बी.ए. (त्रिवर्षीय पाठ्यक्रम)

बी.ए. प्रथम वर्ष (कला, वाणिज्य, विज्ञान)

2004—2005

सामान्य हिन्दी

50 अंक

पाठ्य पुस्तकें :

1. गद्य—वीथी — संपादक : डॉ. ओम प्रकाश शर्मा, प्रकाशक : माया प्रकाशन मंदिर, त्रिपोलिया बाजार, जयपुर

2. कथा दशक — संपादक : डॉ. परमानंद पांचाल, प्रकाशक : राजस्थान प्रकाशन, 28—29 त्रिपोलिया बाजार, जयपुर

3. हिन्दी भाषा ज्ञान — संपादक : डॉ. हरिचरण शर्मा, प्रकाशक : अनुभा प्रकाशन, शालीमार बाग, जयपुर

पाठ्य विषय : पाँच इकाइयों में विभक्त होगा :

इकाई — I

''गद्य—वीथी' पुस्तक से संक्षेपण एवं 'कथादशक' पुस्तक से पल्लवन सम्बन्धी ज्ञान।

दोनों पुस्तकों से सामान्य तथ्यात्मक प्रश्नों का ज्ञान।

इकाई — II

शब्द ज्ञान

शब्द पर्याय और विलोम शब्दों का ज्ञान

अनेकार्थी एवं समश्रुत शब्दों का ज्ञान

इकाई — III

पत्र लेखन और पत्रों के प्रकार सम्बन्धी ज्ञान

अंग्रेजी से हिन्दी अनुवाद का ज्ञान

हिन्दी में पदनाम सम्बन्धी ज्ञान (अंग्रेजी से हिन्दी पदनाम)

इकाई — IV

मुहावरे — लोकोक्तियाँ

शब्द—शुद्धि और वाक्य—शुद्धि

पारिभाषिक शब्दावली

अनेक शब्दों के लिए एक शब्द

इकाई — V

देवनागरी लिपि की विशेषताएँ

देवनागरी लिपि एवं वर्तनी का मानक रूप

कम्प्यूटर में हिन्दी का अनुप्रयोग : प्रारम्भिक परिचय

अंक योजना : यह प्रश्न पत्र 100 अंक का होगा, जो तीन खण्ड — 'अ', 'ब', 'स' में विभक्त होगा, जिसका अंक विभाजन इस प्रकार रहेगा—

खण्ड 'अ' —   10 अंक

इस खण्ड में एक–एक अंक के विकल्प रहित दस वस्तुनिष्ठ लघु उत्तरात्मक प्रश्न होंगे। प्रत्येक इकाई से दो प्रश्न होंगे।

खण्ड 'ब' —   50 अंक

इस खण्ड में दस–दस अंक के दस प्रश्न होंगे, जिनमें से पाँच प्रश्न करने होंगे। प्रत्येक इकाई से एक–एक प्रश्न अवश्य पूछा जाएगा। 'गद्यवीथी' और 'कथादशक' पर आधारित संक्षेपण और पल्लवन सम्बन्धी प्रश्न संख्या एक और दो करना अनिवार्य होगा। इस खण्ड के प्रश्नों के उत्तर लगभग 250 शब्दों तक दिये जा सकते हैं।

खण्ड 'स' —   40 अंक

इस खण्ड में बीस–बीस अंक के चार प्रश्न होंगे, जिनमें से दो प्रश्न करने होंगे। इनका उत्तर लगभग 500 शब्दों में देना होगा। इन प्रश्नों में एक प्रश्न के दो भाग भी हो सकते हैं।

FIRST YEAR T.D.C.
GENERAL ENGLISH (2004-2005)

MM: 50

(Common for Science, Social Sciences and Humanities & Commerce Faculties)

(1)   Texts :

1.   The Many Worlds of Literature ed: Jasbir Jain: Macmilan India.

2.   Animal Farm : By George Orwell

                                    Or

     A Vendor of Sweets : By R.K. Narayan

Distribution of Marks :   **Marks**

1.   Current English for Language skills :   15

(a)   Short-answer questions (5 out of 10)
      Each carrying 1 mark = 5 marks

(b)   General questions (2 out of 4)
      Each carrying 4 marks = 8 marks

(c)   Questions on vocabulary = 2 marks

2. Animal Farm or A Vendor of Sweets :   10

(a)   Two questions (out of 4)
      Each question carrying 5 marks = 10 marks

2. Grammar :   13

(a) Tenses   3 marks

(b) Modal Auxiliaries   2 marks

(c) Phrasal Verbs   3 marks

(d) Clause (Nominal, Adjectival,
     Adverbial)   2 marks

(e) Use of Non-finite verbs (Gerunds,
     Participles and infinitives)   3 marks

3. Comprehension and Composition :   12

(a) Precis writing   5 marks

(b) Essay (about 300 words)   7 marks
     on one topic out of four topics

Books Recommended :

1. Pit Corder : An Intermediate English Grammar

2. Thompson and Martinet : A Practical English
    Grammar (ELBS - Oxford University Press)

ELEMENTARY COMPUTER APPLICATIONS

FOR THE YEAR 2004-2005

EXAMINATION SCHEME FOR THE COMPULSORY SUBJECT ENTITLED ELEMENTARY COMPUTER APPLICATION AT UNDERGRADUATE LEVEL

The student has to pass in theory as well as in practical paper separately.

Theory paper :

The Theory paper will consist of three sections with a maximum of 60 marks.

Section A

Covering complete syllabus. One compulsory question containing 10 multiple choice questions.

Section B

Covering complete syllabus. candidate has to attempt four out of six questions. Each question may have parts and brief answers are expected.

Section C

Covering complete syllabus. One has to attempt two out of four questions. Each question may have parts and long answer are expected.

Distribution of Marks:

Theory :

Duration: Three hours

Max. Marks 60   **Min. Marks 22**

      Section A 1x10   :   10

      Section B 4x6   :   24

      Section C 2x13   :   26

      Total   :   **60**

PRACTICAL:

Duration : Four hours

Max. Marks 40   **Min. Marks 14**

The practical examination will have exercises based on followings:

A. Operating system concepts:

      MS–DOS   4 Marks

      WINDOWS   4 Marks

B. MS-OFFICE

      MS–WORD   7 Marks

      MS–EXCEL   7 Marks

      POWER–POINT   7 Marks

C. Internet Browser   5 Marks

      Viva–voce   6 Marks

                       _____

      Total   **40 Marks**

NOTE :

1. While conducting practical examination student in a batch may be grouped such that number of students in a group is equal to number of computers available for conducting practical examination.

2. All students in a given batch may be given a set of questions to test the computer skills acquired during their practical training Practical examiner can frame his own questions to test student knowledge in computer operation through set of short type of questions which can be answered by students who have undergone practical training.

SYLLABUS

ELEMENTARY COMPUTER APPLICATIONS

Common for Arts, Science & Commerce Faculties

1. **Information concepts and Processing :** Definition of Information, need quality and value of Information, categories of information in business organization level of information, storage and retrieval of data, comparison of manual and electronic storage of date. Organization of data as files, data processing in government, large business, multinational and private organizations.

2. **Elements of Computer Processing system :** The Electronic digital computer, the number systems (binary, digital, octal and hexadecimal and their inter conversions), character code (ASCII and EBCDIC), concept of hardware and software, the architecture of a computer system. CPU, memory and Input/output devices, magnetic storage devices, optical devices, printers and monitors, categories of software, system software, application software, packages.

3. Classification of Computers and Generation of Computers, parallel processing and component, RISC and CISC machines, development of Intel family processors.

4. **Operating System Concept:** The need of an OS (Operating System), OS as resource, processor and memory manager, the various types of operating systems, MS-DOS, WINDOWS 95/98, WINDOWS 2000, UNIX Operating System.

5. **Computer and Communication:** Need for data transmission over distances, communication channels; twisted pair, coaxial cable, microwave, radio wave, optical fiber and satellite, digital and analog transmission, serial and parallel data transmission, Modems, Networking of Computers, LAN, WAN concepts.

6. **Programming Languages:** Machine, Assembly and high level languages, Generation of Languages, 3 GL and 4 GL languages, Graphic User Interfaces.

7. **Personal Computer Software:** Word processing Packages, Spreadsheet Packages and Database Management Packages, Desk Top Publishing, Computer Animation Packages, Introduction to MS-Office.

8. **Internet Technology:** Concept and how it works, E-mail services, Internet surfing, browsers and search engines, World Wide Web, web programming, HTML, and JAVA Programming Concepts.

9. **E-commerce:** What is e-commerce and growth of e-commerce, electronic payment systems,

security considerations, digital currencies, Credit cards, cybercash, e-cash, smart cards, supply chain management.

10. Benefits of electronic forms of data processing and management in education, commerce, public delivery systems, banking and other financial transactions, new developments in these areas.

Laboratory: The laboratory exercises will be designed to help in the understanding of the concepts of computer and the utilization in the areas outlined in the theory syllabus. The emphasis should be on practical uses rather than on theoretical concepts only.

Books Recommended:

1. V.K. Jain Computer Fundamentals.

2. V.Rajaraman Fundamentals of Computer.

FIRST YEAR T.D.C., 2004-2005

ENVIRONMENTAL STUDIES
(Credit Course)
(Compulsory for all Faculties)

The Environmental Studies (Compulsory) Examination shall consist of one theory paper of three hour duration and a field work. The student has to pass in theory as well as in field work separately.

Distribution of Marks	Max. Marks	Min. Pass Marks
Theory Paper	75	27
Field Work	25	09
Total	**100**	**36**

Pattern of question paper in the examination and distribution of marks :

The Environmental Studies (Compulsory) Examination will have a theory paper consisting two parts, A and B and a field work.

In Part A, total 10 questions will be set in the paper selecting at least one from each unit. Each question to be answered in about 50 words. All questions are compulsory. Each question carries 2.5 marks, total 25 marks.

In Part B, total 10 questions will be set, selecting at least one from each unit. Five questions have to be answered by the student selecting not more one from a unit. Each question to be answered in about 350

words. These questions carries 10 marks each, total 50 marks.

Field Work : Student will have to submit a typed/hand written report of about 20 pages based on study of a local area of environmental interest. The report will be assessed by an internal examiner under the supervision of Dean/Principal of the College.

Suggested Books :

1. Chaudhary B.L. and J. Pandey (2004) : Environmental Studies (In Hindi), APEX Publishing House, Udaipur.

2. Purohit, S.S., Q.J. Shammi and A.K. Agrawal (2004), A Text Book of Environmental Sciences (In English), Student Edition, Jodhpur.

SYLLABUS

UNIT-1 : The Multidisciplinary Nature of Environmental Studies
Definition, Scope and Importance; Need for public awareness (2 lectures).

UNIT-2 : Natural Resources

Renewable and Non-renewable Resources : Natural resources and associated problems.

a) **Forest Resources :** Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b) **Water Resources :** Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) **Mineral Resources :** Use and exploitation, environmental effects of extracting and using minerals resources, case studies.

d) **Food Resources :** World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) **Energy Resources :** Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.

f) **Land Resources :** Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

* Role of an individual in conservation of natural resources.
* Equitable use of resources for sustainable life-styles. **(8 Lectures)**

UNIT-3 : Ecosystem

* Concept of an ecosystem
* 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, characteristic features, structure and function of the following ecosystem - (a) Forest ecosystem, (b) Grassland ecosystem, (c) Desert ecosystem, (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) **(6 lectures).**

UNIT-4 : Bio-diversity and its conservation

* Introduction-Definition : Genetic, species and ecosystem diversity.
* Biogeographical classification of India.
* Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
* Biodiversity at global, national and local levels.
* India as a mega-diversity nation
* Hot-spots of biodiversity
* Threats of biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
* Endangered and endemic species of India.

* Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity **(8 lectures)**

UNIT-5 : Environmental Pollution

Definition :
* Causes, effects and control measures of : (a) Air pollution; (b) Water pollution; (c) Soil pollution; (d) Marine pollution; (e) Noise pollution; (f) Thermal pollution; (g) Nuclear hazards.
* Solid Waste Management : Causes, effects and control measures of urban and industrial wastes.
* Role of an individual in prevention of pollution.
* Pollution case studies.
* Disaster management : floods, earthquake, cyclone and landslides. **(8 lectures)**

UNIT-6 : Social Issues and the Environment

* From Unsustainable to sustainable development
* Urban problems related to energy
* Water conservation, rain water harvesting, water-shed management
* Resettlement and rehabilitation of people; its problem and concerns. Case studies.
* Environmental ethics : Issues and possible solutions.
* Climatic change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
* Wasteland reclamation
* Consumerism and waste products
* Environment Protection Act

* Air (Prevention and Control of Pollution) Act
* Water (Prevention and Control of Pollution) Act
* Wildlife Protection Act
* Forest Conservation Act
* Issues involved in enforcement of environment legislation
* Public awareness **(7 lectures).**

UNIT-7 : Human Population and the Environment
* Population growth, variation among nations
* Population explosion - Family Welfare Programme
* Environment and Human Health
* Human Rights
* Value Education
* HIV/AIDS
* Women and Child Welfare
* Role of Information Technology in Environment and Human Health
* Case Studies **(6 lectures)**

UNIT-8 : Field Work
* Visit to a local area to document environmental assets - river/forest/grassland/hill/mountain
* Visit to a local polluted site - Urban/Rural/Industrial/Agricultural
* Study of common plants, insects, birds
* Study of simple ecosystems - pond, river, hill slopes etc. (Field work Equal to **5 lecture** hours).

FIRST YEAR SCIENCE, 2004-2005

BOTANY

Papers		No. of Papers	No. of Periods per week	Maxi- mum Marks	Min. pass Marks
Paper-I	Algae, Lichens and Bryophytes	1	3	50	
Paper-II	Mycology, Micro- biology and Plant Pathology	1	3	50	54
Paper-III	Palaeobotany, Pteridophytes & Gymnosperms	1	3	50	
PRACTICALS		1	6	75	27

Duration of examination of each theory paper   3 hrs.

