NEW SYLLABUS

राजर्षि महाविद्यालय, अलवर

बी.एस.सी प्रथम वर्ष प्रथम सेमेस्टर

सामान्य हिन्दी PC 22-101

समयः 2 घण्टे पूर्णांक 70 अंक

नोटः– इस प्रश्नपत्र में प्राप्त अंको को श्रेणी निर्धारण हेतु नहीं जोडा जायेगा।

प्रश्नपत्र में दो भाग होंगे–1. साहित्य खण्ड 2. व्याकरण खण्ड

साहित्य खण्ड में दो भाग होंगे– गद्य भाग एवं पद्य भाग

साहित्य खण्ड (गद्य भाग)

गद्य भाग

1. प्रेमचन्द – नमक का दारोगा (कहानी)
2. महादेवी – प्रणाम (संस्मरण)
3. बनारसी दास चतुर्वेदी – बाईस वर्ष बाद (रेखाचित्र)
4. गुणाकर मुले – शनि सबसे सुन्दर ग्रह (विज्ञान)
5. पद्य भाग

पद्य भाग

1. कबीर – 20 साखिया, कबीर ग्रथावली – सं. डॉ श्यामसुन्दरदास
   - (i) गुरूदेव कौ अंग –3,11,12,22,–(साखी नं.)
   - (ii) बिरह कौ अंग –5,11,31,32,–(साखी नं.)
   - (iii) करणी बिन कथनी –5 ,–(साखी नं.)
   - (iv) भ्रम बिधौसण कौ अंग –10 ,–(साखी नं.)
   - (v) भेष कौ अंग –5,12 ,–(साखी नं.)
   - (vi) कुसंगति कौ अंग – 1,7 ,–(साखी नं.)
   - (vii) कसतूरिया मृग कौ अंग –1 ,–(साखी नं.)
   - (viii) चितावनी कौ अंग –1 ,–(साखी नं.)
   - (ix) साध कौ अंग –1 ,–(साखी नं.)
   - (x) उपदेश कौ अंग –9, –(साखी नं.)

(xi) काल कौ अंग —1, 4 —(साखी नं.)

2. सूरदास—वात्सलय वर्णन, सूरसागर—दशम स्कन्ध पद संख्या—43,75,99,108,249,344
3. तुलसीदास —कवितावली सं. रामचन्द्र शुल्क—नागरी प्रचारिणी सभा
   (1) पुरतें निकसी रघुबीर बधू (2) जल को गए लक्खन
   (3) वनिता बनी स्यामल गौर (4) रानी मैं जानी अजानी
   (5) सीस जटा उर बाहुविसाल (6) सुनि सुंदर बैन सुधारस साने
4. रहीम— 10 दोहे रहीम ग्रंथावली—पं. विद्यानिवास मिश्र
   (1) प्रीतम छवि नैनन बसी (2) बसि कुसग चाहत कुसल
   (3) रहिमन अंसुना नयन ढरि (4) रहिमन ओछे नरन सो
   (5) रहिमन निजमन की व्यथा (6) काज परै कछु और हैं
   (7) रहिमन धागा प्रेम का (8) पावस देखि रहीम मन
   (9) रूठे सुजन मनाइये, जो रूठे सौ बार (10) रहिमन पानी राखिए, बिन पानी सबसून

(ब) व्याकरण खण्ड

1.	निबंध लेखन (विकल्प देय एवं शब्द सीमा 300 शब्द)	8 अंक
2.	कार्यालयी पत्र / अर्द्धशासकीय पत्र / परिपत्र / ज्ञापन / विज्ञप्ति / निविदा	4 अंक
3.	संक्षेपण	4 अंक
4.	पल्लवन	4 अंक
5.	उपसर्ग, संधि, प्रत्यय, समास	4 अंक
6.	वाक्य शुद्धि / शब्द शुद्धि	4 अंक
7.	मुहावेर / लोकोक्तियाँ	4 अंक

NEW SYLLABUS

राजर्षि महाविद्यालय, अलवर

बी.एस.सी प्रथम वर्ष द्वितीय सेमेस्टर

सामान्य हिन्दी PC 22-201

समयः 2 घण्टे पूर्णांक 70 अंक

नोटः– इस प्रश्नपत्र में प्राप्त अंको को श्रेणी निर्धारण हेतु नहीं जोडा जायेगा।

प्रश्नपत्र में दो भाग होंगे–1. साहित्य खण्ड 2. व्याकरण खण्ड

साहित्य खण्ड में दो भाग होंगे– गद्य भाग एवं पद्य भाग

(अ) साहित्य खण्ड (गद्य भाग)

