता, कॉलरिज-कल्पना सिद्धांत

**टीप :-** प्रत्येक इकाई से 02 दीर्घ उत्तरीय प्रश्न पूछे जाएंगे जिनमें से 01 प्रश्न को हल करना होगा। प्रत्येक इकाई से 02 लघु उत्तरीय प्रश्न पूछे जाएंगे। कुल 8 लघु उत्तरीय प्रश्नों में से 5 प्रश्नों को हल करना होगा। सम्पूर्ण पाठ्यक्रम से पूछे गए 15 प्रश्नों में से 10 अति लघुउत्तरीय/वस्तुनिष्ठ प्रश्नों के उत्तर देने होंगे।

**अंक विभाजन**

प्रश्न 1	—	1X 15	=	15 अंक
प्रश्न 2	—	1X 15	=	15 अंक
प्रश्न 3	—	1X 15	=	15 अंक
प्रश्न 4	—	1X 15	=	15 अंक
प्रश्न 5	—	लघुउत्तरीय 5X 2	=	10 अंक
प्रश्न 6	—	वस्तुनिष्ठ 10X1	=	10 अंक
<b>योग</b>			<b>=</b>	<b>80 अंक</b>
<b>आंतरिक मूल्यांकन</b>				<b>20 अंक</b>

1. डॉ. गणपति चन्द्रगुप्त – भारतीय एवं पाश्चात्य काव्य सिद्धांत
2. डॉ. भगीरथ मिश्र – पाश्चात्य काव्य शास्त्र, इतिहास, सिद्धांत एवं वाद
3. डॉ. राममूर्ति त्रिपाठी- भारतीय काव्य शास्त्र के नये क्षितिज
4. डॉ. शिवकुमार मिश्र- मार्क्सवादी साहित्य के सिद्धांत
5. डॉ. नगेन्द्र – भारतीय काव्य शास्त्र की भूमिका
6. डॉ. निर्मला जैन – पाश्चात्य साहित्य चिंतन
7. मुलजी भाई- भारतीय और पाश्चात्य काव्य शास्त्र
8. डॉ. गंगा प्रसाद विमल – आधुनिकता, साहित्य के संदर्भ में ।





**एम.ए. – (हिन्दी) 2019–20**  
**तृतीय सेमेस्टर प्रश्न पत्र – द्वितीय**  
**(भाषा विज्ञान)**

**पूर्णांक : 80**

**पाठ्य विषय:—**

- इकाई—1 भाषा और भाषा विज्ञान, भाषा की परिभाषा और अभिलक्षण, भाषा व्यवस्था और भाषा व्यवहार, भाषा संरचना, भाषा विज्ञान स्वरूप एवं व्याप्ति, अध्ययन की दिशाएँ—वर्णनात्मक, ऐतिहासिक और तुलनात्मक ।
- इकाई—2 स्वन प्रक्रिया : स्वन विज्ञान का स्वरूप और शाखाएँ, वागवयव और उनके कार्य, स्वन की अवधारणा और स्वनों का वर्गीकरण, स्वन गुण, स्वनिम परिवर्तन। स्वनिम विज्ञान का स्वरूप, स्वनिम की अवधारणा, स्वनिम के भेद ।
- इकाई—3 व्याकरण : रूप विज्ञान का स्वरूप और शाखाएँ, रूपिम की अवधारणा और भेद, मुक्त – आबद्ध अर्थदर्शी और संबंधदर्शी रूपिम और शाखाएँ, रूपिम के भेद और प्रकार्य। वाक्य के भेद, वाक्य—विश्लेषण, निकटस्थ अवयव विश्लेषण ।
- इकाई—4 अर्थ विज्ञान : अर्थ की अवधारणा, शब्द और अर्थ का संबंध, पर्यायता, अनेकार्थता, विलोमता अर्थ परिवर्तन।

**टीप :-** प्रत्येक इकाई से 02 दीर्घ उत्तरीय प्रश्न पूछे जाएंगे जिनमें से 01 प्रश्न को हल करना होगा। प्रत्येक इकाई से 02 लघु उत्तरीय प्रश्न पूछे जाएंगे। कुल 8 लघु उत्तरीय प्रश्नों में से 5 प्रश्नों को हल करना होगा। सम्पूर्ण पाठ्यक्रम से पूछे गए 15 प्रश्नों में से 10 अति लघु उत्तरीय/वस्तुनिष्ठ प्रश्नों के उत्तर देने होंगे।

**अंक विभाजन**

प्रश्न 1 —	1X 15	=	15 अंक
प्रश्न 2 —	1X 15	=	15 अंक
प्रश्न 3 —	1X 15	=	15 अंक
प्रश्न 4 —	1X 15	=	15 अंक
प्रश्न 5 —	5X 2	=	10 अंक
प्रश्न 6 —	10X 1	=	10 अंक
<b>योग</b>		<b>=</b>	<b>80 अंक</b>
<b>आंतरिक मूल्यांकन</b>			<b>20 अंक</b>



## निर्धारित पुस्तकें:-

1. सामान्य भाषा विज्ञान- डॉ. बाबूराम सक्सेना
2. भाषा विज्ञान - डॉ. भोलानाथ तिवारी
3. भारत के भाषा परिवार - डॉ. रामनिवास शर्मा
4. भाषाशास्त्र की रूपरेखा - उदयनारायण तिवारी
5. हिन्दी शब्दानुशासन - किशोरी दास बाजपेयी
6. भाषा विज्ञान और भाषा शास्त्र - कपिलदेव द्विवेदी
7. सामान्य भाषाविज्ञान - बाबूराम सक्सेना
8. हिन्दी और उसका संक्षिप्त इतिहास - भोलानाथ तिवारी
9. हिन्दी और उसकी विविध बोलियाँ - प्रो. दीपचंद जैन
10. भाषा विज्ञान के सिद्धांत और हिन्दी भाषा - द्वारिका प्रसाद मिश्र

The bottom of the page features three handwritten signatures in blue ink. The signature on the left is 'R. S.', the middle one is 'D. S.', and the right one is 'D. S.'. To the right of the 'D. S.' signature, the date '11/10/06' is written.

**एम.ए. – (हिन्दी) 2019–20**  
**तृतीय सेमेस्टर प्रश्न**  
**पत्र – तृतीय**  
**(कामकाजी हिन्दी एवं पत्रकारिता)**

**पाठ्य विषय:—**

**पूर्णांक : 80**

- इकाई—1 हिन्दी के विभिन्न रूप— सर्जनात्मक भाषा, संचार भाषा, राजभाषा, माध्यम भाषा, कार्यालयीन हिन्दी (राजभाषा) के प्रमुख प्रकार्य— प्रारूपण, पत्र लेखन, संक्षेपण, पल्लवन, टिप्पणी ।
- इकाई—2 पारिभाषिक शब्दावली, स्वरूप एवं महत्व, पारिभाषिक शब्दावली निर्माण के सिद्धांत, ज्ञान—विज्ञान के विभिन्न क्षेत्रों की पारिभाषिक शब्दावली । हिन्दी कम्प्यूटर— कम्प्यूटर परिचय, उपयोगिता क्षेत्र, वेब पेज पब्लिशिंग परिचय ।
- इकाई—3 इंटरनेट संपर्क उपकरणों का परिचय, प्रकार्यात्मक रख—रखाव एवं इंटरनेट समय मितव्ययता के सूत्र । इंटरनेट एक्सप्लोइट अथवा नेट स्केप । हिन्दी साफ्टवेयर पैकेज ।
- इकाई—4 पत्रकारिता का स्वरूप एवं प्रकार, हिंदी पत्रकारिता का संक्षिप्त इतिहास । समाचार लेखन कला, संपादन के आधारभूत तत्व, व्यवहारिक प्रूफशोधन, शीर्षक संरचना, लीड, इंट्रो एवं शीर्षक, संपादकीय लेखन, पृष्ठ सज्जा, साक्षात्कार, पत्रकारवार्ता एवं प्रेस प्रबंधन, प्रमुख प्रेस कानून एवं आचार संहिता ।

**टीप :-** प्रत्येक इकाई से 02 दीर्घ उत्तरीय प्रश्न पूछे जाएंगे जिनमें से 01 प्रश्न को हल करना होगा । प्रत्येक इकाई से 02 लघु उत्तरीय प्रश्न पूछे जाएंगे । कुल 8 लघु उत्तरीय प्रश्नों में से 5 प्रश्नों को हल करना होगा । सम्पूर्ण पाठ्यक्रम से पूछे गए 15 प्रश्नों में से 10 अति लघुउत्तरीय/वस्तुनिष्ठ प्रश्नों के उत्तर देने होंगे ।

**अंक विभाजन**

प्रश्न 1 —	1X 15	=	15 अंक
प्रश्न 2 —	1X 15	=	15 अंक
प्रश्न 3 —	1X 15	=	15 अंक
प्रश्न 4 —	1X 15	=	15 अंक
प्रश्न 5 —	5X 2	=	10 अंक
प्रश्न 6 —	10X 1	=	10 अंक
	<b>योग</b>	<b>=</b>	<b>80 अंक</b>
	<b>आंतरिक मूल्यांकन</b>		<b>20 अंक</b>



### निर्धारित पुस्तकें:-

- |  |   |  |
|--|---|--|
| 1. प्रयोजन परक हिन्दी                        | — | प्रो. सूर्यप्रसाद दीक्षित                |
| 2. प्रशासनिक हिन्दी                          | — | पुष्पा कुमारी, क्लासिक पब्लिक कम्पनी     |
| 3. पत्रकारिता के छह दशक                      | — | जगदीष प्रसाद चतुर्वेदी                   |
| 4. हिन्दी पत्रकारिता का प्रतिनिधि संकलन      | — | तरुशिखा सुरजन, राजकमल प्रकाशन, नई दिल्ली |
| 5. हिन्दी पत्रकारिता                         | — | कृष्ण बिहारी मिश्र                       |
| 6. भारतीय समाचार पत्रों का संगठन एवं प्रबंधन | — | डॉ. सुकुमार जैन                          |
| 7. पत्रकारिता का इतिहास एवं जनसंचार माध्यम   | — | डॉ. संजीव भनावत                          |
| 8. कम्प्यूटर के भाषिक अनुप्रयोग              | — | विजय मल्होत्रा                           |
| 9. कम्प्यूटर एप्लीकेशन                       | — | गौरव अग्रवाल                             |

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एम.ए. – (हिन्दी साहित्य) 2019–20

तृतीय सेमेस्टर

प्रश्न पत्र – चतुर्थ

भारतीय साहित्य

पूर्णांक : 80

पाठ्य विषय :-

- इकाई-1 भारतीय साहित्य का स्वरूप, भारतीय साहित्य के अध्ययन की समस्याएँ, भारतीय साहित्य में आज के भारत का बिम्ब, हिन्दी साहित्य में भारतीय मूल्यों की अभिव्यक्ति ।
- इकाई-2 हिन्दीतर साहित्य का इतिहास जो तीन वर्गों में विभक्त है –
1. दक्षिणात्य भाषा वर्ग से मलयालम
  2. पूर्वांचल भाषा वर्ग में बँगला
  3. पश्चिमोत्तर भाषा वर्ग में मराठी
- प्रत्येक विद्यार्थी इन तीनों विकल्पों में से एक भाषा चयन करेंगे बशर्ते वह भाषा अपनी क्षेत्रीय भाषा से भिन्न भाषा वाले वर्ग से संबंधित हो। विद्यार्थी एक भाषा वर्ग (मलयालम, बंगला, मराठी) में से किसी एक के इतिहास एवं हिन्दी भाषा साहित्य से उस भाषा साहित्य का तुलनात्मक अध्ययन करेंगे।
- इकाई-3 उपन्यास – अग्निगर्भ (बंगला— महाश्वेता देवी)
- इकाई-4 नाटक – हयवदन (कन्नड़—गिरीशकर्नाड)
- कविता संग्रह – कोच्चि के दरख्त (मलयालम— के.जी. शंकर पिल्लै)
- इकाई तीन तथा चार के अंतर्गत केवल आलोचनात्मक प्रश्न पूछे जाएँगे।

अंक विभाजन

प्रश्न 1 –	1X 15	=	15 अंक
प्रश्न 2 –	1X 15	=	15 अंक
प्रश्न 3 –	1X 15	=	15 अंक
प्रश्न 4 –	1X 15	=	15 अंक
प्रश्न 5 –	5X 2	=	10 अंक
प्रश्न 6 –	10X 1	=	10 अंक
योग			= 80 अंक
आंतरिक मूल्यांकन			20 अंक



**निर्धारित पुस्तकें :-**

1. मलयालम साहित्य – परख और पहचान – प्रो. आर. सुरेन्द्रन ।
2. राष्ट्रीय चेतना और मलयालम साहित्य – प्रो. आर. सुरेन्द्रन ।
3. मराठी भाषा और साहित्य – राजमल वोरा
4. मलयालम साहित्यकारों से साक्षात्कार – प्रो. आर. सुरेन्द्रन ।
5. बंगला भाषा और साहित्य का इतिहास – भारतीय भाषा संस्थान, इलाहाबाद
6. भारतीय साहित्य – डॉ. नगेन्द्र
7. भारतीय साहित्य रत्नमाला – सं. कृष्णदयाल भार्गव
8. भारतीय साहित्य के इतिहास की समस्याएँ – डॉ. रामविलास शर्मा
9. भारतीय भाषाओं के साहित्य का इतिहास – केन्द्रीय हिन्दी निर्देशालय, दिल्ली ।
10. भारतीय साहित्य : अवधारणा, समन्वय एवं सादृश्यता— जगदीश गुप्त

The bottom of the page features three handwritten signatures in blue ink. The first signature on the left is 'R. S.', the middle one is 'J. M.', and the right one is 'J. G.'. Below these, the date '11/10/06' is written in blue ink.

एम.ए. – (हिन्दी) 2019–20  
चतुर्थ सेमेस्टर  
प्रश्न पत्र – पंचम  
(हिन्दी आलोचना तथा समीक्षा शास्त्र)

पूर्णांक : 80

पाठ्य विषय:-

- इकाई 1 मनोविश्लेषण वाद, अस्तित्ववाद, अभिजात्यवाद, स्वच्छंदतावाद, अभिव्यंजनावाद, मार्क्सवाद, आधुनिक समीक्षा की विशिष्ट प्रवृत्तियाँ, संरचनावाद, शैलीविज्ञान, उत्तर आधुनिकता
- इकाई 2 हिन्दी कवि आचार्यों का काव्य शास्त्रीय चिंतन— लक्षण काव्य परम्परा — आचार्य रामचन्द्र शुक्ल, आचार्य नंददुलारे वाजपेयी, डॉ. रामविलास शर्मा
- इकाई 3 आधुनिक हिन्दी आलोचना का विकास एवं उसकी प्रमुख प्रवृत्तियाँ—शास्त्रीय, ऐतिहासिक, मनोविश्लेषणवादी, सौंदर्य शास्त्रीय
- इकाई 4 व्यावहारिक समीक्षा : काव्यांश की स्वविवेक के अनुसार व्याख्या

अंक विभाजन

प्रश्न 1 — (दीर्घ उत्तरीय)	1X 15	=	15 अंक
प्रश्न 2 — (दीर्घ उत्तरीय)	1X 15	=	15 अंक
प्रश्न 3 — (दीर्घ उत्तरीय)	1X 15	=	15 अंक
प्रश्न 4 — (दीर्घ उत्तरीय)	1X 15	=	15 अंक
प्रश्न 5 — लघुत्तरीय	5X2	=	10 अंक
प्रश्न 6 — वस्तुनिष्ठ	10X 1	=	10 अंक
	योग	=	80 अंक
आंतरिक मूल्यांकन			20 अंक



### निर्धारित पुस्तकें :-

1. डॉ. गोविंद त्रिगुणायत – शास्त्रीय समीक्षा के सिद्धांत भाग 1 एवं 2
2. डॉ. भगवत स्वरूप मिश्र – हिन्दी आलोचना : उद्भव और विकास
3. डॉ. रामेश्वर खण्डेलवाल – हिन्दी आलोचना के आधार स्तम्भ
4. डॉ. शिवकरण सिंह – आलोचना के बदलते मानदण्ड और हिन्दी साहित्य
5. डॉ. नंदकिशोर नवल – हिन्दी आलोचना का विकास
6. योगेन्द्र शाही – अस्तित्ववाद किर्कगार्ड से कामू तक
7. रणधीर सिन्हा – आलोचनात्मक रामविलास शर्मा

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**एम.ए. – (हिन्दी) 2019–20**  
**चतुर्थ सेमेस्टर**  
**प्रश्न पत्र –षष्ठ**  
**(हिन्दी भाषा)**

**पूर्णांक : 80**

**पाठ्य विषय:-**

- इकाई-1 हिन्दी की ऐतिहासिक पृष्ठभूमि : प्राचीन भारतीय आर्य भाषाएँ – वैदिक तथा लौकिक संस्कृत और उनकी विशेषताएँ । मध्यकालीन भारतीय आर्यभाषाएँ – पालि, प्राकृत, शौरसेनी, अर्धमागधी, मागधी, अपभ्रंश और उनकी विशेषताएँ । आधुनिक भारतीय भाषाएँ और उनका वर्गीकरण ।
- इकाई-2 हिन्दी का भौगोलिक विस्तार – हिन्दी की उपभाषाएँ, पश्चिमी हिन्दी, पूर्वी हिन्दी, राजस्थानी, बिहारी तथा पहाड़ी और उनकी बोलियाँ। खड़ी बोली, ब्रज और अवधी की विशेषताएँ ।
- इकाई-3 हिन्दी के विविध रूप- संपर्क भाषा, राष्ट्रभाषा, राजभाषा के रूप में हिन्दी, माध्यम भाषा, संचार भाषा, हिन्दी की संवैधानिक स्थिति ।
- इकाई-4 हिन्दी में कम्प्यूटर सुविधाएँ – आंकड़ा संसाधन और शब्द संसाधन, वर्तनी शोधक, मशीनी अनुवाद, हिन्दी भाषा शिक्षण । देवनागरी लिपि : विशेषताएँ और मानकीकरण ।

**टीप :-**

प्रत्येक इकाई से 02 दीर्घ उत्तरीय प्रश्न पूछे जाएंगे जिनमें से 01 प्रश्न को हल करना होगा। प्रत्येक इकाई से 02 लघु उत्तरीय प्रश्न पूछे जाएंगे। कुल 8 लघु उत्तरीय प्रश्नों में से 5 प्रश्नों को हल करना होगा। सम्पूर्ण पाठ्यक्रम से पूछे गए 15 प्रश्नों में से 10 अति लघुउत्तरीय/वस्तुनिष्ठ प्रश्नों के उत्तर देने होंगे।

**अंक विभाजन**

प्रश्न 1 –	1X 15	=	15 अंक
प्रश्न 2 –	1X 15	=	15 अंक
प्रश्न 3 –	1X 15	=	15 अंक
प्रश्न 4 –	1X 15	=	15 अंक
प्रश्न5 – लघुउत्तरीय	5X 2	=	10 अंक
प्रश्न6 – वस्तुनिष्ठ	10X 1	=	10 अंक
<b>योग</b>		<b>=</b>	<b>80 अंक</b>

**आंतरिक मूल्यांकन**

**20 अंक**



### निर्धारित पुस्तकें:—

1. हिन्दी भाषा का संक्षिप्त इतिहास — भोलानाथ तिवारी
2. हिन्दी और उसकी विविध बोलियों — प्रो. दीपचंद जैन
3. भाषा भूगोल — कैलाशचंद भटिया हिन्दी समिति उ.प्र. शासन लखनऊ
4. हिन्दी भाषा की रूप संरचना — भोलानाथ तिवारी
5. राष्ट्रभाषा हिन्दी समस्याएँ और समाधान — देवेन्द्रनाथ शर्मा
6. नागरी लिपि और हिन्दी — अनंत चौधरी
7. सामान्य भाषा विज्ञान — डॉ. बाबूराम सक्सेना
8. भाषा विज्ञान — डॉ. भोलानाथ तिवारी

The bottom of the page features three handwritten signatures in blue ink. The signature on the left is 'R. S.', the middle one is 'S. S.', and the right one is 'S. S.'. To the right of the 'S. S.' signature, the date '11/10/06' is written.

**एम.ए. – (हिन्दी) 2019–20**  
**चतुर्थ सेमेस्टर**  
**प्रश्न पत्र – सप्तम**  
**(मीडिया–लेखन एवं अनुवाद)**

**पूर्णांक : 80**

**पाठ्य विषय:–**

- इकाई–1 मीडिया लेखन जनसंचार : प्रौद्योगिक एवं चुनौतियाँ, विभिन्न जनसंचार–माध्यमों का स्वरूप– मुद्रण, श्रवण, दृश्य–श्रव्य, इंटरनेट, श्रवण–माध्यम (रेडियो), मौखिक भाषा की प्रकृति । समाचार लेखन एवं वाचन, रेडियो नाटक, उद्घोषणा लेखन, विज्ञापन–लेखन, फीचर तथा रिपोर्टाज ।
- इकाई–2 दृश्य–श्रव्य माध्यम (फिल्म, टेलीविजन एवं रेडियो), दृश्य–माध्यमों में भाषा की प्रकृति, दृश्य एवं श्रव्य सामग्री का सामंजस्य, पार्श्व वाचन (वॉयस ओवर) पटकथा–लेखन, टेली–ड्रामा, संवाद–लेखन, साहित्य की विधाओं का दृश्य माध्यमों में रूपान्तरण, विज्ञापन की भाषा ।
- इकाई–3 अनुवाद – सिद्धांत एवं व्यवहार अनुवाद का स्वरूप, क्षेत्र, प्रक्रिया एवं प्रविधि । हिन्दी की प्रयोजनीयता में अनुवाद की भूमिका । कार्यालयीन हिन्दी और अनुवाद, जनसंचार माध्यमों का अनुवाद, विज्ञापन में अनुवाद, वैचारिक साहित्य का अनुवाद, वाणिज्यिक अनुवाद, वैज्ञानिक तकनीकी तथा प्रौद्योगिकी क्षेत्रों में अनुवाद, विधि साहित्य की हिन्दी और अनुवाद ।
- इकाई–4 व्यावहारिक अनुवाद अभ्यास, कार्यालयीन अनुवाद, कार्यालयीन एवं प्रशासनिक शब्दावली, प्रशासनिक प्रयुक्तियाँ, पदनाम, विभाग, आदि पत्रों के अनुवाद, पदनामों–अनुभागों–दस्तावेजों–प्रतिवेदनों के अनुवाद, साहित्यिक अनुवाद के सिद्धांत एवं व्यवहार–कविता, कहानी, नाटक, सारानुवाद, दुभाषिया–प्रविधि ।
- टीप :-** प्रत्येक इकाई से 02 दीर्घ उत्तरीय प्रश्न पूछे जाएंगे जिनमें से 01 प्रश्न को हल करना होगा। प्रत्येक इकाई से 02 लघु उत्तरीय प्रश्न पूछे जाएंगे। कुल 8 लघु उत्तरीय प्रश्नों में से 5 प्रश्नों को हल करना होगा। सम्पूर्ण पाठ्यक्रम से पूछे गए 15 प्रश्नों में से 10 अति लघुउत्तरीय/वस्तुनिष्ठ प्रश्नों के उत्तर देने होंगे।

**अंक विभाजन**

प्रश्न 1 –	1X 15	=	15 अंक
प्रश्न 2 –	1X 15	=	15 अंक
प्रश्न 3 –	1X 15	=	15 अंक
प्रश्न 4 –	1X 15	=	15 अंक
प्रश्न 5 –	5X 2	=	10 अंक (पांच लघुउत्तरीय)
प्रश्न 6 –	10X 1	=	10 (दस वस्तुनिष्ठ)
	<b>योग</b>	<b>=</b>	<b>80 अंक</b>
	<b>आंतरिक मूल्यांकन</b>		<b>20 अंक</b>



### निर्धारित पुस्तकें:-

1. जनसंचार माध्यमों में हिन्दी – डॉ. चन्द्रकुमार (क्लासिकल पब्लिक कंपनी)
2. जनमाध्यम एवं पत्रकारिता – प्रवीण दीक्षित (सहयोगी साहित्य संस्थान)
3. पत्रकारिता का इतिहास एवं जनसंचार माध्यम— डॉ. संजीव भागवन्त (उ.प्र. जयपुर)
4. पत्रकारिता के विविध आयाम – वेदप्रताप वैदिक
5. दूरदर्शन : हिन्दी के प्रयोनमूलक विविध प्रयोग : डॉ. कृष्णकुमार रत्तू (मीनाक्षी प्रकाशन, जयपुर)
6. जनमाध्यम एवं पत्रकारिता – प्रवीण दीक्षित (सहयोगी साहित्य संस्थान)
7. अनुवाद के सिद्धांत – सुरेश कुमार
8. अनुवाद सिद्धांत की रूपरेखा – सुरेश कुमार
9. अनुवाद – बोध – डॉ. गार्गी गुप्त (भारतीय अनुवाद परिषद् दिल्ली)

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एम.ए. – (हिन्दी) – 2019–20  
चतुर्थ सेमेस्टर  
प्रश्न पत्र – अष्टम  
जनपदीय भाषा और साहित्य (छत्तीसगढ़ी)

पूर्णांक : 80

**पाठ्य विषय :-**

- इकाई-1 छत्तीसगढ़ी भाषा-भौगोलिक सीमा, नामकरण, भाषिक स्वरूप एवं व्याकरणिक विशेषताएँ।  
इकाई-2 छत्तीसगढ़ी साहित्य की युग प्रवृत्तियों एवं इतिहास।  
इकाई-3 छत्तीसगढ़ी कविता एवं कवि –  
(1) सुंदरलालशर्मा  
(2) मुकुटधर पाण्डेय  
(3) हरि ठाकुर  
(4) डॉ. नरेन्द्र देव वर्मा  
इकाई-4 छत्तीसगढ़ी नाटक एवं उपन्यास  
1. करमछड़हा (नाटक) – डॉ. खूबचंद बघेल  
2. आवा (उपन्यास) – परदेशीराम वर्मा  
द्रुतपाठ हेतु निम्नलिखित रचनाकार का अध्ययन (पांच लघुत्तरीय प्रश्न पूछे जायेंगे)  
(1) लखन लाल गुप्त (2) लक्ष्मण मस्तुरिहा  
(3) केयूर भूषण (4) मुकुन्द कौशल  
(5) लोचन प्रसाद पाण्डेय (6) लाला जगदलपुरी  
(7) पवन दीवान (8) कोदूराम दलित

**अंक विभाजन**

प्रश्न 1 –	1X 15	=	15 अंक
प्रश्न2 –	1X 15	=	15 अंक
प्रश्न 3 –	1X 15	=	15 अंक
प्रश्न4 –	1X 15	=	15 अंक
प्रश्न5 –	5X2	=	10 अंक
प्रश्न 6 –	10X 1	=	10 अंक
योग		=	80 अंक
आंतरिक मूल्यांकन			20 अंक



निर्धारित पुस्तकें:-

1. छत्तीसगढ़ी भाषा का उद्‌विकास – डॉ. नरेन्द्र देव वर्मा
2. छत्तीसगढ़ी, हलबी, भतरी भाषाओं का भाषा वैज्ञानिक अध्ययन – भालचंद्र राव तैलंग
3. छत्तीसगढ़ी परिचय– डॉ. बलदेव मिश्र
4. छत्तीसगढ़ी लोकसाहित्य का अध्ययन – दयाशंकर शुक्ल
5. छत्तीसगढ़ी लोकजीवन और लोकसाहित्य का अध्ययन – डॉ. शकुन्तला वर्मा
6. छत्तीसगढ़ी भाषा का शास्त्रीय अध्ययन– डॉ. शंकर शेष
7. प्राचीन छत्तीसगढ़ी बोली – प्यारेलाल गुप्त
8. छत्तीसगढ़ी लोक साहित्य और भाषा – डॉ. बिहारीलाल साहू
9. छत्तीसगढ़ी भाषा और साहित्य – डॉ. सत्यभामा आडिल
10. छत्तीसगढ़ के साहित्यकार – देवीप्रसाद वर्मा
11. मानक छत्तीसगढ़ी व्याकरण – चंद्रकुमार चंद्राकर

Pr Y me  
11/06

# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

Website - [www.durguniversity.ac.in](http://www.durguniversity.ac.in), Email - [durguniversity@gmail.com](mailto:durguniversity@gmail.com)



## SCHEME OF EXAMINATION & SYLLABUS of

**M.A. (English) Semester Exam**

UNDER

**FACULTY OF ARTS**

**Session 2019-20 & 2020-21**

**(Approved by Board of Studies)**

**Effective from June 2019**

Dr. Mila Chakrabarti (Chairperson) 11/06/19. 2. (A.A. KHAN) 3. Dr. Suchika Gupta

# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## Syllabus for M.A. English (Semester System)

### Semester – I (2019-20)

- Paper-I : Poetry-I  
Paper-II : Drama-I  
Paper-III : Prose-I  
Paper-IV : Fiction-I  
Paper-V : History of English Literature

### Semester – II (2019-20)

- Paper-I : Poetry-II  
Paper-II : Drama-II  
Paper-III : Prose-II  
Paper-IV : Fiction-II  
Paper-V : Modernist Poetry

### Semester – III (2020-21)

- Paper-I : Critical Theory-I  
Paper-II : Indian Writing in English-I  
Paper-III : American Literature-I  
Paper-IV : Colonial and Post Colonial Studies-I  
Paper-V : Linguistics-I

### Semester – IV (2020-21)

- Paper-I : Critical Theory-II  
Paper-II : Indian Writing in English-II  
Paper-III : American Literature-II  
Paper-IV : Colonial and Post Colonial Studies-II  
Paper-V : Linguistics-II

The Syllabus for M.A. English (Semester System) is hereby approved by the members of the Board of Studies.

Dr. Mila Chahar (Chairperson) 11/06/19. 2. (A.A. KHAN) 3. Prof. Dr. Suchika Gupta



**Syllabus and Marking Scheme for First/Second/Third/Fourth Semester  
Session 2019-20 & 2020-2021**

Paper No.	Title of the Paper	Marks Allotted in Theory		Marks Allotted in Internal Assessment	
		Max.	Min.	Max.	Min.
I	POETRY-I	80	16	20	04
II	DRAMA-I	80	16	20	04
III	PROSE-I	80	16	20	04
IV	FICTION-I	80	16	20	04
V	HISTORY OF ENGLISH LITERATURE	80	16	20	04
	Total	400		100	

Paper No.	Title of the Paper	Marks Allotted in Theory		Marks Allotted in Internal Assessment	
		Max.	Min.	Max.	Min.
I	POETRY-II	80	16	20	04
II	DRAMA-II	80	16	20	04
III	PROSE-II	80	16	20	04
IV	FICTION-II	80	16	20	04
V	MODERNIST POETRY	80	16	20	04
	Total	400		100	

Paper No.	Title of the Paper	Marks Allotted in Theory		Marks Allotted in Internal Assessment	
		Max.	Min.	Max.	Min.
I	CRITICAL THEORY-I	80	16	20	04
II	INDIAN WRITING IN ENGLISH-I	80	16	20	04
III	AMERICAN LITERATURE-I	80	16	20	04
IV	COLONIAL AND POST COLONIAL STUDIES-I	80	16	20	04
V	LINGUISTICS-I	80	16	20	04
	Total	400		100	

Paper No.	Title of the Paper	Marks Allotted in Theory		Marks Allotted in Internal Assessment	
		Max.	Min.	Max.	Min.
I	CRITICAL THEORY-II	80	16	20	04
II	INDIAN WRITING IN ENGLISH-II	80	16	20	04
III	AMERICAN LITERATURE-II	80	16	20	04
IV	COLONIAL AND POST COLONIAL STUDIES-II	80	16	20	04
V	LINGUISTICS-II	80	16	20	04
	Total	400		100	

Dr. Mila Chahar (Chairperson) 11/06/19.