Duration of examination of practical   5 hrs. (in one day)

PAPER-I
ALGAE, LICHENS AND BRYOPHYTES

Unit-1

General characters, thallus organisation, pigments and reserve food material in algae. Electron micro-scopic structure of *Chalamydomonas* and the Cyano-phycean cell. Fritsch's Classification and modern trends in classification. Morphology, reproduction and evolutionary relationships in the following: Cyano-phyta : *Oscillatoria, Nostoc.* Chlorophyta : *Chlamydo-monas, Volvox, Hydrodictyon* and *Cladophora.*

Unit-2

General characters of Xanthophyta, its relationship with Chlorophyta, Morphology and reproduction in Xanthophyta : *Vaucheria;* Chlorophyta : *Coleochaete* and *Oedogonium*; Charophyta : *Chara.* General account of Bacillariophyceae.

Unit-3

Morphology & reproduction in Phaeophyta: *Ectocarpus*; Rhodophyta: *Polysiphonia.* Economic importance of algae. Lichens: Important features, structure, habitat, importance as colonisers and indicators of environ-ment. Vegetative multiplication and life cycle of *Parmelia* and *Usnea.*

Unit-4

General characters and classification of Bryophytes. The evolutionary trends in thallus structure and sporogonium. Morphology and life history of *Riccia, Marchantia, Pellia, Porella* and *Anthoceros.*

Unit-5

Morphology, life history and relationships of *Sphagnum* and *Polytrichum.* Economic importance of Bryophytes.

Note:

The paper setter is required to set questions of 3 types contained in 3 Sections (**Section A**- 10 questions, **Section B**- 10 questions and **Section C**- 4 questions) from the 5 units of each paper. There will be 10 questions in **Section A** which will be asked from all the 5 units, i.e., 2 questions from each unit. These questions have to be answered in one word or a few words only. Each question will be of half mark . All the questions in **Section A** are compulsory. In **Section B,** 10 questions will be set from the 5 units, i.e., 2 questions from each unit. Students are required to attempt at least 1 question from each unit. Each question will carry 5 marks . The answers of each question should be given in about 250 words. In **Section C** there will be 4 descriptive type questions set from all the 5 units, not more than 1 question from each unit. These questions may also have sub-divisions. The students are required to answer 2 questions, each in approximately 500 words. Each question will carry 10 marks .

In short, pattern of question paper and distribution of marks for UG classes will be as under :

Section A : 10 questions, 2 questions from each unit, short answer, all questions compulsory.

Total marks : **05**

Section B : 10 questions, 2 question from each unit, 5 question to be attempted, at least 1 from each unit, answer approximately in 250 words. Total marks : **25**

Section C : 04 questions (question may have sub-division), not more than 1 question from each unit, descriptive type, answer in about 500 words, 2 questions to be attempted.   Total marks : **20**

PAPER-II
MYCOLOGY, MICROBIOLOGY AND PLANT PATHOLOGY

Unit-1

Characteristics and broad classification of fungi. Structure and life history of *Albugo, Penicillium, Phyllactinia* and *Morchella.* Elementary knowledge of Mycorrhizae and their symbiotic significance.

Unit-2

Structure and life history of *Puccinia, Ustilago, Agaricus* and *Alternaria.* Economic importance of fungi : food, industries, medicine and biological controls.

Unit-3

Characteristics, classification, structure and reproduction of bacteria. Isolation and pure culture of bacteria, Gram's staining. Salient features of Micro-biology of water, soil and food.

Unit-4

Characteristics, structure and economic importance of Mycoplasma. Viruses: Nature, structure, transmission and multiplication of plant viruses.

Unit-5

Principles of plant pathology. Methods of disease control. Important symptoms of plant diseases of the following : Green ear disease of Bajra. Loose smut of Wheat, Black Rust of Wheat, Citrus canker. Little leaf of *Solanum melongena* (Brinjal). Yellow vein mosaic of Bhindi, Tikka disease of ground nut.

Note :

The paper setter is required to set questions of 3 types contained in 3 Sections (**Section A**- 10 questions, **Section B**- 10 questions and **Section C**- 4 questions) from the 5 units of each paper. There will be 10 questions in **Section A** which will be asked from all the 5 units, i.e., 2 questions from each unit. These questions have to be answered in one word or a few words only. Each question will be of half mark . All the questions in **Section A** are compulsory. In **Section B,** 10 questions will be set from the 5 units, i.e., 2 questions from each unit. Students are required to attempt at least 1 question from each unit. Each question will carry 5 marks . The answers of each question should be given in about 250 words. In **Section C** there will be 4 descriptive type questions set from all the 5 units, not more than 1 question from each unit. These questions may also have sub-divisions. The students are required to answer 2 questions, each in approximately 500 words. Each question will carry 10 marks .

In short, pattern of question paper and distribution of marks for UG classes will be as under :

Section A : 10 questions, 2 questions from each unit, short answer, all questions compulsory.

Total marks **: 05**

Section B : 10 questions, 2 question from each unit, 5 question to be attempted, at least 1 from each unit, answer approximately in 250 words. Total marks : **25**

Section C: 04 questions (question may have sub-division), not more than 1 question from each unit, descriptive type, answer in about 500 words, 2 questions to be attempted. Total marks : **20**

PAPER-III
PALAEOBOTANY, PTERIDOPHYTES AND GYMNOSPERMS

Unit-1

Characteristics and broad classification of pteridophyta. Stelar system in pteridophytes. Geological Time Scale. Types of fossils, process of fossilization. Applied aspects of Palaeobotany. Structure of *Rhynia* and *Williamsonia*.

Unit-2

Occurrence, structure and life history of *Psilotum, Lycopodium* and *Equisetum*.

Unit-3

Occurrence, structure and life history of *Selaginella* and *Marsilea*. Homospory, heterospory and origin of seed habit.

Unit-4

General characters, economic importance and broad classification of Gymnosperms, occurrence, structure of life history of *Cycas*.

Unit-5

Occurrence, structure and life history of *Pinus* and *Ephedra*.

Note :

The paper setter is required to set questions of 3 types contained in 3 Sections (**Section A**- 10 questions, **Section B**- 10 questions and **Section C**- 4 questions) from the 5 units of each paper. There will be 10 questions in **Section A** which will be asked from all the 5 units, i.e., 2 questions from each unit. These questions have to be answered in one word or a few words only. Each question will be of half mark . All the questions in **Section A** are compulsory. In **Section B,** 10 questions will be set from the 5 units, i.e., 2 questions from each unit. Students are required to attempt at least 1 question from each unit. Each question will carry 5 marks . The answers of each question should be given in about 250 words. In **Section C** there will be 4 descriptive type questions set from all the 5 units, not more than 1 question from each unit. These questions may also have sub-divisions. The students are required to answer 2 questions, each in approximately 500 words. Each question will carry 10 marks .

In short, pattern of question paper and distribution of marks for UG classes will be as under :

Section A : 10 questions, 2 questions from each unit, short answer, all questions compulsory.

Total marks **: 05**

Section B : 10 questions, 2 question from each unit, 5 question to be attempted, at least 1 from each unit, answer approximately in 250 words. Total marks : **25**

Section C : 04 questions (question may have sub-division), not more than 1 question from each unit, descriptive type, answer in about 500 words, 2 questions to be attempted. Total marks : **20**

PRACTICALS

The practical exercises have been divided into following two groups based on the theory papers as detailed below:

Group-I   Algae, Fungi, Lichens, Microbiology and Plant Pathology.

Group-II   Bryophytes, Pteridophytes, Gymnosperms and Palaeobotany.

GROUP I

Microscopic preparations and study of following algal materials: *Nostoc, Oscillatoria, Chlamydomonas, Volvox, Coleochaete, Hydrodictyon, Cladophora, Oedogonium, Vaucheria, Chara, Ectocarpus* and *Polysiphonia*.

Study of different types of Lichen specimens.

Microscopic preparation and study of following fungal materials : *Albugo, Phyllactinia, Morchella, Penicillium, Ustilago,Agaricus, Puccinia* and *Alternaria*.

Study of some locally available materials showing plant diseases caused by Viruses, Mycoplasma, Bacteria and Fungi in field/ laboratory. Yellow vein mosaic of Bhindi, Little leaf of *Solanum melongena* (Brinjal), Citrus canker, Green ear disease of bajra, Rust and Smut of wheat and White rust of crucifers.

GROUP II

Study of external and internal morphology and micro-scopic preparations of following Bryophytes : *Riccia,*

Marchantia, Plagiochasma, Pellia, Anthoceros, Sphagnum and *Polytrichum*.

Microscopic examination of fossil slide specimens/ photographs: *Rhynia* and *Williamsonia*.

Temporary, double stained microscopic preparations and study of stem/ rhizome, anatomy of following pteridophytes: *Psilotum, Lycopodium, Selaginella, Equisetum* and *Marsilea*. Study of temporary, single stained microscopic preparation of the following : Cone of *Lycopodium, Selaginella* and *Equisetum*. Petiole, Root and Sporocarp of *Marsilea* ; Rhizophore and root of *Selaginella*.

Temporary, double stained microscopic preparations of T.S., T.L.S. and R.L.S. of stem of *Pinus* and *Ephedra* and T.S. Leaflet and Rachis of *Cycas* and needle of Pinus, T.S. of normal and coralloid roots of *Cycas*. Microscopic preparations of male cone of *Pinus* and male and female cones of *Ephedra*. Study of male cone and megasporophyll of *Cycas*.

MARKING SCHEME

There shall be a practical examination of five hours duration and the distribution of marks shall be as follows :

		Students	
		Regular	Ex
1.	A double stained section of plant part either of Pteridophyte or Gymnosperm glycerine mount	10	12
2.	Minor preparation of Pteridophyte or Gymnosperm (not covered in Q.1)	5	10
3.	Preparation and mounting of the part of :		
	(a) A Bryophyte	5	5
	(b) A Fungus	5	5
	(c) An Alga	5	5
	(d) Bacteria	5	3
4.	Spots : Seven		
	(a) One from each group (Algae, Lichen, Bryophytes, Fungi, Fossil, Pteridophytes, Gymnosperms).	21	21
	(b) One microbiological experiment for comments.	4	4
5.	Viva-Voce	10	10
6.	Practical records	5	-
	Total	**75**	**75**

BOOKS SUGGESTED

Alexopoules, C.J.: Introductory Mycology, John Wiley and Sons, N.Y. 1978.

Bendre, A. and Kumar, A.: A Test Book of Practical Botany, Rastogi Publication, Meerut.

Ghemawat, M.S., Kapoor, J.N. and Narayan, H.A.: A Text Book of Algae, Ramesh Book Depot, Jaipur, 1976.

Gupta, M.N.: A Class Book of Gymnosperms, 1978.

Parihar, N.S.: An Introduction to Embryophyta, Vol. I, Pteridophyta, Vol.II, Central Book Depot, Allahabad, 1969.

Sharma, P.D.: Fungi, Rastogi Publications, Meerut, 1989.

Sharma, P.D.: Microbiology and Plant Pathology, Rastogi and Co. Meerut, 1989.

Vashishtha, B.R.: Botany for Degree Students (Algae, Fungi, Bryophyta and Gymnosperms), S. Chand and Co., New Delhi, 1976.

Singhvi, V., Pandey, P.C. and Jain, D.K.: A Text Book of Botany, Rastogi and Co., Meerut.

FIRST YEAR SCIENCE, 2004-2005

CHEMISTRY

The examination shall consist of three theory papers and one practical.

Paper & Course		Hrs/week	M. Marks
Paper -I	Inorganic Chemistry	2	50
Paper- II	Organic Chemistry	2	50
Paper- III	Physical Chemistry	2	50
	Practical	4	75

PAPER-I
INORGANIC CHEMISTRY

Time-3 Hrs. **M.M. 50**

NOTE: The paper will be divided into THREE sections.

Section-A Ten questions (short type answer) two from each Unit will be asked. Each question will be of half mark and the candidates are required to attempt all questions. **Total 5 marks**

Section-B Five questions (answer not exceeding 250 words) one from each Unit with internal choice will be asked and the candidates are required to attempt all questions. Each question will be of 5 marks.
Total 25 marks

Section-C Four questions may be in parts covering all the five Units (answer not exceeding 500 words) will be asked. The candidates are required to attempt any TWO questions. Each question will be of 10 marks.

Total 20 marks

UNIT - I

Covalent Bond- Valence bond theory and its limitations, directional characteristics of covalent bond, various types of hybridization and shapes of simple inorganic molecules and ions. Valence Shell Electron Pair Repulsion (VSEPR) theory, regular and deviation from regular geometry. MO theory, homo-nuclear and heteronuclear (CO, NO, HF and HCl) diatomic molecules, multicenter bonding in electron deficient molecules, bond strength and bond energy, percentage ionic character from dipole moment and electronegativity difference.

Ionic Solids - Ionic structures, radius ratio effect and coordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy and Born-Haber cycle, solvation energy and solubility of ionic solids, polarizing power and polarisability of ions, Fajan's rule. Metallic bond - free electron, valence bond and band theories**.**

Weak Interactions- Hydrogen bonding, Van der Waals forces.

UNIT II

s -Block Elements - Comparative study, diagonal relationships, salient features of hydrides, solvation and complexation tendencies including their function in biosystems, an introduction to metal alkyls and aryls.

Chemistry of Noble Gases-History of discovery, separation of inert gases, chemical properties of the noble gases, chemistry of xenon, structure and bonding in xenon compounds.

UNIT -III

Group-13- General properties, oxides, hydroxides, halides and hydrides of boron, diborane and higher boranes, borohydrides, borazine, oxyacids of boron, borax and borax bead test .

Group-14- General properties, inert pair effect, halides, oxides, silicates, silicones, graphitic compounds, carbides, cyanides and carbonyls, brief idea of fullerenes.