1. हरिशंकर परसाई– भोलाराम का जीव (व्यंग्य)
2. भारत भूषण अग्रवाल– महाभारत की एक सांझ (एकांकी)
3. रामचन्द्र शुक्ल– उत्साह (ललित निबंध)

पद्य भाग

1. मैथिली शरण गुप्त– मातृभूमिए वही मनुष्य है कि जो मनुष्य के लिए मरे
2. सुमित्रानंदन पंत– भारतमाता, पावस ऋतु में पर्वत प्रदेश
3. दिनकर –रश्मिरथी (तृतीय सर्ग से)
   (सच है, विपत्ति जब आजी है .....क्या कर सकती है चिनगारी)
4. नागार्जुन–अकाल और उसके बाद, बादल को घिरते देखा है।
   गद्य व पद्य दोनों को एक ही पाठ्य पुस्तक में संकलित किया जाएगा।

(ब) व्याकरण खण्ड

1.	पारिभाषिक, शब्दावली	4 अंक
2.	संज्ञा, सर्वनाम, विशेषण, क्रिया, क्रिया विशेषण (व्यावाहारिक पक्ष)	4 अंक
3.	शब्द युग्मों का अर्थ भेद	4 अंक
4.	वाक्यांश के लिए एक शब्द	4 अंक
5.	पर्यायवाची / विलोम शब्द	4 अंक

अंक विभाजनः–

कुल चार संख्या	2 गद्य भाग से	2 X 5 =10
	2 पद्य भाग से	2 X 5 =10

कुल चार आलोचनात्मक प्रश्न

2 गद्य भाग से	2 X 7 =14
2 पद्य भाग से	2 X 7 =14

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NEW SYLLABUS

B.Sc/B.Sc (Hons.) Semester I GE P C 22-102

GENERAL ENGLISH

The Question paper shall be of ***TWO HOURS*** duration.

MM: 70

Objectives:

- Reinforcing selected components of grammar and usages.
- Facilitating comprehension of a prosepassage.

Unit – I(Vocabulary)

- Antonyms and Synonyms 10 Marks
- Word formation: Prefix and suffix.

Unit – II(Grammar and Usage – I)20 Marks

Transformation of sentences.

- Direct and Indirect Narration.
- Active and Passive Voice.
- Interchange of Degrees of Comparison.

Unit – III(Grammar and Usage – II)10 Marks

- Sequence of Tenses.
- Prepositions.

Unit – IV(Grammar and Usage – III)10 Marks

- Modal Auxiliaries.
- Articles.

Unit – V(Comprehension)20 Marks

- Comprehension of a passage from the prescribed book(Essential Language Skills by Macmillan)

Following essays and Stories in Essential Language Skills revised edition compiled by Macmillan for General English B.A./B.Com./B.Sc.

William Blake	The Little Black Boy
Sujata Bhatt	Voice of the Unwanted Girl
Ruskin Bond	Night Train at Deoli
M.K. Gandhi	The Birth of Khadi
J.L.NehruA Tryst with Destiny	
A.P.J.AbdulKalam	Vision for 2020

Five Questions to be answered from the texts mentioned.

Suggested Reading:

1. A University Grammar of English by Quirk and Greenbaum.
2. A Foundation English Course for Undergraduates. Ed. Gunashekhar
3. Prose for Pleasure and Comprehension by H G SuryanarayanRao.
4. A Guide to Patterns and Usage by AS Hornby.

Dr. O.P.S. Yadav

Dr. P.C. Kamboddia

Dr. S.S. Vaidwary

Dr. Neeru Meena — Neeru Meena

Approved

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NEW SYLLABUS

B.Sc/B.Sc (Hons.) Semester II GE P C 22-202

GENERAL ENGLISH

The Question paper shall be of ***TWO HOURS*** duration.

MM: 70

Objectives:

- Introducing students to Phonetics, correct their pronunciation and word stress.
- Strengthening compositional skills.
- Introducing students to writing of notices

Unit – I(Phonetics) **20 Marks**

- Transcription of Phonetic symbols.
- Word stress.
- Translation of 5 sentences from Hindi to English
- Translation of 10 words from Hindi to English

Unit – II(Writing Skills) **20 Marks**

- CV"s and Job Applications.
- Precis Writing.

Unit – III(Compositional Skills) **20 Marks**

- Letter Writing (Formal and Informal)
- Paragraph Writing.

Unit – IV(Writing Skills) **10 Marks**

- Notice Writing.

Suggested Reading:

1. CVs and Job Applications by Judith Leigh.
2. English at Workplace. Eds: Panja, Sawhney&Verma.
3. Professional Communication by R P Singh.
4. English made simple by Arthur Waldhorn and Arthur Zeiger.
5. The Written Word by Vandana R Singh.
6. Technical Writing by Sunder Rajan.