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

### M.A. ENGLISH I SEMESTER – SESSION 2019-2020

#### PAPER-I

#### POETRY-I

<b>Unit-I</b>	<b>Geoffrey Chaucer</b>	<b>: Prologue to the Canterbury Tales</b>	<b>- D</b>
	<b>Edmund Spenser</b>	<b>: Epithalamion</b>	<b>- ND</b>
<b>Unit – II</b>	<b>John Donne</b>	<b>: Death Be not Proud, Exstasie, Valediction: Forbidden Mourning</b>	<b>- D</b>
	<b>Andrew Marvel</b>	<b>: To His Coy Mistress, An Horation Ode Upon Cromwell's Return From Ireland, An Exhortation</b>	<b>- ND</b>
<b>Unit – III</b>	<b>John Milton</b>	<b>: Paradise Lost, Book-1</b>	<b>- D</b>
<b>Unit – IV</b>	<b>John Dryden</b>	<b>: Mac Flecknoe</b>	<b>- ND</b>
	<b>Alexander Pope</b>	<b>: The Rape of the Lock</b>	<b>- D</b>

#### DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. The Paper is divided into four units and each unit is compulsory.
2. Question I will consist of 8 passages for explanation with reference to the context from the texts prescribed for detailed study, out of which 4 are to be attempted. Each annotation will carry 4 marks. (4x4 = 16)
3. Candidates will answer four other questions from Unit-I to Unit-IV, carrying 16 marks each.
4. From each Unit questions shall be asked in either of the following pattern:
  - a) From each Unit two descriptive questions; one from each author shall be asked.
  - b) Instead of one descriptive question two short answer type questions from an author (carrying 8 marks each) may also be asked.The candidate shall be required to attempt either one essay type question or two short notes.
5. Essay type questions should not exceed 400 words and will carry 16 marks and short notes should be within the limit of 200 words and will carry 8 marks.
6. All questions carry equal marks. (5x16 = 80)

Dr. Mila Chahar (Chairperson) 11/06/19. 2. A.A. KHAN 3. Suchika Gupta

## Recommended Reading

1. Tillyard : Milton
2. C.M. Bowra : From Virgil to Milton
3. B. Rajan : Paradise Lost and 17<sup>th</sup> Century Reader
4. Ifor Evans : A Short History of English Literature
5. Bradley : Oxford Lectures on Poetry
6. C.S. Lewis : A Preface to Paradise Lost
7. Mark Van Doren : John Dryden
8. Tillotson : On the Poetry of Pope
9. M. Mack : Pope and his Contemporaries
10. Walter Jackson Bate : From Classic to Romantic
11. R.A. Scott James : The Making of Literature
12. Sengupta : The Poems of John Donne
13. Edward Albert : A Short History of English Literature
14. P. Gurrey : The Appreciation of Poetry
15. Robert Penn (Ed.) : Six Centuries of Great Poetry  
Warren & Albert Erskine
16. P. Gurrey : The Appreciation of Poetry
17. Boris Ford (Ed.) : A Guide to English Literature (Seven Volumes)

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

M.A. ENGLISH I SEMESTER – SESSION 2019-2020

### PAPER-II

#### DRAMA-I

Unit-I	Christopher Marlowe	: The Tragical History of Dr. Faustus	- D
	Ben Johnson	: The Alchemist	- ND
Unit-II	John Webster	: The Duchess of Malfi	- D
	William Shakespeare	: Macbeth	- ND
Unit-III	William Shakespeare	: Hamlet	- D
Unit-IV	William Shakespeare	: Tempest	- D
	William Shakespeare	: As You Like It	- ND

#### DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. The Paper is divided into four units and each unit is compulsory.
2. Question I will consist of 8 passages for explanation with reference to the context from the texts prescribed for detailed study, out of which 4 are to be attempted. Each annotation will carry 4 marks. (4x4 = 16)
3. Candidates will answer four other questions from Unit-I to Unit-IV, carrying 16 marks each.
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  - a) From each Unit two descriptive questions; one from each author shall be asked.
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5. Essay type questions should not exceed 400 words and will carry 16 marks and short notes should be within the limit of 200 words and will carry 8 marks.
6. All questions carry equal marks. (5x16 = 80)

#### Recommended Reading

1. A.C. Bradley : Shakespearean Tragedy
2. G. Wilson Knight : The Essential Shakespeare
3. Boas : Marlowe
4. Clough Douglas : Evil and Suffering in the Play
5. A.L. Williams (Ed.) : Twentieth Century Interpretations of the works of Marlowe
6. Nicoll : Theory of Drama
7. Marjouri Boulton : Anatomy of Drama
8. Compton-Rickett : History of English Literature
9. Wilson Knight : Wheels of Fire

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

M.A. ENGLISH I SEMESTER – SESSION 2019-2020

PAPER-III

PROSE-I

Unit-I	Francis Bacon	: Of Studies, Of Truth, Of Revenge, Of Great Place	- D
Unit-II	Thomas Browne	: Urn Burial	- ND
	John Milton	: Areopagitica	- D
Unit-III	Addison & Steele	: Coverley Paper- Essay No. 1- The Spectator's Account of Himself Essay No. 110- On Ghost and Apparitions Essay No. 112- Sir Roger at Church Essay No. 117- On Witchcraft – Story of Moll White Essay No. 119- Rural Manners	- D
	James Boswell	: Life of Dr. Johnson	- ND
Unit-IV	Montaigne	: (Florio's Translation) Of Idleness, Of Readie or Slow Speech, That We Should not Judge of Our Happinesse until after Our Death	- D
	Rousseau	: Confessions	- ND

## DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. The Paper is divided into four units and each unit is compulsory.
2. Question I will consist of 8 passages for explanation with reference to the context from the texts prescribed for detailed study, out of which 4 are to be attempted. Each annotation will carry 4 marks. (4x4 = 16)
3. Candidates will answer four other questions from Unit-I to Unit-IV, carrying 16 marks each.
4. From each Unit questions shall be asked in either of the following pattern:
  - a) From each Unit two descriptive questions; one from each author shall be asked.
  - b) Instead of one descriptive question two short answer type questions from an author (carrying 8 marks each) may also be asked.The candidate shall be required to attempt either one essay type question or two short notes.
5. Essay type questions should not exceed 400 words and will carry 16 marks and short notes should be within the limit of 200 words and will carry 8 marks.
6. All questions carry equal marks. (5x16 = 80)

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### Recommended Reading

1. Sukanta Chowdhary : Bacon's Essays
2. Hugh Walker : English Essays and Essayists
3. Dobre : English Prose Style
4. Smithens : Life of Joseph Addison
5. B. Prasad : An Introduction of the Study of Literature
6. Montaigne : Florio's Translation
7. W.H. Hudson : An Outline History of English Literature
8. Oxford's World Literature in Digest Form

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## SYLLABUS

M.A. ENGLISH I SEMESTER – SESSION 2019-2020

PAPER-IV

FICTION-I

Unit-I	John Bunyan Daniel Defoe	: The Pilgrim's Progress : Robinson Crusoe
Unit-II	Henry Fielding Oliver Goldsmith	: Joseph Andrews : The Vicar of Wakefield
Unit-III	Sir Walter Scott Jane Austen	: Ivanhoe : Pride & Prejudice
Unit-IV	Charles Dickens Thomas Hardy	: Great Expectations : Tess of the D'Urvilles

## DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. The Paper is divided into 4 units and each unit is compulsory.
2. Candidates shall answer 4 essay type questions from Unit I to IV, carrying 16 marks each.
3. The fifth question will comprise of 4 short notes (One from each Unit) out of which 2 are to be attempted.
4. Essay type answers should not exceed 400 words and will carry 16 marks, short notes should be within the limit of 200 words and will carry 8 marks. (8x2 = 16)
5. All questions shall carry equal marks. (16x5 = 80)

## Recommended Reading

1. M. Bruce : Representative English Novels
2. K. Arnold : An Introduction to English Novel Vol. I & II
3. Beach J. Warren : The Technique of Thomas Hardy
4. Edwin Muir : The Structure of the Novel
5. Walter Allen : The English Novel
6. David Cecil : Hardy- The Novelist

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

M.A. ENGLISH I SEMESTER – SESSION 2019-2020

PAPER-V

The History of English Literature

### Unit-I

#### **The Age of Chaucer (1350-1400)**

1. Development of Poetry in the Age of Chaucer
2. Development of Prose during the Age of Chaucer

#### **The Age of Shakespeare (1558-1625)**

3. The Renaissance and its influence on Elizabethan Literature
4. University wits and their contribution to the Pre-Shakespearean Drama
5. Elizabethan sonnets and sonneteers
6. Development of English Prose during the latter half of the 16<sup>th</sup> century

#### **The Age of Milton (1625-1660)**

7. The Puritan Movement in the Age of Milton
8. The Metaphysical Poetry and the poets
9. Cavalier poetry and the Cavalier poets
10. Development of Prose during the Age of Milton

### Unit-II

#### **The Restoration Period (1660-1700)**

1. Social, Political and Literary tendencies of the Age.
2. Restoration Satire and Satirists
3. The comedy of manners and the dramatists of this school
4. English Novel in the latter half of the 17<sup>th</sup> Century

#### **The Age of Pope (1700-1750)**

5. 18<sup>th</sup> Century as an age of Prose & Reason
6. The growth of the 'Periodical Essays' and the causes of its popularity
7. 'Coverley Papers' as the first sketch of the English Novel.

#### **The Age of Transition/The Age of Dr. Johnson (1750-1798)**

8. Salient features of the Poetry of the 'Transitional Age'
9. The precursors of the 'Romantic Revival' or the poets of Revolt
10. The French Revolution and its influence on English literature
11. The 'Four Wheels' of the novel of the 18<sup>th</sup> Century

### Unit-III

#### **The Age of Romanticism (1798-1832)**

1. Characteristics of 'Romanticism'
2. The Romantic Movement as 'The Renaissance of the Wonder'
3. Prose of the age of Romanticism
4. Novel of the age of Romanticism

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### **The Victorian Age (1832-1887)**

1. Salient features of Victorian Poetry
2. The Spasmodic School of Poetry
3. The Pre-Raphaelite Movement in English Poetry and its chief exponents
4. The Oxford Movement
5. Victorian novels and the novelists
6. Women novelists and the Victorian Era

### **Unit-IV**

#### **The Modern Age/The Age of Interrogation (1890-1950)**

1. General characteristics of the Age
2. Poetry;
  - a. The Transitional poets (Robert Bridges, Hopkins, Yeats)
  - b. The Georgian Poets
  - c. The War Poets
  - d. The Imagist Movement and its exponents
  - e. The Neo-Metaphysical
3. The English Essays and the Essayists during the 20<sup>th</sup> Century
4. Drama in the 20<sup>th</sup> Century
  - a. The Expressionistic School of Drama
  - b. The Problem Play of the 20<sup>th</sup> Century
  - c. The Poetic Drama and the Dramatists
  - d. The Theatre of the Absurd
5. The Stream of Consciousness Novel

### **DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS**

1. The Paper is divided into 4 units and each unit is compulsory.
2. Candidates shall answer 4 essay type questions from Unit I to IV, carrying 16 marks each.
3. The fifth question will comprise of 4 short notes (One from each Unit) out of which 2 are to be attempted.
4. Essay type answers should not exceed 400 words and will carry 16 marks, short notes should be within the limit of 200 words and will carry 8 marks. (8x2 = 16)
5. All questions shall carry equal marks. (16x5 = 80)

#### **Recommended Reading**

- |    |                                |   |  |
|----|--------------------------------|---|--|
| 1. | W.H. Hudson                    | : | An Outline History of English Literature     |
| 2. | Compton-Rickett                | : | A History of English Literature              |
| 3. | Ifor Evans                     | : | A Short History of English Literature        |
| 4. | Edward Albert                  | : | A Short History of English Literature        |
| 5. | Emile Legouis                  | : | A Short History of English Literature        |
| 6. | Emile Legouis & Louis Cazamian | : | A History of English Literature              |
| 7. | B. Prasad                      | : | A Short History of English Poetry            |
| 8. | B.P. Bagchi                    | : | Pages From the History of English Literature |

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

M.A. ENGLISH II SEMESTER – SESSION 2019-2020

### PAPER-I

### POETRY-II

Unit-I	Thomas Gray	: Elegy Written in a Country Churchyard - D
	William Blake	: The Lamb, The Chimney Sweeper - ND
Unit – II	William Wordsworth	: Immortality Ode, Tintern Abbey - D
	Samuel Taylor Coleridge	: Kubla Khan, The Rime of the Ancient Mariner - ND
Unit – III	P.B. Shelley	: Adonais, Stanzas Written in Dejection - ND
	John Keats	: Ode to a Nightingale Ode On a Grecian Urn Ode On Melancholy -D
Unit – IV	Alfred Tennyson	: Lotus Eaters, Ulysses - ND
	Robert Browning	: My Last Duchess, The Last Ride Together, Prospice -D

### DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. The Paper is divided into four units and each unit is compulsory.
2. Question I will consist of 8 passages for explanation with reference to the context from the texts prescribed for detailed study, out of which 4 are to be attempted. Each annotation will carry 4 marks. (4x4 = 16)
3. Candidates will answer four other questions from Unit-I to Unit-IV, carrying 16 marks each.
4. From each Unit questions shall be asked in either of the following pattern:
  - a) From each Unit two descriptive questions; one from each author shall be asked.
  - b) Instead of one descriptive question two short answer type questions from an author (carrying 8 marks each) may also be asked.The candidate shall be required to attempt either one essay type question or two short notes.
5. Essay type questions should not exceed 400 words and will carry 16 marks and short notes should be within the limit of 200 words and will carry 8 marks.
6. All questions carry equal marks. (5x16 = 80)

### Recommended Reading

1. Oxford's Fifteen Poets
2. Basis Welley : The Eighteenth Century Background
3. J. Jackson : Collected Coleridge
4. Graham Hough : The Romantic Poets
5. Herbert Read : The True Voice of Feelings: Studies in English Romantic Poetry
6. John Spencer Hill : The Romantic Imagination
7. F.R. Leavis : Revaluation: Tradition and Development in English Poetry

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

### M.A. ENGLISH II SEMESTER – SESSION 2019-2020

#### PAPER-II

#### DRAMA-II

Unit-I	W. Congreve	: The Way of the World	- ND
	Oliver Goldsmith	: She Stoops to Conquer	- D
Unit-II	J.M. Synge	: The Shadow of the Glen	- ND
	G.B. Shaw	: St. Joan	- D
Unit-III	Samuel Becket	: Waiting for Godot	- D
	John Osborne	: Look Back in Anger	- ND
Unit-IV	Ibsen	: A Doll's House	- D
	Antony Chekov	: The Cherry Orchard	- ND

#### DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. The Paper is divided into four units and each unit is compulsory.
2. Question I will consist of 8 passages for explanation with reference to the context from the texts prescribed for detailed study, out of which 4 are to be attempted. Each annotation will carry 4 marks. (4x4 = 16)
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5. Essay type questions should not exceed 400 words and will carry 16 marks and short notes should be within the limit of 200 words and will carry 8 marks.
6. All questions carry equal marks. (5x16 = 80)

#### Recommended Reading

1. J.L. Styon : Modern Drama in Theory and Practice
2. Nicoll : Theory of Drama
3. John Russell Browne : Modern British Dramatists: A Collection of Critical Essays
4. Martin Esslin : The Theater of the Absurd
5. Martin Esslin : Absurd Drama
6. Ibsen's Doll's House Special Introduction by Ezekiel

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

M.A. ENGLISH II SEMESTER – SESSION 2019-2020

### PAPER-III

### PROSE-II

Unit-I	Charles Lamb	: Dream Children, Imperfect Sympathies Dissertation upon a Roast Pig	- D
	William Hazlitt	: On Going a Journey, On the Ignorance of the Learned	- ND
Unit-II	Thomas Carlyle	: Hero as a Poet	- D
	John Ruskin	: Sesame & Lilies	- ND
Unit-III	Robert Lynd	: The Darkness, The Pleasure of Ignorance- ND (From “A Book of English Essays selected by W.E. Williams”, Penguin Books)	
	A.G. Gardiner	: On Painted Face, On Smiles, On Saying “Please”-D	
Unit-IV	J.B. Priestley	: On Doing Nothing My First Article Money For Nothing	- ND
	Aldous Huxley	: Tragedy and the Whole Truth Selected Snobberies	- D

### DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. The Paper is divided into four units and each unit is compulsory.
2. Question I will consist of 8 passages for explanation with reference to the context from the texts prescribed for detailed study, out of which 4 are to be attempted. Each annotation will carry 4 marks. (4x4 = 16)
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5. Essay type questions should not exceed 400 words and will carry 16 marks and short notes should be within the limit of 200 words and will carry 8 marks.
6. All questions carry equal marks. (5x16 = 80)

### Recommended Reading

1. Hugh Walker : English Essays and Essayists
2. MacMillan Edition : Art of the Essayist
3. Dobre : English Prose Style
4. Prakash Book Depot (Pub.) : Masters of English Prose

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

M.A. ENGLISH II SEMESTER – SESSION 2019-2020

PAPER-IV

FICTION-II

Unit-I	James Joyce Virginia Woolf	: Portrait of the Artist as a Young Man : Mrs. Dalloway
Unit-II	D.H. Lawrence E.M. Forster	: Sons & Lovers : A Passage to India
Unit-III	Graham Greene William Golding	: Power and the Glory : The Lord of the Flies
Unit-IV	Gustave Flaubert Dostovesky	: Madam Bovary : Crime and Punishment

### DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. The Paper is divided into 4 units and each unit is compulsory.
2. Candidates shall answer 4 essay type questions from Unit I to IV, carrying 16 marks each.
3. The fifth question will comprise of 4 short notes (One from each Unit) out of which 2 are to be attempted.
4. Essay type answers should not exceed 400 words and will carry 16 marks, short notes should be within the limit of 200 words and will carry 8 marks. (8x2 = 16)
5. All questions shall carry equal marks. (16x5 = 80)

### Recommended Reading

1. Malcolm Bradbury : The Modern British Novel
2. M. Bruce : Representative English Novels
3. Casebook Series : D.H. Lawrence, E.M. Forster, Virginia Woolf
4. J.W. Beach : Twentieth Century Novel
5. E.A. Baker : The History of English Novel Vol. IX

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

M.A. ENGLISH II SEMESTER – SESSION 2019-2020

PAPER-V

Modernist Poetry

Unit-I	G.M. Hopkins	:	Pied Beauty, Felix Randal, The Wind Hover, God's Grandeur	-ND
	W.B. Yeats	:	The Second Coming, Sailing to Byzantium, Easter 1916	-D
Unit-II	T.S. Eliot	:	The Waste Land	-D
Unit-III	W.H. Auden	:	The Shield of Achilles, September 1, 1937, Spain	-D
	Dylan Thomas	:	Fernhill, Do Not Go Gentle Into That Good Night, Death Shall Have No Domain	-ND
Unit-IV	Omar Khayyam	:	Rubaiyat (No. 7, 49, 51, 67, 69, 70, 73) (Translated by Edward Fitzgerald)	-ND
	Kahlil Gibran	:	The Prophet	-D

### DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. The Paper is divided into four units and each unit is compulsory.
2. Question I will consist of 8 passages for explanation with reference to the context from the texts prescribed for detailed study, out of which 4 are to be attempted. Each annotation will carry 4 marks. (4x4 = 16)
3. Candidates will answer four other questions from Unit-I to Unit-IV, carrying 16 marks each.
4. From each Unit questions shall be asked in either of the following pattern:
  - a) From each Unit two descriptive questions; one from each author shall be asked.
  - b) Instead of one descriptive question two short answer type questions from an author (carrying 8 marks each) may also be asked.The candidate shall be required to attempt either one essay type question or two short notes.
5. Essay type questions should not exceed 400 words and will carry 16 marks and short notes should be within the limit of 200 words and will carry 8 marks.
6. All questions carry equal marks. (5x16 = 80)

### Recommended Reading

1. Faber book of Modern Verse
2. J.P. Sen : The Progress of T.S. Eliot as Poet and Critic
3. J.P. Sen : Five Modern Poets
4. Paramhansa Yogananda : The Rubaiyat of Omar Khayyam Explained  
(Motilal Banarashidhar Pub. Pvt. Ltd., Delhi)

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

M.A. ENGLISH III SEMESTER – SESSION 2020-2021

### PAPER-I

#### Critical Theory-I From Aristotle to Walter Pater

Unit-I	Aristotle	:	Poetics (Classical European Theory)
Unit-II	Longinus	:	On the Sublime (Classical European Theory)
	Philip Sidney	:	An Apology for Poetry
Unit-III	William Wordsworth	:	Preface to Lyrical Ballads
	S.T. Coleridge	:	Biographia Literaria Ch. XIII to XVII
Unit-IV	Mathew Arnold	:	Essays in Criticism
	Walter Pater	:	Appreciations

#### DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. The Paper is divided into 4 units and each unit is compulsory.
2. Candidates shall answer 4 essay type questions from Unit I to IV, carrying 16 marks each.
3. The fifth question will comprise of 4 short notes (One from each Unit) out of which 2 are to be attempted.
4. Essay type answers should not exceed 400 words and will carry 16 marks, short notes should be within the limit of 200 words and will carry 8 marks. (8x2 = 16)
5. All questions shall carry equal marks. (16x5 = 80)

#### Recommended Reading

1. Brooks, Cleanth : Irony as a Principle of Structure
2. Brooks, Cleanth : The Making of Literature
3. Seldon, Roman (ed.) : The Theory of Criticism from Plato to the Present
4. Dalton, John : From Literary Theory and Criticism, London, Longman Green & Co. 1931
5. Eliot, T.S. : The Use of Poetry and the use of Criticism
6. Daiches, David : Critical Approach to Literature (London, 1964)
7. M.H. Abrams : The Mirror and the Lamp Romantic Theory and the Critical Tradition
8. George Saintsbury : A History of Criticism & Literary taste in Europe
9. Wimsatt W.K. : Literary Criticism Cleanth Brooks
10. Butcher (ed.) : Aristotle's Poetics
11. J.W.H. Atkins : English Literary Criticism 17<sup>th</sup> and 18<sup>th</sup> Centuries

Dr. Mila Chahar  
(Chairperson)  
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Dr. Suchika Gupta



# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

M.A. ENGLISH III SEMESTER – SESSION 2020-2021

### PAPER-II

#### Indian Writing in English-I

Unit-I	Toru Dutt	: Savitri, The Lotus, Our Casuarina Tree	-ND
	Rabindranath Tagore	: Gitanjali (First Twenty Five Songs)	-D
Unit-II	Kamla Das	: The Freaks, A Hot Noon in Malabar, The Looking Glass, The Sunshine Cat	-ND
	Nissim Ezekiel	: Enterprise, Poet, Lover, Birdwatcher, Night of the Scorpion	-D
Unit-III	M.K. Gandhi	: The Story of My Experiments with Truth	-D
	J.L. Nehru	: Discovery of India (Last ten chapters)	-ND
Unit-IV	Mulk Raj Anand	: Two Leaves and a Bud	-ND
	R.K. Narayan	: The English Teacher	-D

#### DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. The Paper is divided into four units and each unit is compulsory.
2. Question I will consist of 8 passages for explanation with reference to the context from the texts prescribed for detailed study, out of which 4 are to be attempted. Each annotation will carry 4 marks. (4x4 = 16)
3. Candidates will answer four other questions from Unit-I to Unit-IV, carrying 16 marks each.
4. From each Unit questions shall be asked in either of the following pattern:
  - a) From each Unit two descriptive questions; one from each author shall be asked.
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5. Essay type questions should not exceed 400 words and will carry 16 marks and short notes should be within the limit of 200 words and will carry 8 marks.
6. All questions carry equal marks. (5x16 = 80)

Dr. Mila Chahwal  
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## Recommended Reading

1. K.R. Srinivasa Iyengar : Indian Writing in English
2. Gokak, V.K. : English in India: Its Present and Future
3. Sarang, Vilas : Indian English Poetry since 1950: An Anthology
4. Peeradana Saleem : Contemporary Indian Poetry in English (ed.) :  
An Assessment and Selection
5. M.K. Naik (ed.) : Aspects of Indian Writing in English (Macmillan)
6. Parthasarthy, R. (ed.) : Ten Twentieth Century Indian Poets (Poems by Keki  
N. Daruwalla, Kamala Das, Nissim Ezekiel, Jayant  
Mahapatra, A.K. Ramanujan)

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

M.A. ENGLISH III SEMESTER – SESSION 2020-2021

### PAPER-III

#### American Literature-I

Unit-I	Edgar Allen Poe	: Dream Land, The Raven	- ND
	Walt Whitman	: Song of Myself	- D
Unit-II	Emily Dickinson	: The Soul Selects Its Own Society	- D
		Hope is the thing with Feathers, I felt a Funeral in My Brain After Great Pain a Formal Feeling Comes	
	Wallace Stevens	: The Emperor of Ice-Cream, Sunday Morning	- ND
Unit-III	Robert Frost	: Stopping by the Woods..... Birches, Departmental	- D
	Sylvia Plath	: Daddy, Lady Lazarus, The Bee Meeting	-ND
Unit-IV	Ralph Waldo Emerson	: Self-Reliance	-D
	Henry David Thoreau	: Civil Disobedience	-ND

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2. Question I will consist of 8 passages for explanation with reference to the context from the texts prescribed for detailed study, out of which 4 are to be attempted. Each annotation will carry 4 marks. (4x4 = 16)
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5. Essay type questions should not exceed 400 words and will carry 16 marks and short notes should be within the limit of 200 words and will carry 8 marks.
6. All questions carry equal marks. (5x16 = 80)

#### Recommended Reading

1. Forester Norman : American Poetry and Prose V. 4
2. Cox, James M. (ed.) : Robert Frost : Twentieth Century Views.
3. Pearce, Roy Harvey : Whitman : Twentieth Century Views.
4. Barroff, Marie (ed.) : Wallace Stevens : 20<sup>th</sup> Century Views.

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

### M.A. ENGLISH III SEMESTER – SESSION 2020-2021

#### PAPER-IV

#### Colonial & Post Colonial Studies-I

Unit-I	Leela Gandhi	:	Post Colonial Theory (Post-colonialism & Feminism, The Limits of Post-colonial Theory)
	Homi Bhabha	:	The Other Question
Unit-II	Raja Rao	:	Kanthapura
	Arun Joshi	:	Foreigner
Unit-III	V.S. Naipaul	:	A House for Mr. Biswas
	Arundhati Roy	:	The God of Small Things
Unit-IV	Amitav Ghosh	:	The Glass Palace
	Jhumpa Lahiri	:	Namesake

#### DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. The Paper is divided into 4 units and each unit is compulsory.
2. Candidates shall answer 4 essay type questions from Unit I to IV, carrying 16 marks each.
3. The fifth question will comprise of 4 short notes (One from each Unit) out of which 2 are to be attempted.
4. Essay type answers should not exceed 400 words and will carry 16 marks, short notes should be within the limit of 200 words and will carry 8 marks. (8x2 = 16)
5. All questions shall carry equal marks. (16x5 = 80)

#### Recommended Reading

1. Appiah, K.A. : In My Father's House: Africa in the  
Philosophy of Culture
2. Ashcroft, B., Griffiths, G., Tiffin : The Empire Writes Back
3. Bhabha, H. : Literature, Politics & Theory
4. Forster, E.M. : A Passage to India
5. Fanon, F. : A Dying Colonialism  
: Black Skin, White Masks  
: The Wretched of the Earth

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

M.A. ENGLISH III SEMESTER – SESSION 2020-2021

PAPER-V

Linguistics-I

- Unit-I**
- 1) What is Language? Characteristics of Language.
  - 2) What is Linguistics? Linguistics as a Science.
  - 3) Synchronic, Diachronic and Historical Linguistics
- Unit-II**
- 1) Scope, Levels and Branches of Linguistics
  - 2) Langue and Parole, Competence and Performance
- Unit-III**
- 1) Sociolinguistics: Theories of language variation (Dialect and Socio-dialect, Code, iso-gloss, Registers)
  - 2) Psycholinguistics: Theories of Language Acquisition (Empirical/ Behavioral approach and Rationalistic Approach)
- Unit-IV**
- 1) Morphology: Morphemes, Allomorphs, Free and Bound Morphemes, Zero Morphemes.
  - 2) Introduction to Phrase Structure (P S rules) (Syntax NP-VP)
  - 3) I.C. Analysis, Limitations of I.C. Analysis
  - 4) Models of I.C. Analysis

### DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. The Paper is divided into 4 units and each unit is compulsory.
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5. All questions shall carry equal marks. (16x5 = 80)

### Recommended Reading

1. D. Crystal : Linguistics
2. S.K. Verma : Modern Linguistics: An Introduction N. Krishnaswamy
3. Saussure : Course in General Linguistics
4. C.F. Hockett : A Course in Modern Linguistics
5. R. Quirk (Ed.) : A Grammar of Contemporary English
6. Chomsky : Reflections of Language

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## SYLLABUS

M.A. ENGLISH IV SEMESTER – SESSION 2020-2021

### PAPER-I

#### Critical Theory- II

Unit-I	I.A. Richards	:	Communication and the Artist, Analysis of a Poem
	T.S. Eliot	:	Tradition and the Individual Talent
Unit-II	Bharata	:	Natyashastra (Rasa & Bhava Theory)
	Anandavardhanacharya:		Dhvanyaloka (Dhvani Theory)
Unit-II	Saussure	:	Nature of the Linguistic Sign
	Cleanth Brooks	:	The Language of Paradox
Unit-IV	Sigmund Freud	:	Creative Writers and Daydreaming
	Elaine Showalter	:	Feminist Criticism in Wilderness

#### DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. The Paper is divided into 4 units and each unit is compulsory.
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5. All questions shall carry equal marks. (16x5 = 80)

#### Recommended Reading

1. Sean Lucy : T.S. Eliot and the Idea of Tradition
2. J.P. Sen : The Progress of T.S. Eliot as Poet and Critic
3. Raman Selden : The Theory of Criticism from Plato to the Present: A Reader
4. David Lodge : Modern Criticism and Theory
5. Gayle & Green : Making a difference Feminist Literary Criticism
6. Dr. N.P. Unni : Natyashastra Vol. 1-4
7. V. Raghavan & Nagendra : An Introduction to Indian Poetics
8. Dr. Kapil Kapoor : Literary Theory: Indian Conceptual Frame-Work
9. V.S. Senturaman : Indian Aesthetics: An Introduction
10. G.N. Devy : Indian Literary Criticism

Dr. Mila Chahwal  
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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

M.A. ENGLISH IV SEMESTER – SESSION 2020-2021

### PAPER-II

#### Indian Writing in English- II

Unit-I	A.K. Ramanujan	: A River, Obituary, Love Poem For a Wife (From Ten Twentieth Century Poets (OUP))	-ND
	Jayant Mahapatra	: Indian Summer, A Missing Person, Dawn at Puri	- D
Unit-II	N.C. Choudhary	: The Autobiography of an Unknown Indian	- ND
	Dr. A.P.J. Abdul Kalam	: Ignited Minds	- D
Unit-III	Anita Desai	: Cry the Peacock	-ND
	Girish Karnad	: Tughlaq: A Play in Thirteen Scenes	- D
Unit-IV	Shashi Deshpande	: The Dark holds no Terror	-D
	Mahesh Dattani	: Final Solution	-ND

#### DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

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5. Essay type questions should not exceed 400 words and will carry 16 marks and short notes should be within the limit of 200 words and will carry 8 marks.
6. All questions carry equal marks. (5x16 = 80)

#### Recommended Reading

1. V.K. Gokak : English in India: It's Present and Future
2. K.R. Srinivas Iyengar : Indian Writing in English
3. S. Radhakrishnan : Recovery of Faith
4. M.K. Naik : Aspects of Indian Writing in English

Dr. Mila Choudhary (C. Chairperson) 11/06/19. 2. (A.A. KHAN) 3. (S. Suchika Gupta)

# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

M.A. ENGLISH IV SEMESTER – SESSION 2020-2021

### PAPER-III

#### American Literature- II

Unit-I	Eugene O'Neil	:	The Hairy Ape
	Thompton Wilder	:	Our Town
Unit-II	Arthur Miller	:	Death of a Salesman
	Tennessee Williams	:	The Glass Menagerie
Unit-III	William Faulkner	:	The Sound and the Fury
	Ernest Hemingway	:	The Old Man and the Sea
Unit-IV	N. Hawthorne	:	The Scarlet Letter
	Mark Twain	:	Adventures of Huckleberry Finn

#### DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

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4. Essay type answers should not exceed 400 words and will carry 16 marks, short notes should be within the limit of 200 words and will carry 8 marks. (8x2 = 16)
5. All questions shall carry equal marks. (16x5 = 80)

#### Recommended Reading

1. S. Bradley : The American Tradition in Literature
2. Rober Weeks (ed.) : Hemingway: Twentieth Century Views
3. Henry Nash Smith : Mark Twain: Twentieth Century Views
4. John Gassner (ed.) : O'Neil : Twentieth Century Views
5. A.N. Kaul (ed.) : Hawthorne: Twentieth Century Views

Dr. Mila Chahwal  
(Chairperson)

11/06/19

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

M.A. ENGLISH IV SEMESTER – SESSION 2020-2021

### PAPER-IV

#### Colonial and Post Colonial Studies- II

Unit-I	Ashcroft, B., Griffiths, G., and Tiffin, H. Ania Loomba	:	The Empire Writes Back (Introduction & Chapter 1: Cutting the Ground) Colonialism/Post Colonialism (Chapter-1 – Pages 1 to 42)
Unit-II	Edward Said	:	Orientalism
Unit-III	Alice Walker Toni Morrison	:	The Colour Purple The Bluest Eye
Unit-IV	J.M. Coetzee Chinua Achebe	:	Disgrace Things Fall Apart

#### DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

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5. All questions shall carry equal marks. (16x5 = 80)

#### Recommended Reading

1. Edward Said : Orientalism
2. Mohanty, Chandra Talpade,  
Ann Russo and Lourdes Torres, (eds.) : Third World Women and the Politics of  
Feminism
3. Guha, Ranajit and Gayatri Spivak, (eds.) : Selected Subaltern Studies
4. Guha, Ranajit, (ed.) : Subaltern Studies
5. Christian, Barbara : The Race for Theory

Dr. Mila Chahar (Chairperson) 11/06/19. 2. A.A. KHAN 3. Suchika Gupta



# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS

M.A. ENGLISH IV SEMESTER – SESSION 2020-2021

PAPER- V, LINGUISTICS- II

Phonetics and Stylistics

- Unit-I**      1) The Organs of Speech- Places of Articulation  
                 2) Phonetics: Articulatory, Acoustic & Auditory
- Unit-II**      1) Classification of Consonants and Vowel Sounds  
                 2) Pure Vowels, Clusters, Syllables  
                 3) Supra Segmental and Prosodic Phenomenon Stress, Pitch, Intonation, Juncture  
                 And Rhythm
- Unit-III**    1) Phoneme: Free Variation and Neutralization, Arrangement, Allophones, Received  
                 Pronunciation, Assimilation and Elision, Pattern Congruity, Transcription
- Unit-IV**    1) Essentials of Stylistics  
                 2) Deviation, The Irrational in Poetry, Ambiguity, Foregrounding, Figurative  
                 Language, Patterns of Sound

### DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

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5. All questions shall carry equal marks. (16x5 = 80)

### Recommended Reading

1. Daniel Jones : An Introduction to Phonetics
2. T. Balasabramanian : A Textbook of English Phonetics

Dr. Mila Chahar (Chairperson) 11/06/19. 2. (A.A. KHAN) 3. (S. Suchika Gopi)

# **HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**

Website - [www.durguniversity.ac.in](http://www.durguniversity.ac.in), Email - [durguniversity@gmail.com](mailto:durguniversity@gmail.com)



## **SCHEME OF EXAMINATION & SYLLABUS of M.A.(Economics) Semester Exam UNDER FACULTY OF SOCIAL SCIENCE Session 2019-21**

**(Approved by Board of Studies)  
Effective from June 2019**

# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

## SYLLABUS FOR UNIVERSITY TEACHING DEPARTMENT AND AFFILIATED COLLEGES IN P.G. CLASSES

### M.A. in Economics: Semester Examination 2019-21

At post graduate level, candidates are required to study 15 papers in First, Second and Third semester (5 papers in each semester) and 04 papers in fourth semester examination. This is to be treated as the nineteen papers of the course structure. So there shall be 19 papers in the post graduate examination in Economics. Viva - voce examination be treated as a compulsory paper for M.A. fourth semester examination. Each paper shall carry 100 marks out of which 80 marks will be for theory paper and 20 marks for internal assessment. There shall be 2000 marks in M.A. Candidates shall have secure 36 percent marks in aggregate of all papers in order to pass the M.A. Examination. Examination and result shall be treated according to rules and regulations of ordinance no. 13.

### M.A. SEMESTER-I and SEMESTER-II

PAPER	SEMESTER-I	Mark		SEMESTER-II	Marks	
		Theory	Internal Assessment		Theory	Internal Assessment
PAPER-I	Micro Economics-I	80	20	Micro Economics-II	80	20
PAPER-II	Macro Economics-I	80	20	Macro Economics-II	80	20
PAPER-III	Quantitative Methods	80	20	Research Methods & Computer Application	80	20
PAPER-IV	Indian Economy	80	20	Indian Economic Policy	80	20
PAPER-V	Industrial Economics	80	20	Labour Economics	80	20

### M.A. SEMESTER-III and SEMESTER-IV

PAPER	SEMESTER-III	Marks		SEMESTER-IV	Marks	
		Theory	Internal Assessment		Theory	Internal Assessment
PAPER-I	Economics of Growth	80	20	Economics of Development & Planning	80	20
PAPER-II	International Trade	80	20	International Economics	80	20
PAPER-III	Public Finance	80	20	Public Economics	80	20
PAPER-IV	Environmental Economics	80	20	Economics of Social Sector	80	20
PAPER-V	Demography	80	20	Viva-Voce	100	--

  
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26/8/19

**SEMESTER – I**  
**Micro Economics -1**  
**Paper - I**

- Unit-I Introduction: - Concept of Equilibrium, Economic Models, Neo Classical Demand Analysis. Elasticity of Demand (Price, Income & Cross), Elasticity of supply.
- Unit- II Indifference curve, Marginal Rate of Substitution. Income & substitution effect, Hicks and Slutsky theorem, Revealed preference theory. Hicks's Revision of Demand, Hicksian Consumer surplus.
- Unit – III Theory of Production – Production function, The short period & long period production function, the law of variable proportion (isoquant approach), Marginal rate of Technical Substitutions, Returns to a factor and returns to scale. Expansion path, Cobb-Douglas Production function, CES production function.
- Unit- IV Theory of cost and Revenue analysis, Perfect Competition - equilibrium of firm in Perfect Competition. Monopoly - short run and long run equilibriums, price discrimination under monopoly competition, monopoly control and regulation. Comparison between monopoly and perfect competition.
- Unit – V Monopolistic Competition – price and output determination under monopolistic competition, Group equilibrium, theory of excess capacity. Oligopoly – non- collusive oligopoly model: The kinked demand curve. The collusive oligopoly – Cartels: joint profit maximization or perfect cartels, price leadership : the low cost price leadership model.