Group-15- General properties, hydrides, azides, halides, oxides and oxyacids of phosphorous, nitrogen fixation, fertilizers.

UNIT - IV

Group-16 - General properties, polymorphism, hydrides, halides, oxides and oxyacids of sulphur, thiosulphuric acid and salts, thionic acids and their salts, tetrasulphur tetranitride.

Group-17 - General properties, hydrogen halides, oxides and oxyacids of halogens, interhalogen compounds, polyhalides, basic properties of halogens.

UNIT - V

Non -Aqueous Solvents - Physical properties of a solvent, types of solvents and their general characteristics, Differentiating and leveling solvents, reactions in non-aqueous solvents with special reference to liquid NH_3 and liquid SO_2.

Acids and Bases - Arrhenius, Bronsted - Lowry, Lux - Flood, solvent system and Lewis concepts of acid and bases, Usanovitch definition.

Books Recommended

1. Concise Inorganic Chemistry: J. D. Lee

2. General Inorganic Chemistry: J. A. Duffy, Longman (2nd Ed.)

3. Principles of Inorganic Chemistry: B. R. Puri and L. R. Sharma

4. Basic Inorganic Chemistry: F.A.Cotton and G. Wilkinson, Wiley Eastern

5. Molecular Geometry : R. J. Gillespie, Van Nostrand Reinhold.

6. Inorganic Chemistry (Hindi Ed.): Suresh Ameta, A. Sharma and M. Mehta, Himanshu Pub.

PAPER-II

ORGANIC CHEMISTRY

Time-3 Hrs.   **M.M. 50**

NOTE : The paper will be divided into THREE sections.

Section-A   Ten questions (short type answer) two from each Unit will be asked. Each question will be of half mark and the candidates are required to attempt all questions.   **Total 5 marks**

Section-B   Five questions (answer not exceeding 250 words) one from each Unit with internal choice will be asked and the candidates are required to attempt all questions. Each question will be of 5 marks.
                Total 25 marks

Section-C   Four questions may be in parts covering all the five Units (answer not exceeding 500 words) will be asked. The candidates are required to attempt any TWO questions. Each question will be of 10 marks.
                Total 20 marks

UNIT-I

Structure and Bonding - Localized and delocalized chemical bond, Van der Waals interaction, charge transfer complexes, resonance, hyperconjugation, aromaticity, electromeric, inductive and field effects, hydrogen bonding.

Mechanism of Organic Reactions - Curved arrow notation, drawing electron movements with arrows, half-headed and double- headed arrows, types of organic reactions, energy considerations.

Reactive Intermediates - Carbocations, carbanions, free radicals, carbenes, arynes and nitrenes, their formation and stabilities.

Methods of determination of reaction mechanism (product analysis, intermediates, isotope effects, kinetic and stereochemical studies).

UNIT-II

Stereochemistry of Organic Compounds - Concept of isomerism , types of isomerism.

Optical Isomerism- Elements of symmetry, molecular chirality, enantiomers, stereogenic centre, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogenic centers, diastereomers, threo and erythro diastereomers, meso compounds, resolution of enantiomers, inversion, retention and racemization.

Relative and absolute configuration, sequence rules, D and L, R and S systems of nomenclature.

Geometric isomerism-determination of configuration of geometric isomers. E and Z system of nomenclature, geometric isomerism in oximes and alicyclic compounds.

Conformational isomerism-conformational analysis of ethane and n-butane; conformations of cyclohexane,

axial and equitorial bonds, conformation of mono substituted cyclohexane derivatives. Newman projection and Sawhorse formulae, Fischer and Flying Wedge formulae.

Difference between configuration and conformation.

UNIT-III

Alkanes: General methods of formation, physical & chemical properties. Mechanism of free radical substitution in alkanes with reference to halogenation, orientation, reactivity and selectivity.

Cycloalkanes - Nomenclature, methods of formation, chemical reactions, Baeyer's strain theory and its limitation, ring strain in small rings (cyclopropane and cyclobutane), theory of strainless rings, the case of cyclopropane ring : banana bond.

Alkenes, Dienes and Alkynes - Brief introduction of alkenes, their formation with reference to mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides, regioselectivity in alcohol dehydration. The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes.

Chemical reactions of alkenes- mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff's rule, hydroboration- oxidation, oxymercuration-reduction, epoxidation, ozonolysis, hydration, hydroxylation and oxidation with $KMnO_4$, polymerization of alkenes, substitution at the allylic

and vinylic positions of alkenes, industrial applications of ethylene and propene.

Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes, structure of allenes and butadiene, methods of formation, polymerization, chemical reactions - 1,2 and 1,4 - additions, Diels - Alder reaction.

Alkynes: Acidity of alkynes, mechanism of electrophilic and nucleophilic addition reactions, hydroboration, metal - ammonia reductions, oxidation and polymerization.

Unit - IV

Arenes and Aromaticity - Nomenclature of benzene derivatives, the aryl group, aromatic nucleus and side chain, structure of benzene, molecular formula and Kekule structure, stability and carbon - carbon bond lengths of benzene, resonance structure and M. O. picture.

Aromaticity: The Huckel rule, aromatic ions. Aromatic electrophilic substitution: General pattern of the mechanism, role of σ and π complexes. Mechanism of nitration, halogenation, sulphonation, mercuration and Friedel -Craft reaction. Energy profile diagrams. Activating and deactivating substituents, orientation and ortho-para ratio. Side chain reactions of benzene derivatives. Birch reduction, Methods of formation and chemical reactions of alkylbenzenes, alkynylbenzene and biphenyl.

UNIT -V

Alkyl and Aryl Halides - Nomenclature and classes of alkyl halides, methods of formation, chemical reactions, mechanism of nucleophilic substitution reactions of alkyl halides, S_N2 and S_N1 reactions with energy profile diagrams, factors affecting S_N2 and S_N1 reactions.

Haloform reaction, Freons

Methods of formation of aryl halides, nuclear and side chain reactions, the addition - elimination and elimination - addition reaction, mechanisms of nucleophilic aromatic substitution reactions.

Relative reactivites of alkyl halides v/s allyl, vinyl and aryl halides. synthesis and uses of DDT and BHC.

Books Recommended

1. A Text Book of Organic Chemistry: K. S. Tiwari, S. N. Mehrotra and N. K. Vishnoi.
2. Modern Principles of Organic Chemistry: M. K. Jain and S.C. Sharma
3. A Text Book of Organic Chemistry: (Vol. I & II) O. P. Agarwal,
4. A Text Book of Organic Chemistry: B. S. Bahl and Arun Bahl.
5. A Text Book of Organic Chemistry: P. L. Soni.
6. Organic Chemistry: (Vol. I, II & III) S. M. Mukherji, S. P. Singh and R.P.Kapoor, Wiley Eastern Ltd. (New Age International)
7. Organic Chemistry, Morrison & Boyd, Prentice Hall.
8. Organic Chemistry (Hindi Ed.):Suresh Ameta, P. B. Punjabi and B. K Sharma, Himanshu Pub.

PAPER-III

PHYSICAL CHEMISTRY

Time-3 Hrs.   **M.M. 50**

NOTE : The paper will be divided into THREE sections.

Section-A   Ten questions (short type answer) two from each Unit will be asked. Each question will be of half mark and the candidates are required to attempt all questions.   **Total 5 marks**

Section-B   Five questions (answer not exceeding 250 words) one from each Unit with internal choice will be asked and the candidates are required to attempt all questions. Each question will be of 5 marks.
                                                            Total 25 marks

Section-C   Four questions may be in parts covering all the five Units (answer not exceeding 500 words) will be asked. The candidates are required to attempt any TWO questions. Each question will be of 10 marks.
                                                            Total 20 marks

UNIT - I

Mathematical Concepts - Logarithmic relations, curve sketching, linear graphs and calculation of slopes, differentiation of function like k_x, e^x, x^n, $\sin x$, $\log x$, maxima and minima, partial differentiation and reciprocity relations, integration of some useful/ relevant functions, permutations and combinations, factorials, probability.

Computers - General introduction to computers, different components of a computer, hardware and software, input-output devices, binary numbers and arithmetic, introduction to computer languages, programming operating systems.

UNIT - II

Gaseous State - Postulates of kinetic theory of gases, deviation from ideal behavior, Van- der Waals equation of state.

Critical Phenomena - PV isotherms of real gases, continuity of states, the isotherms of Van der Waals equation, relationship between critical constants and Van der Waals constants, the law of corresponding states, reduced equation of state.

Molecular Velocities - Root mean square, average and most probable velocities, qualitative discussion of the Maxwell's distribution of molecular velocities, collision number, mean free path and collision diameter, liquefaction of gases (based on Joule - Thomson effect).

Liquid State - Intermolecular forces, structure of liquid (a qualitative description).

Liquid Crystals - Difference between liquid crystal, solid and liquid, classification, structure of smetic, nematic and cholestric phases, theory of liquid crystals and its applications, thermography and seven segments cell.

UNIT-III

Solid State - Definition of space lattice, unit cell, Bravais lattices.

Laws of crystallography- (i) Law of constancy of interfacial angles (ii) Law of rationality of indices, Weiss and Miller indices (iii) Law of symmetry, symmetry elements in crystals, classification of crystals, X-ray diffraction by crystals, derivation of Bragg equation, determination of crystal structure of NaCl, KCl and CsCl (Laue's method and powder method).

Colloidal State - Definition of colloids, classification of colloids.

Solids in liquid (sols): Properties - kinetic, optical and electrical, stability of colloids, protective action, Hardy - Schulze law, gold number.

Liquids in Liquid (emulsions): Types of emulsions, preparation, emulsifier,

Liquids in solid (gels)- classification, preparation and properties, inhibition, general applications of colloids.

UNIT- IV

Nuclear and Radiochemistry - Elementary idea of nucleus, nuclear forces, packing fraction, mass defect and binding energy, nuclear fission and fusion reactions, calculation of Q - values of nuclear reactions, liquid drop and shell models of nucleus, theory of radioactivity, G. M. Counter, half life period, average life, radioactive disintegration, radioactive steady state, group dis-placement law, radioactive series, separation and identification of isotopes, application of radioactivity and radioactive tracers.

UNIT-V

Atomic Structure - Dual nature of electron, De Broglie equation, Davisson and Germer experiment, Heisenberg uncertainty principle, Schrodinger wave equation, significance of ψ and ψ^2, probability distribution curves, shapes of s, p and d - orbitals, Zeeman and Stark effects.

Physical Properties and Molecular Structure - Physical properties of liquids, vapour pressure, measurement of vapour pressure, heat of vaporization, Trouton's rule.

Surface tension, measurement of surface tension.

Viscosity and its measurement, effect of temperature on the surface tension and viscosity. use of these properties in determination of chemical constitution.

Books Recommended:

1. Principles of Physical Chemistry: B. R. Puri and L. R. Sharma.

2. A Text Book of Physical Chemistry: A. S. Negi and S. C. Anand.

3. Physical Chemistry, Pt. I & II : C.M. Gupta, J.K. Saxena and M. C. Purohit.

4. Physical Chemistry (Hindi Ed.) : Suresh Ameta, R.C.Khandelwal, R. Ameta & J. Vardia, Himanshu Pub.

5. Computers and Applications to Chemistry, Ramesh Kumari, Narosa Publishing House Pvt. Ltd.

FIRST YEAR CHEMISTRY PRACTICALS 2004-2005

TIME: 5 Hrs.(one day)   **M.M. 75**

Distribution of Marks   Marks

Exercises-

1. Semi-micro Analysis of Inorganic mixture containing five radicals (excluding Na$^+$and K$^+$). **20**

2. (i) Detection of extra elements (N, S, and halogen) if any and functional groups in given simple organic compounds. **10**

   (ii) Purification of the given organic compounds by crystallisation (charcoal), sublimation and determination of its m.p. **10**

   OR

   Determination of mixed melting points using urea-cinnamic acid mixtures of given compositions.

3. ONE physical Chemistry experiment **15**

4. Viva- Voce **10**

5. Records **10**

   Total   **75 Marks**

List of Experiments:

1. **Semi-micro Analysis of Inorganic mixture:** The mixture shall contain **Five** radicals at least two cations & two anions) soluble in water or in HCl. Two cations of the same group except II A & II B may be given. Not more than one interfering radical may be given. Interfering radical may not be given with typical anion combinations.

2. (i) Detection of extra elements (N,S, and halogen) if any and functional group in given simple organic compounds. (one organic compound from the following list be given for identification).

   Carboxylic acids, Phenols, Alcohols, Carbohydrates, Aldehydes, Ketones, Nitro Compounds, Amino compounds, Anilides, Amides, Esters, Thioamide, Hydrocarbons, Halogen containing compounds

   (ii) Crystallization:

   Concept of induction of crystallization

   Phthalic acid from hot water (using fluted filter paper and stemless funnel)

   Acetanilide from boiling water

   Naphthalene from ethanol

   Benzoic acid from water

Decolourisation and crystallization using charcoal

Crystallization and decolourisation of impure naphthalene (100 g of naphthalene mixed with 0.3 of Congo Red using 1 g decolourising carbon) from ethanol.

Simple Sublimation : Camphor, Naphthalene, Phthalic acid and Succinic acid.

Mixed Melting Point determination

Urea- Cinnamic acid mixture of various compositions (1:4, 1:1, 4:1)

3. Physical Chemistry Experiments- Any one of the following experiments may be given in the examination.

Distribution Law

(i) To study the distribution of iodine between water and CCl_4.

(ii) To study the distribution of benzoic acid between benzene and water.

(iii) To study the distribution of acetic acid between benzene and water

Colloids

To prepare arsenious sulphide sol and compare the precipitating power of mono-, bi- and trivalent anions.

Viscosity and Surface Tension

(i) To determine the percentage composition of a given mixture (non interacting systems) by viscosity method.