Dr. O.P.S. Yadav

Dr P.C. Kamboj

Dr. S.S Vaidwan

Dr. Neeru Meena — Neeru Meena

Approved

Chairman & Principal
R R College

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Alwar (Rajasthan)

NEW SYLLABUS

B.Sc/B.Sc (Hons.) Semester I ENVS P C 22-103

ENVIRONMENTAL STUDIES

Scheme of examination: *MM:* 70

1. The Question paper shall be of ***TWO HOURS*** duration.
2. Q. No. 1 shall contain 20 (Twenty) objective type questions having four options, out of which one shall be correct. Each question shall carry one mark. (1 X 20 = 20 marks)
3. Q. No. 2 shall contain 8 (Eight) Short-Answer-Type-Questions. Word limit for each question is 100 words. **Candidate has to attempt any five**. Each question shall carry **Four** marks. (5 X 4 = 20 marks).
4. Q. No. 3 shall contain 4 (Four) Essay-Type-Questions. Word limit for each question is 500 words. **Candidate has to attempt any two**. Each question shall carry **Fifteen** marks. (2 X 15 = 30 marks).

UNIT – I

The multidisciplinary nature of environmental studies.

Definition, Scope and importance, Relationship between Environmental Studies and other branches of science and social sciences.

Need for Environmental awareness, Environmental education in present day context.

Natural Resources and Challenges

Natural Resources and associated problems, Classification of resources: renewable resources,nonrenewable resources. Classes of earth resources, resources regions:Defination and criteria, resource conservation.

- Forest Resources: Use and over exploitation, deforestation case studies, Timber extraction, mining, dams and their effects on forest and tribal people.
- Water Resources: Use and over exploitation of surface and ground water, Floods, draught, conflicts over water, dams- benefits and problems.

- Mineral Resources: Use and exploitation, effects of extracting and using mineral resources, case studies.
- Food Resources: World food problems, changes, caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- Energy Resources: Growing energy need, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
- Land Resources: Land as a resource, land degradation, man included landslides, soil erosion and desertification.
- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

UNIT-II

Ecosystems, Concepts, Structure, Functions and Types

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in ecosystems.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem:
  - Forest ecosystem
  - Grassland ecosystem and their types
  - Desert ecosystem with emphasis on Thar Desert
  - Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) and Wet Lands

UNIT – III

Biodiversity and its conservation.

- Introduction – Definition: genetic, species and ecosystem diversity.
- Bio geographical classification of India.
- Value of biodiversity: consumptive use, productive use, social, ethical, asthetic and option values.
- Biodiversity at global, national and local levels.
- India as a mega diversity region.
- Hot spots of biodiversity.
- Threats to biodiversity – habitat loss, poaching of wild life, man – wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of biodiversity: *in situ* and *ex situ* conservation of biodiversity.
- Red Data Book

Suggested Readings:

1. KaniskPandey,Sports a way of life.ManasPublication,Allahabad U.P. 2007
2. Charles Bucher.Foundation of Phy.Education Engle wood cliffs N.J. Prentia Hall. U.S.A.
3. Ajmer Singh GS Gill Foundation of Physical Education,FrenchPub.New Delhi.
4. Dr.M.L. Kamlesh History and foundation of PE,Friends Publication
5. Chauchan,Surendra Singh.2001. Biodiversity,Biopiracy and Biopolitics. The Global Perspectives,KalingaPublications,New Delhi.

6 .Diwan A.P. and Arora D.K. !995 Human Ecology Anmol Publications Pvt.Ltd.,New Delhi.

7. Dubey R.M. 1992 Human Ecology and Environmental Education,Chaugh Publications,Allahabad.

8. Goudie,Andrew.The Human Impact
9. Husain Maxia 1994 Human Geography,RawatPublications,Jaipur
10. Sinha Rajiv,1996. Gloobal Biodiversity Ina.,Shripublications,Jaipur

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Chairman Academic Council / Principal
R R College Alwar

(Dr L K Sharma)

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Governing Body
Raj Rishi Govt. Autonomous College
Alwar (Rajasthan)

Format of the Question Paper

Q. 1 (Multiple Choice Question). Attempt all.

(i).....

(a) (b)

(c) (d)

(ii).....

(iii).....

(iv).....

(v).....

(vi).....

(vii).....

(viii).....

(ix).....

(x).....

(xi).....

(xii).....

(xiii).....

(xiv).....

(xv).....

(xvi).....

(xvii).....

(xviii).....

(xix).....