**Text Books**

1. Jhingan M. L. (2014), Advanced Economic Theory, Vrinda Publication, New Delhi
2. Jhingan M. L. (2014), Micro Economics , Vrinda Publication, New Delhi
3. Agarwal , A (2014), Micro Economic analysis , Sahitya Bhawan Publication, New Delhi

**Reference Books**

1. Kraps, David M. (1990) A course in micro economics theory -Princeton university press, Princeton.
2. Koutsayiannis; A (1979) modern Micro economics (2nd Edition), Macmillan press, London.
3. Layard, PRG and P.W. Watters (1978), Micro economic theory, McGraw Hill, New York.
4. San A (1999) Micro economics theory and Applications, Oxford University Press, New Delhi;
5. Stigler, G. (1996) Theory of Price (4th edition), Princeton Hall of India, New Delhi.
6. Varian, H (2000) Micro economics Analysis, W.W. Norton, New York.
7. Baumol W.J., (1982) Economic theory and operations Analysis, Princeton Hall of India, New Delhi.
8. Handersan, J.M. and R.E. Quandt (1980) Micro economics theory - A Mathematical approach, Mc Graw Hill New Delhi.
9. Hirshleifer, J. And A Glazer (1997), Price theory and Application, Prentise Hall of India, New Delhi.



**SEMESTER – I**  
**MACRO**  
**ECONOMICS-1**

**Paper – II**

- Unit – I National Income and Accounts – Concept of National Income and National Product, Problems of Measurement, Different forms of National Income Accounting – Social Accounting, Input Out-put Accounting, Flow of Funds, Balance of Payment – Accounting. Circular flow of Income – Two, Three and Four Sector Economy
- Unit – II Classical Theory of Employment, Say's Law of Market, Principle of Effective Demand, Keynesian & Pigou Theory of Employment, Comparison of Classical and Keynesian Models. National Income Determination of Keynesian Model - Two, Three and Four Sector Economy.
- Unit- III Consumption Function- Keynesian Psychological Law of Consumption, Short Run & long run Consumption Function. Theory of Consumption Function – Absolute Income Hypothesis, Duesenberry's Relative Hypothesis, Life Cycle and Permanent Income Hypothesis.
- Unit – IV Investment Function- Marginal Efficiency of Capital and Investment. Saving and Investment Equality, Multiplier and its working, Accelerator and its working, Super- Multiplier. Supply of Money, Determinants of Money Supply, Measurement of Money supply, Control of Money Supply. High Powered Money, Money Multiplier.
- Unit – V Demand for Money –Fisher and Cash Balance (Cambridge) Approach, Fundamental Equation of Keynes. Friedman's re-formulation of the quantity theory of money.  
Post Keynesian Approach to Demand for Money- Patinkin, Baumol's, James Tobin, Friedman, and Gurley & Shaw's Approaches.

**Text books**

- 1 Sethi, T.T. (2008) Macro Economics, Laxminarayan Agrawal, Agra.
- 2 Jhingan, M.L. (2010) Monetary Economics, Vrinda publications pvt. ltd.
- 3 Jhingan, M.L. (2000) Macro Economic theory, Vrinda publications pvt. ltd.
- 4 Shinghai G.C & Mishra J.P. (2013) Macroeconomic Analysis, Sahitya bhawan publication Agra.



**SEMESTER- I**  
**QUANTITATIVE METHODS**  
**Paper – III**

- Unit – I      Skewness – Symmetrical and asymmetrical distribution, Measurement of Skewness – Karl Pearson, Bowley
- Simple Correlation- Measurement of Correlation – Karl Pearson's Coefficient of correlation and Spearman's rank correlation, Coefficient of correlation by the method of least square. Probable error and Standard error in correlation, Coefficient of determination of correlation.
- Unit – II      Regression analysis – Regression and Correlation, regression lines and regression coefficient, regression equations. Simple regression analysis, Multiple regression analysis (Up to three variables only). Standard Error of the estimates of simple regression analysis.
- Interpolation and Extrapolation- Method of Fitting a Parabolic Curve, Newton's Advancing Difference Method, Direct Binomial Expansion Method and Lagrange's Method.
- Unit – III      Association of Attributes – Meaning and types of association, Consistency of data, Methods of determining association – Method of Comparison Proportion. Coefficient of association using Yule's method.
- Probability theory– meaning and definition, Permutation and Combination, Types of events, Measurement of Probability – Addition and Multiplication theorem, Conditional Probability.
- Unit – IV      Index Number- Fisher's Ideal Index Number, Reversibility Test – Time & factor reversibility tests.
- Time Series Analysis – Components of time series, Measurement of long term Trend- Semi-Average Method, Moving Average Method and Least Squares Method.
- Unit - V      Functions: Meaning and types of functions. Differentiation: Meaning, Rules of Differentiation, Use of differentiation in economics- Mathematical interpretation of marginal, average and elasticity concept Deriving their inter-relations by calculus. Calculation of these value and form these finding the original function. Optimization problems relating to revenue, cost, profit, utility and production.
- Integration: Meaning and rules of integration, Problems related to integration.

**Reference:**

1. Kothari, C.R.: Research Methodology.
2. Sharma, Dr. Ramnath: Method and Techniques of Social Survey and Research, Rajhans Publications.
3. Bajpai, Dr. S.R.: Methods of Social Survey and Research KitabGhar, Kanjpur-3.
4. मुखर्जी, रविन्द्रनाथ: सामाजिक शोध एवम सांख्यिकी, विवेकप्रकाशन, जवाहरनगर, दिल्ली।
5. शुक्ला एवम सहाय: सांख्यिकी, साहित्य भवन पब्लिकेशन्स, आगरा।



**SEMESTER- I**  
**INDIAN ECONOMY**  
**Paper –IV**

- Unit – I      Indian Economy: Meaning, basic characteristics and major issues of development of Indian Economy, GDP and National Income of India – Components and Structure of GDP, Role of Primary, Secondary and Tertiary Sectors in GDP, National Income and Per Capita Income, Growth Rates of GDP and Per Capita Income.
- Unit – II      Demographic Features of India – Size, Growth Rate, Sex Ratio, Age-Composition, Literacy and Density of Population, Migration, Rural-Urban Migration, Urbanization and Civic Amenities, Occupational Structure, National Population Policy, Demographic Features of Chhattisgarh State.
- Unit – III     Agricultural Development in Indian Economy – Agricultural Growth and Productivity, Causes of Low Productivity and Measures to Increase it, Agricultural Marketing and Warehousing, Institutional Structure- Land Reforms in India, The Green Revolution, National Agricultural Policy and Food Security in India, Rural credit in India, NABARD and its role in rural credit.
- Unit – IV     Industrial Development in India, Industrial Policies of 1956 and 1991, Public Sector Enterprises and their Performance, Privatization and Disinvestment, Small Scale Sector and Minor Medium Enterprises, Unorganized Sector and Informalisation of the Indian Economy and Knowledge Economy.
- Unit – V      Infrastructure- Infrastructure and Economic Development, Energy, Power, Transportation- Road, Railway, Water and Civil Aviation in India, Private Investment in Infrastructure: Outlook and Prospect, Concept of Social Sector and Social Infrastructure, Education, Health and Family Welfare.

**Reference:-**

- 1 Ahulwalia, I. J. and I. M. E. Little (Eds.) 1999): India's Economic Reforms and Development (Essays for Manmohan Singh), Oxford University Press, New Delhi
- 2 Bardhan, P. K. (9<sup>th</sup> Edition) (1998): The Political Economy of Development in India, Oxford University Press, New Delhi.
- 3 Bawa, R.S. and Raikhy (Ed.) (1997): Structural Change in Indian Economy, Guru Nanak Dev University Press. Amritsar (PB).
- 4 Brahmananda, P. R. and V. R. Panchmukhi (9<sup>th</sup> Eds.) (2001): Development Experience in the Indian Economy: Interstate Perspectives, Bookwell, Delhi.
- 5 Chakravarty, S. (1987): Development Planning: The Indian Experience, Oxford University Press, New Delhi.
- 6 Dantwala, M. L. (1996): Dilemmas of Growth: the Indian Experience, Sage Publication, New Delhi.



**SEMESTER- I**  
**INDUSTRIAL ECONOMICS**  
**Paper –V**

- Unit – I      Concept and Organization of a Firm-Ownership, Control and Objectives of the Firm. Rationale of Industrialization: Agriculture and Industrialization – patterns, process, speed, Implications of Industrialization. Theories of Industrial location, Alfred Weber and Sargeant Florence Theory. Factors Affecting Industrial Localization.
- Unit – II      Industrial Productivity, Efficiency and Capacity. Industrial Policy in India, Role of Public and Private Sector industries in India. Recent Trends in Industrial Growth. Strategies for Industrial Growth, Regional Development of Industries.
- Unit – III      Owned, External and Other Components of Funds, Nature, Volume and Types of Institutional Finance – IDBI, IFCI, SFCs, SIDC, Commercial Bank.
- Unit – IV      Structure of Industrial Labour, Employment Dimensions of Indian Industry. Industrial Legislation, Industrial Relations, Exit policy and Social Security.
- Unit – V      Large scale industries:- Iron and Steel, Cement, Jute, Sugar, Paper industry. Development of Small-Scale and Cottage Industries in India.

**Text books**

1. Ahluwalia, I.J. (1985): Industrial Growth in India, Oxford University Press, New Delhi.
2. Barthwal, R.R. (1985): Industrial Economics, Wiley Eastern Ltd., New Delhi.
3. Chernilam, F (1994): Industrial Economics : Indian Perspective (3<sup>rd</sup> Edition), Himalaya Publishing House, Mumbai.
4. Desai, B. (1999): Industrial Economic in India (3<sup>rd</sup> Edition), Himalaya Publishing house Mumbai.
5. Kuchhal .S.C.: The industrial economy of India , Chaitanya publishinghouse.

**Reference**

1. Divine, P.J. and R.M. Jones et. At. (1976): An Introduction to industrial economics, George Allen and Unwin Ltd., London.
2. Government of India, Economic Survey (Annual)
3. Hay, D. and D.J. Morries (1979): Industrial Economics : Theory and Evidence, Oxford University Press, New Delhi.
4. Kuchhal, S.C. (1980) : Industrial Economy of India (th Edition), Chaitanya Publishing House Allahabad.
5. Reserve Bank of India Report on Currency and Finance (Annual).
6. Singh, A. and A. Sadhu (1988): Industrial Economics, Himalaya Publishing House





**SEMESTER- II**  
**MICRO ECONOMICS-II**  
**Paper –I**

Unit – I	Full Cost Pricing Theory – Hall & Hitch, Sales maximization model: Baumol's model (price-output determination of a product without advertisement and optimal advertising outlay), Managerial theories of the firm: Williamson's model of managerial discretion. Theory of limit pricing: Bains model.
Unit- II	Theory of distribution: Marginal productivity theory of distribution (Marshall– Hicks version), Product Exhaustion theorem. NEO-Classical Approach of Distribution: relative share of labor and capital, technological progress and factor shares in income, determinants of rent, wages, interest and profit (Only modern Theory).
Unit- III	Linear Programming and Game Theory (Geographical and Simplex methods).
Unit – IV	Concept of Equilibrium: Static and Dynamic equilibrium, Partial and General equilibrium. Walrasian Excess Demand.
Unit – V	Welfare Economics – Introduction, Value judgment, Classical Welfare Economics- Pigovian welfare economics, Pareto optimal conditions. New welfare economics: Compensation principle of Kaldor - Hicks. Social welfare function: Bergson – Samuelson social welfare function, Arrow's impossibility theorem.

**Text Books**

1. Jhingan M. L. (2014): Advanced Economic Theory, Vrinda Publication, New Delhi
2. Jhingan M. L. (2014): Micro Economics , Vrinda Publication, New Delhi
3. Agarwal , A (2014): Micro Economic Analysis , Sahitya Bhawan Publication, New Delhi

**Reference Books**

1. Mansfield, E. (1997): Micro Economics (9<sup>th</sup> Edition), W.W. Norton and Company, New Delhi.
2. Ray, N.C. (1975): An Introduction to Micro Economics, Macmillan Co. of India Ltd., Delhi.
3. Ryan, W.J.L. (1962): Price Theory, Macmillan and Co. Limited, London.
4. Samuelson, P.A. and W.D. Nordhaus (1998): Economics, Tata McGraw Hill, New Delhi.
5. Stonier, A.W. and D.C. Hague (1972): A Textbook of Economic Theory, ELBS and Longman Group, London.



**SEMESTER- II**  
**MACRO ECONOMICS**  
**Paper –II**

- Unit – I      Theory of Inflation – Classical, Keynesian and Monetarist Approaches to Inflation, Semi And Full inflation, Theory of Structural Inflation, Stagflation, Control of Inflation.  
                  Philip's Curve Analysis – Short Run and Long Run Philip's Curve.  
                  The Natural Rate of Unemployment Hypothesis, Tobin's Modified Philip Curve.
- Unit – II      Business Cycles- Main Features of Business Cycles, Types of Business Cycle, measures to control business cycle. Theories of Business Cycles :- Hawtrey's Monetary Theory of Trade Cycle, Schumpeter's, Keynes, Hicks, Samuelson's, Friedman, Kaldor Model of Trade Cycle.
- Unit – III     Monetary Policy-Meaning of Monetary Policy, Instrument of Monetary Policy, Objective of Monetary policy, Limitations of Monetary Policy, Monetary Policy and Economic Development. Fiscal Policy – Meaning of Fiscal Policy, Instruments of Fiscal Policy, Objectives of Fiscal Policy, Fiscal Policy and Economic Growth, Effectiveness of Fiscal Policy, Monetarism Vs Fiscalism – The Debate, Similarities between Monetary Policies and Fiscal Policies.
- Unit – IV     IS-LM Model, The Product Market Equilibrium, The Money Market Equilibrium, Equilibrium of Product and Money Market, Merits and Demerits of IS-LM Curve, Extension of IS-LM Models With Flexible Prices and Labour Market.
- Unit – V      The Rational Expectation Hypothesis: - Adaptive Expectations, Rational Expectations. The New Classical Macro - Economics, Policy implications of New Classical Macro- Economics. Supply side economics: - main features, policy prescriptions.

**Text books**

1. Sethi, T.T. (2009-10): Macro economics, Laxminarayan Agrawal, Agra.
2. Jhingan, M.L. (2008): Monetary Economics, Vrinda Publications Pvt. Ltd.
3. Jhingan, M.L. (2010): Macroeconomic theory, Vrinda Publications Pvt. Ltd.
4. Shinghai G.C. & Mishra J.P. (2013): Macro Economic Analysis, Sahitya Bhawan Publication Agra.



## Reference

1. Blackhouse, R. and A. Salansi (Eds.) (2000), Macroeconomics and the Real World (2 vols) Exford University Press, London.
2. Branson, W.A. (1989), Macroeconomics Theory and Policy, (3<sup>rd</sup> Edition), Harper and Row, New York.
3. Aornbusch, R and F. Stanley (1997), Macroeconomics, McGraw Hill, inc., New York
4. Hall, R.E. and J.B. Taylor (1986), Macroeconomics, W.W>Norton, New York.
5. Heijdra, B.J. and V.P. Frederick (2001), Foundations of Modern Macroeconomics, Oxford University Press, New Delhi.
6. Jha, R. (1991), Contemporary Macroeconomic Theory and Policy, Wiley Eastern Ltd. New Delhi.
7. Romer, DL. (1996), Advanced macroeconomics, McGraw Hill Company Ltd., New York.
8. Scarte, B.L. (1997), Cycles, Growth and inflation, McGraw Hill, New York.
9. Markeley, G. (1978), Macroeconomics Theory and Policy, macmillan, New York.

*W. A. Branson*

*D. L. Romer*  
26/6/19

*B. L. Scart*  
*G. Markeley*

**SEMESTER - II**  
**RESEARCH METHODOLOGY AND COMPUTER APPLICATION**  
**Paper –III**

Unit – I	Research methodology and research methods, Research: Meaning, types of research, motivation of research, main stages of statistical research, primary and secondary data, methods of collecting primary data, secondary data-different sources, precautions while constructing questionnaire/schedule, editing of primary data.
Unit – II	Sampling- Meaning and need for sampling, size of sampling, merits and limitations of sampling, sampling and non- sampling errors, sampling frame, how to judge the reliability of samples. Various methods of sampling. Sampling design- meaning and steps in sample design.
Unit – III	Classification and tabulation of data- meaning and objectives of classification, types of classification, tabulation of data, parts of a table, types of tables. Processing and analysis of data- processing operations, some problems in processing, Elements/types of analysis.
Unit – IV	Hypothesis: Meaning of hypothesis, basic concepts concerning testing of hypothesis, procedure for hypothesis testing, test of significance based on students 't' test, Chi-square test 'F' ratio test and Paired T test. Practical problems related to Students 't' test, Chi-square test, F ratio test and paired T test .
Unit – IV	Computer: What is a Computer? Important characteristics of a computer, history of computer, different parts of a computer - hardware and software, various types of computer, main characteristics of a computer, elementary knowledge of INTERNET and MS office, role of computer in economic research.

**Reference Books**

1. Kothari, C.R.: Research Methodology
2. Sharma, Dr. Ramnath: Methods and Techniques of Social Survey and Research, Rajhans Publications
3. Bajpai, Dr. S. R.: Methods of Social Survey and Research, Kitab Ghar, Kanjpur-3.
4. मुखर्जी, रविन्द्रनाथ: सामाजिक शोध एवं सांख्यिकी, विवेक प्रकाशन, जवाहर नगर, दिल्ली – 7
5. शुक्ला एवं सहाय: सांख्यिकीय, साहित्य भवन पब्लिकेशन्स, आगरा



**SEMESTER- II**  
**INDIAN ECONOMIC POLICY**

**Paper – IV**

- Unit – I      Planning in India– Objectives and Strategies of Planning, Twelfth Five Year Plan, Development Strategy, LPG Model of Development, PURA- A Neo Gandhian Approach to Development, Developing Grass-root Organization: Panchayats, NGO's.
- Unit – II      Problem of Poverty and Inequality – The Concept of Poverty, Measurement and Estimation of Poverty in India, International Comparison of Poverty and Inequality of Incomes, Poverty Eradication Programmes, Causes of Failure to Remove Poverty.
- Problem of Unemployment in India- Nature of Unemployment, Various Schemes to Reduce the Unemployment, Balanced Regional Development- Indicators, Causes, Changing Scenario and Policy Measures to remove Regional Disparity.
- Unit – III      Indian Finance System – An overview, Functions of the Reserve Bank of India, Commercial Banking system, Progress of Banking since 1969, RRBs, DFIs and NBFCs, Financial Sector Reforms in India, Stock Exchange in India, Composition of Indian Capital Market, SEBI and Capital market reform.
- Unit – IV      Foreign Trade of India- Importance of Foreign Trade for a developing Economy, Foreign Trade since 1991, Structure and Direction of Foreign Trade, Balance of Payments of India, Issues in Export Import Policies, External value of the Rupee and Foreign Exchange Reserves, FEMA, SEZs, Trade Reforms in India.
- Unit – V      WTO and its Impact on the Different Sector of Economy, Economic Reforms – Rational of Internal and External Reforms, Cooperative movement in India- Organization, Structure and Development of different types of Cooperatives in India.

**Reference:-**

1. Ahulwalia, I. J. and I. M. E. Little (Eds.) (1999): India's Economic Reforms and Development (Essays for Manmohan Singh), Oxford University Press, New Delhi,.
2. Bardhan, P. K. (9<sup>th</sup> Edition) (1998): The Political Economy of Development India, Oxford University Press, New Delhi.
3. Bawa, R.S. and Raikhy (Ed.) (1997): Structural Change in Indian Economy, Guru Nanak Dev University Press. Amritsar (PB).
4. Brahmananda, P. R. and V. R. Panchmukhi (9<sup>th</sup> Eds.) (2001): Development Experience in the Indian Economy : Interstate Perspectives, Bookwell, Delhi.
5. Chakravarty, S. (1987): Development Planning: The Indian Experience, Oxford University Press, New Delhi.
6. Dantwala, M. L. (1996): Dilemmas of Growth: the Indian Experience, Sage Publication, New Delhi.



**SEMESTER- II**  
**LABOUR ECONOMICS**  
**Paper – V**

- Unit – I      Labour Economics - Definition, Nature, Scope & Importance. Labour Market – Nature and Characteristics of Labour Markets in India .Supply of Labour - Labour force,factors affecting Law of Labour Supply. Demand for Labour – Labour productivity, Demand for Labour by Industrialist..
- Unit – II      Theories of labour market:- Classical Theory of labour, Marginal productivity theory of Labour Concept of wages – Real Wages , Nominal Wages, Factors Affecting Real wages , Theories of Wage Determination - Classical Theory, New Theory, The theory of Collective Bargaining.
- Unit – III      Theories of Labour Movement- Labour Unions in India, Rise and Growth of Labour Union, Achievements of Labour Unions. Structure and Pattern of Trade Union- Objectives, Growth, Achievements and Failures.
- Unit – IV      Labour Legislation in Indian Labour, Laws and Practices in Relation to International Labour Standards. State and Labour, State and Social Security of Labour, Concept of Social Security and its Evolution.
- Unit – V      Labour Welfare in India, Rural and Agricultural Labour in India, Child Labour, Female Labour, Concept of Industrial Peace, Settlement of Industrial Dispute, Second National Labour Commission.

**Text books**

1. Goyal, Sunil & Goyal, M.L.(2008): Labour Economics, R.B.S.A. Publications, Jaipur.
2. Saxsena, R.C.(2010): Labour Problems & Social Welfare, K. Nath and Company Publication, Meerut.
3. Singh, Dilip Kumar,(2008): Workers Participationin in Management and Industrial Relation, Rawat Publication, Jaipur & Delhi.
4. Singh, Usha & Singh, H.P.(2011): Child Labour in India :Problem and Solutions, Classical Publication ,New Delhi
5. Gupta, P.K.: labour economics , Vrinda publications .



**SEMESTER – III**  
**ECONOMICS OF GROWTH**  
**PAPER – I**

- Unit-I Economic Growth: Economic Growth and Development, Measurement of Economic Growth, Vicious Circle of poverty, Physical Quality of Life Index. Human development Index, Gender Development index, Gender empowerment measure, UNDP's Human Development Report 2015.
- Unit-II The Concept of Capital Output Ratio, Input-Output Analysis, Project Evaluation and its methods and Cost–Benefit analysis, Shadow Prices.
- Unit-III Theories of Growth:- Harrod-Domar model, Joan Robinson model, Mead's Neo -Classical Model, Solow Long- Run, Kaldor model of Distribution.
- Unit-IV Approaches to Growth:- Kaldor model of Growth, The Pesinetti Model of Profit and Growth, The Models of Technical Change, The Golden rule of Accumulation model.
- Unit- V Steady State Growth, Growth Accounting, The Friedman Model, The Mahalanobis Four Sector Model.

**Text Books**

1. Jhingan, M.L. (2008) 31<sup>ST</sup> edition, The economics of development and planning, Vrinda publication pvt. Ltd.
2. Shinghai G.C. & Mishra J.P. (2013): Macroeconomic Analysis, Sahitya bhawan publication Agra.
3. Mishra, J.P. (2012): Economics of Growth and development, Sahitya bhawan publication Agra.

**Reference Books**

1. Hajela P.D. (1998): Labour Restructuring in India: A Critique of the New Economic Policies, Commonwealth Publishers, New Delhi.
2. Jhabvala, R. and R.K. Subrahmanya (Eds.) (2000): The Un-organised Sector : Work Security and Social Protection. Sage Publication, New Delhi.
3. Lester, R.A. (1964): Economics of Labour (2<sup>nd</sup> Edition), Macmilan, New York.
4. McConnell, C.R. and S.L. Brue (1986): Contemporary Labour Economics, McGraw-Hill New York.
5. Papola, T.S., P.P. Ghosh and A.N. Sharma (Eds. 1993): Labour, Employment and Industrial Relations in India, B.R. Publishing Corporation, New Delhi.
6. Rosenberh M.R. (1998): Labour Markets in Low income Countries in Chenery, H.B. and T.N. Srinivasan, (Eds.) The Handbook of Development Economics, North-Holland, New York.
7. Venkata Ratnam, C.S. (2001): Globlization and Labour- Management Relations Dynamics of change, Sage publications/ Response Books, New Delhi.



**SEMESTER- III**  
**INTERNATIONAL TRADE**

**Paper – II**

- Unit – I      Theory of International Trade– Meaning and Distinguishing Features of Inter-regional and International Trade, The Comparative Cost Theory, Refinements of the Comparative Cost Theory, Opportunity Cost Theory, Theory of Reciprocal Demand.
- Unit – II      Modern Theory of International Trade, Factor Price Equalization, Theorem of International Trade, Stopler Samuelson and Rybezynski Theorems.
- The Terms of Trade– Concepts, Determination of Terms of Trade, Factors affecting Terms of Trade, Terms of Trade & Economic Development, Its Empirical Relevance and Policy Implications for Less Developed Countries, Terms of Trade & Welfare Implications.
- Unit – III      The Theory of Intervention– Tariffs, Quotas, and Non-tariff Barriers, Economic Effects of Tariff and Quotas on National Income, Output, Consumption, Price, Employment, Terms of Trade & Income Distribution, The Stopler – Samuelson Theorem of Tariff on Income Distribution, The Learner’s Paradox.
- Unit – IV      Balance of Payments– Meaning and components, Equilibrium and Disequilibrium in the BOP, Measures to Correct the Adverse BOP, Adjustment Mechanisms of BOP, Devaluation- The ‘J’ curve effect, Marshall-Lerner’s Conditions under Devaluation, Expenditure Reducing and Expenditure Switching Policies and Direct Control.
- Unit – V      Income Adjustment- Foreign Trade Multiplier, Foreign Repercussion or Back-Wash Effect, Foreign Exchange Rate- Spot and Forward Exchange Rates, Fixed and Flexible Exchange Rates- their Merits and Demerits, Hybrid Exchange Rate, Floating Rate of Exchange, Managed Floating System.

**Reference:-**

1. Bhagwati, J. (Ed). (1981): International Trade, Selected readings, Cambridge, University Press, Massachusetts.
2. Carbough, R.J. (1999): International Economics, International Thompson Publishing, New York.
3. Chacholiades, M. (1990): International Trade: Theory and Policy, McGraw Hill, Kogakusha, Japan.
4. Dana, D. S. (2000): International Economics: Study Guide and Work Book, (5<sup>th</sup> Edition), Routledge Publishers, London.
5. Dunn, R. M., and J. H. Mutti (2000): International Economics, Routledge, London.
6. Kenen, P.B. (1994): The International Economy, Cambridge University Press, London.
7. Kindleberger, C. P. (1973): International Economics and International Economic Policy A Ready, McGraw Hill International, Singapore.
8. Krugman, P. R. and M. Obstfeld (1994): International Economics : Theory and Policy, Glenview, Foresman.





**SEMESTER- III**  
**PUBLIC FINANCE**  
**Paper – III**

- Unit – I      Definition, Nature and scope of Public Finance, Role of Public Finance in developing Countries, Principles of Maximum Social Advantages. Taxation– features of a good tax system, Objectives of Taxation, Principles of Taxation, canons of Taxation, Shifting, Effects and Incidence of Taxation. Impact of Tax under Laws of Returns and Perfect Competition.
- Unit – II      Public Expenditure:- Meaning and Scope, Different Forms of Expenditure, Canons of Public expenditure, Structure and Growth of Public Expenditure in India. Trends in Central Government Expenditure. Economic Effects of Public Expenditure on Production and Distribution. Public Expenditure and Economic Growth.
- Unit – III      Public Revenue:- Meaning, classification, sources, principles and effects of public revenue. Classification of taxation: - Indirect & Direct Tax, Goods and service tax GST) New Direct tax, Central Excise, Custom Duties, Taxes on Land and Agriculture, Value Added Tax, Modvat, Service Tax. Taxable Capacity.
- Unit – IV      Public Debt– Meaning and Objectives of public debt, Different Sources of Public Debt, Redemption of Public Debt. Principle of Public Debt Management, Growth of Public Debt in India, Burden of Public Debt.
- Unit – V      Budget– Meaning, Objectives, Different forms of Budget, Budgetary Process in India, Kinds of Budget– traditional Budget, Performance Budget, Zero Based Budget, Out-come Budget, Gender Budget. Budget Theory– Classical Viewpoint (Balance Budget), Modern View Point (Imbalanced Budget.)

**Text Book**

1. Lekhi, R.K.,(2014): Public Finance, Kalyani Publication Ludhiana New Delhi
2. S.K., Sing, (2013): Principal of Public Finance Sahitya Bhavan Publication, Agra.
3. Pant, K.C., (2012): Public Finance
4. Sinha, V.C.,(2013): Public Finance and Economic, Sahitya Bhavan Publication.



## Reference Books

1. Atkinson, A.B. and J.E. Siglitz (1980): Lectures on Public Economics, Tata McGraw Hill, New York.
2. Auerbach, A.J. and M. Feldstern (Eds.): Handbook of Public Economics, Vol. 1, North Holland, Amsterdam.
3. Government of India (1992): Reports of the Tax Reforms Committee – Interim and Final (Chairman : Raja J. Chelliah).
4. Chelliah, Raja J. et. Al (1981): Trends and issues in India's Federal Finance, NIPFP. New Delhi.
5. Peacock, A and G.K. Shaw (1976): The Economic Theory of Fiscal Policy, George Alen and Unwin, London.
6. Sahni, B.S. (Ed.) (1972): Public Expenditure Analysis: Selected Readings, Rotherdam University Press.
7. Musgrave, R.A. and P.B. Musgrave (1976): Public Finance in Theory and Practice, Mcgraw Hill, Kogakusha, Tokyo.
8. 14th Finance commission Report-2015
9. Central Govt. and Stat Govt. Budget- 2015



**SEMESTER- III**  
**ENVIRONMENTAL ECONOMICS**

**Paper – IV**

**Unit – I** The Economics of Environment - Environmental Micro Economics and Macro Economics, The Circular Flow Model. Theory of Resources Environment and Economic Development - Economic Growth and The Environment, Future of Economic Growth and The Environment. Criterion of Social Welfare- Bentham Criteria, Pareto Optimality Criteria, Kaldor-Hicks Compensation Criterion.

**Unit – II** Economic Theory of Environmental Issues - The Theory of Environmental Externalities, Accounting for Environmental Cost, Internalizing Environmental Cost, Positive Externalities. Welfare Analysis of Externalities - Property Rights and The Environment. Common Property Resources and Public Goods - Common Property, Open Excess and Property Rights, Market Failure and Public Goods, Social choice of optimum pollution, Pigovian Taxes and subsidies, Maximization of Social Welfare Under Perfect Competition.

**Unit – III** Population, Agriculture and The Environment - Population and the Environment- Demographic Transition and Environment, Population Growth and Economic Growth, Population Policy for the 21st Century, Agriculture, Food and Environment, Sustainable Agriculture for the Future, Environment and Neo-Classical Model of Natural Resources, Energy and Resources.

**Unit – IV** Ecological Economics, National Income and Environmental Accounting - Ecological Economics Basic Concept, Natural Capital and Accounting for Changes in Natural Capital, Macro Economic Scale, Model of Economic and Ecological System. National Income and Accounting - Natural Capital, System of Environment and Economic Accounts (SEEA).

**Unit – V** Environmental Value and Methods - Use Value, Option Value and Non Use Value, Cost Benefit Analysis, Methods of environmental valuation- Hedonic Pricing. Household Production Function, Travel Cost Method, Averting Behavior Approach, Contingent Valuation Method, International Carbon Tax. Environment and W.T.O.

**Reference**

1. Madhu Raj – Environmental Economics.
2. Steve Baker – Environmental Economics.
3. D.W. Pearce – Environmental Economics.
4. Bauriol, W.J. and W.E. Oates. (1988): The Theory of Environmental Policy, (2nd Edition), Cambridge University Press, Cambridge.
5. Thomas and Callan (2009): Environmental Economics.
6. Charles D. Kolstad (2005): Environmental Economics, Oxford University Press.
7. Brian Roach, Jonathan M. Harries and Anne Marie Codur (2015): Microeconomics and the environment, Global Development and Environment Institute, Tufts University, Medford.
8. Jonathan M. Harries and Anne-Marie Codur (2004): Macroeconomics and the environment, Global Development and Environment Institute, Tufts University, Medford.



## SEMESTER- III

## DEMOGRAPHY

### Paper – V

- Unit – I Demography – Meaning and Importance, Theories of Population – Theory of Optimum Population and Theory of Demographic Transition. Measures of Population Change and Distribution – Rate of Population Change and Distribution, Measures of Degree of Concentration of Population – Lorenz Curve and Gini Concentration Ratio.
- Unit – II Migration – Kinds and Factor Affecting of Migration, Hurdles of Migration, Measurement of Internal Migration, Migration Rates and Ratio. Urbanization- Factors Influencing Urbanization and Effects of Urbanization, Population and Economic Development. Human Resource Development in India.
- Unit – III Mortality – Meaning and Sources of Mortality Data, Causes of High Death Rate in India, Trends in Death Rate in India, Measurement of Mortality Based on Death Statistics, Crude Death, Specific Death Rate, Infant Mortality Rate and Standardized Death Rate, Child Mortality Rate, Maternal Mortality Rate, Life Table – Functions and Construction of Life Table. Problems Related to Death Rates and Life Table.
- Unit – IV Fertility– Meaning, Causes of High Birth Rate in India, Trends in Birth Rate in India, Measurement of Fertility and Reproduction – Crude Birth Rate, General Fertility Rate, Age- Specific Fertility Rate, Total Fertility Rate. Gross Reproduction Rate and Net Reproduction Rate. Problems Related to Fertility and Reproduction Rates.
- Unit – V Women Empowerment- Economic Status, Women in Decision Making, Women and Labour Market; Women Work Participation: Concept and Analysis of Women's Work Participation, Structure of Wages across Regions and Economic Sectors, Determinants of wage Differentials, Gender and Education.

### Text Books

1. Agrawal, S. N.: India's Population Problems, Tata Mc-Graw Hill co. Bombay.
2. Bogue, D. J.: Principles of Demography, Honwiley, New York.
3. Sinha, V. C. and Pushpa Sinha: Principles of Demography, Mayur Paper backs.
4. Mishra, Jai Prakash, Demography: Sahitya Bhawan Publications, Agra.
5. Pathak, K. B. and F. Ram.: Techniques of Demographic Analysis, Himalaya Publishing House.
6. Jhingan, M. L. and others: Demography, Vrinda Publications (P) Ltd.
7. Srinivasan, K.: Basic Demographic Techniques and Applications, Sage Publication.