(ii) To determine the percentage composition of a given binary mixture by surface tension method

(iii) To determine the parachor value of – CH_2 – group.

(iv) To determine the rheochor value of – CH_2 – group.

Transition Temperature

(i) Determination of the transition temperature of the given substance by thermometric/dialometric method (e.g.: $MnCl_2 . 4H_2O$, $SrBr_2 . 2H_2O$)

Thermochemistry

(i) To determine the solubility of benzoic acid at different temperatures and to determine ΔH of the dissolution process

(ii) To determine the enthalpy of neutralisation of a weak acid/ weak base versus strong base/ strong acid and to determine the enthalpy of ionisation of the weak acid/weak base

(iii) 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.

Books Recommended:

1. Practical Chemistry - Giri, Bajpai and Pandey, S. Chand & Co. Ltd. New Delhi

2. Laboratory Manuel in Organic Chemistry, R.K. Bansal, Wiley Eastern

3. Experimental Organic Chemistry Vol.I & II, P.R. Singh, D.S. Gupta & K.S. Bajpai, Tata McGraw Hill.

4. Experiments in Physical Chemistry- J.C. Ghose, Bharti Bhawan

5. Experiments in General Chemistry, N.R. Rao & U.C. Agarwal, Eastern Press

6. Practical Chemistry- Suresh Ameta & P.B. Punjabi, Himanshu Publication.

B.Sc. FIRST YEAR SCIENCE
2004-2005

GEOLOGY

The examination shall consist of three theory papers and one practical.

	Hr/ Week	Exam. Hr.	M. Marks
A. Theory Papers			
Paper I : Physical Geology	2	3	50
Paper II : Paleontology	2	3	50
Paper III : Crystallography and Mineralogy	2	3	50
B. Practical:	4	4	75
Total Marks			**225**

Note:

Time: 3 hr **MM 50**

Note: Each paper will be divided into THREE parts.

Part I – Ten questions (short type answer) two from each Unit will be asked. Each question will be of half a mark and the candidates are required to attempt **ALL** questions. **Total - 05 marks** (10x 3=30 min)

Part II – Five questions (answer not exceeding 250 words) one from each Unit with internal choice will be asked and the candidates are required to attempt **ALL** questions. Each question will be of 05 marks.

Total 25 marks (5x 12=60 min)

Part III – Four questions may be in parts covering all five Units (answer not exceeding 500 words) will be asked. The candidates are required to attempt any **TWO** questions. Each question will be of 10 marks.

Total 20 marks (2x 45=90 min)

PAPER–I
PHYSICAL GEOLOGY

Time: 3 hr   **MM 50**

UNIT-1

Earth as a member of the Solar system. Origin and age of the Earth. Physical parameters of the Earth. Internal constitution of the Earth. Concept of lithosphere. Isostasy.

UNIT-II

Surface features of the Earth. Distribution of land and ocean and peculiarities. Coral reefs. Distribution and causes of earthquakes. Seismic waves as indicator of the Earth's interior. Volcanoes: causes, distribution and types.

UNIT-III

Weathering and erosion. Geological work of wind, groundwater, river, ocean, and glacier.

UNIT-IV

Major tectonic features of the Earth: Mountain belts, shields, island arcs, trenches, mid-oceanic ridges, and ocean basins.

UNIT-V

Concept of Plate Tectonics. Evolution of Himalayas and Indo-Gangetic Plain.

PAPER–II
PALAEONTOLOGY

Time: 3 hr   **MM 50**

UNIT-I

Definition, subdivisions of Paleontology and its relation with allied subjects. Fossils, their modes of preservation. Uses of fossils. Habitats and Habits. Elementary ideas of organic evolution. Classification and Nomenclature.

UNIT-II

Morphology and geological distribution of Foraminifera, Graptoloidea and Echinoidea.

UNIT–III

Morphology and geological distribution of Gastropoda, Pelecypoda and Cephalopoda.

UNIT–IV

Morphology and geological distribution of Brachiopoda, Corals and Trilobita.

UNIT–V

Elementary knowledge of Gondwana plant fossils. Vertebrate fossils of Siwaliks of India. Evolutionary history of man.

PAPER–III
CRYSTALLOGRAPHY AND MINERALOGY

Time: 3 hr   **MM 50**

UNIT–I

Fundamental Laws of Crystallography, Elements of crystal symmetry, Millers and Wiess systems of Notation. Crystal forms and their classification into crystal system.

UNIT-II

Study of holohedral classes of following crystal systems- Cubic system, Tetragonal system, Hexagonal system, Orthorhombic system, Monoclinic system and Triclinic system.

UNIT–III

Physical properties of minerals, Concept of isomorphism and polymorphism. Elementary ideas about structure and classification of silicate minerals. Study of physical and optical properties of quartz, feldspar, and mica families.

UNIT–IV

Petrologic microscope and its construction; principles of optics as applied to orthoscopic study of minerals; color, form, birefringence, and pleochroism. Ideas about uniaxial and biaxial characters of minerals.

UNIT–V

Study of the physical and optical properties of following rock forming mineral families: Olivine, pyroxene, amphibole, and nepheline. Study of optical properties in particular of following minerals: Muscovite, biotite, quartz, orthoclase, microcline, albite, olivine, augite, diopside, hypersthene, hornblende and tremolite.

B. Sc. FIRST YEAR GEOLOGY PRACTICAL 2004-2005

Examination will be of four hours' duration.

Maximum Marks 75

Physical Geology	05
Paleontology	20
Crystallography-Mineralogy	20
Field Work	15
Viva Voce	05
Record	10
Total	**75**

(i)   Paleontology :

Identification and description of following fossils in hand specimens:

Foraminifera	:	*Nummulites, Assilina, Alveolina.*
Echinoidea	:	*Cidaris, Hemiaster, Micraster.*
Brachiopoda	:	*Rhynchonella, Terebratula, Productus, Spirifer.*
Pelecypoda	:	*Pecten ,Ostrea, Trigonia, Lima, Exogyra.*
Gastropoda	:	*Trochus, Murex, Voluta, Physa, Turritella, Conus.*

Ammonoidea	:	*Phylloceras, Ceratites, Perisphinectes.*
Coleoidea	:	*Belemnites.*
Nautiloidea	:	*Nautilus, Orthoceras.*
Trilobita	:	*Calymene, Phacops, Agnostus, Trinucleus, Paradoxides.*
Graptoloidea	:	*Monograptus, Diplograptus.*
Plant fossils	:	*Glossopteris, Gangmopteris, Vertibraria, Ptilophyllum.*

(ii) Crystallography and Mineralogy :

Description and identification of the following minerals in hand specimen : Quartz, feldspar, muscovite, biotite, chlorite, hornblende, augite, olivine, garnet, kyanite, staurolite, sillimanite, tremolite, asbestos, serpentine, calcite, dolomite, magnetite, hematite, epidote, tourmaline, beryl, nepheline, talc, gypsum, apatite, fluorite, topaz and corundum.

Drawing, description and identification of crystal models.

(iii) Physical Geology :

Preparation of charts and diagrams illustrating important processes of erosion and weathering.

(iv) Field Training :

Field training on study of minerals, rocks, and fossils of seven-day duration and a report thereon.

Fieldwork is compulsory. Students not taking part in the fieldwork shall not be allowed to appear in the examination.

Books suggested, besides the Internet: B.Sc. Part-I

Datta A. K.: Introduction to Physical Geology, Kalyani Publishers, New Delhi.

Ford, W. E.: Dana's Textbook of Mineralogy, John Wiley & Sons, New York.

Hamblin W. K.: Earth's Dynamic Systems, Macmillan Publishing Company, New York.

Homes A.: Principles of Physical Geology, Thomas Nelson & Sons, London.

Mahapatra G. B.: A Textbook of Geology, CBS Publishers & Distributors, Delhi.

Mukerjee P. K.: A Textbook of Geology, The World Press Pvt. Ltd., Calcutta.

Parbin Singh: Engineering & General Geology, S. K. Kataria & Sons, New Delhi.

Read H. H.: Rutley's Elements of Mineralogy (revised by C.D. Gribble), CBS Publishers & Distributors, Delhi.

Sharma, N. L.: Determinative Tables, ISM, Dhanbad.

Shrock R. R. & Twenhofel W. H.: Principles of Invertebrate Palaeontology, CBS Publishers & Distributors, Delhi.

Tarbuck E. J. & Lutgens F. K.: The Earth - An Introduction to Physical Geology, Merrill Publishing Co., London.

Woods, Henry: Paleontology Invertebrates, CBS Publishers & Distributors, Delhi.

FIRST YEAR T.D.C. SCIENCE, 2004-05

ZOOLOGY

The first year TDC examination shall consist of three theory papers, each of three hours duration and a practical examination of five hours duration.

		Marks
Paper-I :	Life And Diversity Of Animals-I (Invertebrates)	50
Paper-II :	Cell Biology	50
Paper-III :	Developmental Biology	50
Practical :		75

Pattern of question paper in the annual examination and distribution of marks:

Each theory paper in the annual examination shall have three sections i.e. A, B, and C. **In section A,** total 10 questions will be set in the paper, selecting at least two from each unit. These questions to be answered in a word or so. All questions are compulsory. Each question carries 0.5 mark, total 05 marks.

In section B, there shall be total 10 questions, selecting two questions from each unit, five questions to be answered by the student selecting at least one from each unit. Answer should be given in approximately 250 words. Each question carries 05 marks, total 25 marks.

In section C, 04 descriptive type questions will be set in the examination paper from five units of the syllabus of the paper, selecting not more than one question from a unit. Each question may have two sub divisions. Students are required to answer any two questions approximately in 500 words. Each question is of 10 marks, total 20 marks.

FIRST YEAR T.D.C. SCIENCE, 2004-05

ZOOLOGY

PAPER-I
LIFE AND DIVERSITY OF ANIMALS-I
(INVERTEBRATES)

Duration : 3 hours   **M.M. 50**

UNIT- I

1   General characters and classification of phylum Protozoa upto orders with examples and their economic importance.

2   Type study-*Paramecium, Plasmodium,* Pathogenecity of *Plasmodium.*

3   Parasitic protozoans : Pathogenesis and morphology of *Entamoeba histolytica, Trichomonas vaginalis, Leishmania tropica, Trypanosoma gambiense*

UNIT-II

4   General characters and classification of phylum Porifera upto orders with examples and their economic importance.

5   Type study-*Sycon*

6   Canal system in sponges.

7   General characters and classification of phylum Coelenterata upto orders with examples.

8   Type study-*Metridium.*

9   Corals and coral reefs - their formation, kinds and importance. Polymorphism in Coelenterates, Metagenesis.

UNIT-III

10   General characters and classification of phylum Platyhelminthes and Aschelminthes upto orders with examples.

11   Type study –*Fasciola hepatica, Ascaris lumbricoides.*

12   Helminth parasites in relation to human diseases, parasitic adaptations of trematodes, cestodes and nematodes.

UNIT-IV

13   General characters and classification of phylum Annelida & Arthropoda upto orders with examples.

14   Type study-*Nereis, Palaemon, Schistocerca.*

15   Metamerism, pseudocoelom, trochophore larva.

UNIT-V

16   General characters and classification of phylum- Mollusca, Echinodermata and Hemichordata upto orders with examples.

17   Type Study – *Pila, Asterias, Balanoglossus*

18   Echinoderm larvae; Affinities of Hemichordata

FIRST YEAR T.D.C. SCIENCE, 2004-05

ZOOLOGY

PAPER-II

CELL BIOLOGY

Duration : 3 hours **M.M. 50**

UNIT -I

1   The Cell: Discovery of cell, basic properties of cell, diversity of cell size and shape, cell theory.

2   Prokaryotic cell : Characteristics and structure.

3   Cellular macromolecules : Proteins, carbohydrates, lipids.

UNIT -II

4   Centrioles and basal bodies.

5   Cilia and flagella.

6   Cytoplasmic skeleton : Microfilaments and microtubules.

7   Plasma membrane: Fluid mosaic model, functions of plasma membrane viz. Endo- and exocytosis, active and passive transport.

UNIT -III

8   Shape, size, distribution, chemical nature and functions of following:

(a) Endoplasmic reticulum.

(b) Golgi complex.

(c) Lysosomes.

(d) Mitochondria.

UNIT -IV

9   Nucleus and nucleolus: Structure, chemical nature and functions.

10 Nucleic acids: Watson and Crick model of DNA, chemical nature of DNA, types of DNA, replication of DNA, different types and chemical nature of RNA, Ribosomes.

11 Elementary knowledge of protein synthesis.

UNIT -V

12 Brief idea of cell cycle. General description of mitosis and meiosis.

13 An elementary idea of cell transformation and cancer.

14 An elementary idea of cellular basis of immunity.

15 Methods in cell Biology.

(a) Elementary idea of techniques in cell biology: Light, electron and fluorescence microscopy.

(b) Elementary idea of cell culture.

FIRST YEAR T.D.C. SCIENCE, 2004-05

ZOOLOGY

PAPER-III
DEVELOPMENTAL BIOLOGY

Duration : 3 hours   **M.M. 50**

UNIT-I

1   Aima and scope of developmental biology. Historical review and concepts of Embryology.

2   Sexual and asexual reproduction.

3   Neuroendocrine regulation of reproductive organs (hypothalamo-hypophysial axis only).

UNIT-II

4   Gametogenesis: Spermatogenesis and structure of sperm, oogenesis and structure of ovum, types of ova.

5   Fertilization: Events of fertilization, mechanism of sperm transfer, polyspermy, preventing mechanisms.

6   Errors in fertilization and significance of fertilization.

7   Parthenogenesis.

UNIT-III

8   Cleavage: Patterns and planes of cleavage.

9   Blastulation: Types of blastula.

10 Gastrulation : Types, mechanism, fate maps, morphogenetic cell movement and their significance in gastrulation.

UNIT-IV

11 Elementary knowledge of primary organizer.

12 Embryonic induction, concept of competance.

13 Determination, differentiation and growth.

14 Regeneration.

UNIT -V

15 Extra embryonic membranes: Development and functions.

16 Placentation: Definition, types, classification on the basis of morphology and histology. Functions of placenta.

FIRST YEAR T.D.C. SCIENCE, 2004-05

ZOOLOGY PRACTICAL

Duration : 5 hours   **M.M. 75**

S.No.	Exercise	Regular	Ex-Students
1	Major dissection	18	25
2	Cell Biology/Developmental Biology exercise	09	12
3	Mounting/Slide preparation	08	08
4	Spots (10)	20	20
5	Viva-voce	10	10
6	Record	10	—
	Total :-	**75**	**75**

1. General survey of invertebrates (museum specimens) : The student is required to know classification, habit and habitat, economic importance etc.

A   Protozoa   : *Entamoeba, Polystomella, Monocystis, Euglena, Noctiluca, Leishmania, Trichomonas, Trypanosoma, Nyctotherus, Paramecium, Vorticella*, various stages of *Plasmodium.*

B   Porifera   : *Scypha, Hyalonema, Euplectella, Spongilla, Euspongia.*

C. Coelenterata   : *Physalia, Porpita, Aurelia, Rhizostoma, Alcyonium, Corallium, Gorgonia, Pennatula, Madrepora, Metridium*

D   Platyhelminthes &: *Dugesia, Fasciola, Taenia,*
    Aschelminthes   *Schistosoma, Dracunculus, Ascaris* (male and female*), Wucheraria, Enterobius*

E   Annelida   : *Nereis, Heteronereis, Aphrodite, Arenicola, Chaetopterus Pontobdella, Hirudinaria, Pheretima.*

F   Onychophora   : *Peripatus.*

G   Arthropoda   : *Palaemon, Limulus, Aranea, Palamnaeus, Lepas, Balanus, Apus, Sacculina, Eupagurus, Carcinus, Lepisma, Pediculus, Schistocerca, Bombyx, Xenopsylla, Apis, Cimex, Julus, Scolopendra, Ixodes, Sarcoptes, Cyclops.*

H   Mollusca   : *Mytilus, Chiton, Teredo, Turbinella, Laviculus, Patella, Limax, Helix, Doris, Aplysia, Dentalium, Nautilus, Sepia, Octopus, Loligo, Pecten, Solen, Pila, Pinctada.*

I	Echinodermata	: *Asterias, Pentaceros, Antedon, Ophiothrix, Holothuria.*
J	Hemichordata	: *Balanoglossus, Saccoglossus.*

II. Study of the permanent slides, sections passing through different regions of animals and developmental stages.

1	Protozoa	: Blood smears showing malarial parasite. *Paramecium*: Binary fission, conjugation.
2	Porifera	: T.S. and L.S. of *Sycon.*, spicules, spongin fibres and gemmules
3	Coelenterata	: *Obelia* (colony and medusa), Planula, Scyphistoma and ephyra larva of *Aurelia,* T.S. of mesentry of *Metridium*
4	Platyhelminthes	: Miracidium, sporocyst, redia and cercaria larvae of *Fasciola,* scolex of *Taenia*, W.M. of mature and gravid proglottids of *Taenia*, hexacanth and cysticercus larvae of *Taenia.*
5	Aschelminthes	: T.S. of *Ascaris.*(male and female)

6	Annelida	: T.S. of *Nereis* through different regions, parapodia of *Nereis* and *Heteronereis*. Trochophore larva.
7	Arthropoda	: V.S. of compound eye, nauplius, zoea, megalopa larvae and *Mysis*
8	Mollusca	: T.S. of gill lamella and T.S. of shell of *Lamellidens*, glochidium larva.
9	Echinodermata	: T.S. of arm, tubefeet and pedicellaria, bipinnaria larva of starfish, echinopluteus larva.
10	Hemichordata	: Torneria larva.

III Dissections:

1.	*Pheretima*	: General anatomy, digestive, nervous, excretory and reproductive systems.
2.	*Palaemon*	: Appendages, general anatomy, digestive system and nervous system.
3.	*Periplaneta*	: General anatomy, digestive system, nervous system and reproductive systems.
4.	*Pila*	: Organs of pallial complex, nervous system.

IV Mountings : Permanent preparation of the following :

1	Protozoa	: *Euglena, Paramecium*, rectal ciliates, *Polystomella.*
2	Porifera	: Sponge spicules, spongin fibres and gemmules.
3	Coelenterata	: *Obelia* (colony and medusa)
4	Platyhelminthes	: Proglottid of *Taenia.*
5	Annelida	: Parapodia of *Nereis* and *Heteronereis*, ovary, septal nephridia and setae (*in situ*) of earthworm.
6	Arthropoda	: Statocyst and hastate plate of prawn, salivary glands and tracheae of cockroach, W.M. of *Cyclops, Daphnia,* mouth parts of any 4 insects, *Culex, Anopheles* male and female, housefly, cockroach and honey bee.
7	Mollusca	: Gill lamella, glochidium larva, osphradium and radula of *Pila.*

Cell Biology

1. Prepared slides of mitochondria, Golgi bodies, centrosome, different stages of mitosis.

2. Buccal smear preparation for localization of mitochondria and Golgi complex using vital stains.

3. Demonstration of chromosomes in the buds of *Tradescantia / Aloe vera* and in root tips of *Allium cepa.*

4. Squash preparation of polytene chromosomes.

Developmental Biology

1. W.M of eggs, early cleavage stage, T.S. of blastula and gastrula of frog.

2. Study of chick embryo. 18 hours, 24 hours, 36 hours, 48 hours and 72 hours.

3. T.S. of ovary and testis.

4. Sperm smear to study the structure of sperm.

5. Foetus with placenta.

REFERENCE BOOKS (LATEST EDITIONS) :

LIFE AND DIVERSITY OF ANIMALS (INVERTEBRATES)

1. Hickman C.P.Jr.,F.M. Hickman and L.S. Roberts, Integrated Principles of Zoology, Mosby College Publication. St. Louis.

2. Ayyar, E.K. and T.N.Ananthakrishnan, Manual of Zoology, Vol.1 (Invertebrata), Parts I and II. S, Viswanathan (Printers and Publishers) Pvt. Ltd. , Madras.

3   Jordan, E.L. and P.S.Verma, Invertebrate Zoology, S.Chand & Co. Ltd., Ram Nagar, New Delhi. (English and Hindi Editions).

4   Parker, T.J. and Haswell, W.A.: Text Book of Zoology, Vol.1, (Invertebrata), A.Z.T.B.S. Publishers and Distri-butors, New Delhi- 110051

5   Ismail, S.A., Vermicology : The Biology of Earthworms, Orient Longman, India.

6   Kotpal, R.L.: Modern Text Book of Zoology : Invertebrates, Rastogi Publications, Meerut. (English and Hindi Editions)

7   Storer, T.I. and Usinger, K.L. : General Zoology, Tata McGraw- Hill Publishing Co., New Delhi.

8   Simpson, GG : Principles of Taxonomy, Oxford and IBH Publisher Co. New Delhi.

CELL AND DEVELOPMENTAL BIOLOGY :

9   Alberts B., Bray D., Lewis J., Raff M., Roberts K. and J.D. Watson, Molecular Biology of the Cell (Garland).

10   Balinsky, An Introduction to Embryology (CBS College Publishers)

11   Grant : Biology of Developing systems (Holt, Reihart and Winston).

12   Gilbert : Developmental Biology (Sinauer)

13   Lodish, H., et al., Molecular Cell Biology (Freeman).

PRACTICAL :

14   Verma, PS, A manual of practical Zoology S.Chand and Co. Ltd., Ram Nagar, New Delhi (English and Hindi Editions).

15   Lal, SS : Practical Zoology , Invertebrates, Rastogi Publication, Meerut (English and Hindi Editions).

FIRST YEAR T.D.C. SCIENCE, 2004-05

ENVIRONMENTAL SCIENCES

The first year TDC examination shall consist of three theory papers, each of three hours duration and a practical examination of five hours duration.

		Marks
Paper-I :	Basic Concepts of Ecology and Evolution	50
Paper-II :	Ecological Organisation	50
Paper-III :	Ecosystem Ecology	50
Practical :		75

Pattern of question paper in the annual examination and distribution of marks:

Each theory paper in the annual examination shall have three sections i.e. A, B and C. **In section A**, total 10 questions will be set in the paper, selecting at least two from each unit. These questions to be answered in a word or so. All questions are compulsory. Each question carries 0.5 mark, total 05 marks.

In section B, there shall be total 10 questions, selecting two questions from each unit, five questions to be answered by the student selecting at least one from each unit. Answer should be given in approximately 250 words. Each question carries 05 marks, total 25 marks.

In section C, 04 descriptive type questions will be set in the examination paper from five units of the syllabus of the paper, selecting not more than one question from a unit. Each question may have two sub divisions. Students are required to answer any two questions approximately in 500 words. Each question is of 10 marks, total 20 marks.

FIRST YEAR SCIENCE - 2004-05

ENVIRONMENTAL SCIENCES

PAPER-I
BASIC CONCEPTS OF ECOLOGY & EVOLUTION

Duration : 3 Hrs   **M.M.: 50**

UNIT-I

Fundamental principles of environment; Man's attitude towards environment, Rise of agriculture, Domestication of animals, Ancient civilization and environment.

Ecology : Definition , aim, scope and branches; Historical background of ecology : Ecology in Indian classics and ancient Greek and Roman Literature, growth of ecology from 12th to 20th Century; Growth of plant as well as Animal Ecology in India.

UNIT-II

Natural processes – Primeval atmosphere and origin of life; Structure and composition of present day atmosphere; atmosphere and earth radiation balance; Hydrosphere: atmospheric humidity and precipitation, hydrological cycle. Lithosphere – soil formation, soil texture, soil profile, soil classification.

UNIT-III

Energy - Brief idea of Biogas, biomass, solar energy, coal, hydro – power and nuclear power. Environmental impacts of energy use. Energy conservation.

UNIT-IV

Evolution and Ecology : Evolution – evidences and theories of organic evolution. Darwinism & Lamarkism. Adaptation, co-evolution, speciation and selection. Evolution of Man.

UNIT - V

Plant nomenclature : Plant kingdom – classification, general characters and examples of different groups.

Animal kingdom – Classification and general characters upto class level with examples.

FIRST YEAR SCIENCE - 2004-05

ENVIRONMENTAL SCIENCES

PAPER-II
ECOLOGICAL ORGANISATION

Duration : 3 Hrs.   **M.M.: 50**

UNIT-I

Population ecology : Definition, natality, mortality, fecundity, age and sex ratio; population growth form and concept of carrying capacity, population regulation.

UNIT-II

Community ecology - The biotic community concept; community characteristics- analytical characteristics of the community - quantitative, qualitative characteristics, synthetic characteristics of community, IVI and concept of ecological dominance.

UNIT-III

Methods of studying vegetation, gradient analysis and continuum concept, concept of ecotone and edge effect. Species diversity and diversity indices; community classification; Ecological niche.

UNIT- IV

Interspecific interactions - Commensalism, Amensalism, Mutualism, Protocooperation, Symbiosis, Predation, Parasitism, Competetion, Epiphytism, Types of association-Colonization, Aggregation, Social organization and behaviour.

UNIT-V

Ecological succession; Types, cause and processes of succession, hydrosere, xerosere, significance of ecological succession; concept of climax.

FIRST YEAR SCIENCE - 2004-05

ENVIRONMENTAL SCIENCES

PAPER – III
ECOSYSTEM ECOLOGY

Duration : 3 Hrs.   **M.M.:50**

UNIT-I

The Ecosystem - Ecosystem concept, its structure and function, homeostasis in the ecosystem.

Energy flow in ecosystems, food chains, food webs, tropic levels, ecological pyramids, ecological efficiencies.

UNIT-II

Major ecosystems of the world : The pond ecosystem, the ocean ecosystem, the forest ecosystem, the grassland ecosystem, the desert ecosystem; Productivity in different ecosystem.

UNIT-III

Concept of production and decomposition in nature, concept of productivity – primary and secondary production; gross and net production; standing crop, turn over, energy subsidies, methods of measuring primary productivity.

UNIT-IV

Concept of plant growth; Primary production process, factors affecting growth and pattern of resource allocation in plants; Plant growth indices and their ecological significance.

UNIT-V

Biogeochemical cycles with special reference to water, nitrogen, carbon, phosphorus and sulphur.

Duration : 5 Hrs.   **M.M.: 75**

		Regular	Ex-Students
1.	Major Exercise	15	25
2.	Major Exercise	15	15
3.	Minor Exercise	10	08
4.	Spots	20	20
5.	Viva – Voce	10	10
6.	Record	05	—
	Total :	**75**	**75**

1. **Examination of Soil :**
i)   Determination of soil structure
ii) Determination of soil texture
iii) Determination of soil moisture
iv) Determination of soil organic matter
v)   Study of soil profile
vi) Quantitative estimation of carbonate / bicarbonates / chlorides
vii) Estimation of percentage of calcium carbonate by rapid titration method
viii) Water holding caapcity, wilting coefficient and specific gravity, bulk density, porosity.

2. **Community studies :**

   To determine the minimum size of a quadrat for a grassland / forest by species area curve method.

   Determination of frequency, density, abundance and IVI with the help of Quadrat method.

   To determine the index of dominance in a grassland community.