### Reference Books

1. Census India SRS Bulletins, Registrar General of India, Govt. of India, 2011
2. Rural-Urban distribution *Census of India: Census Data 2001: India at a glance >> Rural-Urban Distribution*. Office of the Registrar General and Census Commissioner, India. Retrieved on 2008-11-26.
3. Number of Villages *Census of India: Number of Villages* Office of the Registrar General and Census Commissioner, India. Retrieved on 2008-11-26.
4. Urban Agglomerations and Towns *Census of India: Urban Agglomerations and Towns*. Office of the Registrar General and Census Commissioner, India. Retrieved on 2008-11-26.
5. Preston, S.H.(1976):Family Sizes of Children and Family Sizes of Women. *Demography* 13(1): 105-114.
6. Pritchett, L.H. (1994). Desired Fertility and the Impact of Population Policies. *Population and Development Review* 20(1): 1-55.



**SEMESTER - IV**  
**ECONOMICS OF DEVELOPMENT AND PLANNING**  
**Paper – I**

- Unit – I      Economic Planning; Objectives, Achievements and Failures of Indian Plans, Resource Mobilization in Indian Plans, Strategy of Indian Plan. Saving, Capital Formation and Overall Growth Rate, Twelfth Five Year Plan (2012-17), Achievement of Eleventh Five Year Plan.
- Unit – II      Theories of Development:- The Marxian Model, The Schumpeterian Model, Keynesian Theory of Development, Rostow's Stages of Economic Growth.
- Unit – III     Approaches to Development:- Arther Lewis Model of Unlimited Supply of Labour, Ranis & Fie Model, Leibenstein's Critical Minimum Effort thesis, The Big push theory.
- Unit – IV      Development Models:- The doctrine of Balanced Growth, the concept of Unbalanced Growth, The Limits to Growth Model, Myrdal's theory of Circular Causation.
- Unit - V      Investment Criteria in Economic Development; The social Marginal Productivity Criteria, The capital Turnover Criteria, The Re-investment Criterion, Time Series Criterion, the Choice of Techniques.

**Text books**

1. Jhingan, M.L. (2003): The Economics of development & planning, Vrinda publication pvt. Ltd.
2. Shinghai, G.C. & Mishra, J.P. (2013): Macro Economic Analysis, Sahitya bhawan publication Agra.
3. Mishra, J.P. (2012): Economics of Growth and Development, Sahitya bhawan publication Agra.

**Reference Books**

1. Todaro, M.P. (1996) (6<sup>th</sup> edition): Economic Development, Longman London.
2. Solow, R.M. (2000): Growth Theory An Exposition, Oxford University Press, Oxford.
3. United Nations, Human development Department report 2005.
4. Behrman, S. and T.N. Shrinivasan (1995): Hand book of Development Economics, Vol 1, 2 & 3, Elsevier; Amsterdam.
5. Ghatak, S. (1986): An introduction to development Economics, Allen & elnein, London.
6. Sen, A.K. (Ed.) 1990 growth Economics, Penguin, Harmondsworth.
7. Dasgupta, P.A.K. Sen and S. Marglin (1972): Guidelines for project Evaluation, UNIDO, Vienna,
8. Mehrotra, S. and J. Richard (1998): Development with a Human Face, Oxford University Press New Delhi.



**SEMESTER- IV**  
**INTERNATIONAL ECONOMICS**  
**Paper – II**

- Unit – I Foreign Trade and Economic Development, The Theory of Regional Blocks- Customs Union, Static and Dynamic Effects of a Customs Union and Free Trade Area, Rational of Economic Progress of SAARC, ASEAN, IBSA and BRICS.
- Unit – II Regionalism of European Union, The Euro-Dollar Market, NIEO, WTO- Functions of WTO, Multilateralism and WTO, TRIPS, TRIMS, Agriculture, Market- Access, Textile Clothing, Patent Rights, Ministerial Conferences of WTO, UNCTAD.
- Unit – III Theory of Short Term & Long Term Capital Movement and International Trade– Port Folio Investment and International trade, FDI and International Trade, Merits & Demerits of Long Term Capital Movement in International Trade, Factors Affecting International Capital Movement, The Transfer Problem, Optimum Currency Area, Global Financial Crises.
- Unit – IV International Monetary System, International Liquidity, IMF, World Bank, The World Bank Group, ADB, Foreign Capital in India.
- Unit – V International Organisations- G-20, G-15, BIMSTEC, OPEC, NAFTA, OECD, Working and Regulations of MNCs in India.

**Reference:-**

1. Bhagwati, J. (Ed).(1981): International Trade, Selected Readings, Cambridge, University press, Massachusetts.
2. Carbough, R. J. (1999): International Economics, International Thompson Publishing, New York.
3. Chacholiades, M. (1990): International Trade: Theory and Policy, McGraw Hill, Kogakusha, Japan.
4. Dana, M.S. (2000): International Economics: Study Guide and Work Book, (5<sup>th</sup> Edition), Routledge Publishers, London.
5. Dunn, R. M. And J. H. Mutti (2000): International Economics, Routledge, London.
6. Kenen, P. B. (1994): The International Economy, Cambridge University Press, London.
7. Kindleberger, C. P. (1973): International Economics and International Economic Policy A Reader, McGraw Hill International, Singapore.
8. Krugman, P. R. and M. Obstfeld (1994): International Economics: Theory and Policy, Glenview, Foresman.



**SEMESTER- IV**  
**PUBLIC ECONOMICS**  
**Paper – III**

- Unit – I      Role of Public Finance in Economic Development, Major Fiscal Function, Concept of Social Goods. Fiscal Federalism in India, Principles of Fiscal Federalism, Vertical and Horizontal Imbalances.
- Unit – II      Federal Finance– Principle of Federal Finance in India, Centre–State Financial Relation, Resource Transfer From Centre to States, Gadgil's Formula. Fourteen Finance Commission.
- Unit – III      Indian Tax System:- Salient Features, Merits, Demerits, Measures for improvement of Indian Tax system Government measures for improvement:- Taxation enquiry Commission (1953-54), Wanchoo committee, Jha Committee, Kelkar Committee Report, Chelliah Committee Recommendations for reforming the taxation system.
- Unit – IV      Analysis of Centre & Chhattisgarh Govt, Budget. Taxable and Non Taxable Income of Chhattisgarh. Performance of the Chhattisgarh government budget.
- Unit – V      Financial Responsibilities and Budget Management Act. Structure and Growth of Public Expenditure in Chhattisgarh, Revenue Expenditure and Capital Expenditure. Plan & Non Plan Expenditure in Chhattisgarh.

**Text Books**

1. Lekhi, R.K.(2014): Public Finance, Kalyani Publication, Ludhiana New Delhi.
2. S.K.Singh,(2013): Principal of Public Finance Sahitya Bhavan Publication, Agra.
3. Pant, K.C. (2012): Public Finance
4. Sinha, V.C.(2013) : Public Finance and Economic, Sahitya Bhavan Publication.

**Reference Books**

1. Government of India (1992), reports of the Tax Reforms Committee – Interim and Final (Chairman : Raja J. Chelliah).
2. Chelliah, Raja J. et. Al (1981): Trends and issues in India's Federal Finance, NIPFP. New Delhi.
3. Peacock, A and G.K. Shaw (1976): The Economic Theory of Fiscal Policy, George Allen and Unwin, London.
4. Sahni, B.S. (Ed.) (1972): Public Expenditure Analysis: Selected Readings, Rotherdam University Press.
5. Jha, R. (1998): Modern Public Economics, Routledge, London.
6. Musgrave, R.A. and P.B. Musgrave (1976): Public Finance in Theory and Practice, McGraw Hill, Kogakusha, Tokyo.
7. Cornes, R. and T. Sandler (1986): The Theory of Externalities, Public Goods and Club Goods, Cambridge University Press. Cambridge.
8. Economic Survey Centre and State (2014-15)
9. 14<sup>th</sup> Finance commission Report-2015
10. Central Govt. and State Govt. Budget- 2015





**SEMESTER- IV**  
**ECONOMICS OF SOCIAL SECTOR**  
**Paper – IV**

**Unit-1** Pollution- classification of pollution, Air, Water and Land Pollution, Cause & Effects of pollutant. Problem of solid waste management, Pollution control strategies, Equi Marginal law of pollution, Global environmental issues- Climate change, Global warming, Green House Effect, Ozone depletion.

**Unit-2** Development and Environment: Relation between development & environmental stress, The Environmental Kuznets Curve, The concept of Sustainable Development, Indicators of sustainability, Measuring sustainable development, Green Economy.


**Unit-3** Economics of Resources- Classification of resources, Renewable & Non-renewable resources, Optimum use of resources. Land resources, Forest resources, Social forestry, Peoples participation in the management of Common & forest land. Energy- Sources of energy, energy efficiency & environment, Alternative sources of energy.

**Unit-4** Economics of Education- Expenditure on education, Productive expenditure on education, Productivity of education, the return of education, Human capital, Human capital Vs Physical capital, Educational reforms and Right to Education Act.

**Unit-5** Health Economics- Determinants of health care, Malnutrition. The concept of Human life, Inequalities in health- class & gender, Perspective HDI, GDI, GEM and HPI.

**Reference**

1. Bauriol, W.J. and W.E. Oates (1988): The Theory of Environmental Policy, (2nd Edition), Cambridge University Press, Cambridge.
2. Berman, P. (Ed.) (1995): Health Sector reform in Developing Countries: Making health development sustainable, Boston: Harvard Series on Population and International health.
3. Blaug, M. (1972) : Introduction to Economics of Education J Penguin, London.
4. Bromely, D.W. (Ed.) (1995): Handbook of Environmental Economics, Blackwell, London.
5. Cohn, E. and T. Gaske (1989): Economics of Education, Pergamon Press, London.
6. Fisher, A.C. (1981): resource and Environmental Economics, Cambridge University Press, Cambridge.
7. Hanley, N.J.F. Shogern and B. White (1997): Environmental Economics in Theory and Practice, Macmillan.
8. Hussen, A.M. (1999) : Principles of Environmental Economics, Routledge. London.
9. Jeroen, C.J.M. van den Bergh (1999): Handbook of Environmental and Resource Economics, Edward Elgar Publishing Ltd. U.K.
10. Thomas and Callan (2009): Environmental Economics.





## **SEMESTER- IV**

### **Paper – V**

The MA students in the fourth semester would be required to appear for a Viva-Voce examination before the external examiner appointed by the University for marks of 100(Hundred). Viva-Voce will be conducted by the Department as per the rules and regulations of the University.

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*W. C. S.*

*Dr. K. S.*  
26/8/19

*Dr. S. S.*  
*26/8/19*

# **HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**

Website - [www.durguniversity.ac.in](http://www.durguniversity.ac.in), Email - [durguniversity@gmail.com](mailto:durguniversity@gmail.com)



## **SCHEME OF EXAMINATION & SYLLABUS of M.Sc. (Zoology) Semester Exam UNDER FACULTY OF SCIENCE Session 2021-22**

**(Approved by Board of Studies)  
Effective from June 2021**

**HEMCHAND YADAV VISHWAVIDYALAYA, DURG**  
**CHHATTISGARH**  
**SYLLABUS FOR 2021-22**  
**M. Sc. ZOOLOGY**

Semester	Paper	Title	External marks	Internal marks	Credit
<b>First DEC, 2017</b>	I	Biosystematics, Taxonomy and Biodiversity	80	20	4
	II	Structure and Function of Invertebrates	80	20	4
	III	Population Genetics and Evolution	80	20	4
	IV	Tools & Techniques in Biology	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
<b>Second MAY-JUNE, 2018</b>	I	Molecular Cell Biology and Biotechnology	80	20	4
	II	General Physiology and Endocrinology	80	20	4
	III	Development Biology	80	20	4
	IV	Quantitative Biology and Computer Application	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
<b>Third DEC, 2018</b>	I	Comparative Anatomy of Vertebrates	80	20	4
	II	Animal Behavior	80	20	4
	III	Environment Physiology and Population Ecology	80	20	4
	IV	Immunology and Parasitism	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2

*S. Chandra*

*R. K.*

*V. Aravind*

*S. K.*

*27.8.21*

<b>Fourth MAY- JUNE, 2019</b>	I	Biochemistry	<b>80</b>	<b>20</b>	4
	II	Neurophysiology	<b>80</b>	<b>20</b>	4
<b>Optional papers (Group I)*</b>					
	I	Fish (ichthyology) structure and function	<b>80</b>	<b>20</b>	4
	II	Cell biology	<b>80</b>	<b>20</b>	4
	III	Entomology	<b>80</b>	<b>20</b>	4
	IV	Wild life conservation	<b>80</b>	<b>20</b>	4
	V	Biology of Vertebrate immune system	<b>80</b>	<b>20</b>	4
<b>Optional paper (Group II)*</b>					
	I	Pisci culture and economic importance of fishes (Ichthyology)	<b>80</b>	<b>20</b>	4
	II	Cellular organization and molecular organization	<b>80</b>	<b>20</b>	4
	III	Applied entomology	<b>80</b>	<b>20</b>	4
	IV	Environment and Biodiversity conservation	<b>80</b>	<b>20</b>	4
	V	Molecular endocrinology and reproductive technology	<b>80</b>	<b>20</b>	4
	LC-I	Lab Course I (Based on paper I & II)	<b>80</b>	<b>20</b>	2
	LC-II	Lab Course I (Based on paper III & IV)	<b>80</b>	<b>20</b>	2
<b>Total</b>			<b>1920</b>	<b>480</b>	<b>80</b>

\* Student has to choose one optional paper (special paper) from group I & group II.

\* Each theory paper will have 5 questions of equal marks. First question will encompass all the four units without any internal choice, whereas rest questions will be unit wise with internal choice.

UGC guideline should be followed strictly for animal dissections. Animal dissections can be performed by using alternate methods like clay modeling.

\*\*The respective teachers on each paper will ensure the internal evaluation by a class test and a seminar/poster presentation of 10 marks each and submit the foil and counter foil to the HOD by the end the activity.

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# M. Sc. ZOOLOGY FIRST SEMESTER

## PAPER – I

### BIOSYSTEMATICS AND BIODIVERSITY

(There will be 5 questions of equal marks. First question will encompass all the four units without any internal choice, whereas rest questions will be unit wise with internal choice).

#### UNIT-I

##### Definition and basic concepts of biosystematics and taxonomy

- Concept of taxonomy
- Chemotaxonomy
- Cytotaxonomy
- Molecular taxonomy and mapping of phylogenetic tree

#### UNIT-II

##### Dimensions of speciation and taxonomic characters

- Species, types of species and mechanism of speciation.
- Species concepts and species category.
- Theories of biological classification.
- Taxonomic characters and different kinds.

#### UNIT-III

##### Procedure keys in taxonomy

- Taxonomic procedures-taxonomic collections, preservation, curation
- Taxonomic keys-different kinds of taxonomic keys, their merits and demerits.
- Process of typification and different Zoological types.
- International code of Zoological Nomenclature (ICZN)

#### UNIT-IV

##### Biodiversity

- Concept and types of Biodiversity
- Methods of study of terrestrial, aquatic and aerial biodiversity
- Significance of wetland biodiversity
- Conservation methods of biodiversity
- Climate change and biodiversity
- Biosphere reserves
- Threat to biodiversity and IUCN Red list
- Hot spots of Biodiversity- Biodiversity legislation of India, USA, UK, Canada.

*Sahain*

*Raj*

*V. Aravind*

*27.8.21*

*Shruti*

## **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

Biosystematics & Taxonomy by Dr. R. C. Tripathi, University Book House, Jaipur

Theory & Practice of Animal Taxonomy by V.C. Kapoor, 5th Edition Oxford & IBH Publishing Co.

Principle of Animal Taxonomy by G.G. Simpson, Oxford & IBH Publishing Co.

Elements of taxonomy by Earnst Mayer

Biodiversity. E.O. Wilson, Academic Press Washington

The Biology of Biodiversity by M. Kato, Springer

Molecular Markers - Natural History & Evolution by J.C. Avise

Shubain

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Uttarabur

27.8.27

Stone

# M.Sc. ZOOLOGY FIRST SEMESTER

## PAPER-II

### STRUCTURE & FUNCTION OF INVERTEBRATES

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### UNIT-I

##### Organization of coelom

- Acoelomates and Pseudocoelomates
- Coelomates: Protostomia and Deuterostomia.

##### Locomotion

- Flagellar and ciliary movement in Protozoa.
- Hydrostatic movement in Coelenterata, Annelida and Echinodermata.

#### UNIT-II

##### Nutrition and Digestion

- Patterns of feeding and digestion in Protozoa
- Filter feeding in polychaeta.

##### Respiration

- Organs of respiration: Gills, lungs and trachea.
- Respiratory pigments.

#### UNIT-III

##### Excretion

- Organs of excretion.
- Excretion and osmoregulation

##### Nervous System

- Primitive nervous system: Coelenterata and Echinodermata.
  - Advanced Nervous system: Arthropoda (Crustacea and insecta) and Mollusca (Cephalopoda)

#### UNIT-IV

- Invertebrate larvae
- Larval forms of free-living and parasitic invertebrates
- Minor Phyla
- Organization and general characters of (Ctenophore, Rotifera, Ectoprocta)

*S. S. Saini*

*R. K.*

*V. Aravind*

*27.8.22*

*S. S. Saini*

### **SUGGESTED READING MATERIALS (ALL LATEST EDITION)**

- Invertebrate Structure and function, E.J.W. Barrington English language Book society UK.
- Invertebrate Zoology: Robert Barnes, IV Edition, Holt Saunders International, Edition Japan.
- The Cambridge Natural History Volume 1 -9.S F Harmer, A.E. Shipley, Todays & Tomorrows Book agency, New Delhi India.
- A Text book of Zoology Invertebrate Parker Hasvell, Marshall & Williams. ITBS Publishing & Distributers, Delhi
- The Invertebrates Vol. 1 –9, Libbic Henrietta Hyman, McGraw Hill Book Company

S. Abhinav

R. K.

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D. S. S. S.



**M. Sc. ZOOLOGY FIRST SEMESTER**  
**PAPER-III**  
**POPULATION GENETICS & EVOLUTION**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

**UNIT-I**

- Concepts of evolution and theories of organic evolution:  
Lamarckism, Darwinism and Synthetic theory of evolution
- Evidences of evolution: anatomical, embryological, palaeontological, physiological and Bio-chemical

**Unit-II**

- Hardy-Weinberg law of genetic equilibrium
- Detailed account of destabilizing forces.
- Natural selection
- (i) Mutation                      (ii) Genetic drift                      (iii) Meiotic drive
- Calculation of genotypic frequency
- Calculation of allelic frequency
- Molecular variation

**UNIT-III**

- Patterns and mechanisms of reproductive isolation
- Phylogenetic and biological concepts of species
- Gene Evolution, Evolution of gene families
- Factors affecting human disease
- Genetic alterations and human diseases

**UNIT-IV**

- Origin of higher categories
- Micro-and Macro-evolution
- Evolution of horse, elephant, camel, man
- Ethical legal and social issues in human genetics.

*S. S. Jain*

*R. K.*

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*S. S. Jain*

## **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- Gene & Evolution by Jha A.P. John Publication, New Delhi
- Evolution & Genetics by Merrel D.J. Holt Rinchert & Wiston INC.
- The Genetics & Origin of Species by Dobzhansky, Columbia University Press.
- Evolution by Dobzhansky, Ayala F.J., Stebbins G.L. & Valentine J.M.  
Surjeet Publication New Delhi.
- Species Evolution - The Role of Chromosomal Change  
King M. Cambridge University Press. Cambridge
- A Primer of Population Genetics  
Hartl D.L. Suinaer Associates INC, Massachusetts
- Evolutionary Genetics  
Smith J.M. Oxford University Press, New York
- Evolutionary Biology
- Futuyama D.J. Suinaer Associates INC publishers, Dunderland
- Evolution  
Strikberger M.W. Johns & Bartett Publishers, Boston London

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# M. Sc. ZOOLOGY FIRST SEMESTER

## PAPER-IV

### TOOLS & TECHNIQUES IN BIOLOGY

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### UNIT-I

- Principles and Application of : -
  - Ultracentrifugation
  - Electrophoresis
  - Chromatography (various types)
  - Colorimetry and spectrophotometry
  - Flow cytometry.

#### UNIT-II

- Principles and Application of : -
  - Light Microscopy and micrometry
  - Phase Contrast microscopy
  - Interference microscopy
  - Fluorescence microscopy
  - Transmission Electron microscopy.
  - Scanning Electron microscopy.

#### UNIT-III

- ELISA
- PCR
- Biological assays-in vivo and invitro
- Principles of cytological and cytochemical techniques
- Fixation: chemical basis of fixation by formaldehyde, glutaraldehyde, chromium salts, mercury salts, osmium salts, alcohol and acetone
- Chemical basis of staining of carbohydrate, protein lipids and nucleic acids.
- Principle and techniques of

#### UNIT-IV

- Nucleic acid hybridization
- Sequencing of proteins and nucleic acids
- Cryopreservation
- Chromosomal isolation and preparation of Cladogram
- Separation of DNA from animal/human sample

*S. Abhinav*

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*V. Aravind*

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*S. R. S. S.*

## **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- Introduction to Instrumental Analysis by Robert Braun, McGraw Hill International Edition
- A biologist guide to principles and techniques of practical biochemistry
- K Wilson and K. H. Goulding , ELBs Edition
- Instrumentation by Upadhyay and Nath, Meerut Publications
- Instrumentation and Techniques by R.C. Bajpayee, Himalayan Publications

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**M. Sc. ZOOLOGY FIRST SEMESTER**  
**LAB COUSE-I**  
**(PRACTICAL BASED ON PAPER I & II)**

**Biosystematics and Taxonomy**

- Study of biodiversity among various invertebrates and vertebrates (Listing of all the animals found in and around your house and also try to find out their Zoological names).
- Collection and preservation of insect species.
- Visits to a local animal park or zoo to identify and study the captive fauna and preparation of report.
- Study of adaptive characteristics of various invertebrates and vertebrates in different climate.
- Taxonomic key formation and conversion.
- Study of biodiversity in grassland and pond water and computation of index
- Other exercise related to theory paper

**Structure and Function of Invertebrates**

- Identification, and taxonomic determination,
- Classification and study of distinguishing features of important representatives from various groups (Protozoa to Hemichordata, Ciliary Feeders).
- Study of permanent prepared slides (from Protozoa to Hemichordata).
- Model preparation and study of various organ system of Invertebrates, viz- Digestive, Nervous, Respiratory, reproductive and vascular systems.
- Study of various adaptations among insect fauna
- Collection and study of soil nematodes.
- Collection and study of Apterygota.
- Permanent preparations of different materials to be provided for study.

**EXAMINATION SCHEME**

Based on paper I	35 marks
Based on paper II	35 marks
Viva	10 marks
Sessional (Internal)	20 mark
<b>Total</b>	<b>80+20 (100)</b>

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**M. Sc. ZOOLOGY FIRST SEMESTER  
LAB COUSE-II  
(PRACTICAL BASED ON PAPER III & IV)**

**Population genetics and evolution**

- Preparation of human chromosomes map, demonstration of chromosomal deficiencies.
- Study of model-based pedigree analysis.
- Study of evolution of horse and human by model or skeletal evidence
- Study of evolution through homologous and analogous organs.
- Calculation of Body mass index
- Morphometric analysis

**Tools and techniques in biology: Principles and use of following instruments for different techniques**

- Analysis of electrical conduction using conductivity meter
- Analysis of pH of sample by using pH meter
- Analysis of chemicals /Biochemicals using colorimeter /spectrophotometer
- Separation of compound using chromatography
- Separation of molecules using centrifuge
- Separation of DNA/protein using electrophoresis
- Identification of hormones or the compound using ELISA
- Amplification of Nucleic acid using PCR

**EXAMINATION SCHEME**

Based on paper III	35 marks
Based on paper IV	35 marks
Viva	10 marks
Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

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**M. Sc. ZOOLOGY SECOND SEMESTER**  
**PAPER – I**  
**MOLECULAR CELL BIOLOGY AND BIOTECHNOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

**UNIT-I**

- DNA replication-Enzymes of DNA replication, Mechanism of DNA replication, Regulation of DNA replication.
- DNA damage and repair, causes consequences of DNA damage
- Mutation- Mutagen, molecular basis of mutation & types of mutation.
- DNA repair- Direct, Excision, Mismatch, Recombination and SOS repair.

**UNIT-II**

- Transcription- RNA polymerase, prokaryotic and eukaryotic mechanism, post transcriptional modification
- Translation- Process of translation, regulation and post translation modification
- DNA recombination-types and models of homologous recombination, biological importance of recombination
- Maintenance of DNA sequence role of methylation, phosphorylation, acetylation and deacetylation.

**UNIT-III**

- cDNA library- Mechanism and applications
- Molecular markers- RAPD, RFLP, AFLP, SSR etc.
- Genome sequencing- techniques and applications, human genome projects, ethical, legal and social issues
- Gene therapy – gene delivery, gene replacement, augmentation and application

**UNIT-IV**

- Application of molecular biology in health sectors.
- Application of molecular biology in agricultural sector
- Application of molecular biology in environment
- Embryonic stem cell technology and its application

*S. Abhinav*

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## **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- MOLECULAR CELL BIOLOGY by Lodish, W.H. Freeman & Co. New York
- Lehninger's PRINCIPLES OF BIOCHEMISTRY, Fourth Edition - David L [1]. Nelson, Michael M. Cox
- MOLECULAR CELL BIOLOGY by Lodish M. Baltimore, Scientific American books
- ESSENTIALS OF CELL & MOLECULAR BIOLOGY by Roberties & Roberties, Halt Saunders International Edition.
- CELL & MOLECULAR CELL BIOLOGY Gerald Karp, Willey & Sons Co.
- MEDICAL CELL BIOLOGY by Flickinger E.J. Brown J.C. Halt Saunders International Edition.
- CELL BIOLOGY by Powar C.B. Himalaya Publishing House

*S. Abain*

*R. K.*

*V. Arabur*

*27.8.27*

*D. Stone*



# **M. Sc. ZOOLOGY SEMESTER – II**

## **PAPER – II**

### **GENERAL PHYSIOLOGY AND ENDOCRINOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### **UNIT-I**

##### Digestion and Metabolism

- General organization of alimentary canal
- Mechanism of digestion
- Mechanism of absorption
- Gas Exchange and Acid-base Balance
- Oxygen and Carbon dioxide transport in blood
- Structure and Significance hemoglobin
- Regulation of body pH
- Thermoregulation and Cold Tolerance
- Heat balance and exchange
- Endotherms Vs Ectotherms
- Torpor, hibernation and aestivation

#### **UNIT-II**

##### Muscle Function and Movement

- Anatomy of muscle
- Mechanism of muscle contraction
- Regulation of muscle contraction
- Nervous System
- Neurons and membrane excitation
- Resting Membrane & Action Potential
- Nerve Impulse
- Synapses and neurotransmitters
- Synaptic transmission
- Sensory Transduction
- Auditory receptors
- Chemoreceptor: taste and smell
- Vision and Photoreception – Photo Chemistry of vision

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### UNIT-III

#### Endocrinology

- Structure and functions of endocrine glands (Pituitary, pineal, pancreas, adrenal, thyroid etc.)
- Some New Hormones : Ghrelin, Leptin, Amylin, Renin, ANF.
- Biosynthesis of hormones (thyroid and gonads)
- Hormones and Reproduction -Pregnancy, Parturition, Lactation
- Hormonal Control - Estrous Cycle, menstrual cycle, Menarche Puberty Menopause

### UNIT-IV

- Mechanism of Hormone action
- Hormone receptors
- Endocrine disruptors
- Hormones & Homeostasis

### **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- Comparative vertebrate Endocrinology – by Gorbman & Bern
- Medical Physiology by Guyton and Hall
- Physiology by Antonio Lucanio
- Human Physiology – by Dr. C. C. Chatterjee
- Comparative Endocrinology – by Barrington
- Applied Animal Endocrinology – by Squires
- Endocrinology – Basic & Clinical principles - by Melmed & Cohn
- T.B. of Endocrinology by Griffin.
- Endocrinology by Hardy.

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# **M. Sc. ZOOLOGY SEMESTER II**

## **PAPER – III**

### **DEVELOPMENT BIOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### **UNIT-I**

##### Oogenesis

- Differentiation and growth of oocytes.
- Organization of egg cytoplasm and egg cortex.
- Vitellogenesis
- Spermatogenesis
- Differentiation and ultra-structure of sperm
- Spermatocytogenesis Spermiation

#### **UNIT-II**

##### Fertilization

- Biological role of fertilization.
- Basic requirements of fertilization.
- Activation of egg metabolism
- Capacitation
- Biochemistry of fertilization
- Cleavage
- Characteristics and mechanisms of cleavage, Egg types

#### **UNIT-III**

##### Formative movements

- Fate maps - Organogenesis
- Utility and comparative topographical relationship of the Presumptive areas in early embryos of- Amphioxus, Fishes, Amphibian and Birds
- Organogenesis of eye, heart and brain

#### **UNIT-IV**

- Differentiation
- Cell and tissue interactions in development
  - Primary embryonic induction
  - Competence
  - Concept of organizer
- Metamorphosis
- Teratology

*S. Abhinav*

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*V. Aravind*

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## **SUGGESTED READINGS MATERIALS**

- Animal Gametes – Vishmanath, Asia Publishing House
- Foundation Of Embrology –Bradley M.Patten, McGrow Publication
- Fertilization In Animals – Brain Dale, Arlond Heiniman, Gulab Vazerani Publication
- Development Biology - N.J. Berril, Tata McGraw Hill Publication N. Delhi
- Embryology of Vertebrates -Nelson

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# **M. Sc. ZOOLOGY SEMESTER - II**

## **PAPER – IV**

### **QUANTITATIVE BIOLOGY AND COMPUTER APPLICATION**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### **UNIT-I**

Introduction to digital computer and application

- Basic knowledge of hardware and software
- CPU (Central Processing Unit)
- Input and Output devices
- Auxiliary storage system
- Operating system and Binary number system

#### **UNIT-II**

Computer application

- Introduction to MS Office
  - Word
  - Excel
  - Power point
- Computer application in biostatistics
- Simple computation and elementary knowledge of flow chart

#### **UNIT-III**

- Organization of data
- Presentation of data
- Measures of central tendency
- Measures of dispersion

#### **UNIT-IV**

Tests of significance

- Chi-square test
- Student's t-test
- Analysis of Variance
- Regression
- Correlation
- Probability

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## **SUGGESTED READING MATERIALS**

- Bataschelet. E. Introduction to mathematics for site scientist springer-verlag, berling
- Lenderen D. Modelling in behavioral ecology. Chapman & Hall London U.K.
- Snedecor, G.W. and W.G. Cochran: statistical methods, Affilited East, West Press New Delhi (Indian ed.)
- Muray , J.D. Methamatical Biology, Springer Verlag Berlin Pelon, E.C. The interpretation of ecological data :
- A promer on classification and ordination. lewis . Biostatics
- B.K. Mahajan Methods in Biostatics
- J.D. Murrey Mathematical Biology Georgs & Wilians Starticalmethod

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**M. Sc. ZOOLOGY SEMESTER – II**  
**LAB COURSE – I: (PRACTICAL BASED ON PAPER I & II)**

• **Molecular biology and Biotechnology**

- Isolation of DNA/RNA
- Study of mitochondria from buccal epithelium by staining with supravital stains.
- Study of cell division mitosis/meiosis by squash and smear preparation of root tip and cockroach/grasshopper testis.
- Study of giant chromosome in the salivary gland of Chironomous larvae or Drosophila.
- Study of Barr body and human chromosome.
- Culture and study of drosophila.
- Study of micronuclei
- Separation of mitochondria
- Organelles fractionation
- Electrophoresis separation of DNA
- RAPD, RFLP, AFLP

**General physiology and endocrinology**

- Estimation of RBC, hemoglobin, hematocrit/PVC, blood group and Rh factor blood clotting time.
- Determination of urea, glucose and ketone bodies in urine.
- Determination of bilirubin ALP, total protein, globulin
- Demonstration of osmosis.
- Study of histology of endocrine glands in different animal types through permanent slides and microtomy.
- Configuration of hormones by antigen-antibody test system.

**EXAMINATION SCHEME**

Exercise based on paper I	35 marks
Exercise based on paper II	35 marks
Viva	10 marks

Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

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## **M. Sc. ZOOLOGY SEMESTER – II**

### **LAB COURSE-II: (PRACTICAL BASED ON PAPER III & IV)**

#### **Development biology**

- Study of slides of development of frog.
- Study of development of Hen's egg, by cover glass window method, staining and mounting of blastodisc.
- Study of caudal regeneration in Teleost (Meal time effect).
- Study of embryological slides: spermatogenesis, oogenesis, histology of gonads.
- Study of effect of Na, K/urea on growth of fish fingerlings.
- Study of effect of thyroid hormone on metamorphosis of tadpole
- Other exercises related to theory paper

#### **Quantitative biology and computer application**

- Preparation of frequency tables and graphs.
- Calculation of standard deviation, variance and standard error of mean.
- Calculation of probability and significance between means using t-test, Chi-square test, ANOVA
- Calculation of correlation, regression and probability distribution.
- Computer software use for computational tasks, data presentation, design task and communication
- Other exercises related to theory paper.

### **EXAMINATION SCHEME**

Exercise based on paper III	35 mark
Exercise based on paper IV	35 mark
Viva	10 mark
Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

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# **M. Sc. ZOOLOGY SEMESTER - III**

## **PAPER-I**

### **COMPARATIVE ANATOMY OF VERTEBRATES**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise) with internal choice.

#### **UNIT-I**

- Origin of vertebrates
- Origin of fish & Amphibian.
- Origin of reptiles, Birds and Mammals.
- Classification of Vertebrates and specialty of respective classes
- Amphibians, Gymnophiona, Neotony, Parental care
- Reptiles – Extinct reptiles
- Birds – Palate in Birds
- Mammals. – New world and old-world Monkeys

#### **UNIT-II**

- Comparative studies of Integument system in vertebrates
- Comparative study of derivatives of integuments in vertebrates
- Skeletal system in vertebrates.
- Comparative study of Jaw suspensorium,
- Comparative study of Limbs and Girdles in vertebrates

#### **UNIT-III**

- Comparative study of Respiratory system among vertebrates.
- Comparative study of respiratory pigments among vertebrates
- Comparative study of heart in vertebrates
- Comparative study of Aortic arch in vertebrates

#### **UNIT-IV**

- Comparative studies of digestive system in vertebrates
- Comparative study of brain among vertebrates.
- Comparative study of sense organs among vertebrates
- Comparative study of urinogenital system among vertebrates

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### **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- Vertebrate life :– William N. Ferland, F. Harvey pough, Tom J Gode, John B. Heiser, Collier MacNille International edition
- Chordate morphology :–Malcom Jollie, Reinhold Publishing Corporation New York
- Chordate –Structure & Function :- Arnold G. Khage, B.E. Fry Johanson, Mc Millan Publishing Co. INC. New York
- Comparative Animal Physiology :-Orosser ,Satish Book Enterprises, Agra
- The Vertebrate Body :- Alfred Sherwood Romer, Vakils, Feffer & Simons Publications Ltd.