3. Aquarium as an ecosystem.

4. Determination of rate of production by harvest method.

5. Rapid field tests for pH, carbonate, nitrate and chloride.

FIRST YEAR SCIENCE - 2004-05

ENVIRONMENTAL SCIENCES

BOOKS RECOMMENDED :

1 E.P. Odum : Fundamentals of Ecology, Saunders (3rd Editon)

2 Subhramanyam and Sambhamurthi : Ecology

3 K.C. Agarwal : Fundamentals of Environmental Biology, Nidhi Publishers, Bikaner.

4 V.Verma : Plant Ecology (4th Edition) Emkay Publishers.

5 Paul Colinvaux : Ecology, John Wiley and Sons.

6 P.D. Sharma : Ecology and Environment, Rastogi Publications, Meerut.

7 श्रीवास्तव एवं राव, पर्यावरण और पारिस्थितिकी, वसुन्धरा प्रकाशन, गौरखपुर।

8 भाटिया कोहली एवं स्वरूप : पर्यावरण जैविकी के विभिन्न आयाम, रमेश बुक डिपो, जयपुर

PRACTICAL :

9 J. Pandey and M.S.Sharma : Environmental Science : Practical and Field Manual, Yash Publications, Bikaner.

COURSE CURRICULAM AND SYLLABII OF THREE YEAR DEGREE COURSE 2004-2007

PHYSICS

COURSE CURRICULAM

Paper-code	Paper	Nomenclature	Lectures	Duration of Exam	Max. Marks	Min. Marks
1161	I	Mechanics of Particles, Rigid bodies and Continuous Media	60 hrs	3hrs	50	18
1162	II	Oscillations, Waves and Acoustics	60 hrs	3 hrs	50	18
1163	III	Electricity and Magnetism	60 hrs	3 hrs	50	18
1164	IV	Practical	120 hrs	6 hrs	75	27

Each theory paper in the annual examination shall have three sections.

Section A shall contain one compulsory question of 5 marks having 10 parts. Two parts shall be set from each unit. The candidate is required to answer each part in about 20 words.

Section B shall contain five compulsory questions of 5 marks each with internal choice .One question with internal choice will be set from each unit .The answer may be given in approximately 250 words.

Section C shall contain four descriptive questions covering all units and candidate has to answer any two questions of ten marks each. The answer may be given in approximately 500 words. There can be two parts in a question from this section.

In total the candidate has to answer eight questions in each theory paper.

FIRST YEAR T.D.C. SCIENCE
2004-2005

PAPER-I
MECHANICS OF PARTICLES, RIGID BODIES AND CONTINUOUS MEDIA

UNIT – I

Laws of motion, conservation of energy and momentum, transformation equations for rotating frame, centripetal and Coriolis accelerations, Coriolis force, Coriolis force due to earth's rotation – experimental demonstration by Focualt pendulum.

Motion under a central force, conservation of angular momentum, Kepler's laws.

UNIT – II

Fields and potential, gravitational field and potential due to spherical bodies, Gauss's and Poisson's equations, gravitational self energy.

Two body problem, reduced mass, scattering and scattering cross sections, illustrations, Rutherford scattering by hard spheres, centre of mass and laboratory reference frames, binary stars.

UNIT – III

System of particles, centre of mass, calculation of centre of mass of regular bodies, angular momentum, equations of motion, conservation theorems for energy, momentum and angular momentum, system of variable mass, elastic and inelastic collisions, rigid body, degrees of freedom, Euler's theorem.

UNIT – IV

Molecular rotations (as rigid bodies), moment of inertia, di and tri atomic molecules, intrinsic spin, precessional motion, motion of top, gyroscope.

Elastic constants for an isotropic solid, their inter relation, torsion of a cylinder, bending of beam, applications to cantilever.

UNIT – V

Kinematics of moving fluid, equation of continuity, Euler's law for fluidity.

Viscous fluids, streamline and turbulent flow, flow through a capillary tube, Poisvilles law, Reynold's number, Stoke's law, theory of rotation viscometer, effect of temperature and pressure on the viscosity of liquids.

Text and Reference Books:

1. E.M. Purcell, Editor, Berkeley Physics Course, Vol. 1, Mechanics, McGraw Hill.

2. R.P. Feynmann, R.B. Lighton, M. Sands, The Feynmann Lectures in Physics, Vol.I, B.I. Publications, Bombay, Delhi, Calcutta, Madras.

PAPER-II
OSCILLATIONS, WAVES AND ACOUSTICS

UNIT - I

Free oscillations of simple systems: Equilibrium; concept of potential well, small oscillations approximation, solutions, linear and transverse oscillations of a mass between two springs, diatomic molecule, reduced mass concept.

Damped and forced oscillations: Damped oscillations; critical damping, Q of an oscillator. Forced oscillator with one degree of freedom; Transient and steady state oscillations, resonance energy absorption, low and high frequency responses.

UNIT - II

Free oscillations of system with two degrees of freedom: Two dimensional oscillator; normal modes, longitudinal and transverse oscillation of coupled masses, energy transfer between modes, coupled pendulum.

Fourier analysis: Fourier series and Fourier coefficients; simple examples (square wave, saw-tooth wave, half and full wave rectifier), use of exponential representation for harmonic oscillations, expression for Fourier coefficients. Non-periodic disturbance; representation by Fourier integral, Fourier transform. Case of a wave train of finite length, constancy of $\Delta \mathbf{x}$ $\Delta \mathbf{k}$ (the uncertainty product).

UNIT - III

Wave equation: Waves in a one-dimensional chain of particles; classical wave equation; wave velocity, boundary conditions and normal modes, dispersion relations, dispersion waves, acoustic and optical modes.

Waves in continuous 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, dispersion in waves, group velocity and phase velocity, their measurements.

Superposition of waves: Linear homogenous equations and the superposition principle, interference in space and energy distribution; beats and combination tones.

UNIT -IV

Ultrasonics: Production, detection, and applications of ultrasonic waves

Vibrations in bounded systems: Normal modes of a bounded system; harmonics, the quality of sound, Chladni's figures, Vibration of a drum. Noise and Music; Limits of human audibility; intensity and loudness, bel and decibel. Music scale and musical instruments.

UNIT - V

Reflection, refraction, and diffraction of sound: Acoustic impedance of a medium, percentage refle-

ction, and refraction at a boundary, impedance matching for transducers. Diffraction of sound; principle of a sonar system, sound ranging.

Applied acoustics: Transducers and their characteristics, recording and reproduction of sound, measurement of frequency, velocity, waveform, and intensity. The acoustics of halls, reverberation period, Sabine's formula.

Text and Reference Books:

1. Waves and Oscillations, Berkley Physics Course Vol. III

2. Vibrations and waves, I.G. Main (Cambridge University Press)

3. The Physics of Vibrations and Waves, H.J. Pain, McMillan (1975).

PAPER-III
ELECTRICITY AND MAGNETISM

UNIT – I

Electric Field: Coulomb's law, unit of charge (SI and other systems of units). Conservation and quantization of charge. Field due to different charge distributions, monopole, dipole, quadrupoles, line charge, sheet charge. Torque on a dipole in uniform field and non-uniform fields, flux of an electric field. Gauss's law - applications to deduce $\mathbf{E}$ fields, force per unit area on the surface of a charged conductor.

Potential: Line integral of electric field and electrical potential. Field as the gradient of potential. Potential energy of a system of charges and its calculation in various configurations. Field equations for $\mathbf{E}$ in vacuum. Energy associated with $\mathbf{E}$ field. Differential form of Gauss's law: Poisson's equation, Laplace's equation, boundary conditions and uniqueness theorems.

Electric field around conductors: induced charges, field and potential inside a conductor, field near the surface of a conductor, method of images.

UNIT – II

Electric fields in matter: atomic and molecular dipoles, induced dipoles, polarizability tensor, electronic and molecular contributions. Electrical field caused by polarized matter, $\mathbf{E}$ and $\mathbf{D}$ fields, permittivity, diele-

ctric constant. Capacitor filled with dielectric, field equations in presence of dielectric. The field of a polarized sphere, dielectric sphere in a uniform field. Energy in dielectric systems. Polarizability and susceptibility, frequency dependence of polarizability, Claussius-Mossotti equation.

Magnetic filed: Magnetic field **B** seen through Lorentz force on a moving charge, unit for B field, magnetic dipoles in atoms and molecules, gyromagnetic ratio. Magnetic field due to currents: Biot and Savart's law. Field equations in magnetostatics, Ampere's law. Fields due to a straight wire, magnetic dipole, circular current and solenoid. Magnetic fields in matter. Magnetizing current, magnetization vector, **H** and **B** fields, magnetic permeability, susceptibility. Comparison of magnetostatics and electrostatics.

UNIT – III

Electrical current: current density and current; non-steady currents and continuity equations. Electrical conductivity, resistivity, conductance and their temperature dependence. Thermo electric current and dark current, non-ohmic circuitry, thermistor. Varying current. Rise and decay of currents in LR and CR circuits, time constant, integrating and differentiating circuits, electrical shielding. Study of a discrete LC transmission line.

UNIT – IV

Alternating currents: Skin effect for resistance at high frequencies, complex impedance, reactance, impe-

dances of LCR series and parallel circuits, resonance, Q factor, power dissipation and power factor. AC bridges: Anderson's ,deSauty's and Owens bridges, Self and mutual inductance. Measurement of mutual inductance by Carry Foster Method, Coupled circuits and Transformers.

UNIT – V

Ballistic Galvanometer (moving coil type), its distinction from beat type. B.G. differential equation and its solution under different conditions of damping. Critical damping, over damping. Logarithmic decrements, charge sensitivity, current sensitivity, determination of B using search coil and B.G. Determination of high resistance using B.G. Factors for sensitivity. B.G. constant. Measurement of mutual inductance by Carey Foster's bridge by B.G. Measurement of small resistance by Kelvin's double bridge.

Text and Reference Books:

1. E.M. Purcell, Ed. Berkely Physics Course, Vol. 1, Electricity and Magnetism McGraw Hill.

2. D. Halliday and R. Resnick, Physics, vol. 2, Wiley Eastern, New Delhi.

3. D.J. Griffiths, Introduction to Electrodynamics, Prentice Hall of India.

4. Reitz and Milford, Electricity and Magnetism, Addison Wesley.

5. A.S. Mahajan and A.A. Rangawala , Electricity and Magnetism, Tata McGraw Hill.

6. A.M. Portis Electromagnetic Fields

7. S.S. Atwood, Electricity and Magnetism, Dover publication.

8. A.F. Kip, Fundamentals of Electricity and Magnetism, International Student Edition, McGraw Hill and Kogakusha, 1969

PAPER-IV
PHYSICS PRACTICALS

Note : Students are expected to perform sixteen experiments in all taking the eight experiments from each section. One experiment from section A and one from section B will be set in the examination paper.

The distribution of marks in the practical examination will be as follows:

(i) Two experiments   48 Marks

For each experiment, distribution of marks will be as follows:

Figure :	3
Formula/Theory :	3
Observation :	10
Calculation and Result :	6
Precautions :	2

(ii) Viva voce   12

(iii) Records 15

Total	**75 Marks**

LIST OF EXPERIMENTS

Section-A

1. Determination of elastic constants Y, η, σ and K by Searle's method.

2. Determination of thermal conductivity 'K' of a bad conductor by Lee's method.

3. Determination of J by Callender and Barne's method.

4. Study of temperature variation of surface tension by Jaegers method.

5. Study of free fall of a body: use of a digital timer to get time and velocity at different depth and analysis.

6. Study of collision in two dimension

7. Kater's pendlum, precise setting, analysis and determination of value of acceleration due to gravity 'g' at a place.

8. Study of damping of a bar pendulum under various kinds of damping mechanisms.

9. To determine coefficient of damping k ,relaxation time T and quality factor of a damped SHM using a simple pendulum.

10. Study of dependence of period of oscillations of a spring or rubber band on mass and spring constant.

11. To determine the velocity of sound in air at room temperature with Kundt's tube.

12. Using scattering to deduce the nature of potential hump or well (two dimensional)

13 Study of laws of parallel and perpendicular axes for estimation of moment of inertia.

14. Computer simulation of equations of motion for a system of particles.

15. Computer simulation of molecular rotations, as rigid bodies.

16. Study of motion of a top and a gyroscope.

17. Study of torsion of a wire; dependence on radius, length, torque and material (static method)

18. To determine the modulus of rigidity of the material of a wire by statistical method using Bortan's apparatus

19. To determine the value of modulus of rigidity of the material of a given wire by dynamical method using Maxwell's needle

20. Study of flow of liquids through capillaries: laminar and turbulent flow stages, capillaries

21. To determine the coefficient of viscosity of water by Poisevill's method

22. Studying the fall of solids through a liquid.

23. To determine the coefficient of viscosity of a liquid (glycerene or castor oil) by Stoke's method

24. Study of air flow through a capillary : U- tube with a long capillary fitted on one arm, mercury level difference pushing air.

25. To determine Poisson's ratio of rubber

SECTION -B

1. Calibration of Carey Fosters bridge wire and determination of the specific resistance of the material of the given wire.

2. Measurement of thermo e.m.f.

3. To study growth and decay of current in R.C. circuit and determine the time constant.

4. To determine impedance of L-R circuit and find phase relation ship in current and voltage.

5. To determine the constants of a ballistic galvanometer. Current and charge sensitivity, time period, log decrement and galvanometer resistance.

6. To determine intensity of magnetic field using search coil and ballistic galvanometer.

7. To determine high resistance by method of leakage. Measure leakage resistance of a condenser.

8. To determine low resistance by Kelvin's double bridge.

9. Determination of dielectric constant of a given liquid.

10. To determine inductance of a coil using Anderson's method.

11. Desauty's bridge method for comparison of two capacitors.

12. To determine mutual inductance by Carry Foster's Method

13. Study of the impedance of a capacitor of varying frequencies to measure C.

14. Response curve for LCR circuits series resonance.

15. Study of a discrete LC transmission line.

16. Response curve for LCR circuit parallel resonance

17. Measurements of electric charge and related quantities using an electrometer.

18. Study of potential distribution in a given geometrical configuration.

19. Mapping of electric fields for specified configurations.

20. Study of magnetic field using a vibration magnetometer.

21. Study of the rise and decay of current in a RL circuits.

22. Characteristics of a choke.

23 Study of the impedance of an inductor at varying frequencies to measure R and L

COMPUTER SCIENCE

Each theory question paper in the annual exami-nation shall have three sections.