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# **M. Sc. ZOOLOGY SEMESTER – III**

## **PAPER-II**

### **ANIMAL BEHAVIOUR**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise) with internal choice.

#### **UNIT- I**

##### **Ethology**

- Historical perspectives of ethology
- Behavioural patterns
- Innate behaviour
- Biological rhythms
  - Types of biological rhythm
  - Biological clock

#### **UNIT- II**

##### **Communications**

- Auditory
- Visual
- Chemical

##### **Learning and Memory**

- Conditioning
- Habituation
- Reasoning
- Reproductive behaviour.

#### **UNIT-III**

##### **Orientation**

- Echolocation in bats
- Bird migration and navigation.
- Fish migration.
- Neural and hormonal control of behaviour

#### **UNIT-IV**

##### **Hormonal effect on behavioural patterns.**

- Social behaviour
- Social organization in insects and primates

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- Schooling in fishes and Flocking in birds
- Homing, territoriality, dispersal
- Altruism
- Host–parasite relation

### **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- ANIMAL BEHAVIOR – Mc Farland (English Language Book Society)
- ANIMAL BEHAVIOR – Arora M.P. (Himalaya Publishing House, Mumbai)
- ANIMAL BEHAVIOR - Reena Mathur (Rastogi Publications, Meerut)

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# **M. Sc. ZOOLOGY SEMESTER – III**

## **PAPER – III**

### **ENVIRONMENT PHYSIOLOGY AND POPULATION ECOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### **UNIT – I**

Population dynamics:

- Demography, life table, reproductive rates, reproductive values
- Population growth, exponential, non-overlapping
- Stochastic and time lag models of population growth
- Population density
- Population evolution
- Community dynamics: Characteristics, development and classification

#### **UNIT-II**

- Terrestrial Adaptation in vertebrates
- Aquatic adaptation in vertebrates
- Aerial adaptation in vertebrates
- Cave adaptations in vertebrates

#### **UNIT-III**

Stress Physiology

- Basic concepts of environmental stress and strain, Concept of elastic and plastic strain.
  - Stress avoidance, stress tolerance and stress resistance.
  - Acclimatization, acclimation and adaptation.
  - Endothermic and physiological mechanism of regulation of body temperature.

#### **UNIT -IV**

- Stress physiology in different conditions
  - Osmoregulation in aqueous and terrestrial habitats.
  - Physiological response to oxygen deficient stress.
  - Physiological response to body exercise.
  - Effect of meditation and yoga

*Shabir*

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**SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- ECOLOGY with special reference to animal & man by S. Charles, Kendeigh Prentice hall of India Pvt. Ltd. New Delhi
- ELEMENTS OF TROPICAL ECOLOGY by Yanney Ewusie (English language Book Society, Heine mann educational book publication)
- FUNDAMENTALS OF ECOLOGY by Odum P.
- ANIMAL PHYSIOLOGY, MECHANISM AND ADAPTATION - Eckert, R., W, H, freeman and Co.
- BIOCHEMICAL ADAPTATION - Hochachka, P.W, and Somero S.N, Princeton, New Jersey
- ANIMAL PHYSIOLOGY: ADAPTATION AND ENVIRONMENT.-Shiemidt Nielsen, Cambridge
- GENERAL & COMPARATIVE ANIMAL PHYSIOLOGY By Hoar W.S. Princeton Hall of India
- ENVIRONMENTAL PHYSIOLOGY by Willmer, P.G. Stone & Johanson I, Blackwell Science Oxford

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**M. Sc. ZOOLOGY SEMESTER – III**  
**PAPER – IV**  
**IMMUNOLOGY AND PARASITISM**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

**UNIT-I**

- Cells and organs of immune system
- Antigen and antibody structure
- Antigen-Antibody interaction
- Monoclonal antibody
- Primary and Secondary lymphoid organs

**UNIT-II**

- B-cell generation, activation and differentiation
- T-cell maturation, activation and differentiation
- T-cell receptors
- Complement system
- Cytokines

**UNIT-III**

- Major histocompatibility organ
- Cell mediated cytotoxic response
- Hypersensitivity reaction
- Autoimmune diseases
- Transplantation immunology
- Vaccine development

**UNIT-IV**

- Immune response in cancer, AIDS, SARS-Cov2
- Immune response to helminth parasite infection
- Immune response to protozoan parasite infection
- Immune response to bacterial infection
- Immune response to viral infection

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### **SUGGESTED READING MATERIALS**

- Immunology by Kuby, W.H. Freeman USA
- Fundamental of Immunology by W. Paul
- Essential Immunology by I.M. Roitt, ELBs Edition
- Immunology by Richard M. Hyde, Robert A. Patnode, A Wiley Medical Publications
- Reproductive Physiology by Gayton,

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**M. Sc. ZOOLOGY SEMESTER – III**  
**LAB COURSE-I: (PRACTICAL BASED ON PAPER I & II)**

- **Comparative anatomy of Vertebrates**
- Identification, classification and study of distinguishing features of important representatives, museum specimens and slides (Protochordates and Chordates)
- Comparative studies of integumentary and reproductive system of major vertebrate classes.
- Comparative study of embryos of fish, amphibia and aves.
- Comparative study of skull & jaw of vertebrates
- Comparative study of fins of fishes
- Other exercise related to theory paper

**Animal Behavior**

- To study the photo tactic response in earthworm or grain/pulse pest.
- To study the geotaxis behavior of earthworm.
- To study the food preference and cleaning behavior of housefly.
- To study the food preference in tribolium or grain/pulse pests.
- To study the web construction and habituation in spider.
- Estimation of body temperature and pulse rate on daily time scale.
- Estimate the time perception among various individuals at two different time points on daily time scale.
- Toxicological response of fish opercular and surfacing activity.

**EXAMINATION SCHEME**

Based on paper I	35 mark
Based on paper II	35 mark
Viva	10 mark
Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

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# **M. Sc. ZOOLOGY SEMESTER – III**

## **LAB COURSE-II: (PRACTICAL BASED ON PAPER III & IV)**

### **Immunology and Parasitism**

- Total and differential counting of leucocytes.
- Preparation of blood film & identification of cell
- Determination of agglutination reaction
- Study of permanent slides (for spotting); thymus, lymph nodes, spleen, bone marrow, blood cells, stages of cancer cells
- ODD test for antigen-antibody pattern
- DOT ELISA test
- Rocket Immuno electrophoresis
- Study of parasites in fish, birds and other vertebrates
- **Environmental Biology, Population ecology**
- Study of biotic community in a pond/grassland ecosystem.
- Study of population growth rate (curve) in protozoan culture.
- Population dynamics of *Tribolium* sp.
- Study of biogeochemical cycles by way of models.
- Visit to some natural habitats and manmade habitats to study the human impact on environment.
- Determination of heavy metals from water & soil, viz. As, Fluoride, cadmium, chromium, iron, lead etc.
- Determination of BOD from sewage samples
- Determination of COD from sewage sample
- Determination of dissolved oxygen from water sample
- Determination of total dissolved solid, conductivity and hardness of water sample.

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### SUGGESTED READING MATERIALS

- Immunology by Kuby, W.H. Freeman USA
- Fundamental of Immunology by W. Paul
- Essential Immunology by I.M. Roitt, ELBS Edition
- Immunology by Richard M. Hyde, Robert A. Patnode, A Wiley Medical Publications
- Reproductive Physiology by Gayton,
- Water analysis for fresh and waste water (Dissolve oxygen and chloride).
- Other exercises related to theory paper.

#### EXAMINATION SCHEME

Based on paper III	35 mark
Based on paper IV	35 mark
Viva	10 mark
Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

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# **M. Sc. ZOOLOGY SEMESTER – IV**

## **PAPER– I (Compulsory)**

### **BIOCHEMISTRY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise) with internal choice.

#### **UNIT-I**

- Amino acids-Structure and classification
  - Structure of proteins
  - Biosynthesis of amino acids
  - Catabolism of protein

#### **UNIT-II**

- Structure & classification of carbohydrate
- Metabolism of carbohydrate
- Structure & classification of lipid
- Biosynthesis of fatty acid

#### **UNIT-III**

- Vitamins
  - Water- and Fat-soluble vitamins,
  - Chemistry, occurrence and physiological role.
  - Enzymes Classification and nomenclature.
  - Mechanism of enzyme action
  - Kinetics of enzymes
  - Enzyme immobilization

#### **UNIT-IV**

- Vitamins- Structure and Classification
- Metabolism of nucleic acid
- Hormonal regulation of carbohydrate metabolism
- Hormonal regulation of protein metabolism
- Hormonal regulation of lipid metabolism

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## Suggested Reading

- Lehninger Principles of Biochemistry, Fourth Edition, David L. Nelson, Michael M. Cox  
Publisher: W. H. Freeman
- Biochemistry by Donald Voet, hardcover: 1616 pages, Publisher: Wiley; 3 edition
- Principles of Biochemistry With a Human Focus by Reginald H. Garrett, Charles M. Grisham Publisher: Brooks Cole
- The Molecular Basis of Cell Cycle and Growth Control by
- Gary S. Stein (Editor), Renato Baserga, Antonio Giordano, David T. Denhardt,  
Publisher: Wiley-Liss
- Experiments in Biochemistry: A Hands-On Approach by Shawn O. Farrell, Ryan T. Ranallo, Publisher: Brooks Cole

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# M. Sc. ZOOLOGY SEMESTER – IV

## PAPER II (Compulsory)

### NEUROPHYSIOLOGY

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise) with internal choice.

#### UNIT - I

- Histogenesis and types of nerve cells
- Histological structure of nerves system
- Physiological properties of nerve fiber
- Synapse and synaptic transmission

#### UNIT - II

- Spinal cord – arrangement of grey and white matter
- The spinal nerves
- The tract- ascending tract
- The tract- descending tract

#### UNIT - III

- Cerebrum
- Brain stem – mid brain, pons varolii, medulla oblongata
- Cerebellum
- Thalamus

#### UNIT - IV

- Autonomic nervous system; sympathetic and para-sympathetic nervous system with special comparison to hormonal mechanism of transmission through autonomic nervous system
- Reflex action; verities, characteristics, unconditional reflex, electrophysiology of spinal reflexes
- Sensation
- Electro encephalography and its physiological basis.

#### Suggested Reading

- The Brain: Our Nervous System by Seymour Simon
- Mass Action in the Nervous System by Walter J. Freeman
- Human Anatomy and Physiology with Interactive Physiology 10-System Suite, 8th Edition by Elaine N. Marieb and Katja N. Hoehn (Jan 10, 2010)
- Neuroanatomy by H.G. Snell
- Clinical Neurophysiology-Guide for Authors - Elsevier
- Foundations of Cellular Neurophysiology (Bradford Books): Daniel Johnston, Optional papers

*S. Simon*

*W. J. Freeman*

*H. G. Snell*

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**M.Sc. ZOOLOGY SEMESTER – IV**  
**Paper- III (Optional paper)**  
**Ichthyology (Fish) structure and Function**

The following optional papers are being suggested as below

- Fish (Ichthyology) structure and function  
Or
- Cell Biology Or  
or
- Entomology  
Or
- Wild life conservation  
Or
- Biology of vertebrate's immune system

**OPTIONAL (SPECIAL PAPER) GROUP 2**

- Pisci culture and economic importance of fishes Ichthyology)  
Or
- Cellular organization and molecular organization  
Or
- Applied entomology  
Or
- Environment and Biodiversity conservation  
Or
- Molecular endocrinology and reproductive technology

\*\* Student has choice to opt for one paper each (special paper) from group 1 and group 2

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**M. Sc Zoology Semester-IV**  
**Paper- III A (optional paper)**  
**Ichthyology (Fish) Structure and Function**

**Unit-1**

- Origin and evolution of fishes
- Classification of fishes as proposed by Berg
- Fish integument
- Locomotion
- Alimentary canal and digestion

**Unit-2**

- Accessory respiratory organs
- Air bladder and its functions
- Weberian ossicles their homologies and functions
- Excretion and osmoregulation
- Acoustico-lateral line system

**Unit-3**

- Luminous organs
- Colouration in fishes
- Sound producing organs
- Deep sea adaptations
- Hill stream adaptations

**Unit-4**

- Migration in fishes
- Sexual cycle and fecundity
- Parental care in fishes
- Early development and hatching
- Poisonous and venomous fishes.

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# **M. Sc Zoology Semester-IV**

## **Paper- III B (Optional) Cell Biology**

### **Unit-1**

- Molecular organization of eukaryotic chromosomes : structure of nucleosome particles and higher order compaction of mitotic chromosomes, chromatin remodeling
- specialized chromosomes: structural organization and functional significance of polytene chromosomes
- DNA methylation and DNA Aase-1 Hypersensitivity in relation to gene activity and chromatin organization.
- Specialized chromosomes II : structural organization and functional significance of lampbrush chromosome.
- Organisation and significance of heterochromatin.

### **Unit-2**

- Structural organization of Eukaryotic genes, interrupted genes and overlapping genes and their evolution
- Gene families: organization, evolution and significance
- Transposable genetic elements of prokaryotes and eukaryotes Gene imitation and molecular mechanism of occurrence of mutation repair mechanism
- Organisation of eukaryotic transcriptional machinery promoter enhancer's transcription factors polymerase activators and repressors.
- DNA binding domains of transcription apparatus zinc finger steroid receptors hemeo domains HILIX-loop, Helix and Leucine Zipper.

### **Unit-3**

- Eukaryotic transcription of Eukaryotic transcriptional control.
- Environmental modulation of gene activity (stress response) stress genes and stress proteins
- Molecular basis of thalasemia's, muscular dystrophy ,cystic fibrosis
- DNA rearrangement
- Amplification during development with special response to
- ciliates
- Choriongenic
- 5 S-RNA

### **Unit-4**

- Drosophila development
- Cleavage
- Gastrulation

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- Origin of Anterior –Posterior (Maternal effect genes and segmentation genes)
- Drosophila development II origin of dorsal ventral polarity
- Basic idea of homeotic selector genes and homeotic mutation
- Basic idea of organization of homeoboxes
- Evolutionary significance of homeoboxes

### **Suggested Reading Materials:**

- Robertis, De and Robertis Cell and molecular biology Lea and Febiger.
- Watson Hopkins Roberts Steitz Weiner, Molecular Biology of the Gene the Benjamin, Cummings Publishing Company inc.
- Bruce Alberts Bray Lewis Raff Roberts Watson Molecular Biology of the Cell, Garland Publishing inc.
- Watson Gilman Witkowski Zoller Recombinant DNA Scientific American Books.
- Karp Gerald Cell Biology.
- Lewin B., Genes VII.
- King Cell Biology. Kaniel L. Hartl, Elizabeth W. Jones.
- Genetics principals and Analysis, Jones and Bartlett Publishers.
- Kuby, Immunology, W.H. Freeman and Company.
- Roitt Male Snustad Immunology.

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## **Paper- III**

### **C (Optional) Entomology**

#### **Unit-1**

- Insect head types and modification as per their habit and habitat
- Modification of mouth parts and feeding behaviour
- Structure types and function of antennae
- Hypothetical wing venation
- Structure of cuticle and pigment

#### **Unit-2**

- Sclerotisation and tanning of the cuticle
- Structure of alimentary canal and Physiology of digestion
- Malpighian tubules – anatomical organization , Transport mechanism
- Structure of circulatory system
- Cellular elements in the haemolymph

#### **Unit-3**

- Structure of compound eye and Physiology of Vision
- Sound Production in insect
- Structure and function of endocrine glands
- Pheromones

#### **Unit-4**

- Embryonic membranous up to the formation of blastoderm
- Metamorphosis
- Insecticide effects on CNS
- Important pest of Soybean Modern concept of pest management Suggested

#### **Reading Materials:**

- The Insect: Structure and function by R.F. Chapman
- Comparative Insect physiology, Biochemistry and Pharmacology .Vol :1-13.  
Edited by G.A. Kerkut and L.I. Gilbert.
- Entomophagous Insect by Clausen
- Entomology by Gilbert
- Principles of Insect Physiology by Wigglesworth.
- Fundamentals of Entomology by Elzinga
- Hand book of economic Entomology for South India by Ayyar.
- Insect cytogenetics by R.E.F. Symposium.
- Insects and plants by Sting, Lawton and Southwood.
- Insect and hygiene by Busvine.
- Insect Physiology by Wigglesworth.
- Insect morphology by Mat Calf and Flint
- Applied Agricultural Entomology by Dr. Lalit Kumar Jha

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## Paper- III D (Optional) Wild Life Conservation

### Unit-1

- Wild life -
- Values of wild life - positive and negative.
- Our conservation ethics.
- Importance of conservation.
- Causes of depletion.
- World conservation strategies.
- Habitat analysis, Evaluation and management of wild life.
- Physical parameters - Topography, Geology, Soil and water.
- Biological Parameters - food, cover, forage, browse and cover estimation.
- Standard evaluation procedures - remote sensing and GIS.
- Management of habitats -
- Setting back succession.
- Grazing logging.
- Mechanical treatment.
- Advancing the successional process.
- Cover construction.
- Preservation of general genetic diversity.

### Unit-2

- Population estimation.
- Population density, Natality, Birth rate, Mortality, fertility schedules and sex ratio
- computation.
- Fecal analysis of ungulates and carnivores - Fecal samples, slide preparation, Hair identification, Pug marks and census method.
- National Organization.
- Indian board of wild life.
- Bombay Natural History Society.
- Voluntary organization involved in wild life conservation.
- Wild life Legislation - Wild Protection act - 1972, its amendments and implementation.
- Management planning of wild life in protected areas.
- Estimation of carrying capacity

### Unit-3

- Eco tourism / wild life tourism in forests.
- Concept of climax persistence.
- Ecology of perturbation.
- Management of excess population & translocation.
- Bio-telemetry.
- Care of injured and diseased animal.

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#### Unit-4

- Quarantine.
- Common diseases of wild animal.
- Protected areas National parks & sanctuaries, Community reserve.
- Important features of protected areas in India.
- Tiger conservation - Tiger reserve in M.P, in India.
- Management challenges in Tiger reserve.

#### Suggested Reading Materials:

- Gopal Rajesh : Fundamentals of wild life management
- Agrawal K.C : Wild life India
- Dwivedi A.P (2008) : Management wild life in India
- Asthana D.K : Environment problem and solution
- Rodgers N.A & Panwar H.S : Planning of wild life / Protected area Network in India vol. the report, wild life Institute of India Dehradun.
- Odum E.P : Fundamentals of Ecology
- Saharia V.B : Wild life in India
- Tiwari S.K : Wild life in Central India
- E.P Gee : Wild life of India
- Negi S.S : Wild life conservation (Natraj Publishers)

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**M. Sc Zoology Semester-IV**  
**Paper- III E (Optional)**  
**Biology of vertebrate immune system**

**Unit-1**

- Tissues of Immune system- Primary lymphoid organs, structure and functions
- (Thymus and Bursa of Fabricius)
- tissues of Immune system- Secondary lymphoid organs, structure and functions
- (Spleen, lymphnode and Payers patches)
- Antigen processing
- Antigen presentation

**Unit-2**

- **T-cell** lineage and receptors
- T-cell activation
- B-cell lineage and receptors
- B-cell activation
- Immunoglobulin structure, Biological and physical properties of immunoglobulin
- Gene model for Immunoglobulin gene structure

**Unit-3**

- Generation of antibody diversity ( Light and heavy chain)
- Immunization
- Immediate type of hypersensitivity reaction of Anaphylectic type-1.
- Antibody dependent cytotoxic type II reaction.
- . Complex mediated type III reaction

**Unit-4**

- Delayed type cell mediated hypersensitivity type IV reaction.
- Enzyme linked immunosorbent assay (ELISA) technique and its applications.
- Immuno fluorescence technique (Direct & Indirect and Sandwich antibody labeling techniques.
- Immunodiffusion techniques (Mancini and Ouchterlony immunodiffusion techniques) Monoclonal antibody technology (Hybridoma technology)

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**M. Sc. Zoology Semester-IV**  
**Paper- IV A (Optional)**  
**Pisci Culture and Economic Importance of Fishes (Ichthyology)**

**Unit-1**

- Collection of fish seed from natural resources and transportation of fish seed.
- Breeding in fish, Bundh breeding and Induced breeding.
- Types of ponds required for fresh water fish culture farms.
- Management of fish farm.
- Physiochemical factors of freshwater for fish farming.

**Unit-2**

- Composite fish culture
- Prawn culture and pearl industries in India.
- Fisheries resources of C.G.
- Riverine fishries.

**Unit-3**

- Costal fishries in India
- Offshore and deep sea fishery's in India
- Role of fishries in rural development
- Sewage fed fishries

**Unit-4**

- Methods of fishpreservation
- Marketing of fish in India.
- Economic importance and by product of fishes
- Fish disease.

**Suggested Reading Materials: Paper III A & IV A**

- JR. Norman - The History of fishes.
- Nagaraja Rao - An introduction to fisheries.
- Lagler Ichthyology.
- Herclen Jones Fishmigration.
- Marshal The life offishes.
- Thomas - Diseases offish.
- Greenwood - Inter relationship of fishes.
- Gopalji, Srivastava - Freshwater fishes of U.P. and Bihar.
- Brown -Physiology of fishes Vol. I & II.
- Hoar and Randall -Fish physiology of fishes Vol. 1 & IX.
- Gunther Sterba C.N.H.-Freshwater fishes of the world
- W. Lanham -TheFishes.
- G.V. Nikolsky -The ecologyof Fishes,
- Borgstram -Fish as food Vol. I & II.

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*V. Narasimha*

*Dr. S. S. Rao*

*Dr. S. S. Rao*

- Nilsson -Fish physiology -Recent Advances.
- P.B. Myle and J.J. Cech Fishes An Introduction to Ichthyology.
- Carl E. Bond -Biology offishes.
- M. Jobling -Environmental Biology of fishes.
- Santosh Kumar & Manju Ternbhre -Fish and Fisheries.
- S.K. Gupta-Fish and Fisheries
- K.P. Vishwas -Fish andFishries.
- Jhingaran -Fish andFishries.

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**M.Sc. Zoology Semester-IV**  
**Paper- IV B (Optional)**  
**Cellular Organization and Molecular Organization.**

**Unit-1**

- General organization and characterizes of viruses (Examples SV 40 and HIV).
- Yeast : Structure, reproduction and chromosome organization: Basic ideas of its applications as vectors for gene cloning.
- Molecular organization of respiratory chain assemblies, ATP / ADP
- Translocase and F<sub>0</sub>F<sub>1</sub> ATPase.
- Cell cycle: Cell cycle control in mammalian cells and xenopus.
- Cytochemistry of Golgi complex and its role in cell secretion.

**Unit-2**

- Peroxisomes and targeting of peroxysomal proteins.
- Nucleolus: Structure and Biogenesis and functions of lysosomes.
- Intracellular digestion : Ultra structure and function of lysosomes.
- Synthesis and targeting of mitochondrial proteins.
- Secretory pathways and translocation of secretory proteins across the EPR membrane.

**Unit-3**

- Genome complexity: C- value [paradox and cot value].
- DNA sequences of different complexity.
- Difference between normal cells and cancer cells.
- Biochemical changes.
- Cytoskeleton changes.
- Cell surface changes.
- Genetic basis of human cancer

**Unit-4**

- Chromosomal abnormalities in human cancer.
- General idea of oncogenes and proto oncogens.
- Oncogenesis and cancer.
- Transforming Agents.
- Tumor Suppressor genes.
- Receptor – Ligand interaction and signal transduction. Cross – talk among various signaling pathways.

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## Suggested Reading Materials:

- DeRobertis and De Robertis Cell and Molecular Biology.
- Lea and Febiger. W. Watson Hopking reberts steits, Weiner molecular biology of the gene, the Benjamin / Cummings Publishin Company Inc.
- Bruce alberts, Bray, Lewis, Raff, Roberts, Watson molecular Biology of the cell garlandpublishing inc.
- P.K. Gupta, Molecular Cell Biology, Rastogi Publication.
- Watson Gilman, Witkowski, Zoller: Recomdinant D.N.A. scientific American Books.
- Gerald Karp. Cell Biology.
- Lewin B. Genes VII.
- King Cell Biology.
- Baniel L. HArtl Elizabeth W. Jones, Genetics Principles and analysis. Jones and Bartlett Publisher.
- Lodish, Berk Zipursky, Matsudaira Baltimore, Dernell Molecular: Cell Biology W.H.Freeman andcompany.
- J. Traver's Immunology, current Biology limited.
- Kubey Immunology W.H. Freeman and Company.
- Riott, Male snustad Principles of genetics john weley and sons Inc.

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# **M. Sc Zoology Semester-IV**

## **Paper- IV C (Optional)**

### **Applied Entomology**

#### **Unit-1**

- Classification according to Imms
- Classification of apterygota upto families.
- Classification of following insect orders
- Orthoptera (b) Hemiptera (c) diptera.
- Classification of following insect order
- Hymenoptera (b) Lepidoptera (c) Coleoptera
- Collection and preservation of insects.

#### **Unit-2**

- Insect pest-Management strategies and tools
- Biological control, Genetic control, Chemical control
- Pests of Cotton
- Pests of sugarcane
- Pests of paddy
- Pests of stored food grains
- Pests of citrus fruits and mango
- Pests of pulses
- House hold insect pests

#### **Unit-3**

- Insects in relation to forensic science
- Insects migration, population fluctuation and factors
- Insects of medical and veterinary importance
- Ecological factors affecting the population and development of Insects

#### **Unit-4**

- Mulberry and non mulberry sericulture
- Apiculture
- Lac culture
- Insects as human food for future.

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# **M. Sc. Zoology Semester-IV**

## **Paper- IV D (Optional)**

### **Environment & Biodiversity Conservation**

#### **Unit I**

- Basic concept of Environmental Biology Scope and Environmental Science
- Biosphere and Biogeochemical cycles.
- Environmental monitoring and impact assessment.
- Environmental and sustainable development.
- Water conservation, rain water harvesting, water shed management.

#### **Unit II**

- Cause, effects and remedial measure of air pollution, Water pollution.
- Noise. radioactive and thermal pollution.
- Agriculture pollution
- Basic concepts of Bioaccumulation.
- Solid waste management.

#### **Unit III**

Global warming and disaster management

- Cause of global warming
- Impact of global warming – acid rains and ozone depletion, green house effect.
- Control measures of global warming
- Afforestation (b) reduction in the use of CFCS
- Disaster management -floods, earthquake, Cyclone, landslides.
- Environmental legislation.

#### **Unit IV**

Natural Resources:-

Forest-

- Use and over exploitation of forests.
- Timber extraction. Land
- Land degradation. Landslides.
- Soil-ersion and desertification.

#### **Water**

- Use and over utilization of surface and ground water
- Floods. Drought dams- benefits and problems

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### **Mineral**

- Use and exploitation ,
- Environmental effect of extracting and using mineral resources

### **Food**

- World food problem
- Effects of modern agriculture and overgrazing

### **Energy**

- Conventional and nonconventional energy resources.
- Using of alternate energy sources
  - Role of an individual in conservation of natural resources
- Equitable use of resources for sustainable life
- Biodiversity crisis – habitat degradation poaching of wild life.
- Socio economic and political causes of loss of biodiversity.
- In situ and exsitu conservation of biodiversity
- Value of biodiversity.

### **Suggested Reading Materials: Paper III D & IV D**

- Arora: Fundamentals of environmental biology
- Anathakrishnan : Bioresources ecology
- Bottain : Environmental studies
- Bouhey : Ecology of populations
- Clark : Elements of ecology
- Dowdoswell : An introduction to animal ecology
- Goldman : Limnology
- Kormondy : Concepts of ecology
- May : Model ecosystems
- Odum : Ecology
- Perkins : Ecology
- Simmons : Ecology of estuaries and coastal water
- Pawlosuske : Physico-chemical methods for water
- South Woods : Ecological methods
- Trivedi and Goel : Chemical and biological methods for water pollution studies
- Willington : Fresh water biology
- Wetzel : Limnology
- Welch : Limnology Vols. I-II

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**M.S c Zoology Semester-IV**  
**Paper- IV E (Optional)**  
**Molecular Endocrinology and Reproductive Technology**

**UNIT-I**

Definition and scope of molecular endocrinology.

**Chemical nature of Hormones-**

- Protein & polypeptides.
  - Amino acid derivative
  - Steroids
  - Phospholipids derivative
  - (tissue hormones)
- Purification and characterization of Hormones.

**UNIT-2**

**Receptor.**

- Membrane Receptor.
- Nuclear Receptor.
- Orphan Receptor
- G-Protein
- Nuclear Receptor

**UNIT-3**

- Hormone – Transduction
- G-Protein & Cyclic Nucleosides.
- Calcium calmoduline & phospholipids.
- Miscellaneous Second Messengers.
- Phosphorylation & other non transcriptional effect of Hormones.
- Genetic control of formation of Hormone.
- Transcription.
- Post transcription.
- Translation.
- Post translation
- Secretion of Hormone.

**UNIT-4**

- Multiple ovulation and embryo transfer Technology.
- Study of estrous cycle by vaginal smear technology
- Surgical technique-
- Castration
- Ovariectomy
- Vasectomy
- **Tubectomy**
- Laprotomy.

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### **Suggested Reading Materials:**

- Benjamin Lewis – Genes VII/ VIII, oxford University press.
- Lodish - Molecular Cell Biology.
- Zarrow, M.X., Yochin J.M. and Machrthy, J.L. – Experimental Endocrinology.
- Chatterji C.C.- Human Physiology (Vol- II).
- Bentley, P.J. – Comparative Vertebrate endocrinology.
- Hadley Mac. E.- Endocrinology.
- Chinoy, N.J. Rao, M.V., Desarai, K.J. and High land, H.N. – Essential techniques in reproductively
- physiology and Endocrinology. Norris, D.O. – Vertebrate Endocrinology.

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**M.Sc. ZOOLOGY – IV SEMESTER**  
**LAB COURSE-I**  
**(COMPULSARY)**

**PAPER- I**  
**BIOCHEMISTRY**

1. Estimation of antioxidant enzymes.
2. Estimation of amylase. analitative study of amylase
3. Analitative study of protein
4. analitatative study of CBH
5. Estimation of protein by Lowry method.
6. Estimation of Oil in seeds.
7. Estimation of Carbohydrate by Anthrone reagent.
8. Other exercise related to theory paper.

**PAPER- II NEUROPHYSIOLOGY**

1. Study of slides of nervous system.
2. Neck nerve of squirrel by using alternate methods like clay modeling.
3. Study of Brain through Model.
4. Study of Cranial nerve of Bird, Amphibian, Reptile and Mammals by using alternate methods like clay modeling.
5. Other exercise related to theory paper.

**EXAMINATION SCHEME**

Based on paper I	35 marks
Based on paper II	35 marks
Viva	10 marks
Sessional (Internal)	20 mark
<b>Total</b>	<b>80+20 (100)</b>

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**M.Sc. SEMESTER-IV**  
**LAB COURSE-II**  
**OPTIONAL (SPECIAL PAPER) GROUP 1**

**PAPER-III(A) FISH (ICHTHYOLOGY) STRCTURE AND FUNCTION**

1. Anatomy of various organ systems and mounting of fish materials
2. Cranial nerves of teleost fishes: *Wallago*, *Mystus*, *Labeo* and other fishes by using alternate methods like clay modeling
3. Osteology of fish: *Scoliodon*, carps, catfishes, murrels etc.
4. Accessory respiratory organs of air breathing fish by using alternate methods like clay modeling
5. Study of histological (permanent) slides
6. Study of museum specimens of the concerned group
7. Other exercise related to theory paper.

**PAPER –III(B) CELL BIOLOGY**

1. Study of mitosis from onion root tip.
2. Study of meiosis in grasshopper testis.
3. Study of polytene chromosome in Dipteran Larvae.
4. Demonstration of Barr-Body in Human Cheek cell.
5. Estimation of DNA.
6. Estimation of RNA.
7. Other exercise related to theory paper.

**PAPER –III(C) ENTOMOLOGY**

1. Anatomy of common grasshopper, cockroach, honey bee, wasp and *Dysdercus*, *mylabris*, *belestoma* (Giant water Bugs) by using alternate methods like clay modeling.
2. Dissection by using alternate methods like clay modeling and exposure of:
  - (i) Sting apparatus of honey bee and wasp.
  - (ii) Tympanal organs of grasshoppers.
  - (iii) Testes of cockroach
  - (iv) Aristae of house fly.
  - (v) Different types of mouthparts of insects.
  - (vi) Different types of wings and antennae of insects.
  - (vii) Tentorium of grasshoppers.
3. Identification and comment on insects of different orders and families.
4. Identification with the help of keys of common insects from different orders and families.
5. Other exercise related to theory paper.

**PAPER-III (D) WILD LIFE CONSERVATION**

1. Anatomy of (by using alternate methods like clay modeling):
  - (a) Toad / Frog.
  - (b) Lizard / Snake / Turtle.
  - (c) Pigeon / Parrot.
  - (d) Rat / Squirrel.
2. Ecological survey of National Parks and Sanctuaries.
3. Mounting: Permanent preparation of parts of internal organs.
4. Study of slides of different microscopic structure.

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5. Identification of wild animal species as objects of museum and zoo and specimens of photographs.
6. Osteology of wild animals.
7. Ecological comments on wild species of different niche and habits. Candidates would be required to keep records of exercise in laboratory, field types, sanctuaries and parks of importance and collections.
8. Other exercise related to theory paper.

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### **PAPER-III (E) BIOLOGY OF VERTEBRATE IMMUNE SYSTEM**

1. Dissection by using alternate methods like clay modeling of primary and secondary immune organs from mice:
  - a. Preparation of single cell suspension from bone marrow and spleen (spleenocytes) of mice.
  - b. Cell counting and viability testing of the spleenocytes prepared.
2. Preparation and study of phagocytosis by splenic/peritoneal macrophages.
3. Raising polyclonal antibody in mice, serum collection and estimating antibody titre in serum by following methods:
  - a. Ouchterlony (double diffusion) assay for Antigen -antibody specificity and titre.
  - b. ELISA
4. Antibody purification from the serum collected from immunized mice: affinity purification/chromatography.
5. Immunoelectrophoresis.
6. Demonstration of Western blotting:
  - a. Protein estimation by Lowry's method /Bradford's method
  - b. SDS-PAGE.
  - c. Immunoblot analysis.
7. Other exercise related to theory paper

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## OPTIONAL (SPECIAL PAPER) GROUP 2

### PAPER –IV(A) PISCI CULTURE AND ECONOMIC IMPORTANCE OF FISH (ICHTHYOLOGY)

1. Systematic identification of freshwater fishes with particular reference to C.G.
2. Age determination with the help of scales / otolith
3. Pigmentary behaviour in fish
4. Qualitative zooplankton analysis
5. Nutrient analysis of water
6. Analysis of gut contents
7. Microtomy of fish materials
8. Other exercise related to theory paper

### PAPER-IV(B) CELLULAR ORGANIZATION AND MOLECULAR ORGANIZATION

1. Histochemical demonstration of Mitochondria
2. Histochemical demonstration of Golgi complex
3. Histochemical demonstration of Lactate dehydrogenase
4. Histochemical demonstration of Succinate dehydrogenase
5. Isolation and characterization of Nuclei from liver
6. Isolation and characterization of Mitochondria
7. Isolation of DNA from any tissue
8. Separation of lipids using thin layer chromatography
9. Separation of various proteins using column chromatography
10. Study of metaphase chromosomes from rat bone marrow
11. G banding of metaphase chromosomes
12. C- banding of metaphase chromosomes
13. Estimation of Mitotic Index
14. Measurement of cell size using oculometer.
15. Other exercise related to theory paper

### PAPER- IV(C) APPLIED ENTOMOLOGY

1. Insect collection and preservation for systematic studies
2. Identification of different insects upto orders
3. Identification of insects upto families of economically important insects up to orders
4. Identification of insects upto species: Mosquitoes, honeybees, stored grain beetles, aquatic insects, important crop and household pests
5. Analysis of honey and its quality control.
6. Field studies of insects to understand their habit, habitat environmental impact, beneficial and harmful activities etc.
7. Study of beneficial insects, benefits derived from them and useful products
8. Study of destructive insects, damage caused by them and damaged products
9. Study of insecticidal formulations and insect control appliances
10. Experiments on insect control like LC-50 /LD-50, knock down and recovery effect, repellency/antifeedance tests, percentage damage tests for leaf eating insects, and stored grain pests
11. Other exercise related to theory paper

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**PAPER- IV(D) ENVIRONMENT AND BIODIVERSITY CONSERVATION**

- (i) Environmental hazards, destruction of habitat and extinction of species causes and preventive measures.
- (ii) Environmental planning of rural and urban development.
- (iii) Management of soil resources.
- (iv) UNESCO's role in ecology, earth summit, SARC, ED trust fund.
- (v) Biodiversity, its significance and conservation measures.
- (vi) Role of biodiversity in species development.
- (vii) Other exercise related to theory paper

**PAPER- VI(E) MOLECULAR ENDOCRINOLOGY AND REPRODUCTIVE TECHNOLOGY**

- 1. Chromatography method (separation of Androgen & Progesterone).
- 2. Bioassay of  $\alpha$ -Ketosteroids.
- 3. Bioassay of Gonadotropins.
- 4. Study of slide related to endocrine glands.
- 5. Estimation of cholesterol.
- 6. Estimation of catecholamine.
- 7. Dissection by using alternate methods like clay modeling of endocrine glands.
- 8. Other exercise related to theory paper.