Section A shall contain one compulsory question of 5 marks having 10 parts. Two parts shall be set from each unit. The candidate is required to answer each part in about 20 words**.**

Section B shall contain five compulsory questions of 5 marks each with internal choice. One question with internal choice will be set from each unit. The answer may be given in approximately 250 words**.**

Section C shall contain four descriptive questions covering all units and candidates has to answer any two questions of ten marks each. The answer may be given in approximately 500 words. There can be two parts the question**.**

In total the candidate has to answer eight questions in each theory paper.

FIRST YEAR SCIENCE, 2004-2005

COMPUTER SCIENCE

PAPER-I
DIGITAL ELECTRONICS

M.M.: 50

UNIT-I

Number Systems: Data representation - binary, octal, decimal, hexadecimal, conversion from one to another number system. Representation of positive, negative numbers, integers, real and characters digital codes: BCD, ASCH, EBCDIC coding binary arithmetic in 1's and 2's complement.

UNIT-II

Boolean Algebra : Logic gates, truth table, logic expression, rules and laws of Boolean algebra, deMorgan's theorems, Boolean expression for gate networks, simplification of Boolean expression using Karnaugh map (upto 4 variables).

UNIT-III

Flip Flops : Latches, edge-triggered flip flop, pulse triggered flip flop, R-S flip flop, JK Master - slave flip flop, D flip flop, T flip flop.

Shift Registers : Shift registers function, serial and parallel shift registers, bi-directional shift registers.

UNIT-IV

Counters : Asynchronous and synchronous counters, up/down counters, module counters, BCD counters, A procedure for design of sequential circuit.

UNIT-V

Combinational circuits : Adder, subtractor, comparator, decoder, encoder, code conversion, multiplexer, demultiplexer, parity bit checker and generators.

Suggested Books :

1. Thomas L Floyd, Digital Fundamentals, Third edition, United Book Stall, New Delhi.

2. Malvino and Leach, Digital Principles and Applications, (1991) Tata McGraw-Hill Edition New Delhi.

3. Rajaraman V. and T. Radhakrishanan, An Introduction to Digital Computer Design, Third Edition, 1995, Prentice Hall of India Private Limited, New Delhi.

4. Mao M.M., Digital Logic and Computer Design, 1996, Prentice Hall of India Private Limited, New Delhi.

PAPER-II
INTRODUCTION TO COMPUTER PROGRAMMING USING PASCAL LANGUAGE

M.M.: 50

UNIT-I

Overview of computer system architecture : Simple model of a computer to explain how it exceutes algroithms, CPU, memory, I/O units main and secondary memory. CPU structure, machine instruction, operation code and operand location, instruction counter, fetch and execute cycles in a computer. Arithmetic and logic operations.

Memory locations, address and contents, read and write operations. Difference between low level and high level languages, hierarchy of programming languages.

Computer generations: First, second, third, fourth and fifth generations.

Types of computers - Mainframe, Mini, super computers, micro computers.

UNIT-II

Algorithm and algorithm development : Definition and properties of algorithm, flow chart symbols, conversion of flow chart to language, example of simple algorithms. Program design, errors : syntax error, runtime error, logic error, debugging, program verification, testing, documentation and maintenance.

UNIT-III

Introduction to PASCAL : Character set, syntax diagram, PASCAL notation, symbols and separators, standard, scalar data types - integer, real, character and boolean. User defined scalar data types, subrange data types.

Program heading and declarations : type, constant and variable declaration. Structure of a PASCAL program.

PASCAL operators and expressions : Arithmetic, boolean and relational expression. Statements : input/output statements, compund statements, iterative statements - while, repeat...until and for statements. Nested loops, conditional statements: If.......then...... else, case statements, Go to statement. User defined functions.

UNIT-IV

Language PASCAL : Structured data types: introduction to arrays - its representation, mainpulation and application of one - dimensional and multi-dimensional arrays. Functions and procedures : declaration and their invocations, parameters, local and global variables, block structure, recursion.

Program design : basic structures construct, top down modular design, stepwise refinement, structured modular programming. Advantages and disadvantages of strutured programming.

UNIT-V

Language PASCAL : Structured data type : Record Definition, record data types, accessing field of record, hierarchical records, arrays of records, variant record, with statement.

Sets : Defining a set type, constructing a set, operations with sets, set comparison, membership testing.

Files : Text files, typed files. Defining a file, creating a file, elementary exercises on file processing.

Suggested Books :

1. Deendayalu R., Computer Science Volume I and II, Second Edition, Tata McGraw Hill Publishing Company Limited, New Delhi.

2. Rajaraman V., Fundamentals of Computers, Second Edition, Prentice Hall of India Private Limited, New Delhi.

3. Drogmey R., How to solve it by computers. Prentice Hall of India Private Limited, New Delhi.

4. Mathur, Arora, Reddy, Introduction to Pascal, Tata McGraw Hill Company, New Delhi.

5. Gottfried, Programming with PASCAL, Schaum series, Tata McGraw Hill Company, New Delhi.

PAPER-III
COMPUTER ORIENTED NUMERICAL METHODS

M.M. : 50

UNIT-I

Computer Arithmetic : Floating point representation of numbers, arithmetic operations with normalized floating point numbers and their consequences, error in number representation, pitfalls in computing. Iterative Methods successive approximation, bisection method, false position, Newton Raphson method. Comparison of iterative methods, Baristow's method for finding complex roots.

UNIT-II

Solution of simultaneous linear equations : Gauss elimination method, pivoting ill conditioned equations, refinement of solution, Gauss Seidel iterative method, comparison of direct and iterative methods.

UNIT-III

Solution of ordinary differential equations : Euler's method, Taylor series method, local and global error analysis, Runge-Kutta methods, predictor-corrector methods, stability of solution.

UNIT-IV

Interpolation and approximation : Langrange's interpolation, Polynomial interpolation, difference table, truncation error in interpolation, linear regression, polynomial fitting and other curve fitting techniques, approximation of function by Taylor series and Chebyshev series.

UNIT-V

Numerical differentiation and integration : Differentiation formulae based on polynomial fits, pitfalls in differentiation. Integration trapezoidal, Simpson rules and Guassian quardature.

Suggested Books :

1. Rajaraman V., Computer Oriented Numerical Methods, Third edition, Prentice Hall of India Private Limited.

2. Krishnamurhy, Computer based numerical algorithms, East West Press.

COMPUTER SCIENCE

PRACTICALS

M.M.: 75

Note : Students are required to perform all the experiments. In the examination two exercises selecting one from each part, will be set.

Marks Distribution

Part A :		**24**
Theory	:	8
Logic diagram and verification on digital kits	:	16
Part B :		**24**
Algorithm and flowchart	:	8
Program coding	:	8
Program execution, result and documentation	:	8
Viva	:	**12**
Record	:	**15**

PART-A

1. To study the function of Basic Logic gates and verify their truth table AND, OR, NOT, NAND, NOR, XOR, XNOR.

2. To study the application of AND, OR, NAND, XOR gates for getting digital signals.

3. (a) The study of different logical expression and their simplifications.

   (b) To familiarise and verify the Boolean algebraic theorems.

4. To study the different arithmetic circuits.

   (a) Half adder and subtractor

   (b) Full adder and subtractor

5. To study the BCD to binary and Binary to BCD code converter.

6. To study the binary-to-gray and Gray-to-binary code converter.

7. Study of the encoder circuits.

   (a) Decimal to BCD encoder

   (b) Octal to binary encoder.

8. Study of decoder circuits.

   (a) BCD to decimal decoder

   (b) BCD to 7 Segment decoder.

9. To study the Flip flop circuits using gates.

   (a) R-S flip flop

   (b) J-K flip flop

   (c) Master slave J-K flip flop

   (d) D-flip flop

10. To study the RS, JBK and DB flip flop ICs

11. To study the shift registers and ripple counter.

12. To study the synchronous counter using flip flop ICs.

13. To study synchronous counter ICs.

14. To study synchronous counter ICs.

15. To study synchronous counter using flip flop ICs.

PART-B

Programming in PASCAL

1. A simple PASCAL program to explain its structure.

2. PASCAL programs using scalar data types.

3. PASCAL programs using enumerated and sub range data types.

4. PASCAL program using array, records and sets.

5. Simple PASCAL programs based on conditional and looping statements.

6. PASCAL program using functions and procedures (recursive non-recursive).

7. PASCAL program for processing files.

B.A./B.Sc. FIRST YEAR EXAMINATIONS, 2004-2005

MATHEMATICS

(Common for the Faculties of Arts & Science)

Papers	Teaching hours/ week	Examination Hours	Maximum Marks B.A.	B.Sc.
Theory Papers				
Paper-I	3	3	70	75
Paper-II	3	3	65	75
Paper-III	3	3	65	75
Total Marks			**200**	**225**

Note :

1. Common papers will be set for both the Faculties of Arts & Science.

2. Students are allowed to use simple electronic desk calculators (as per University guidelines).

3. Mathematical/ Log Tables may be used (as per University guidelines).

PAPER-I
ALGEBRA

Note : The question paper will be divided into three sections A, B and C as follows:

Section A : In this section, ten questions will be set taking two questions from each unit. Each question will be of short answer type not exceeding 20 words and will carry 3/4 mark. The candidate will be required to attempt all the questions (aggregating 7.5 marks).

Section B : In this section, ten questions will be set taking two questions from each unit. The answer of each will not exceed 250 words or two and a half page. Each question will be of 7.5 marks. The candidate will be required to attempt five questions in all taking one question from each unit (aggregating 37.5 marks).

Section C : In this section, four questions will be set covering all the five units and whose answers shall not exceed 500 words or five pages each. Each question may have sub parts in it and will carry 15 marks.

The candidate will be required to attempt any two questions (aggregating 30 marks).

UNIT-I

Symmetric, Skew Symmetric, Hermition and skew Hermition matrices. 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 characteristic equation of a matrix. Cayley-Hamilton theorem and its use in finding inverse of a matrix. Theorems and examples of consistency of a system of linear equations.

UNIT-II

Groups and their defining theorems. Various examples, order of an element and related theorems, Permutation Groups, even and odd permutations, cyclic groups, subgroups, union, intersection of two and finite subgroups and various examples, product of two subgroups. Left and right cosets and their properties, Lagrange's theorem, index of a subgroup.

UNIT-III

Group homomorphism and isomorphism with elementary basic properties, Cayley's theorem for finite groups, normal subgroups their examples and elementary basic theorems, Quotient group, fundamental theorem of homomorphism in groups.

UNIT-IV

Rings, definition and examples of various kinds of rings, integral domain, division ring, field, characteristic of a ring and of integral domain, subring and subfield with examples. Left and right ideals with examples and properties, Principal ideal, principal ideal ring.

UNIT-V

Quotient ring,. homomorphism and isomorphism in rings, kernel of homomorphism, Fundamental theorem of ring homomorphism.

Relation between the roots and coefficients of general polynomial equation in one variable. Transformation of equations. Descarte's Rule of signs, solution of Cubic equations (Cardon method). Biquadratic equations.

References :

1. I.N. Herstein : Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975.

2. R.S. Agrawal : A Textbook on Modern Algebra.

3. K.B.Datta : Matrix and Linear Algebra Prentice Hall of India Pvt. Ltd., New Delhi, 2000.

4. H.S.Hall and S.R. Knight : Higher Algebra, H.M. Publications, 1994.

5. Bansal, Bhargava, Agrawal : Amurt Big Ganita.

6. Chandrika Prasad : Text book on Algebra and Theory of Equations, Pothi shala Pvt. Ltd, Allahabad.

7. Gokhroo, Saini : Elements of Abstract Algebra

8. Sharma, Purohit : Elements of Abstract Algebra

PAPER-II
CALCULUS

Note : The question paper will be divided into three sections A, B and. C as follows:

Section A : In this section, ten questions will be set taking two questions from each unit. Each question will be of short answer type not exceeding 20 words and will carry 3/4 mark. The candidate will be required to attempt all the questions (aggregating 7.5 marks).

Section B : In this section, ten questions will be set taking two questions from each unit. The answer of each will not exceed 250 words or two and a half page. Each question will be of 7.5 marks. The candidate will be required to I attempt five questions in all taking one question from each unit (aggregating 37.5 marks).

Section C : In this section, four questions will be set covering all the five units and whose answers shall not exceed 500 words or five pages each. Each question may have sub parts in it and will carry 15 marks. The candidate will be required to attempt any two questions (aggregating 30 marks).

UNIT-I

Polar coordinates and derivatives of arc, Polar sub-tangent and subnormal, pedal-equation, successive differentiation. Leibnitz theorem. Maclaurin and Tailor series expansions.

UNIT - II

Asymptotes, curvature, Test of concavity and convexity. Points of inflexion. Multiple points. Tracing of curves in Cartesian and polar coordinates.

UNIT - III

Reduction formula for nth power of trigonometric functions. Quadrature, Rectification, volumes and surfaces of solid of revolution.

UNIT - IV

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.

UNIT - V

First order and higher degree equations solvable for x,y,p. Clairaut's form and singular solutions. Geometrical meaning of a differential equation. Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations and the equations reducible in homogeneous form.

References

1. Gorakh Prasad   : A Text book on differential calculus (Pothi shala)

2   Gorakh Prasad   : A Text book on Integral calculus and Differential Equations (Pothi shala).

3. E.A.Codignton   : An introduction to ordinary Differential Equations Prentice Hall of India, 1961.

4. P.K. Jain and S.K.Kaushik   : An Introduction to Real Analysis, S.Chand & Co., New Delhi-II 2000.

5. Bansal, Bhargava   : Avakalan Ganita-II

6. Bansal, Bhargava   : Samakalan Ganita-Il

7. Gokhroo, Saini   : Uchch Avakalan Ganita

8. Gokhroo, Saini   : Uchch Samakalan Ganita.

9. Bansal, Bhargava & Agrawal   : Avkal Samikaran I.

10. Gokhroo, Saini, Kumbhat   : Avkal Samikaran.

PAPER-III
GEOMETRY

Note : The question paper will be divided into three sections A, B and C as follows:

***Section* A** : In this section- ten questions will be set taking two questions from each unit. Each question will be of short answer type not exceeding 20 words and will carry 3/4mark. The candidate will be required to attempt all the questions (aggregating 7.5 marks).