**EXAMINATION SCHEME**

Based on paper III	35 marks
Based on paper IV	35 marks
Viva	10 marks
Sessional (Internal)	20 mark
<b>Total</b>	<b>80+20 (100)</b>

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# **HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)**

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## **SCHEME OF EXAMINATION & SYLLABUS of M.Sc. (Zoology) Semester Exam UNDER FACULTY OF SCIENCE Session 2019-21**

**(Approved by Board of Studies)  
Effective from June 2019**

# HEMCHAND YADAV UNIVERSITY DURG

## CHHATTISGARH

### SYLLABUS FOR 2019-21

### M. Sc. ZOOLOGY

Semester	Paper	Title	External marks	Internal marks	Credit
<b>First DEC, 2017</b>	I	Biosystematics, Taxonomy and Biodiversity	80	20	4
	II	Structure and Function of Invertebrates	80	20	4
	III	Population Genetics and Evolution	80	20	4
	IV	Tools & Techniques in Biology	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
<b>Second MAY-JUNE, 2018</b>	I	Molecular Cell Biology and Biotechnology	80	20	4
	II	General Physiology and Endocrinology	80	20	4
	III	Development Biology	80	20	4
	IV	Quantitative Biology and Computer Application	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
<b>Third DEC, 2018</b>	I	Comparative Anatomy of Vertebrates	80	20	4
	II	Animal Behavior	80	20	4
	III	Environment Physiology and Population Ecology	80	20	4
	IV	Immunology and Parasitism	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
	<b>Compulsory</b>				

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<b>Fourth MAY-JUNE, 2019</b>	I	Biochemistry	<b>80</b>	<b>20</b>	<b>4</b>
	II	Neurophysiology	<b>80</b>	<b>20</b>	<b>4</b>
<b>Optional papers (Group I)*</b>					
	I	Fish (ichthyology) structure and function	<b>80</b>	<b>20</b>	<b>4</b>
	II	Cell biology	<b>80</b>	<b>20</b>	<b>4</b>
	III	Entomology	<b>80</b>	<b>20</b>	<b>4</b>
	IV	Wild life conservation	<b>80</b>	<b>20</b>	<b>4</b>
	V	Biology of Vertebrate immune system	<b>80</b>	<b>20</b>	<b>4</b>
<b>Optional paper (Group II)*</b>					
	I	Pisciculture and economic importance of fishes (Ichthyology)	<b>80</b>	<b>20</b>	<b>4</b>
	II	Cellular organization and molecular organization	<b>80</b>	<b>20</b>	<b>4</b>
	III	Applied entomology	<b>80</b>	<b>20</b>	<b>4</b>
	IV	Environment and Biodiversity conservation	<b>80</b>	<b>20</b>	<b>4</b>
	V	Molecular endocrinology and reproductive technology	<b>80</b>	<b>20</b>	<b>4</b>
	LC-I	Lab Course I (Based on paper I & II)	<b>80</b>	<b>20</b>	<b>2</b>
	LC-II	Lab Course I (Based on paper III & IV)	<b>80</b>	<b>20</b>	<b>2</b>
<b>Total</b>			<b>1920</b>	<b>480</b>	<b>80</b>

\* Student has choice to opt. for one paper each (special paper) from group I & group II.


\* Each theory paper will have 5 questions of equal marks. First question will encompass all the four units without any internal choice, whereas rest questions will be unit wise with internal choice.

UGC guideline should be strictly followed for animal dissections. Animal dissections can be performed by using alternate methods like clay modeling.

\*\*The respective teachers on each paper will ensure the internal evaluation by a class test and a seminar/ poster presentation of 10 marks each and submit the foil and counter foil to the HOD by the end the activity.

  
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**M. Sc. ZOOLOGY FIRST SEMESTER**  
**PAPER – I**  
**BIOSYSTEMATICS, TAXONOMY AND BIODIVERSITY**

(There will be 5 questions of equal marks. First question will encompass all the four units without any internal choice, whereas rest questions will be unit wise with internal choice).

**UNIT-I**

- Definition and basic concepts of biosystematics and taxonomy.
  - Historical resume of systematics.
  - Importance and applications of biosystematics in biology
  - Trends in biosystematics concepts of different conventional and newer aspects
  - Chemotaxonomy
  - Cytotaxonomy
  - Molecular taxonomy

**UNIT-II**

- Dimensions of speciation and taxonomic characters
  - Mechanisms of speciation in panmictic and apomictic species
  - Species concepts and species category.
  - Theories of biological classification.
  - Taxonomic characters and different kinds.

**UNIT-III**

- Procedure keys in taxonomy.
  - Taxonomic procedures-taxonomic collections, preservation, curation
  - Taxonomic keys-different kinds of taxonomic keys, their merits and demerits.
  - Process of typification and different Zoological types.
  - International code of Zoological Nomenclature (ICZN)
  -

**UNIT-IV**

- Biodiversity
  - Types of Biodiversity
  - Hot spots of Biodiversity
  - Threats to Biodiversity
  - Conservation of Biodiversity
- Evaluation of biodiversity indices
  - Shannon-Weiner index.

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## **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **Biosystematics & Taxonomy**  
**Dr. R. C. Tripathi**, University Book House Jaipur
- **Theory & Practice of Animal Taxonomy**  
**V.C. Kapoor**, 5th Edition Oxford & IBH Publishing Co.
- **Principle of Animal Taxonomy**  
**G.G. Simpson**, Oxford & IBH Publishing Co.
- **Elements of axonomy**  
**Earnst Mayer**
- **Biodiversity**  
**E.O. Vilson**, Academic Press Washington
- **The Biology of Biodiversity M. Kato**, Springer
- **Molecular Markers - Natural History & Evolution J.C. Avise**

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# **M.Sc. ZOOLOGY FIRST SEMESTER**

## **PAPER-II: STRUCTURE & FUNCTION OF INVERTEBRATES**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

### **UNIT-I**

- Organization of coelom
  - Acoelomates and Pseudocoelomates
  - Coelomates: Protostomia and Deuterostomia.
- Locomotion
  - Flagellar and ciliary movement in Protozoa.
  - Hydrostatic movement in Coelenterata, Annelida and Echinodermata.

### **UNIT-II**


- Nutrition and Digestion
  - Patterns of feeding and digestion in Protozoa
  - Filter feeding in polychaeta.
- Respiration
  - Organs of respiration Gills, lungs and trachea.
  - Respiratory pigments.

### **UNIT-III**


- Excretion
  - Organs of excretion.
  - Excretion and osmoregulation
- Nervous System
  - Primitive nervous system: Coelenterata and Echinodermata.
  - Advanced Nervous system: Arthropoda (Crustacea and insecta) and Mollusca (Cephalopoda)

### **UNIT-IV**

- Invertebrate larvae
- Larval forms of free-living and parasitic invertebrates
- Minor Phyla
  - Organization and general characters of (Ctenophore, Rotifera, Ectoprocta, Endoprocta)

  
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### **SUGGESTED READING MATERIALS (ALL LATEST EDITION)**

- **Invertebrate Structure and function:-**  
E.J.W. Barrigton English language Book society UK.
- **Invertebrate Zoology:**  
Robert Barnes IV Edition Holt Saunders International Edition japan.
- **The Cambrige Natural History Vol 1 - 9.**  
S F Harmer, A.E. Shipley.  
Todays & Tomorrows Book agency, New Delhi India.
- **A Text book of Zoology Invertebrate:**  
Parker Hasvell, Marshall & Williams.  
AITBS Publishing & Distributers, Delhi
- **The Invertebrates Vol. 1 - 9**  
Libbic Henrietta Hyman, McGraw Hill Book Company

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# **M. Sc. ZOOLOGY FIRST SEMESTER**

## **PAPER-III: POPULATION GENETICS & EVOLUTION**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

### **UNIT-I**

- Concepts of evolution and theories of organic evolution:  
Lamarckism, Darwinism and Synthetic theory of evolution
- Evidences of evolution: anatomical, embryological, palaeontological, physiological and Bio-chemical

### **Unit-II**

- Hardy-Weinberg law of genetic equilibrium
- Detailed account of destabilizing forces.
  - Natural selection (i) Mutation  
(ii) Genetic drift  
(iii) Meiotic drive
- Phenotypic variation

### **UNIT-III**

- Patterns and mechanisms of reproductive isolation
- Phylogenetic and biological concepts of species
- Gene Evolution, Evolution of gene families
- Factors affecting human disease

### **UNIT-IV**

- Origin of higher categories
- Micro-and Macro-evolution
- Evolution of horse, elephant, camel, man

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## **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **Gene & Evolution**  
Jha A.P. John Publication, New Delhi
- **Evolution & Genetics**  
Merrel D.J. Holt rinchert & Wiston INC.
- **The Genetics & Origin of Species**  
Dobzhansky, Columbia University Press.
- **Evolution**  
Dobzhansky, Ayala F.J., Stebbins G.L. & Valentine J.M. Surjeet Publication  
New Delhi.
- **Species Evolution - The Role of Chromosomal Change**  
King M. Cambridge University Press. Cambridge
- **A Primer of Population Genetics**  
Hartl D.L. Suinaer Associates INC, Massachusetts
- **Evolutionary Genetics**  
Smith J.M. Oxford University Press, New York
- **Evolutionary Biology**
- Futuyama D.J. Suinaer Associates INC publishers, Dunderland
- **Evolution**  
Strikberger M.W. Johns & Bartett Publishers, Boston London

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**M. Sc. ZOOLOGY FIRST  
SEMESTER PAPER-IV  
TOOLS & TECHNIQUES IN BIOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

**UNIT-I**

- Principles and application of
  - Ultracentrifugation
  - Electrophoresis
  - Chromatography (various types)
  - Lambert-Beers Law and colorimetry and spectrophotometry
  - Flow cytometry.

**UNIT-II**

- Principles and Application of
  - Light Microscopy and micrometry
  - Phase Contrast microscopy
  - Interference microscopy
  - Fluorescence microscopy
  - Transmission Electron microscopy.
  - Scanning Electron microscopy.

**UNIT-III**

- Assay
- Chemical assays
- Biological assays-in vivo and in vitro
- Principles of cytological and cytochemical techniques
  - Fixation: chemical basis of fixation by formaldehyde, glutaraldehyde, chromium salts, mercury salts, osmium salts, alcohol and acetone
  - Chemical basis of staining of carbohydrate, protein lipids and nucleic acids.

**UNIT-IV**

- Principle and techniques of
  - Nucleic acid hybridization and cot curve
  - Sequencing of proteins and nucleic acids
- Freeze techniques
- Media preparation and sterilization
- Inoculation and growth monitoring

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## **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **Introduction to Instrumental Analysis**
- **Robert Braun**, McGraw Hill International Edition
- **A biologist guide to principles and techniques of practical biochemistry**
- **K Wilson and K. H. Goulding** ELBs Edition
- **Instrumentation**
- **Upadhyay and Nath**, Meerut Publications
- **Instrumentation and Techniques**
- **R.C. Bajpayee**, Himalayan Publications

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**M. Sc. ZOOLOGY FIRST SEMESTER**  
**LAB COUSE-I: (PRACTICAL BASED ON PAPER I & II)**

• **Biosystematics and Taxonomy**

- Study of biodiversity among various invertebrates and vertebrates (Listing of all the animals found in and around your house and also try to find out their Zoological names).
- Collection of various insect species.
- Visits to a local animal park or zoo to identify and study the captive fauna and preparation of report.
- Study of adaptive characteristics of various invertebrates and vertebrates in different climate.
- Taxonomic key formation and conversion.
- Study of biodiversity in grassland and pond water by using Shannon -Weiner index
- Other exercise related to theory paper

• **Structure and function of invertebrates**

- Identification, classification and study of distinguishing features of important representatives from various groups (Protozoa to Hemichordata Ciliary Feeders).
- Study of permanent prepared slides (from Protozoa to Hemichordata).
- Dissection by using alternate methods like clay modeling : Reproductive, Excretory, nervous and haemocoelomic systems of leech.
- Dissection by using alternate methods like clay modeling: Reproductive system of cockroach; general anatomy, nervous and reproductive systems of grasshopper; nervous system of crab; nervous and reproductive systems of scorpion.
- Dissection by using alternate methods like clay modeling: Nervous system of Mytilus, Sepia and Aplysia, general anatomy of Aplysia.
- Study of sections of the arm of a starfish; general anatomy of a Holothurian; Aristotle's lantern of a sea urchin complete as well as disarticulated parts of the Aristotle's lantern.
- Permanent preparations of different materials to be provided for study.
- Wonder invertebrates
- Other exercise related to theory paper.
- UGC guideline should be followed.

**EXAMINATION SCHEME**

Based on paper I	35 marks
Based on paper II	35 marks
Viva	10 marks
Sessional (Internal)	20 mark
<b>Total</b>	<b>80+20 (100)</b>

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**M. Sc. ZOOLOGY FIRST SEMESTER**  
**LAB COUSE-II: (PRACTICAL BASED ON PAPER III & IV)**

**Population genetics and evolution**


- Problems on genetics (complete and incomplete linkage; dominance, sex-linked inheritance) Demonstration of Hardy-Weinberg law
- Preparation of human chromosomes map, demonstration of chromosomal deficiencies.
- Experiments based on population genetics, pedigree analysis.
- Study of evolution of horse by way of models.
- Study of evolution through homologous and analogous organs.
- Other exercises related to theory paper.

**Tools and techniques in biology**


- Parts study, principles and use of following instruments for different techniques:
- pH meter: Determination of pH of different soil and water samples.
- Spectrophotometer: Preparation of absorption spectrum.
- Chromatography: Paper and thin layer chromatography.
- Centrifuge: Extraction proteins and carbohydrates from tissues.
- Electrophoresis: Paper and gel electrophoresis.
- Microscope: Parts study and principles of various microscopes.
- Demonstration of cryostat.
- Other exercise related to theory paper.

**EXAMINATION SCHEME**

Based on paper III	35 marks
Based on paper IV	35 marks
Viva	10 marks
Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

  
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## M. Sc. ZOOLOGY SECOND SEMESTER

### PAPER – I: MOLECULAR CELL BIOLOGY AND BIOTECHNOLOGY

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### UNIT-I

- Biomembranes
  - Molecular composition and Organization of -
    - Plasma membrane
    - Mitochondria
    - E.R.
    - Cytosome
    - Golgi body
  - Transport across The biomembranes – Mitochondria
    - Plasma membrane, E.R.
    - Ribosome and its Biogenesis

#### UNIT-II

- DNA replication
- Protein Synthesis- Central Dogma Regulation of translation
- Genetic Code.

#### UNIT-III

- Genome organization
  - Chromosomal organization: morphological and structural types. (Lamprash, Polyline, Heterochromatin)
  - Non-coding DNA
- Molecular mapping of genome
  - Genetic and physical maps
  - Polymerase Chain Reaction (PCR) and blotting techniques
  - Molecular markers in genome analysis.

#### UNIT-IV

- Transgenic animals and knock-outs
  - Production and applications
  - Embryonic stem cells
- Application of genetic engineering
  - Medicine
  - Agriculture
  - Industry

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## **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **MOLECULAR CELL BIOLOGY**  
**Lodish**, W.H. Freeman & Co. New York
- **Lehninger PRINCIPLES OF BIOCHEMISTRY**,  
Fourth Edition - David L [1]. Nelson, Michael M. Cox
- **MOLECULAR CELL BIOLOGY**  
Lodish M. Baltimore, Scientific American books
- **ESSENTIALS OF CELL & MOLECULAR BIOLOGY**  
**Roberties & Roberties**, Halt Saunders International Edition.
- **CELL & MOLECULAR CELL BIOLOGY**  
**Gerald Karp**, Willey & Sons Co.
- **MEDICAL CELL BIOLOGY**  
**Flickinger E.J. Brown J.C.** Halt Saunders International Edition.
- **CELL BIOLOGY**  
**Powar C.B.** Himalaya Publishing House

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## **M. Sc. ZOOLOGY SEMESTER - II**

### **PAPER – II: GENERAL PHYSIOLOGY AND ENDOCRINOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

#### **UNIT-I**


- Digestion and Metabolism
  - General organization of alimentary canal
  - Mechanism of digestion
  - Mechanism of absorption
- Gas Exchange and Acid-base Balance
  - Oxygen and Carbon dioxide transport in blood
  - Structure and Significance hemoglobin
  - Regulation of body pH
- Thermoregulation and Cold Tolerance
  - Heat balance and exchange
  - Endotherms Vs Ectotherms
  - Torpor, hibernation and aestivation

#### **UNIT-II**


- Muscle Function and Movement
  - Anatomy of muscle
  - Mechanism of muscle contraction
  - Regulation of muscle contraction
- Nervous System
  - Neurons and membrane excitation
  - Resting Membrane & Action Potential
  - Nerve Impulse
  - Synapses and neurotransmitters
  - Synaptic transmission
- Sensory Transduction
  - Auditory receptors
  - Chemoreceptor: taste and smell
  - Vision and Photoreception – Photo Chemistry of vision

#### **UNIT-III**

- Endocrinology
  - Structure and functions of endocrine glands (Pituitary, pineal, pancreas, adrenal, thyroid etc.)
  - Some New Hormones Ghrelin, Leptin, Amylin, Renin, Ang.
  - Biosynthesis of hormones (thyroid and gonadal)
  - Hormones and Reproduction -Pregnancy, Parturition, Lactation
  - Hormonal Control - Estrous Cycle menstrual cycle Menarche Puberty Menopause

  
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#### UNIT-IV

- Mechanism of Hormone action
- Hormone receptors
- Hormonal regulation of metabolism carbohydrate, Proteins and fats.
- Hormones & Homeostasis

#### **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- Comparative vertebrate Endocrinology – by **Gorbman & Bern**
- Medical Physiology by Guyton and Hall
- Physiology by **Antonio Lucanio**
- Human Physiology – by **Dr. C. C. Chatterjee**
- Comparative Endocrinology – by **Barrington**
- Applied Animal Endocrinology – by **Squires**
- **Endocrinology** – Basic & Clinical principles - by **Melmed & Cohn**
- **T.B. of Endocrinology** by **Griffin**.
- **Endocrinology** by **Hardly**.

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**M. Sc. ZOOLOGY SEMESTER - II PAPER – III:**  
**DEVELOPMENT BIOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

**UNIT-I**

- Oogenesis
- Differentiation and growth of oocytes.
- Organization of egg cytoplasm and egg cortex.
- Vitellogenesis
- Spermatogenesis
- Differentiation and ultra-structure of sperm
- Spermatocytogenesis Spermiation

**UNIT-II**


- Fertilization
  - Biological role of fertilization.
  - Basic requirements of fertilization.
  - Activation of egg metabolism
  - Capacitation
  - Biochemistry of fertilization
- Cleavage
  - Characteristics and mechanisms of cleavages, Egg types

**UNIT-III**


- Formative movements
  - Fate maps - Organogenesis
  - Utility and comparative topographical relationship of the Presumptive areas in early embryos of
  - Amphioxus
  - Fishes
  - Amphibian
  - Birds
- Differentiation

**UNIT-IV**

- Cell and tissue interactions in development
  - Primary embryonic induction
  - Competence
  - Concept of organizer
- Metamorphosis
- Teratology

  
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## **SUGGESTED READINGS MATERIALS**

- **Animal Gametes –**

Vishmanath, Asia Publishing House

- **Foundation Of Embrology –**

Bradley M.Patten, McGraw Publication

- **Fertilization In Animals –**

Brain Dale, Arlond Heiniman, Gulab Vazerani Publication

- **Development Biology -**

N.J. Berril, Tata McGraw Hill Publication N. Delhi

- **Embryology Of Vertebrates -**

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# **M. Sc. ZOOLOGY SEMESTER - II**

## **PAPER – IV: QUANTITATIVE BIOLOGY AND COMPUTER APPLICATION**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

### **UNIT-I**

- Introduction to digital computer and application
  - Basic knowledge of hardware and software
  - CPU (Central Processing Unit)
  - Input and Output devices
  - Auxiliary storage system
  - Operating system and Binary number system

### **UNIT-II**


- Computer application
  - Introduction to MSoffice
    - Word
    - Excel
    - Power point
- Computer application in biostatistics
- Simple computation and elementary knowledge of flow chart

### **UNIT-III**


- Types of biological data
- Representation of data
- Sample and sampling
- Measures of central tendency
- Measures of dispersion
- Hypothesis testing: Null and alternate hypothesis

### **UNIT-IV**

- Tests of significance
  - Chi-square test
  - Student's t-test
- Analysis of Variance
- Simple linear regression
- Correlation
- Probability distribution: normal and binomial

  
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## **SUGGESTED READING MATERIALS**

Bataschelet. E. Introduction to mathematics for site scientist springer-verlag, berling

Lenderen D. Modelling in behavioral ecology. Chapman & Hall London U.K.

Snedecor, G.W. and W.G. cochrane, statistical methods, Affiliated East,  
West Press New Delhi (Indian ed.)

Murray, J.D. Mathematical Biology, Springer Verlag Berlin

Pielou, E.C. The interpretation of ecological data :

A primer on classification and ordination.

A. Lewis . Biostatistics

B.K. Mahajan Methods in Biostatistics

J.D. Murray Mathematical Biology

Georgs & Wilians Statistical method

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**M. Sc. ZOOLOGY SEMESTER – II**  
**LAB COURSE – I: (PRACTICAL BASED ON PAPER I & II)**

• **Molecular biology and Biotechnology**

- Isolation of DNA/RNA
- Study of mitochondria from buccal epithelium by staining with supravital stains.
- Culture of amoeba, paramecium, euglena.
- Study of cell division mitosis/meiosis by squash and smear preparation of root tip and cockroach/grasshopper testis.
- Study of giant chromosome in the salivary gland of Chironomous larvae or Drosophila.
- Study of Barr body and human chromosome.
- Culture and study of drosophila.
- Preparation of culture media and culture of bacteria.
- Other exercise related to theory paper.

**General physiology and endocrinology**

- Estimation of RBC, hemoglobin, hematocrit/PVC, blood group and Rh factor blood clotting time.
- Determine the blood pressure of man.
- Determination of urea, glucose and ketone bodies in urine.
- Demonstration of osmosis.
- Dissection by using alternate methods like clay modeling and exposure of major endocrine glands in an experimental animals.
- Study of histology of endocrine glands in different animal types through permanent slides and microtomy.
- Other exercise related to theory paper.

EXAMINATION SCHEME

Exercise based on paper I	35 marks
Exercise based on paper II	35 marks
Viva	10 marks

Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

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## **M. Sc. ZOOLOGY SEMESTER – II**

### **LAB COURSE-II: (PRACTICAL BASED ON PAPER III & IV)**

#### **Development biology**


- Study of slides of development of frog.
- Study of development of Hen's egg, by cover glass window method, staining and mounting of blastodisc.
- Study of caudal regeneration in Teleost (Meal time effect).
- Study of embryological slides: spermatogenesis, oogenesis, histology of gonads.
- Study of effect of NaF/urea on growth of fish fingerlings.
- Study of effect of thyroid hormone on metamorphosis of tadpole
- Other exercises related to theory paper

#### **Quantitative biology and computer application**


- Preparation of frequency tables and graphs.
- Calculation of standard deviation, variance and standard error of mean.
- Calculation of probability and significance between means using t-test, Chi-square test, ANOVA
- Calculation of correlation, regression and probability distribution.
- Computer software use for computational tasks, data presentation, design task and communication
- Other exercises related to theory paper.

#### **EXAMINATION SCHEME**

Exercise based on paper III	35 mark
Exercise based on paper IV	35 mark
Viva	10 mark
Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

  
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## **M. Sc. ZOOLOGY SEMESTER - III**

### **PAPER-I: COMPARATIVE ANATOMY OF VERTEBRATES**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise) with internal choice.

#### **UNIT-I**

- Origin of Chordates
- Amphibians, Reptiles, Birds and Mammals.
  - Classification of Vertebrates and specialty of respective classes
- Amphibians, Gymnophiona Neoteny, Parental care
- Reptiles – Extinct reptiles
- Birds – Palate in Birds
- Mammals. – New world and old world Monkeys

#### **UNIT-II**


- Vertebrate integument and its derivatives.
- General structure and functions of Integument.
- Structure and functions of glands, scales, horns, claws, nails, hoof, feather and hair.
- Skeletal system in vertebrates.
- Comparative account of (i) Jaw suspensorium, (ii) Limbs and Girdles.

#### **UNIT-III**


- Respiration in Vertebrates.
- Comparative account of respiratory organs (structure and functions).
- Circulation in Vertebrates.
- Structure and function of blood.
- Evolution of heart.
- Evolution of aortic arches.

#### **UNIT-IV**

- Nervous System – Central, Peripheral and Autonomic.
- Sense organs.
- Comparative account of Sensory Receptors.
- Evolution of Urinogenital system in vertebrates.

  
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## **SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **Vertebrate life** :– William N. Ferland, F. Harvey Pough, Tom J. Gode, John B. Heiser
- Collier MacMillan International edition
- **Chordate morphology** :–Malcolm Jollie
- Reinhold Publishing Corporation New York
- **Chordate –Structure & Function** :- Arnold G. Khage, B.E. Fry Johanson
- Mc Millan Publishing Co. INC. New York
- **Comparative Animal Physiology** :- Orosier
- Satish Book Enterprises, Agra
- **The Vertebrate Body** :- Alfred Sherwood Romer
- Vakils, Feffer & Simons Publications Ltd.

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## **M. Sc. ZOOLOGY SEMESTER – III PAPER-II: ANIMAL BEHAVIOUR**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise) with internal choice.

### **UNIT- I**

- Historical perspectives- Ethology
- Behavioural patterns
- Innate behaviour
- Biological rhythms
  - Types of biological rhythm
  - Biological clock

### **UNIT- II**

- Communications
  - Auditory
  - Visual
  - Chemical
- Learning and Memory
  - Conditioning
  - Habituation
- Reasoning
- Reproductive behaviour.

### **UNIT-III**

- Orientation
  - Echolocation in bats
  - Bird migration and navigation.
  - Fish migration.
  - Neural and hormonal control of behaviour

### **UNIT-IV**

- Hormonal effect on behavioural patterns.
  - Social behaviour
  - Social organization in insects and primates
  - Schooling in fishes and Flocking in birds
  - Homing, territoriality, dispersal
  - Altruism
  - Host–parasite relation

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**SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

- **ANIMAL BEHAVIOR – Mc Farland** (English Language Book Society)
- **ANIMAL BEHAVIOR – Arora M.P.** (Himalaya Publishing House, Mumbai)
- **ANIMAL BEHAVIOR - Reena Mathur** (Rastogi Publications, Meerut)

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**M. Sc. ZOOLOGY SEMESTER – III**  
**PAPER – III: ENVIRONMENT PHYSIOLOGY AND**  
**POPULATION ECOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

**UNIT – I**

Population dynamics:

- Demography, life table, reproductive rates, reproductive values
- Population growth, exponential, non overlapping
- Stochastic and time lag models of population growth
- Population density
- Population evolution
- Community dynamics: Characteristics, development and classification

**UNIT-II**

- Adaptations
  - Levels of adaptation.
  - Mechanisms of adaptation.
- Adaptations to different environments.
  - Marine, shores and estuaries.
  - Freshwater.
- Terrestrial Life.

**UNIT-III**

- Stress Physiology
  - Basic concepts of environmental stress and strain, Concept of elastic and plastic strain.
    - Stress avoidance, stress tolerance and stress resistance.
    - Acclimatization, acclimation and adaptation.
    - Endothermic and physiological mechanism of regulation of body temperature.

**UNIT -IV**

- Stress physiology in different conditions
  - Osmoregulation in aqueous and terrestrial habitats.
  - Physiological response to oxygen deficient stress.
  - Physiological response to body exercise.
  - Effect of meditation and yoga

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**SUGGESTED READING MATERIALS - (ALL LATEST EDITION)**

**ECOLOGY** with special reference to animal & man

**S. Charles, Kendeigh** Prentice hall of India Pvt. Ltd. New Delhi

- **ELEMENTS OF TROPICAL ECOLOGY**
- **Yanney Ewusie** (English language Book Society, Heinemann educational book publication)
- **FUNDAMENTALS OF ECOLOGY**
- **Odum P.**
- **ANIMAL PHYSIOLOGY, MECHANISM AND ADAPTATION -**

**Eckert, R., W, H, Freeman and Co.**

- **BIOCHEMICAL ADAPTATION -**

**Hochachka, P.W, and Somero S.N,** Princeton, New Jersey

- **ANIMAL PHYSIOLOGY: ADAPTATION AND ENVIRONMENT.-**

**Schiemidt Nielsen,** Cambridge

- **GENERAL & COMPARATIVE ANIMAL PHYSIOLOGY**

**Hoar W.S.** Princeton Hall of India

- **ENVIRONMENTAL PHYSIOLOGY**

**Willmer, P.G. Stone & Johanson I,** Blackwell Science Oxford

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## **M. Sc. ZOOLOGY SEMESTER – III PAPER – IV: IMMUNOLOGY AND PARASITISM**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise with internal choice).

### **UNIT-I**

- Cells of immune system
- B-Lymphocytes, T-lymphocytes ( N K Cells, Helpa Cells, Killer Cells)
- Mononuclear cells
- Granulocytic cells (Neutrophils, Eosinophils and Basophils)
- Mast cells
- Dendritic cells
- Organs of immune system
- Primary lymphoid organs (Thymus, bone marrow)
- Secondary lymphoid organs (Lymph nodes, spleen, mucosal associated lymphoid tissue, cutaneous associated lymphoid tissue)

### **UNIT-II**

- Immunoglobulin structure and function
- Molecular structure of Ig, Light chain and Heavy chain
- Immunoglobulin classes
- IgG
- IgM
- IgE
- IgD
- Monoclonal antibodies

### **UNIT-III**

- Antigens Immunogenicity
- Contribution of the immunogens.
- Contribution of Biological system.
- Antigen - Antibody Interaction
- Antibody affinity and activity
- Cross reactivity
- Agglutination reactions
- Precipitation Reaction
- Vaccine
- Active and passive immunization
- Whole organism vaccine
- Recombinant vector vaccines
- DNA vaccines

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#### **UNIT-IV**

- Immune system in Health disease
- Immune response to infectious disease
- Immune response in cancer
  - Pathophysiology of parasitic infection
  - Viral infections
  - Bacterial infection
  - Helminths infection
- AIDS

#### **SUGGESTED READING MATERIALS**

- **Immunology**
- **Kuby, W.H. Froeman USA**
- **Fundamental of Immunology**
- **W. Paul,**
- **Essential Immunology**
- **I.M. Roitt, ELBs Edition**
- **Immunology**
- **Richard M. Hyde, Robert A. Patnode, A Wiley Medical Publications**
- **Reproductive Physiology**
- **Gayton,**

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**M. Sc. ZOOLOGY SEMESTER – III**  
**LAB COURSE-I: (PRACTICAL BASED ON PAPER I & II)**


- **Comparative anatomy of Vertebrates**
- Identification, classification and study of distinguishing features of important representatives, museum specimens and slides (Protochordates and Chordates)
- Comparative studies of integumentary, skeleton and reproductive system of major vertebrate classes.
- Dissections by using alternate methods like clay modeling: fowl/snake cranial nerves
- Wonder vertebrates
- Other exercise related to theory paper.

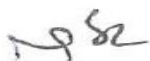
**Animal Behavior**


- To study the phototactic response in earthworm or grain/pulse pest.
- To study the geotaxis behavior of earthworm.
- To study the food preference and cleaning behavior of housefly.
- To study the food preference in tribolium or grain/pulse pests.
- To study the web construction and habituation in spider.
- Estimation of body temperature and pulse rate on daily time scale.
- Estimate the time perception among various individuals at two different time points on daily time scale.
- Determination of effect of time on schooling behavior in fish.
- Toxicological response of fish opercular and surfacing activity.

**EXAMINATION SCHEME**

Based on paper I	35 mark
Based on paper II	35 mark
Viva	10 mark
Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

  
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**M. Sc. ZOOLOGY SEMESTER – III**  
**LAB COURSE-II: (PRACTICAL BASED ON PAPER III & IV)**

**Immunology and Parasitism**

- Dissection of primary and secondary immune organs from fish/fowl- Preparation and study of cell suspension from spleen (spleenocytes) of fish / fowl.
- Total and differential counting of leucocytes.
- Protein estimation by Lowry's method in normal and infected blood sample.
- Determination of Blood group.
- Study of permanent slides (for spotting); thymus, lymph nodes, spleen, bone marrow, types of cells squamous, cuboidal, columnar, epithelial cells, blood cells, nerve cells, muscles cells, connective tissue of various types, adipose tissue, mitotic and meiotic chromosomes and their different phases cancer cells of various types etc.
- Study of parasites in fish
- Study of various parasites through slides and specimen.
- Other exercises related to theory paper.
- **Environmental Biology, Population ecology**
- Study of biotic community in a pond/grassland ecosystem.
- Study of population growth rate (curve) in protozoan culture.
- Population dynamics of *Tribolium* sp.
- Study of biogeochemical cycles by way of models.
- Visit to some natural habitats and man made habitats to study the human impact on environment.
- Water analysis for fresh and waste water (Dissolve oxygen and chloride).
- Other exercises related to theory paper.

**EXAMINATION SCHEME**

Based on paper III	35 mark
Based on paper IV	35 mark
Viva	10 mark
Sessional (Internal)	20 Mark
Total	<b>80+20 (100)</b>

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**M. Sc. ZOOLOGY SEMESTER – IV**  
**PAPER– I (Compulsory)**  
**BIOCHEMISTRY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise) with internal choice.

**UNIT-I**

- Properties of Proteins
  - Structure and properties of amino acids.
  - Classification of proteins.
  - Structure of proteins.
  - Biological Functions of Proteins.
  - Protein Metabolism.

**UNIT-II**


- Carbohydrates
  - Classification of carbohydrates.
  - Structure and Functions of Carbohydrates.
  - Carbohydrate metabolism.
- Lipid
  - Lipid structure and functions
  - Lipid metabolism.

**UNIT-III**


- Vitamins
  - Water and Fat soluble vitamins,
  - Chemistry, occurrence and physiological role.
- Enzymes
  - Classification and nomenclature.
  - Mechanism of action
  - Regulation of enzyme activity and functions of Co-enzymes.

**UNIT-IV**

- Nucleic acid
  - Chemistry of DNA.
  - Chemistry of RNA.
  - Biological importance of nucleic acids.
  - Nucleoproteins.
  - Metabolism of nucleic acids.

  
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**Suggested Reading**

**Lehninger Principles of Biochemistry, Fourth Edition**

David L. Nelson, Michael M. Cox

Publisher: W. H. Freeman

- **Biochemistry**

Donald Voet, Hardcover: 1616 pages,

Publisher: Wiley; 3 edition

- **Principles of Biochemistry With a Human Focus**

Reginald H. Garrett, Charles M.

Grisham Publisher: Brooks Cole

- **The Molecular Basis of Cell Cycle and Growth Control**

Gary S. Stein (Editor), Renato Baserga, Antonio Giordano, David T.

Denhardt, Publisher: Wiley-Liss

- **Experiments in Biochemistry: A Hands-On Approach**

Shawn O. Farrell, Ryan T. Ranallo,

Publisher: Brooks Cole

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# **M. Sc. ZOOLOGY SEMESTER – IV**

## **PAPER II (Compulsory)**

### **NEUROPHYSIOLOGY**

(There will be 5 questions of equal marks. First question will be based on complete syllabus with no internal choice, whereas rest questions will be unit wise) with internal choice.

#### **UNIT - I**

- Physiological role of neurosecretory cells
- Histological structure of neurons and neuroglial cells
- Physiological properties of neural fibres
- Synapsis and synaptical transmission
- Myoneural junction and neuromuscular transmission
- Degeneration and regeneration of nerve fibre

#### **UNIT - II**

- Nerve fibre, peripheral nerves, receptors and effector endings, dermatomes and muscle activity
- The spinal cord and the ascending and descending tracts
- The cranial and spinal nerves

#### **UNIT - III**

- The fore brain, brain stem, the cerebellum
- The meninges and cerebrospinal fluid
- Peripheral nervous system

#### **UNIT - IV**

- Autonomic nervous system; sympathetic and para-sympathetic nervous system with special comparison to hormonal mechanism of transmission through autonomic nervous system
- Reflex action; varieties, characteristics, unconditional reflex, electrophysiology of spinal reflexes
- Sensation
- Electro encephalography and its physiological basis.

#### **Suggested Reading**

- The Brain: Our Nervous System by Seymour Simon
- Mass Action in the Nervous System by Walter J. Freeman
- Human Anatomy and Physiology with Interactive Physiology 10-System Suite, 8th Edition by Elaine N. Marieb and Katja N. Hoehn (Jan 10, 2010)
- Neuroanatomy by H.G. Snell
- Clinical Neurophysiology-Guide for Authors - Elsevier
- Foundations of Cellular Neurophysiology (Bradford Books): Daniel Johnston, Optional papers

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## M.Sc. ZOOLOGY SEMESTER – IV

- The following optional papers are being suggested as below
- OPTIONAL (SPECIAL PAPER) GROUP 1
  - Fish (ichthyology) structure and function
  - Or
  - Cell Biology Or
  - Entomology Or
  - Wild life conservation Or
  - Biology of vertebrates immune system
- OPTIONAL (SPECIAL PAPER) GROUP 2
  - Pisci culture and economic importance of fishes (Ichthyology) Or
  - Cellular organization and molecular organization Or
  - Applied entomology Or
  - Environment and Biodiversity conservation Or
  - Molecular endocrinology and reproductive technology
- \*\* Student has choice to opt for one paper each (special paper) from group 1 and group 2

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## M. Sc Zoology Semester-IV

Paper- III A (optional paper)

Ichthyology (Fish) Structure and Function

### Unit-1

- Origin and evolution of fishes
- Classification of fishes as proposed by Berg
- Fish integument
- Locomotion
- Alimentary canal and digestion

### Unit-2

- Accessory respiratory organs
- Air bladder and its functions
- Weberian ossicles their homologies and functions
- Excretion and osmoregulation
- Acoustico-lateral line system

### Unit-3

- Luminous organs
- Colouration in fishes
- Sound producing organs
- Deep sea adaptations
- Hill stream adaptations

### Unit-4

- migration in fishes
- Sexual cycle and fecundity
- parental care in fishes
- Early development and hatching
- Poisonous and venomous fishes.

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## M.Sc Zoology Semester-IV

Paper- III B (Optional) Cell Biology

### Unit-1

- Molecular organization of eukaryotic chromosomes : structure of nucleosome particles and higher order compaction of mitotic chromosomes, chromatin remodeling
- specialized chromosomes: structural organization and functional significance of polytene chromosomes
- DNA methylation and DNA Aase-1 Hypersensitivity in relation to gene activity and chromatin organization.
- specialized chromosomes II : structural organization and functional significance of lampbrush chromosome.
- Organisation and significance of heterochromatin.

### Unit-2

- Structural organization of Eukaryotic genes, interrupted genes and overlapping genes and their evolution
- Gene families: organization, evolution and significance
- Transposable genetic elements of prokaryotes and eukaryotes Gene imitation and molecular mechanism of occurrence of mutation repair mechanism
- Organisation of eukaryotic transcriptional machinery promoter enhancers transcription factors polymerase activators and repressors.
- DNA binding domains of transcription apparatus zinc finger steroid receptors hemeo domains HILIX-loop, Helix and Leucine Zipper.

### Unit-3

- Eukaryotic transcription of Eukaryotic transcriptional control.
- Environmental modulation of gene activity (stress response) stress genes and stress proteins
- Molecular basis of thalasemias muscular dystrophy cystic fibrosis
- DNA rearrangement
- Amplification during development with special response to
- Ciliates
- Choriongenc
- 5 Ssribosomal RNA

### Unit-4

- Drosophila development
- Cleavage
- Gastrulation
- Origin of Anterior –Posterior (Maternal effect genes and segmentation genes
- Drosophila development II origin of dorsal ventral polarity
- Basic idea of homoetic selector genes and homeotic mutation
- Basic idea of organization of homeoboxes
- Evolutionary significance of homeoboxes

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**Suggested Reading Materials:**

- Robertis, De and Robertis Cell and molecular biology Lea and Febiger.
- Watson Hopkis Roberts Steitz Weiner, Molecular Biology of the Gene the Benjamin, Cummings Publishin Company inc.
- Bruce A; berts Bray ewis Raff Roberts Watson Molecular Biology of the Cell, Garland Publishing inc.
- Watson Gilman Witkowski Zoller Recombinant DNA Scientific American Books.
- Karp Gerald Cell Biology.
- Lewin B., Genes VII.
- King Cell Biology.
- Kaniel L. Hartl, Elizabeth W. Jones. Genetics Principals and Analysis, Jones and Bartlett Publishers.
- Kuby, Immunology, W.H. Freeman and Company.
- Roitt Male Snustad Immunology.

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**M.Sc. Zoology Semester-IV**  
**Paper- III**  
**C (Optional) Entomology**

Unit-1

- Insect head types and modification as per their habit and habitat
- Modification of mouth parts and feeding behaviour
- Structure types and function of antennae
- Hypothetical wing venation
- Structure of cuticle and pigment

Unit-2

- Sclerotisation and tanning of the cuticle
- Structure of alimentary canal and Physiology of digestion
- Malpighian tubules – anatomical organization , Transport mechanism
- Structure of circulatory system
- Cellular elements in the haemolymph

Unit-3

- Structure of compound eye and Physiology of Vision
- Sound Production in insect
- Structure and function of endocrine glands
- Pheromones

Unit-4

- Embryonic membranous up to the formation of blastoderm
- Metamorphosis
- Insecticide effects on CNS
- Important pest of Soybean Modern concept of pest management

Suggested Reading Materials:

- The Insect: Structure and function by R.F. Chapman
- Comparative Insect physiology, Biochemistry and Pharmacology .Vol :1-13.  
Edited by G.A. Kerkut and L.I. Gilbert.
- Entomophagous Insect by Clausen
- Entomology by Gilbert
- Principles of Insect Physiology by Wigglesworth.
- Fundamentals of Entomology by Elzinga
- Hand book of economic Entomology for South India by Ayyar.
- Insect cytogenetics by R.E.F.Symposium.
- Insects and plants by Sting, Lawton and southwood.
- Insect and hygiene by Busvine.
- Insect Physiology by Wigglesworth.
- Insect morphology by Mat Calf and Flint
- Applied Agricultural Entomology by Dr. Lalit Kumar Jha

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**M.Sc. Zoology Semester-IV**  
**Paper- III D (Optional) Wild Life Conservation**

**Unit-1**

- Wild life -
- Values of wild life - positive and negative.
- Our conservation ethics.
- Importance of conservation.
- Causes of depletion.
- World conservation strategies.
- Habitat analysis, Evaluation and management of wild life.
- Physical parameters - Topography, Geology, Soil and water.
- Biological Parameters - food, cover, forage, browse and cover estimation.
- Standard evaluation procedures - remote sensing and GIS.
- Management of habitats -
- Setting back succession.
- Grazing logging.
- Mechanical treatment.
- Advancing the successional process.
- Cover construction.
- Preservation of general genetic diversity.

**Unit-2**

- Population estimation.
- Population density, Natality, Birth rate, Mortality, fertility schedules and sex ratio
- computation.
- Faecal analysis of ungulates and carnivores - Faecal samples, slide preparation, Hair identification, Pug marks and census method.
- National Organization.
- Indian board of wild life.
- Bombay Natural History Society.
- Voluntary organization involved in wild life conservation.
- Wild life Legislation - Wild Protection act - 1972, its amendments and implementation.
- Management planning of wild life in protected areas.
- Estimation of carrying capacity

**Unit-3**

- Eco tourism / wild life tourism in forests.
- Concept of climax persistence.
- Ecology of perturbation.
- Management of excess population & translocation.
- Bio-telemetry.
- Care of injured and diseased animal.

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#### Unit-4

- Quarantine.
- Common diseases of wild animal.
- Protected areas National parks & sanctuaries, Community reserve.
- Important features of protected areas in India.
- Tiger conservation - Tiger reserve in M.P, in India.
- Management challenges in Tiger reserve.

#### Suggested Reading Materials:

- Gopal Rajesh : Fundamentals of wild life management
- Agrawal K.C : Wild life India
- Dwivedi A.P (2008) : Management wild life in India
- Asthana D.K : Environment problem and solution
- Rodgers N.A & Panwar H.S : Planning of wild life / Protected area Network in India vol. the report, wild life Institute of India Dehradun.
- Odum E.P : Fundamentals of Ecology
- Saharia V.B : Wild life in India
- Tiwari S.K : Wild life in Central India
- E.P Gee : Wild life of India
- Negi S.S : Wild life conservation (Natraj Publishers)

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**M. Sc Zoology Semester-IV**  
**Paper- III E (Optional)**  
**Biology of vertebrate immune system**

**Unit-1**

- Tissues of Immune system- Primary lymphoid organs, structure and functions
- (Thymus and Bursa of Fabricius)
- tissues of Immune system- Secondary lymphoid organs, structure and functions
- (Spleen, lymphnode and Payers patches)
- Antigen processing
- Antigen presentation

**Unit-2**


- **T-cell** lineage and receptors
- T-cell activation
- B-cell lineage and receptors
- B-cell activation
- Immunoglobulin structure, Biological and physical properties of immunoglobulin
- Gene model for Immunoglobulin gene structure

**Unit-3**


- Generation of antibody diversity ( Light and heavy chain)
- Immunization
- Immediate type of hypersensitivity reaction of Anaphylectic type-1.
- Antibody dependent cytotoxic type II reaction.
- . Complex mediated type III reaction

**Unit-4**

- Delayed type cell mediated hypersensitivity type IV reaction.
- Enzyme linked immunosorbent assay (ELISA) technique and its applications.
- Immunofluorescence technique (Direct & Indirect and Sandwich antibody labelling techniques.
- Immunodiffusion techniques (Mancini and Ouchterlony immunodiffusion techniques) Monoclonal antibody technology (Hybridoma technology)

  
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## M.Sc Zoology Semester-IV

### Paper- IV A (Optional)

#### Pisci Culture and Economic Importance of Fishes (Ichthyology)

##### Unit-1

- Collection of fish seed from natural resources and transportation of fish seed.
- Breeding in fish, Bundh breeding and Induced breeding.
- Types of ponds required for fresh water fish culture farms.
- Management of fish farm.
- Physiochemical factors of freshwater for fish farming.

##### Unit-2

- Composite fish culture
- Prawn culture and pearl industries in India.
- Fisheries resources of C.G.
- Riverine fisheries.

##### Unit-3

- Costal fishries in India
- Offshore and deep sea fishery's in India
- Role of fishries in rural development
- Sewage fed fishries

##### Unit-4

- Methods of fish preservation
- Marketing of fish in India.
- Economic importance and by product of fishes
- Fish disease.

##### Suggested Reading Materials: Paper III A & IV A

- JR. Norman - The History of fishes.
- Nagaraja Rao - An introduction to fisheries.
- Lagler Ichthyology.
- Herclen Jones Fishmigration.
- Marshal The life of fishes.
- Thomas - Diseases of fish.
- Greenwood - Inter relationship of fishes.
- Gopalji, Srivastava - Freshwater fishes of U.P. and Bihar.
- Brown -Physiology of fishes Vol. I & II.
- Hoar and Randall -Fish physiology of fishes Vol. 1 & IX.
- Gunther Sterba C.N.H.-Freshwater fishes of the world
- W. Lanham -The Fishes.
- G.V. Nikolsky -The ecology of Fishes,
- Borgstram -Fish as food Vol. I & II.
- Nilsson -Fish physiology -Recent Advances.
- P.B. Myle and J.J. Cech Fishes An Introduction to Ichthyology.
- Carl E. Bond -Biology of fishes.
- M. Jobling -Environmental Biology of fishes.
- Santosh Kumar & Manju Ternbhre -Fish and Fisheries.
- S.K. Gupta-Fish and Fisheries
- K.P. Vishwas -Fish and Fishries.
- Jhingaran -Fish and Fishries.

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**M.Sc. Zoology Semester-IV**  
**Paper- IV B (Optional)**  
**Cellular Organization and Molecular Organization.**

**Unit-1**

- General organization and characterizes of viruses (Examples SV 40 and HIV).
- Yeast : Structure, reproduction and chromosome organization: Basic ideas of its applications as vectors for gene cloning.
- Molecular organization of respiratory chain assemblies, ATP / ADP
- Translocase and FOF1 ATPase.
- Cell cycle: Cell cycle control in mammalian cells and xenopus.
- Cytochemistry of Golgin complex and its role in cell secretion.,

**Unit-2**


- Peroxisomes and training of peroxysmal proteins.
- Nucleolus: Structure and Biogenesis and functions of lysosomes.
- Intracellular digestion : Ultra structure and function of lysosomes.
- Synthesis and targeting of mitochondrial proteins.
- Secretory pathways and translocation of secretory proteins across the EPR membrane.

**Unit-3**


- Genome complexity: C- value [paradox and cot value].
- DNA sequences of different complexity.
- Difference between normal cells and cancer cells.
- Biochemical changes.
- Cytoskeleton changes.
- Cell surface changes.
- Genetic basis of human cancer

**Unit-4**

- Chromosomal abnormalities in human cancer.
- General idea of oncogenes and proto oncogenes.
- Oncogenesis and cancer.
- Transforming Agents.
- Tumor Suppressor genes.
- Receptor – Ligand interaction and signal transduction. Cross – talk among various signaling pathways.

  
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## Suggested Reading Materials:

- DeRobertis and De Robertis Cell and Molecular Biology. Lea and Febiger.
- We Watson Hopking reberts steits, Weiner molecular biology of the gene, the Benjamin / Cummings Publishin Company Inc.
- Bruce alberts, Bray, Lewis, Raff, Roberts, Watson molecular Biology of the cell garland publishing inc.
- P.K. Gupta, Molecular Cell Biology Rastogi Publication.
- Watson Gilman Witkowski, Zoller Recomdinant D.N.A. scientific American Books.
- Gerald Karp. Cell Biology.
- Lewin B. Genes VII.
- King Cell Biology.
- Baniel L. HArtl Elizabeth W. Jones, Genetics Principles and analysis. Jones and Bartlett Publisher.
- Lodish, Berk Zipursky, Matsudaira Baltimore Dernell Molecular Cell Biology W.H.Freeman and company.
- J. Travers Immunology current Biology limited.
- Kubey Immunology W.H. Freeman and Company.
- Riott, Male snustad Principles of genetics john weley and sons Inc.

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# **M. Sc Zoology Semester-IV**

## **Paper- IV C (Optional)**

### **Applied Entomology**

#### **Unit-1**

Classification according to immms

- Classification of apterygota upto families.
- Classification of following insect orders

(a) orthoptera (b) hemiptera (c) diptera.

- Classification of following insect order

(a) hymenoptera (b) lepidoptera (c) coleoptera

- Collection and preservation of insects.

#### **Unit-2**


- Insect pest-Management strategies and tools
- Biological control, Genetic control, Chemical control
- Pests of Cotton
- Pests of sugarcane
- Pests of paddy
- Pests of stored food grains
- Pests of citrus fruits and mango
- Pests of pulses
- House hold insect pests

#### **Unit-3**


- Insects in relation to forensic science
- Insects migration, population fluctuation and factors
- Insects of medical and veterinary importance
- Ecological factors affecting the population and development of Insects

#### **Unit-4**

- Mulberry and non mulberry sericulture
- Apiculture
- Lac culture
- Insects as human food for future.

  
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**M. Sc. Zoology Semester-IV**  
**Paper- IV D (Optional)**  
**Environment & Biodiversity Conservation**

**Unit I**

- Basic concept of Environmental Biology  
Scope and Environmental Science
- Biosphere and Biogeochemical cycles.
- Environmental monitoring and impact assessment.
- Environmental and sustainable development.
- Water conservation, rain water harvesting, water shed management.

**Unit II**

- Cause, effects and remedial measure of Air pollution, Water pollution.
- Noise, radioactive and thermal pollution.
- Agriculture pollution
- Basic concepts of Bioaccumulation.
- Solid waste management.

**Unit III**

Global warming and disaster management

- Cause of global warming
- Impact of global warming – acid rains and ozone depletion, green house effect.
- Control measures of global warming
- Afforestation (b) reduction in the use of CFCs
- Disaster management - floods, earthquake, Cyclones, landslides.
- Environmental legislation.

**Unit IV**

Natural Resources:- Forest-

- Use and over exploitation of forests.
- Timber extraction. Land
- Land degradation. Landslides.
- Soil-erosion and desertification. Water
- Use and over utilization of surface and ground water
- Floods. Drought dams- benefits and problems Mineral
- Use and exploitation,
- Environmental effect of extracting and using mineral resources Food
- World food problem
- Effects of modern agriculture and overgrazing Energy
- Conventional and nonconventional energy resources.
- Using of alternate energy sources
- Role of an individual in conservation of natural resources Equitable use of resources for sustainable life
- Biodiversity crisis – habitat degradation poaching of wild life.
- Socio economic and political causes of loss of biodiversity.
- In situ and ex situ conservation of biodiversity
- Value of biodiversity.

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### **Suggested Reading Materials: Paper III D & IV D**

- Arora: Fundamentals of environmental biology
- Anathakrishnan : Bioresources ecology
- Bottain : Environmental studies
- Bouhey : Ecology of populations
- Clark : Elements of ecology
- Dowdswell : An introduction to animal ecology
- Goldman : Limnology
- Kormondy : Concepts of ecology
- May : Model ecosystems
- Odum : Ecology
- Perkins : Ecology
- Simmons : Ecology of estuaries and coastal water
- Pawlosuske : Physico-chemical methods for water
- South Woods : Ecological methods
- Trivedi and Goel : Chemical and biological methods for water pollution studies
- Willington : Fresh water biology
- Wetzel : Limnology
- Welch : Limnology Vols. I-II

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**M.S c Zoology Semester-IV**  
**Paper- IV E (Optional)**  
**Molecular Endocrinology and Reproductive Technology**

**UNIT-1**

- Definition and scope of molecular endocrinology.
- Chemical nature of Hormones-
- Protein & polypeptides.
- Amino acid derivative
- Steroids
- Phospholipids derivative
- (tissue hormones)
- Purification and characterization of Hormones.

**UNIT-2**


- Receptor.
- Membrane Receptor.
- Nuclear Receptor.
- Orphan Receptor
- G-Protein
- Nuclear Receptor

**UNIT-3**


- Hormone – Transduction
- G-Protein & Cyclic Nucleosides.
- Calcium calmoduline & phospholipids.
- Miscellaneous Second Messengers.
- Phosphorylation & other non transcriptional effect of Hormones.
- Genetic control of formation of Hormone.
- Transcription.
- Post transcription.
- Translation.
- Post translation
- Secretion of Hormone.

**UNIT-4**

- Multiple ovulation and embryo transfer Technology.
- Study of estrous cycle by vaginal smear technology
- Surgical technique-
- Castration
- Ovariectomy
- Vasectomy
- Tuectomy
- Laprotomy.

  
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### **Suggested Reading Materials:**

- Benjamin Lewin – Genes VII/ VIII, Oxford University Press.
- Lodish et al- Molecular Cell Biology.
- Zarrow, M.X., Yochim J.M. and Machrthy, J.L. – Experimental Endocrinology.
- Chatterji C.C.- Human Physiology (Vol- II).
- Bentley, P.J. – Comparative Vertebrate endocrinology.
- Hadley Mac. E.- Endocrinology.
- Chinoy, N.J. Rao, M.V., Desai, K.J. and High land, H.N. – Essential techniques in reproductively physiology and Endocrinology.
- Norris, D.O. – Vertebrate Endocrinology.

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**M.Sc. ZOOLOGY - IV SEMESTER  
LAB COURSE-I (COMPULSARY)**

**PAPER- I BIOCHEMISTRY**


1. Estimation of antioxidant enzymes.
2. Estimation of amylase. analitattative shudy of a my lase
3. analitattative study of protem
4. analitattative study of CBH
5. Estimation of protein by Lowry method.
6. Estimation of Oil in seeds.
7. Estimation of Carbohydrate by anthrone reagent.
8. Other exercise related to theory paper.

**PAPER- II NEUROPHYSIOLOGY**


1. Study of slides of nervous system.
2. Neck nerve of squirrel by using alternate methods like clay modeling.
3. Study of Brain through Model.
4. Study of Cranial nerve of Bird, Amphibian, Reptile and Mammals by using alternate methods like clay modeling.
5. Other exercise related to theory paper.

**EXAMINATION SCHEME**

Based on paper I	35 marks
Based on paper II	35 marks
Viva	10 marks
Sessional (Internal)	20 mark
<b>Total</b>	<b>80+20 (100)</b>

  
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**M.Sc. SEMESTER-IV**  
**LAB COURSE-II**  
**OPTIONAL (SPECIAL PAPER) GROUP 1**

**PAPER-III(A) FISH (ICHTHYOLOGY) STRUCTURE AND FUNCTION**

1. Anatomy of various organ systems and mounting of fish materials
2. Cranial nerves of teleost fishes: *Wallago*, *Mystus*, *Labeo* and other fishes by using alternate methods like clay modeling
3. Osteology of fish: *Scoliodon*, carps, catfishes, murrels etc.
4. Accessory respiratory organs of air breathing fish by using alternate methods like clay modeling
5. Study of histological (permanent) slides
6. Study of museum specimens of the concerned group
7. Other exercise related to theory paper.

**PAPER –III(B) CELL BIOLOGY**


1. Study of mitosis from onion root tip.
2. Study of meiosis in grasshopper testis.
3. Study of polytene chromosome in Dipteran Larvae.
4. Demonstration of Barr-Body in Human Cheek cell.
5. Estimation of DNA.
6. Estimation of RNA.
7. Other exercise related to theory paper.

**PAPER –III(C) ENTOMOLOGY**


1. Anatomy of common grasshopper, cockroach, honey bee, wasp and dysdercus, mylabris, belestoma (Giant water Bugs) by using alternate methods like clay modeling.
2. Dissection by using alternate methods like clay modeling and exposure of:
  - (i) Sting apparatus of honey bee and wasp.
  - (ii) Tympanal organs of grasshoppers.
  - (iii) Testes of cockroach
  - (iv) Aristae of house fly.
  - (v) Different types of mouthparts of insects.
  - (vi) Different types of wings and antennae of insects.
  - (vii) Tentorium of grasshoppers.
3. Identification and comment on insects of different orders and families.
4. Identification with the help of keys of common insects from different orders and families.
5. Other exercise related to theory paper.

**PAPER-III(D) WILD LIFE CONSERVATION**

1. Anatomy of (by using alternate methods like clay modeling):
  - (a) Toad / Frog.
  - (b) Lizard / Snake / Turtle.
  - (c) Pigeon / Parrot.
  - (d) Rat / Squirrel.
2. Ecological survey of National Parks and Sanctuaries.
3. Mounting: Permanent preparation of parts of internal organs.
4. Study of slides of different microscopic structure.
5. Identification of wild animal species as objects of museum and zoo and specimens of photographs.
6. Osteology of wild animals.
7. Ecological comments on wild species of different niche and habits. Candidates would be required to keep records of exercise in laboratory, field types, sanctuaries and parks of importance and collections.
8. Other exercise related to theory paper.

  
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### **PAPER-III(E) BIOLOGY OF VERTEBRATE IMMUNE SYSTEM**

1. Dissection by using alternate methods like clay modeling of primary and secondary immune organs from mice:
  - a. Preparation of single cell suspension from bone marrow and spleen (spleenocytes) of mice.
  - b. Cell counting and viability testing of the spleenocytes prepared.
2. Preparation and study of phagocytosis by splenic/peritoneal macrophages.
3. Raising polyclonal antibody in mice, serum collection and estimating antibody titre in serum by following methods:
  - a. Ouchterlony (double diffusion) assay for Antigen -antibody specificity and titre.
  - b. ELISA
4. Antibody purification from the serum collected from immunized mice:  
affinity purification/chromatography.
5. Immunoelectrophoresis.
6. Demonstration of Western blotting:
  - a. Protein estimation by Lowry's method /Bradford's method
  - b. SDS-PAGE.
  - c. Immunoblot analysis.
7. Other exercise related to theory paper

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## OPTIONAL (SPECIAL PAPER) GROUP 2

### PAPER –IV(A) PISCI CULTURE AND ECONOMIC IMPORTANCE OF FISH (ICHTHYOLOGY)

1. Systematic identification of freshwater fishes with particular reference to C.G.
2. Age determination with the help of scales / otolith
3. Pigmentary behaviour in fish
4. Qualitative zooplankton analysis
5. Nutrient analysis of water
6. Analysis of gut contents
7. Microtomy of fish materials
8. Other exercise related to theory paper

### PAPER-IV(B) CELLULAR ORGANIZATION AND MOLECULAR ORGANIZATION

1. Histochemical demonstration of Mitochondria
2. Histochemical demonstration of Golgi complex
3. Histochemical demonstration of Lactate dehydrogenase
4. Histochemical demonstration of Succinate dehydrogenase
5. Isolation and characterization of Nuclei from liver
6. Isolation and characterization of Mitochondria
7. Isolation of DNA from any tissue
8. Separation of lipids using thin layer chromatography
9. Separation of various proteins using column chromatography
10. Study of metaphase chromosomes from rat bone marrow
11. G banding of metaphase chromosomes
12. C- banding of metaphase chromosomes
13. Estimation of Mitotic Index
14. Measurement of cell size using oculometer.
15. Other exercise related to theory paper

### PAPER- IV(C) APPLIED ENTOMOLOGY

1. Insect collection and preservation for systematic studies
2. Identification of different insects upto orders
3. Identification of insects upto families of economically important insect orders
4. Identification of insects upto species: Mosquitoes, honeybees, stored grain beetles, aquatic insects, important crop and household pests
5. Analysis of honey and its quality control
6. Field studies of insects to understand their habit, habitat environmental impact, beneficial and harmful activities etc.
7. Study of beneficial insects, benefits derived from them and useful products
8. Study of destructive insects, damage caused by them and damaged products
9. Study of insecticidal formulations and insect control appliances
10. Experiments on insect control like LC-50 /LD-50, knock down and recovery effect, repellency/antifeedance tests, percentage damage tests for leaf eating insects, and stored grain pests
11. Other exercise related to theory paper

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**PAPER- IV(D) ENVIRONMENT AND BIODIVERSITY CONSERVATION**

- (i) Environmental hazards, destruction of habitat and extrication of species causes and preventive measures.
- (ii) Environmental planning of rural and urban development.
- (iii) Management of soil resources.
- (iv) UNESCO's role in ecology, earth summit, SARC, ED trust fund.
- (v) Biodiversity, its significance and conservation measures.
- (vi) Role of biodiversity in species development.
- (vii) Other exercise related to theory paper


**PAPER- VI(E) MOLECULAR ENDOCRINOLOGY AND REPRODUCTIVE TECHNOLOGY**

- 1. Chromatography method (separation of Androgen & Progesterone).
- 2. Bioassay of  $\alpha$ -Ketosteroids.
- 3. Bioassay of Gonadotropins.
- 4. Study of slide related to endocrine glands.
- 5. Estimation of cholesterol.
- 6. Estimation of catecholamine.
- 7. Dissection by using alternate methods like clay modeling of endocrine glands.
- 8. Other exercise related to theory paper.


**EXAMINATION SCHEME**

Based on paper III	35 marks
Based on paper IV	35 marks
Viva	10 marks
Sessional (Internal)	20 mark
<b>Total</b>	<b>80+20 (100)</b>

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# HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

Website - [www.durguniversity.ac.in](http://www.durguniversity.ac.in), Email - [durguniversity@gmail.com](mailto:durguniversity@gmail.com)



## SCHEME OF EXAMINATION & SYLLABUS of P.G.D.C.A. Semester Exam UNDER FACULTY OF COMPUTER SCIENCE Session 2019-20

(Approved by Board of Studies)  
Effective from June 2019

POST GRADUATE DIPLOMA IN COMPUTER APPLICATION, 2019-2020

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A handwritten signature in blue ink, appearing to be 'S. Manish', with the date '16.05.19' written below it.

A handwritten signature in blue ink, appearing to be 'P. K.', with the date '16/5/19' written below it.

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## **[DURATION - ONE YEAR - FULL TIME]**

The duration of the course shall be one year consisting of two semesters. There shall be three theories and two practical courses in the each semester.

### **FIRST SEMESTER**

**PGDCA-101 : Introduction to software organization**

**PGDCA-102 : Programming in “C”**

**PGDCA-103 : Office Automation & Tally**

**PGDCA-104 : Practical based on PGDCA-103.**

**PGDCA-105 : Practical based on PGDCA-102.**

### **PGDCA-101**

## **INTRODUCTION TO SOFTWARE ORGANISATION**

### **UNIT – I: Introduction to Computers**

Computers – Introduction, Computer System Characteristics, Strength and Limitations of Computer, Development of Computers, Types of Computers, Generations of Computers.

Introduction to Personnel Computers – Uses of PC's, Components of PC's, Evolution of PC's, Developments of Processors, Architecture of Pentium IV, Configuration of PC's; Input Device; Output Devices.

### **UNIT – II : Computer Organization**

Central Processing Unit – Arithmetic Logic Unit, Control Unit, Registers, Instruction Set, Processor speed. Storage Devices – Storage and its need, Storage Evaluation Units, Primary Storage, Secondary Storage, Data Storage and Retrieval Systems, SIMM, DIMM, Types of Storage Devices.

### **UNIT – III : Computer Software**

Basics of Software – needs of Software, Types of Software; Free Domain Software; Open Source Software; Compiler, Interpreter and Assembler; Linker and Loader; Debugger; Integrated Development Environment; Operating System – Introduction, Uses of OS, Functions of OS, Booting process, Types of Reboot, Booting from different OS, Types of OS, DOS, Windows, Linux.

**UNIT – IV: Programming Languages** – Introduction, Comparison between Human and Computer Language; Program; Data, Information and Knowledge; Characteristics of Information; Types of Programming Languages; Generations of Languages; Program Development Steps; Programming Paradigms; Object-Oriented Programming; Structured Programming, Functional Programming, Process Oriented Programming.

### **UNIT – V : Communication, Networks and Internet**

Communication – Introduction, Communication process, Communication Types, Communication Protocols, Communication Channels/Media. Networks – Introduction; Types of Network; Topology; Media - NIC, NOS, Bridges, HUB, Routers, Gateways. Internet – Introduction, Growth of Internet, Owner of Internet, Internet Service Provider, Anatomy of Internet, ARPANET and Internet History of World Wide Web, Services Available on Internet - File Transfer Protocol, Gopher, E-mail, Telnet, Newsgroups, WWW, Applications of Internet.





### Books Recommended

1. Using IT
2. Essentials of Information Technology
3. IT
4. Fundamental of Information Technology
5. Computer Fundamentals
6. Fundamental of Computer
7. Computer today

: Williams T M Hill  
: A. Mansoor, Prgya Publications  
: Curtin T M Hill  
: Chetan Shrivastava\_Kalyani Publishers  
: P.K Sinha BPB Publications  
: V. Rajaraman  
: Sanders D.H



  
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**PROGRAMMING IN 'C'**

**UNIT – I: Introduction:**

Introduction Character set, Identifiers and Keywords, Variables, Displaying variables, Reading Variables, Character and Character String, Qualifiers, Type define Statements, Value initialized variables, Constants, Constant Qualifier, Operators and Expressions, Operator Precedence and Associativity, Basic input output: Single Character I/O, Types of Characters in format string, Scanf with specifier.

**UNIT – II : Control Structures -**

Control Structure: If - statement, If -else statement, Multi decision, Compound Statement, Loops: For - loop, While -loop, Do-While loop, Break statement, Switch statement, Continue statement, Go to statement.

**UNIT – III: Functions & Arrays-**

Functions: Function main, Functions accepting more than one parameter, User defined and library functions, Concept associatively with functions, function parameter, Return value, recursion comparisons of Iteration and recursion variable length argument list.

Arrays: Scope and Extent, Multidimensional Arrays, Array of Strings, Function in String, passing arrays to functions, accessing array inside functions.

**UNIT – IV Pointes**

Pointers: Definition and use of pointer, address operator, pointer variable, referencing pointer, void pointers, pointer arithmetic, pointer to pointer, pointer and arrays, pointer and functions, pointers and two dimensional arrays, array of pointers, pointers constants, pointer and strings.