***Section* B** : In this section- ten questions will be set taking two questions from each unit. The answer of each will not exceed 250 words or two and a half page. Each question will be of 7.5 marks. The candidate will be required to attempt five questions in all taking one question from each unit (aggregating 37.5 marks).

***Section* C** *: In* this section four questions will be set covering all the five units and whose answers shall not exceed 500 words or five pages each. Each question may have sub parts in it and will carry 15 marks. The candidate will be required to attempt any two questions (aggregating 30 marks).

UNIT -I

General equation of second degree, nature of conic, eccentricity and foci of conic, Tracing of different conics.

Ellipse : Tangent, normal, Chord of contact of the tangents, pole and polar, eccentric angle, auxiliary circle, director circle, equation of chord in term of middle point, pair of tangents, conjugate lines, diameter and conjugate diameters and their properties.

UNIT-II

Hyperbola: Parametric coordinates, tangent, normal chord of contact of tangents, pole and polar etc. asymptotes, conjugate hyperbola, conjugate diameters, rectangular hyperbola, equation of hyperbola referred to its asymptotes.

Polar Equations :Polar equation of a conic, Polar equations of tangent, perpendicular lines and normal, director circle of the conic.

UNIT-III

Plane: Revision of Equations of plane in different forms, bisectors of angles between two planes, condition for homogeneous, equation to represent two planes and angle between them, projection on a plane area of a triangle and volume of tetrahedron.

UNIT-IV

Straight line : General equation of line, symmetric form, line passing through one and two points, perpendicular distance of a point from a line, angle between a line and a plane, condition for co-planarity of two lines, equations of line intersecting two lines, skew lines, shortest distance between two lines, intersection of three planes and three lines.

UNIT-V

Sphere, Cone, Cylinder.

References :

1. Gorakh Prasad & : A Text book of coordinate(
    H.C.Gupta   Geometry (Pothishala)

2. S.L.Loney   : The Elements of coordinate
                      Geometry; Mack-Millan and
                      Company, London

3. R.J.T. Bell   : Elementary Treatise on
                      coordinate Geometry of the
                      Dimensions

4. P.K. Jain and   : A Textbook of Analytical
    Khalil Ahmed   Geometry of three Dimen-
                      sions, Wiley Eastern Ltd.,
                      1999.

5. N.Saran and   : Analytical Geometry of three
    R.S.Gupta   Dimentions. (Pothhishala)

6. Bansal, Bhargava : Dwivim Nirdeshank Jysrruyl

7. Gokhroo, Saini   : Dwivirn Nirdeshank Jyamiti

8. Gokhroo Saini,   : Trivim Nirdeshank Jyamiti

9. Bansal, Bhargava : Trivim Nirdeshank Jyamiti.

10. Golas, Tandon,   : Analytical solid Geometry.
    Bhargava

B.A/B.Sc. FIRST YEAR EXAMINATIONS 2004-2005

STATISTICS

(Common for the Faculty of Arts & Science)

Papers	Periods* per week	Examination Hours	Maximum Marks B.A.	Maximum Marks B.Sc.
Theory Papers				
Paper I	2	3	45	50
Paper II	2	3	45	50
Paper III	2	3	45	50
Practicals**	4	4	65	75
Total Marks			**200**	**225**

* 1 Period = 1 hours   ** per batch

N.B.

1. Common papers will be set for both the Faculties of Arts & Science.

2. Students are allowed to use simple electronic desk calculators (as per University guidelines).

3. Statistical Tables may be used (as per University guidelines)

PAPER - I
DESCRIPTIVE STATISTICS

Note : The question paper will be divided into three sections A, B and C as follows:

Section A : In this section ten questions will be set taking two questions from each unit. Each question will be of short answer type not exceeding 20 words and will carry 1/2 mark. The candidate will be required to attempt all the questions (aggregating 5 marks).

Section B : In this section ten questions will be set taking two questions from each unit. The answer of each will not exceed 250 words or two and a half page. Each question will be of 5 marks. The candidate will be required to attempt five questions in all taking one question from each unit (aggregating 25 marks).

Section C : In this section four questions will be set covering all the five units and whose answers shall not exceed 500 words or five pages each. Each question may have sub parts in it and will carry 10 marks. The candidate will be required to attempt any two questions (aggregating 20 marks).

UNIT - I

Definition and History of Statistics, Concept of statistical population. Attributes and Variables, different methods of collection, classification and tabulation of statistical data.

Representation of Data: Discrete and continuous variates, Construction of frequency tables for grouped and ungrouped data in uni-variate and bivariate cases, Histogram, Frequency polygon, curves and ogives, One, two and three dimensional diagrams.

UNIT - II

Measures of Location: Arithmetic mean, weighted arithmetic mean, geometric mean and harmonic mean, Median and Mode. Requisites of an ideal measure of central tendency with merits and demerits. Partition Values: Quartiles, Deciles and Percentiles.

UNIT - III

Measures of Dispersion: Range, Semi-interquartile range, Mean deviation, Root mean square deviation, Standard deviation and coefficient of variation. Lorenz curve, Requisites of and ideal measure of dispersion.

UNIT - IV

Moments: Raw, central, factorial and absolute moments, Relationship between central, raw and factorial moments.

Charlier's checks and Sheppard's corrections (without proof, effect of change of origin and scale on moments.

Different measures of Skewness and Kurtosis.

UNIT - V

Theory of Attributes: Class frequencies and their order (upto three attributes only), consistency of data, association and independence of attributes. Yule's coefficient of association and coefficient of colligation.

Recommended Books :

1. Gupta S.C. & Kapoor, V.K : Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi

2. Kapur, J.N and Saxena, H.C. : Mathematical Statistics,. S.Chand & Company Ltd., New Delhi.

Reference Books

1. Gokhroo, D.C. & Saini, S.R. : Mathematical Statistics (Hindi edition), Navkar Prakashan, Ajmer

2. Gupta, S.P. : Statistical Methods, Sultan Chand & Sons, New Delhi.

3. Rao N.S., Suthar S.P. and Gupta S.L. : Business Statistics (Hindi edition), Alka Publication, Ajmer

PAPER - II
PROBABILITY THEORY

Note : The question paper will be divided into three sections A, B and C as follows:

Section A : In this section ten questions will be set taking two questions from each unit. Each question will be of short answer type not exceeding 20 words and will carry 1/2 mark. The candidate will be required to attempt all the questions (aggregating -5 marks).

Section B : In this section, ten questions will be set taking two questions from each unit. The answer of each will not exceed 250 words or two and a half page. Each question will be of 5 marks. The candidate will be required to attempt five questions in all taking one question from each unit (aggregating 25 marks).

Section C : In this section, four questions will be set covering all the five units and whose answers not shall not exceed 500 words or five pages each. Each question may have sub parts in it and will carry 10 marks. The candidate will be required to attempt any two questions (aggregating 20 marks).

UNIT - I

Random experiment, sample space, events, elements of an event, union and intersection of events, mutually exclusive, exhaustive, independent and equally likely events. Classical and Statistical definitions of probability and simple problems, Axiomatic approach

to probability. Addition law of probability for two or more events.

UNIT - II

Conditional probability, Multiplication law of probability, Statistical independence of events, Baye's theorem and its simple applications.

UNIT - III

Random Variable Discrete and continuous random variables, Probability mass and density functions, joint, marginal and conditional probability functions, Distribution functions.

UNIT - IV

Mathematical Expectation Definition of expectation, Addition and Multiplication laws of expectation, Moments in terms of expectation, variance and covariance for the linear combination of random variables. Elementary idea of conditional expectation. Schwartz's inequality.

UNIT - V

Moment generating and Cumulants generating functions with properties, Characteristic function with properties (without proof).

Recommended Books:

1. Gupta S.C.and : Fundamentals of Mathe-
    Kapoor V. K   matical Statistics, Sultan
                       Chand & Sons, New Delhi

2. Kapur J.N.and : Mathematical Statistics
    Saxena H.C.   S.Chand & Company Ltd., New
                     Delhi.

3. Goon A.M.,   : Fundamentals of Statistics,
    Gupta M.,   Vol.II, World Press Calcutta
    K. Dasgupta B
    (1999)

Reference Books :

1. Gokharoo D.C. : Mathematical Statistics (Hindi
    and Saini, S.R.   edition), Navkar Prakashan,
                      Ajmer.

2. Bhargava, S.L. &: Mathematical Statistics (Hindi
    Agarwal, S.M.   edition), Jaipur Publishing
                     House, Jaipur.

3. David, R. (1996) : Elementary Probability, Oxford
                       Press.

4. Bhat B.R., Sri- : A Beginner's Text, Vol II New
    venkatramana T   Age International (P) Ltd
    & Rao Madhava,
    K.S. (1977)

PAPER - III
COMPUTATIONAL TECHNIQUES &
OFFICIAL STATISTICS

Note: The question paper will be divided into three sections A, B and C as follows:

Section A : In this section, ten questions will be set taking two questions from each unit. Each question will be of short answer type not exceeding 20 words and will carry 1/2 mark. The candidate will be required to attempt all the questions (aggregating 5 marks).

Section B : In this section, ten questions will be set taking two questions from each unit. The answer of each will not exceed 250 words or two and a half page. Each question will be of 5 marks. The candidate will be required to attempt five questions in all taking one question from each unit (aggregating 25 marks).

Section C : In this section, four questions will be set covering all the five units and whose answers shall not exceed 500 words or five pages each. Each question may have sub parts in it and will carry 10 marks. The candidate will be required to attempt any two questions (aggregating 20 marks).

UNIT - I

Statistical Organizations in India Central Statistical Organization, National Sample Survey Organization, their functions and publications, Agricultural Statistics, Area and Yield Statistics, Trade Statistics, Statistical Organizations in Rajasthan, their functions and publications.

UNIT - II

Linear Programming: Definition of Linear Programming Problem (LPP), formulation of LPP, Graphical method (for two variable), Simplex computational procedure and Duality.

UNIT - III

Theory of Finite Differences: Operator Δ, E with their properties, Problems of identities involving Δ & E, Factorial function; Newton-Gregory's forward and backward interpolation formulae, Estimation of missing value in equal intervals.

UNIT - IV

Theory of divided differences and its properties, Newton's divided difference & Lagrange's interpolation formulae, inverse interpolation by making use of Lagrange's formula.

UNIT - V

Numerical Integration : Trapezoidal rule, Simpson's 1/3rd & 3/8th rule, Weddle's rule and related problems.

Recommended Books:

1. Saxena H.C. : Finite Differences and Numerical Analysis, S.Chand & Company Ltd., New Delhi.

2. Gokhroo D.C. & Saini S.R. : Numerical Analysis (Hindi edition), Navkar Prakashan, Ajmer

3. Gokhroo D.C. & Saini S.R. : Elements of Linear Programming (Hindi and English editions), Jaipur Publishing House

4. Asthana B.N. & Srivastava S.S. : Applied Statistics of India, Chaitanya Publishing House, Allahabad.

5. Porwal L.S. & Agarwal N.P. : Applied & Economic Statistics of India (Hindi Ed.), Ramesh Book Depot, Jaipur.

Reference Books :

1. Bhargava S.L., Sharma, K.D. and Bhati S.S. : Linear Programming (Hindi edition), Jaipur Publishing House, Jaipur

2. Nagar, K.N. : Fundamentals of Statistics (Hindi edition) Meenakshi Prakashan, Meerut

3. Gupta, B.N. : Statistics: Theory & Practice (Hindi and English editions), Sahitya Bhawan, Agra.

4. Saluja M.R. : Indian Official Statistical Systems, Statistical Publishing Society, Calcutta

STATISTICS PRACTICAL

Duration of Examination: Four Hours

Max. Marks : Arts - 65
Science - 75

The distribution of marks will be as follows:

		B.A.	B.Sc.
(a)	Practicals	39 Marks	45 Marks
(b)	Practical Record	13 Marks	15 Marks
(c)	Viva-voce	13 Marks	15 Marks
	Total	**65 Marks**	**75 Marks.**

The following topics are prescribed for practical work:

1. Presentation of raw data.

2. Graphical representation by (i) Histogram (ii) Frequency polygon (iii) Frequency curve and (iv) Ogives.

3. Diagrammatic representation by (i) Bars (ii) Pie diagram.

4. Measures of Central Tendency: Mean, Median, Mode, G.M., H.M., Quartiles, Deciles & Percentiles.

5. Measures of Dispersion (i) Range (ii) Semi interquartile range (iii) Mean Deviation (iv)

Standard Deviation and Variance (v) Coefficient of Variation (vi) Lorenz Curve.

6. Moments and various measures of Skewness and Kurtosis.

7. Evaluation of probabilities using addition and multiplication theorems, conditional probabilities and Baye's Theorem.

8. Exercises on Mathematical expectation and finding measures of central tendency, dispersion, Skewness and kurtosis of uni-variate probability distribution.

9. Exercises on determination of class frequencies, consistency of data and association of attributes.

10. Exercises on Finite Difference Theory: (i) Construction of finite difference table. (ii) Newton Gregory's forward and backward interpolation formulae (iii) Estimation of missing value in case of equal intervals.

11. Lagrange's and Newton's divided difference formulae

12. Inverse interpolation by Langrange's formula.

13. Numerical Integration by Trapezoidal, Simpson's 1/3rd & 3/8th rules.

14. Solution of LPP by Graphical and Simplex methods.