**UNIT – V: Structure and Union -**

Declaring and using Structure, Structure initialization, Structure within Structure, Operations on Structures, Array of Structure, Array within Structure, Creating user defined data type, pointer to Structure and function. Union, difference between Union and Structure, Operations on Union, Scope of Union.

**Suggested Books:-**

- |                     |                      |
|---------------------|----------------------|
| 1. Letus C          | - Yashwant Kanetkar. |
| 2. Programming in C | - E. Balaguruswamy   |



**OFFICE AUTOMATION & TALLY**

**UNIT – I: Windows Concept**

Windows Concepts, Features, Structure, Desktop, Icons, Taskbar, Start Menu, My Computer, Recycle Bin, My document, creating shortcut. Accessories: Calculator, Notepad, Paint, Word Pad, Character Map. Windows Explorer: Creating files & folders and other Explorer facilities, Object Linking & Embedding. Communication: Dialup Networking, Phone Dialer. Difference among windows versions.

**UNIT – II : Word Processing & Spreadsheet**

**Word :** Creating, Editing, & Previewing Documents, Formatting, Advanced Features, Using Thesaurus, Mail Merge, Table & Charts, Handling Graphics, Converting Word Documents into other Formats.

**Excel:** Worksheet Basics, Creating, Opening, & Moving in Worksheet, Working with Formula & Cell referencing, Absolute & Relative addressing, Working with Ranges, Formatting of Worksheet, Graphs & Charts, Database, Function, and Macros.

**UNIT – III: Power Point**

**Power Point:** Creating a presentation, Modifying visual Elements, Adding objects, Applying Transitions, animations and linking, preparing handouts, presenting a slide show. Creating presentation, working with slides, different types of slides, setting page layout, selecting background and applying design, adding graphics to slide, adding sound and movie, working with table, creating chart and ginih, playing a slide show, slide transition, advancing slides, setting time, rehearsing timing, animating slide, animating objects, running the show from windows.

**UNIT – VI: Access**

Introduction to MS Access, The Tables of a Database, Introduction to the Record of a Table, Introduction to Controls Design, Details on Controls Design, The Characteristics of a Table, The Characteristics of a Form, The Characteristics of a Window Control, Data Controls, Introduction to Data Expressions, Getting Assistance With Data Entry, Database Strings, Database Numeric Values, Database Conditional Values, Database Date and Time Values, Creating Reports, Characteristics of Reports. Multiple queries and switch boards manager.

**UNIT – V:Tally**

Setting up Ledger & Groups. Study of recording of transactions in the 'Voucher'. (According to Golden rules). Study of 'Final A/C preparation & displaying in different mode/format'. Study of alteration & Deletion of ledger/Groups. Study of cash & fund flow, day book, sales register, purchase register, bills receivable/Payable etc. Study of data security & backing up data. Outline of entry for Income Tax, ED, VAT, ST/CST, PF, Gratuity, Bonus, Loans & Depreciation etc.

## PGDCA-104: Practical based on PGDCA-103

### 1. Scheme of Examination: -

Practical examination will be of 3 hours duration. The distribution of practical marks is as follows :

Question1(Word)	-	15
Question 2 (Excel/ Power point)	-	15
Question3(Access)	-	15
Question4(Tally)	-	15
Viva-Voice	-	20
[Practical Copy +InternalRecord]	-	20
Total	-	100

2 In every program there should be comment for each coded line or block of code.

3 Practical file should contain printed programs with name of author, date, path of program, unit no. and printed output.

4 All the following programs or a similar type of programs should be prepared.

### List of Practical

1. At least 10 practical Questions in Word
2. At least 10 practical Questions in Excel
3. At least 5 practical Questions in Powerpoint
4. At least 10 practical Questions in Access
5. At least 5 practical Questions in Tally

## PGDCA-105 :Practical based on PGDCA-102

### 1 Scheme of Practical Examination:-

Practical examination will be of 3 hours duration. All programs with flowchart & algorithms. The distribution of practical marks is as follows and

Question 1 (with flowchart & algorithms)	-	20
Question 2 (with flowchart & algorithms)	-	20
Question 3 (with flowchart & algorithms)	-	20
Viva-Voice	-	25
[Practical Copy + Internal Record]	-	15
Total	-	100

2 Practical file should contain printed programs with name of author, date, path of program, unit no. and printed output.

3 In every program there should be comment for each coded line or block of code.

4 All the programs or a similar type of programs should be prepared as per the practical list.



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## List of Practical

### INPUT AND OUTPUT, FORMATTING

1. Write a program in which you declare variable of all data types supported by C language. Get input from user and print the value of each variable with alignment left, right and column width 10. For real numbers print their values with two digits right to the decimal.

### LOOPS, DECISIONS

2. Write program to print all combination of 1 2 3.
3. Write program to generate following pattern)

c)

```
* * * * *
* * * *
* * *
* *
*
* * * * *
```

b) 1  
2 3  
4 5 6  
7 8 9 10

d) 1  
2 1 2  
3 2 1 2 3  
4 3 2 1 2 3 4

4. Write main function using switch...case, if.. else and loops which when called asks pattern type; if user enters 11 then first pattern is generated using for loop. If user enters 12 then first pattern is generated using while loop. If user enters 13 then first pattern is generated using do-while loop. If user enters 21 then a second pattern is generated using for loop and so on.
5. Write program to display number 1 to 10 in octal, decimal and hexa decimal system.
6. Write program to display number from one number system to another number system. The program must ask for the number system in which you will input integer value then the program must ask the number system in which you will want output of the input number after that you have to input the number in specified number system and program will give the output according to number system for output you mentioned.
7. Write a program to perform following tasks using switch...case, loops and conditional operator (a and when necessary).
  - a) Find factorial of a number
  - b) Print fibonacci series up to n terms and its sum.
  - c) Print sin series up to n terms and its sum.
  - d) Print prime numbers up n terms.
  - e) Print whether a given year is leap or not.
8. Write program no. 6 but use library function to perform above tasks.

### ARRAY

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9. Create a single program to perform following tasks using switch, if. Else, loop and single dimension character array without using library function:
  - a) To reverse the string.
  - b) To count the number of characters in string.
  - c) To copy the one string to other string;
  - d) To find whether a given string is palindrome or not.
  - e) To count no. of vowels, consonants in each word of a sentence and no. of punctuation in sentence.
  - f) To arrange the alphabets of a string in ascending order.
10. Create a single program to perform following tasks using switch, if. Else, loop and single dimension integer array:
  - a) Sort the elements.
11. Write a program that read the afternoon day temperature for each day of the month and then report them on the average temperature as well as the days on which hottest and coolest days occurred.
12. Create a single program to perform following tasks using switch, if. Else, loop and double dimension integer array of size 3x3:
  - a) Addition of two matrix.
  - b) Subtraction of two matrix.
  - c) Multiplication of two matrix.
13. Create a single program to perform following tasks using switch, if..else, loop and double dimension character array of size 5x40:
  - a) Sorting of string.

## FUNCTIONS

14. Write program using the function power (a, b) to calculate the value of a raised to b.
15. Write program to demonstrate difference between static and auto variable.
16. Write program to demonstrate difference between local and global variable.
17. Write a program to perform following tasks using switch...case, loops and function.
  - a) Find factorial of a number
  - b) Print Fibonacci series up to n terms and its sum.
18. Write a program to perform following tasks using switch...case, loops and **recursive** function.
  - a) Find factorial of a number
  - b) Print Fibonacci series up to n terms and its sum.
19. Write a function to accept 10 characters and display whether each input character is digit, uppercase letter or lower case letter.

## STRUCTURE & UNION

20. Create a structure Student having data members to store roll number, name of student, name of three subjects, max marks, min marks, obtained marks. Declare a structure variable of student. Provide facilities to input data in data members and display result of student.
21. Create a structure Date with data member's dd, mm, yy (to store date). Create another structure Employee with data members to hold name of employee, employee id and date of joining (date of joining

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will be hold by variable of structure Date which appears as data member in Employee Structure). Store data of an employee and print the same.

22. Create a structure Student having data members to store roll number, name of student, name of three subjects, max marks, min marks, obtained marks. Declare array of structure to hold data of 3 students. Provide facilities to display result of all students. Provide facility to display result of specific student whose roll number is given.
23. Write program to create structure complex having data members to store real and imaginary part. Provide following facilities:
  - a) Add two complex nos. using structure variables.
  - b) Subtract two complex nos. using structure variables.

Use structure as argument to function and function returning structure.

#### POINTER

24. Define union Emp having data members:-one integer, one float and one single dimension character array. Declare a union variable in main and test the union variable.
25. Define an enum Days\_of\_Week members of which will be days of week. Declare an enum variable in main and test it.
26. Write a program of swapping two numbers and demonstrates call by value and call by reference.
27. Write program to sort strings using pointer exchange.
28. Write a program in c using pointer and function to receive a string and a character as argument and return the no. of occurrences of this character in the string.
29. Create a program having pointer to void to store address of integer variable then print value of integer variable using pointer to void. Perform the same operation for float variable.
30. Write program to find biggest number among three numbers using pointer and function.
31. Write program to Create a structure Employee having data members to store name of employee, employee id, salary. Use Pointer to structure to store data of employee and print the stored data-using pointer to structure.
32. Write program to Create a structure Employee having data members to store name of employee, employee id, salary. Use Pointer to structure to simulate dynamic array of structure store data of n employees and print the stored data of n employees using pointer to structure.
33. Write a program to sort a single dimension array of integers of n elements simulated by pointer to integer. Use function for sorting the dynamic array.
34. Write a program to sum elements of a double dimension array of integers of m rows and n columns simulated by pointer to pointer to integer. Use function for sum the elements of the dynamic array.
35. Write program to demonstrate difference between character array and pointer to character.
36. Write program to demonstrate difference between constant pointer and pointer to constant.
37. Write program to demonstrate pointer arithmetic.
38. Write program to demonstrate function-returning pointer.



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## POST GRADUATE DIPLOMA IN COMPUTER APPLICATION, 2019-2020

### [DURATION - ONE YEAR - FULL TIME]

The duration of the course shall be one year consisting of two semesters. There shall be three theories and two practical courses in the each semester.

**Second Semester: PGDCA-106 : GUI - Programming in Visual Basic.**

**PGDCA-107 : Database Management System**

**PGDCA-108 : Essential of E –Commerce & HTML .**

**PGDCA-109 : Practical based on PGDCA106, PGDCA107 &PGDCA-108**

**PGDCA-110 : Project**

### **PGDCA-106**

### **GUI - PROGRAMMING IN VISUAL BASIC**

#### **UNIT – I**

**Introduction to visual Basic** - Editions of Visual Basic, Event Driven Programming, Terminology, Working environment, project and executable files ,Understanding modules, Using the code editor window, Other code navigation features, Code documentation and formatting, environment options, code formatting option, Automatic code completion features.

**Creating Programs** - Introduction to objects, Controlling objects, Properties, methods and events, Working with forms, Interacting with the user: MsgBox function, InputBox function, Code statements, Managing forms, Creating a program in Visual Basic, Printing.

#### **UNIT – II**

**Variable and Procedures** - Overview of variables, Declaring, Scope, arrays, User-defined data types, constants working with procedures, Working with dates and times, Using the Format function, Manipulating text strings.

**Controlling Program Execution** - Comparison and logical operators, If...Then statements, Select Case Statements looping structures, Using Do...Loop structures, For...Next statement, Exiting a loop.

#### **UNIT – III**

**Working with Controls** - Types of controls, Overview of standard controls, ComboBox and ListBox, OptionButton and Frame controls Menu, Status bars, Toolbars, Advanced standard controls, ActiveX controls, Insert table objects, Validation.

**Error Trapping & Debugging** - Overview of run-time errors, error handling process, The Err object, Errors and calling chain, Errors in an error-handling routine, Inline error handling, Error-handling styles, General error-trapping options Type of errors, Break mode Debug toolbar, Watch window, Immediate window, Local window, Tracing program flow with the Call Stack.

#### **UNIT – IV**

**Sequential and Random Files** - Saving data to file, basic filling, data analysis and file, the extended text editor, Random access file, The design and coding.

**Data Access Using the ADO Data Control** - Overview of ActiveX data Objects, Visual Basic data access features, Relational database concepts Using the ADO Data control to access data, Overview of DAO, RDO, Data Control, structured query language (SQL), Manipulating data Using Data Form Wizard.

#### **UNIT – V**

**Report Generation** - Overview of Report, Data Report, Add groups, Data Environment, Connection to database Introduction to Crystal Report Generator.

**Advances Tools** - Overview of drag and drop, Mouse events, Drag-and drop basics, Date Time Control, Calendar, Print Dialog, MDI (Multiple Document Interface).






**BOOK RECOMMENDED:**

Mastering Visual Basic 6 Fundamentals – By Microsoft Mastering  
in Visual Basic – By BPB Publications.  
Introduction to VB Programming – V. K. Jain



  
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**PGDCA-107**  
**Database Management System**

**UNIT – I : Introduction To DBMS**

Data, Information and knowledge, concept of DBMS, Advantages of DBMS, data independence, database administration roles, DBMS architecture, different kinds of DBMS users, importance of data dictionary, contents of data dictionary, types of database languages. Data models: network, hierarchical, relational, Introduction to ODBC concept.

**UNIT – II : E-R Model**

Entity - Relationship model as a tool for conceptual design-entities, attributes and relationships. ER diagrams; Concept of keys; Case studies of ER modeling Generalization; specialization and aggregation.

**UNIT – III: Relational Model**

Structure to Relational Database, Relational Algebra, Extended Relational- Algebra Operation, Simple and complex queries using relational algebra, The Domain Relational Calculus, Tuple relational calculus.

**UNIT – IV : Relational Database Design**

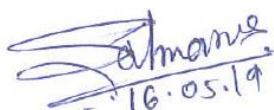
Pitfalls in Relational Database Design, Decomposition, Functional Dependencies, Normalization: 1NF, 2NF, BCNF, 3NF, 4NF, 5NF.

**UNIT – V : Structured Query Language :**

**DDL and DML:** Creating Table, Specify Integrity Constraint, Modifying Existing Table, Dropping Table, Inserting, Deleting and Updating Rows in as Table, Where Clause, Operators, ORDER BY, GROUP Function, SQL Function, JOIN, Set Operation, SQL Sub Queries. Views: What is Views, Create, Drop and Retrieving data from views. **Security:** - Management of Roles, Changing Password, Granting Roles & Privilege, with drawing privileges.

**Suggested Books:**

- |                                       |                         |
|---------------------------------------|-------------------------|
| 1. Data base system                   | : Korth & Silberschatz. |
| 2. Data Base Management System        | : Alexies & Mathews     |
| 3. An Introduction to Database System | : C.J. Date             |
| 4. Data Base Management System        | : Raguramakrishnan.     |
| 5. Data Base Management System        | : Elmasri & Nawathe.    |



# PGDCA-108

## ESSENTIALS OF E –COMMERCE & HTML

### UNIT – I

**Introduction to Electronic Commerce** –The scope of E-commerce; Size, growth and future projection of E-commerce market Worldwide and in India; Internet and its impact on traditional businesses; Definition of E-commerce; Business models in E –Commerce environment; Case studies. *Emergence of E-commerce* - E-commerce on private networks, Electronic Data Interchange (EDI), What is EDI, EDI in action, EDI basics, EDI standards, financial EDI, FEDI for international trade transaction, FEDI payment system within the US, ACH credit transfer payment system FEDI, application of EDI, benefits of EDI, Electronics Payment system, E-commerce on the web, E-commerce in India,

### UNIT – II

**Internet, Security and E-Commerce:** Security of Data/Information in Internet/web environment; Client security, Network security; Virus protection and Hacking; Security Measures: Authentication, Integrity, Privacy, Non-repudiation; Public information, Private information, firewall tunnels, encryption, secret key encryption, public key encryption, digital signature. Business-to-Business (B2B), Business-to-Consumer (B2C); Business-to-Business-to-Consumer (B2B2C) and Consumer-to-Consumer (C2C) E-Commerce

### UNIT – III

**HTML Basics & Web Site Design Principles** –Concept of a Web Site, Web Standards, What is HTML? HTML Versions, Naming Scheme for HTML Documents , HTML document/file, HTML Editor , Explanation of the Structure of the homepage , Elements in HTML Documents ,HTML Tags, Basic HTML Tags, Comment tag in HTML, Viewing the Source of a web page, How to download the web page source? XHTML, CSS, Extensible Markup Language (XML), Extensible Style sheet language (XSL), Some tips for designing web pages, HTML Document Structure. HTML Document Structure-Head Section, Illustration of Document Structure,<BASE> Element,<ISINDEX> Element,<LINK> Element ,META ,<TITLE> Element,<SCRIPT> Element ,Practical Applications, *HTML Document Structure-Body Section:-* Body elements and its attributes: Background; Background Color; Text; Link; Active Link (ALINK); Visited Link (VLINK); Left margin; Top margin ,Organization of Elements in the BODY of the document: Text Block Elements; Text Emphasis Elements; Special Elements -- Hypertext Anchors; Character-Level Elements; Character References ,Text Block Elements: HR (Horizontal Line); Hn (Headings) ; P (Paragraph); Lists; ADDRESS ; BLOCKQUOTE; TABLE; DIV (HTML 3.2 and up) ; PRE (Preformatted); FORM ,Text Emphasis Elements, Special Elements -- Hypertext Anchors ,Character-Level Elements: line breaks (BR) and Images (IMG),Lists ,ADDRESS Element, BLOCKQUOTE Element, TABLE Element ,COMMENTS in HTML ,CHARACTER Emphasis Modes, Logical & Physical Styles, Netscape, Microsoft and Advanced Standard Elements List, FONT, BASEFONT and CENTER.

### UNIT – IV

**Image, Internal and External Linking between Web Pages** - Netscape, Microsoft and Advanced Standard Elements List, FONT, BASEFONT and CENTER. Insertion of images using the element IMG (Attributes: SRC (Source), WIDTH, HEIGHT, ALT (Alternative), ALIGN), IMG (In-line Images) Element and Attributes; Illustrations of IMG Alignment, Image as Hypertext Anchor, Internal and External Linking between Web Pages. Hypertext Anchors, HREF in Anchors, Links to a Particular Place in a Document, NAME attribute in an Anchor ,Targeting NAME Anchors ,TITLE attribute, Designing Frames in HTML.

### UNIT – V

**Creating Business Websites with Dynamic Web Pages** – Concept of static web pages and dynamic web pages. Hosting & promotion of the web site, Domain Name Registration, Web Space allocation, Uploading / Downloading the website- FTP, cute FTP. Web Site Promotion Search Engines, Banner Advertisements.

### Recommend Books –



1. Business on the net - by Kamlesh N. Agarwala , Amit Lal & Deeksha Agarawal ( Macmillan India Ltd.).
2. Introduction to HTML by Kamlesh N. Agarwala, O.P.Vyas, Prateek A. Agarwala. (Kitab Mahal Publications).
- 3.. ASP Developer's Guide – by Greg Buczec (TATA McGraw Hill).
4. Information Technology Act 2000: [www.mit.gov.in/it-bill.htm](http://www.mit.gov.in/it-bill.htm)



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## PGDCA-109: Practical based on PGDCA106, PGDCA107 & PGDCA108

### 1 Scheme of Examination:-

Practical examination will be of 3 hours duration. The distribution of practical marks will be as follows

Question 1(VB)	-	15
Question 2(VB)	-	15
Question 3(SQL)	-	15
Question 4(HTML/Web Design)-		15
Viva	-	25
[Practical Copy + Internal Record] -		15

Total	-	100
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2 In every program there should be comment for each coded line or block of code

3 Practical file should contain printed programs with name of author, date, path of program, unit no. and printed output.

4 All the following programs or a similar type of programs should be prepared

### List of Practical of Visual Basic

1. WAP to perform arithmetic operation **using command buttons**. (**Declare variables globally**).
2. WAP to take input of principal, rate & time and calculate simple interest & compound interest.
3. Write a program to take input of x and print table of x in the following

format.  $X * 1 = X$

$X * 2 = 2X$

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$X * 10 = 10 * X$

4. Design an interface, which will appear like marksheet. It will take input of marks in five subjects and calculate total marks and percentage then provide grade according to following criteria. (**Using nested if**) (Use tab index property to move focus).

If %	Then Grade
------	------------

$\geq 90$	A+
-----------	----

$> = 75 \ \&< 90$	A
-------------------	---

$> = 60 \ \&< 75$	B
-------------------	---

$> = 45 \ \&< 60$	C
-------------------	---

Otherwise	F
-----------	---

5. WAP to create a simple calculator (**Using control array**)
6. Write a program to check whether an entered no. is prime or not. (**Using for loop & Exit for**)
7. Write a program which will count all vowels, consonants, digits, special characters and blank spaces in a sentence (Using **select case**)
8. WAP to illustrate all functionalities of **listbox** and **combobox**.
9. WAP using **check boxes** for following font effects.  
Bold  
Italic  
Underline  
Increase font size  
Decrease font size  
Font color
10. WAP for temperature conversion using **optionbutton**.

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11. WAP to launch a rocket using **pictures box** and **timer control**.
12. WAP to change back color of any control (label, textbox) using **scroll box**.
13. WAP to search an element for a **one dimension static array**.
14. WAP to sort a dynamic array
  - of (a)n numbers
  - (b)n strings (Input array size at run time)
15. WAP to take input of two matrices and perform their addition, subtraction and multiplication using **menu editor**.
17. WAP to illustrate **call by value and call by reference** ( to swap to values)
18. Write a program to calculate factorial of a number using **user defined function**.
19. Take input of a word and WAP to check whether it is a palindrome or not. (**Without using structure fun**)
20. WAP to find smallest among given three numbers using **user defined procedures**.
21. WAP to generate, print and find sum of first n elements of fibonacci series using **recursion**.
22. WAP to perform read write operations in a **sequential file**.
23. Create a **user defined data type** having fields name (as string of length 20 bytes), Roll no (as integer), class (as string of 10 bytes). WAP to create a **random access file** to store above data and perform following operations in this file.
  - (a) Write new record      (b) Read / display existing record      (c) Delete any record
  - (d) Search any record      (f) Lists elected records
  - (e) close the file
24. WAP to display records of a table using **DAO & bound control** code for buttons to move at first record, next record, previous record, last record in the table.
25. Create a table using **visual data manager** and write a program using **RDO & advanced bound control** to add, delete, edit & navigate records.
26. WAP to access a database using **ADO &** display a key column in the combo box or list box when an item is selected in it, its corresponding records is shown in **MSH flexgrid**.
27. Using **Data Environment** create a program to display records of any table.
28. WAP to generate marksheet of students in a class through **data report**.
29. WAP to illustrate various **key board and mouse events**.
30. Using **drive, directory and file list box** (it will show only .bmp files). Let the user select the bmp files, which will appear in picture box as user click on any item in list box.
31. Using **toolbar** design an interface for string manipulation. Toolbar should have tabs to
  - (a) Find length of string (b) No of blank spaces in sting (c) Reverse the string
 Also show current date & time in **status bar**.

### List of Practical of SQL

1. Using the following database,
  - Colleges ( cname, city, address, phone, afdate)
  - Staffs ( sid, sname, saddress, contacts)
  - StaffJoins ( sid, cname, dept, DOJ, post, salary)
  - Teachings ( sid, class, paperid, fsession, tsession)
  - Subjects ( paperid, subject, paperno, pape rname)

Write SQL statements for the following –

- a. Create the above tables with the given specifications and constraints.
- b. Insert about 10 rows as are appropriate to solve the following queries.
- c. List the names of the teachers teaching computer subjects.
- d. List the names and cities of all staff working in your college.
- e. List the names and cities of all staff working in your college who earn more than 15,000
- f. Find the staffs whose names start with 'M' or 'R' and ends with 'A' and/or 7 characters long.
- g. Find the staffs whose date of joining is 2005.
- h. Modify the database so that staff N1 now works in C2College.
- i. List the names of subjects, which T1 teaches in this session or all sessions.

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- j. Find the classes that T1 do not teach at present session.
- Find the colleges who have most number of staffs.
  - Find the staffs that earn a higher salary who earn greater than average salary of their college.
  - Find the colleges whose average salary is more than average salary of C2
  - Find the college that has the smallest payroll.
  - Find the colleges where the total salary is greater than the average salary of all colleges.
  - List maximum, average, minimum salary of each college
  - List the names of the teachers, departments teaching in more than one department.
  - Acquire details of staffs by name in a college or each college.
  - Find the names of staff that earn more than each staff of C2College.
  - Give all principals a 10% rise in salary unless their salary becomes greater than 20,000 in such case give 5%rise.
  - Find all staff that do not work in same cities as the colleges they work.
  - List names of employees in ascending order according to salary who are working in your college or all colleges.
    - Create a view having fields sname, cname, dept, DOJ, andpost
    - Create a view consisting of cname, average salary and total salary of all staff in that college.
    - Select the colleges having highest and lowest average salary using above views.
    - List the staff names of a department using above views.
2. Create the following database,
- Enrollment (enrollno, name, gender, DOB, address, phone)
- Admission (admno, enrollno, course, yearsem, date, cname)
- Colleges (cname, city, address, phone, afdate)
- FeeStructure (course, yearsem, fee)
- Payment (billno, admno, amount, pdate, purpose)
- Create the above tables with the given specifications and constraints.
  - Insert about 10 rows as are appropriate to solve the following queries.
  - Get full detail of all students who took admission this year class wise
  - Get detail of students who took admission in Bhilai colleges.
  - Calculate the total amount of fees collected in this session
    - By your college
    - by each college
    - by all colleges
  - List the students who have not payed full fee
    - in your college
    - in all colleges
  - List the number of admissions in your class in every year.
  - List the students in the session who are not in the colleges in the same city as they live in.
  - List the students in colleges in your city and also live in your city.
3. Create the following database,
- Subjects (paperid, subject, paper, papername)
- Test (paperid, date, time, max, min)
- Score (rollno, paperid, marks, attendance)
- Students (admno, rollno, class, yearsem)
- Create the above tables with the given specifications and constraints.
  - Insert about 10 rows as are appropriate to solve the following queries.
  - List the students who were present in a paper of a subject.
  - List all roll numbers who have passed in first division.
  - List all students in BCA-II who have scored higher than average
    - in your college
    - in every college
  - List the highest score, average and minimum score in BCA-II
    - in your college
    - in every college

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4. Using the following database

Colleges (cname, city, address, phone, afdate)  
Staffs ( sid, sname, saddress, contacts)  
StaffJoins ( sid, cname, dept, DOJ, post, salary)  
Teachings ( sid, class, paperid, fsession, tsession)  
Subjects ( paperid, subject, paperno, papername)

Write SQL statements for the following –

- Create the above tables with the given specifications and constraints.
- Insert about 10 rows as are appropriate to solve the following queries.
- List the names of the teachers teaching computer subjects.
- List the names and cities of all staff working in your college.
- List the names and cities of all staff working in your college who earn more than 15,000

5. Using the following database

Colleges (cname, city, address, phone, afdate)  
Staffs ( sid, sname, saddress, contacts)  
StaffJoins ( sid, cname, dept, DOJ, post, salary)  
Teachings ( sid, class, paperid, fsession, tsession)  
Subjects ( paperid, subject, paperno, papername)

- Find the staffs whose names start with 'M' or 'R' and ends with 'A' and/or 7 characters long.
- Find the staffs whose date of joining is 2005.
- Modify the database so that staff N1 now works in C2college.
- List the names of subjects which T1 teaches in this session or all sessions.

6. Using the following database

Colleges (cname, city, address, phone, afdate)  
Staffs ( sid, sname, saddress, contacts)  
StaffJoins ( sid, cname, dept, DOJ, post, salary)  
Teachings ( sid, class, paperid, fsession, tsession)  
Subjects ( paperid, subject, paperno, papername)

- Find the classes that T1 do not teach at present session.
- Find the college who have most number of staffs.
- Find the staffs who earn a higher salary who earn greater than average salary of their college.
- Find the colleges whose average salary is more than average salary of C2
- Find the college that has the smallest payroll.
- Find the colleges where the total salary is greater than the average salary of all colleges.
- List maximum, average, minimum salary of each college

7. Using the following database

Colleges (cname, city, address, phone, afdate)  
Staffs ( sid, sname, saddress, contacts) StaffJoins  
( sid, cname, dept, DOJ, post, salary)  
Teachings ( sid, class, paperid, fsession, tsession)  
Subjects ( paperid, subject, paperno, papername)

- Find the classes that T1 do not teach at present session.
- List the names of the teachers, departments teaching in more than one departments.
- Acquire details of staffs by name in a college or each college.
- Find the names of staff who earn more than each staff of C2college.





- e. Give all principals a 10% rise in salary unless their salary becomes greater than 20,000 in such case give 5%rise.
  - f. Find all staff who do not work in same cities as the colleges they work.
  - g. List names of employees in ascending order according to salary who are working in your college or all colleges.
8. Using the following database  
 Colleges (cname, city, address, phone, afdate)  
 Staffs ( sid, sname, saddress, contacts) StaffJoins  
 ( sid, cname, dept, DOJ, post, salary)  
 Teachings ( sid, class, paperid, fsession, tsession)  
 Subjects ( paperid, subject, paperno, papername)
- a. Find the classes that T1 do not teach at present session.
  - b. Create a view having fields sname, cname, dept, DOJ, and post
  - c. Create a view consisting of cname, average salary and total salary of all staff in that college.
  - d. Select the colleges having highest and lowest average salary using above views.
  - e. List the staff names of a department using above views.
9. Enrollment (enrollno, name, gender, DOB, address, phone)  
 Admission (admno, enrollno, course, yearsem, date, cname)  
 Colleges (cname, city, address, phone, afdate)  
 FeeStructure (course, yearsem, fee)  
 Payment (billno, admno, amount, pdate, purpose)
- a. Create the above tables with the given specifications and constraints.
  - b. Insert about 10 rows as are appropriate to solve the following queries.
  - c. Get full detail of all students who took admission this year classwise
  - d. Get detail of students who took admission in Bhilai colleges.
  - e. Calculate the total amount of fees collected in this session
    - i) by your college ii) by each college iii) by all colleges
10. Enrollment (enrollno, name, gender, DOB, address, phone)  
 Admission (admno, enrollno, course, yearsem, date, cname)  
 Colleges (cname, city, address, phone, afdate)  
 FeeStructure (course, yearsem, fee)  
 Payment (billno, admno, amount, pdate, purpose)
- a. List the students who have not payed full fee
    - i) in your college ii) in all colleges
  - b. List the number of admissions in your class in every year.
  - c. List the students in the session who are not in the colleges in the same city as they live in.
  - d. List the students in colleges in your city and also live in your city.
11. Subjects ( paperid, subject, paper, papername)  
 Test (paperid, date, time, max, min)  
 Score (rollno, paperid, marks, attendance)  
 Students (admno, rollno, class, yearsem)
- a. Create the above tables with the given specifications and constraints.
  - b. Insert about 10 rows as are appropriate to solve the following queries.
  - c. List the students who were present in a paper of a subject.
  - d. List all roll numbers who have passed in first division.
  - e. List all students in MCA-II who have scored higher than average
    - i) in your college ii) in every college
  - f. List the highest score, average and minimum score in MCA-II
    - i) in your college ii) in every college

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## **List of Practical of HTML**

At least 10 practical of HTML & Web Designing

### **PGDCA-110:Project**

#### **1. Scheme of Examination:- The Project should be done by individual student.**

Practical examination will be of 3 hours duration. The distribution of practical marks will be as follows

Software Demonstration	-	40
Project Report (Hard Copy + Soft Copy)	-	20
Project Demonstration/Presentation	-	20
Project Viva	-	20
Total	-	100

#### **2. Format of the student project report on completion of the project**

- Cover page as per format
- Certificate of Approval
- Certificate of project guide/Center Manager
- Certificate of the company/Organization
- Certificate of Evaluation
- Declaration / Self Certificate
- Acknowledgement

In the "Acknowledgement" page, the writer recognizes his /her indebtedness for guidance and assistance of the thesis/report adviser and other members of the faculty. Courtesy demands that he/she also recognize specific contributions by other persons or institutions such as libraries and research foundations. Acknowledgements should be expressed simply, tastefully, and tactfully.

- Synopsis of the project
- Main Report
  - ✓ Objectives & Scope of the project
  - ✓ Theoretical Background of Project
  - ✓ Definition of problem
  - ✓ System Analysis & Design
  - ✓ System Planning (PERTC hart)
  - ✓ Methodology adopted, system Implementation & Detail of Hardware & Software used
  - ✓ System maintenance & Evaluation
  - ✓ Cost and benefit Analysis
  - ✓ Detailed Life Cycle of the project
    - ERD, DFD
    - Input and Output Screen Design
    - Process involved
    - Methodology used for testing
    - Test Report, Printout of the code sheet
  - ✓ User/Operational Manual- including security aspects, access rights, back up, Controls etc.
  - ✓ Conclusion
  - ✓ References
  - ✓ Soft copy of the project on CD



## Formats of various certificates and formatting styles are as:

### 1. Project report Cover Format:

**A**  
**Project Report**  
**On**  
**Title of the Project Report**  
(Times New Roman. Italic, Font Size=24)  
Submitted in partial fulfillment of the requirements for the award of degree  
**Post Graduate Diploma in Computer Application**

### 2. Certificate of Approval by Head of the Department in letterhead

#### CERTIFICATE OF APPROVAL

This is to certify that the Project work entitled "\_\_\_\_\_ "is carried out by Mr/Ms/Mrs \_\_\_\_\_, a student of PGDCA at (College Name) is hereby approved as a credible work in the discipline of Computer Science & Information Technology for the award of degree of **Post Graduate Diploma in Computer Application** during the year \_\_\_\_\_ From Durg University, Durg(CG).

(Head Name)

### 2. Certificate from the Guide in letterhead

#### CERTIFICATE

This is to certify that the Project work titled "\_\_\_\_\_ "Submitted to the ( College Name ) by Mr/Ms/Mrs \_\_\_\_\_ RollNo \_\_\_\_\_, in partial fulfillment for the requirements relating to nature and standard of the award of **Post Graduate Diploma in Computer Application** degree by , **Durg University, Raipur (CG)** for the academic year 20\_\_ - 20 \_\_.

This project work has been carried out under my guidance.

(Guide Name)

### 3. Certificate of the Company or Organization from where the Project is done from the Project Manager or Projectguide.

### 4. Certificate of evaluation in the department letterhead



# CERTIFICATE OF EVALUATION

This is to certify that the Project work entitled "\_\_\_\_\_ "is carried out by Mr/Ms/Mrs \_\_\_\_\_, a student of PGDCA at (**College Name**), after proper evaluation and examination, is hereby approved as a credible work in the discipline of Computer Science & Information Technology and is done in a satisfactory manner for its acceptance as a requisite for the award of degree of **Post Graduate Diploma in Computer Application** during the year \_\_\_\_\_ from **Durg University, Durg (CG)**.

Internal Examiner

External Examiner

## 5. Declaration of Student / Self Certificate

### DECLARATION

This to certify that the project report entitled "\_\_\_\_\_", which is submitted by me in the partial fulfillment for the award of the degree of **Post Graduate Diploma in Computer Application, ( College Name )**, comprises the original work carried out by me.

I further declare that the work reported in this project has not been submitted and will not be submitted, either in part or in full for the award of any other degree or diploma in this Institute or any other Institute or University.

Place:  
Date:

(Name)  
(Roll No)

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