(xx).....

(1 X 20 = 20)

Q. 2 (Short Answer Type Question).Attempt any FIVE. Word limit 100 words for each.

(i).....

(ii).....

(iii).....

(iv).....

(v).....

(vi).....

(vii).....

(viii).....

(5 X 4 = 20)

Q. 3 (Essay Type Question).Attempt any TWO. Word limit 500 words for each.

(i).....

(ii).....

(iii).....

(iv).....

(2 X 15 = 30)

NEW SYLLABUS

B.Sc/B.Sc (Hons.) Semester II ENVS P C 22-203

ENVIRONMENTAL STUDIES

Scheme of examination: *MM: 70*

1. The Question paper shall be of ***TWO HOURS*** duration.
2. Q. No. 1 shall contain 20 (Twenty) objective type questions having four options, out of which one shall be correct. Each question shall carry one mark. (1 X 20 = 20 marks)
3. Q. No. 2 shall contain 8 (Eight) Short-Answer-Type-Questions. Word limit for each question is 100 words. **Candidate has to attempt any five**. Each question shall carry **Four** marks. (5 X 4 = 20 marks).
4. Q. No. 3 shall contain 4 (Four) Essay-Type-Questions. Word limit for each question is 500 words. **Candidate has to attempt any two**. Each question shall carry **Fifteen** marks. (2 X 15 = 30 marks).

Unit – I

Environmental Pollutions and Control Measures

1. Definition, causes, effects and control measures of

- Air Pollution,
- Water Pollution,
- Soil Pollution,
- Marine Pollution,
- Noise Pollution,
- Thermal Pollution,
- Nuclear Pollution,

2. Solid waste management: Causes, effects and control measures of urban and industrial waste, Role of an individual in prevention of pollution
   Pollution case studies
3. Disaster management: Floods, earthquakes, cyclone and landslides.

UNIT-II

Social issues, Environment, Laws and Sustainability

- From unsustainable to sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people, its problems and concerns, case studies.
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environmental protection laws in India.
- Air(Prevention and Control of Pollution) Act
- Wild life protection Act
- Forest Conservation Act
- Biological Diversity Act
- Issues involved in enforcement of environmental legislation
- Public Awareness

UNIT-III

Human Population and the Environment

- Population growth, variation among nations.
- Population explosion – family welfare programmes.
- 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

Philosophy of Sports

- Define sports and physical education & classification of sports activities.
- Sports as a way of life.
- Development of social and moral values through sports.
- Sports and personality development.
- Team work and sports.
- Physiological changes in body through sports participation
- Peace through sports in the world.

Suggested Readings:

1. KaniskPandey,Sports a way of life.ManasPublication,Allahabad U.P. 2007
2. Charles Bucher.Foundation of Phy.Education Engle wood cliffs N.J. PrentiaHall. U.S.A.
3. Ajmer Singh GS Gill Foundation of Physical Education,FrenchPub.New Delhi.
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6. Diwan A.P. and Arora D.K. !995 Human Ecology Anmol Publications Pvt.Ltd.,New Delhi.
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8. Goudie,Andrew.The Human Impact
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10. Sinha Rajiv,1996. Gloobal Biodiversity Ina.,Shripublications,Jaipur

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Chairman Board of Studies
RR College Alwar

(Dr L K Sharma)

Format of the Question Paper

Q. 1 (Multiple Choice Question). Attempt all.

(i).....

(a) (b)

(c) (d)

(ii).....

(iii).....

(iv).....

(v).....

(vi).....

(vii).....

(viii).....

(ix).....

(x).....

(xi).....

(xii).....

(xiii).....

(xiv).....

(xv).....

(xvi).....

(xvii).....

(xviii).....

(xix).....

(xx).....

(1 X 20 = 20)

Q. 2 (Short Answer Type Question).Attempt any FIVE. Word limit 100 words for each.

(i).....

(ii).....

(iii).....

(iv).....

(v).....

(vi).....

(vii).....

(viii).....

(5 X 4 = 20)

Q. 3 (Essay Type Question).Attempt any TWO. Word limit 500 words for each.

(i).....

(ii).....

(iii).....

(iv).....

(2 X 15 = 30)

NEW SYLLABUS

B.Sc/B.Sc (Hons.) **Semester I** **ECA** **P C 22-104**

ELEMENTARY COMPUTER APPLICATIONS

Scheme of examination: MM: 70

1. The Question paper shall be of ***TWO HOURS*** duration.
1. Q. No. 1 shall contain 20 (Twenty) objective type questions having four options, out of which one shall be correct. Each question shall carry one mark. **(1 X 20 = 20 marks)**
2. Q. No. 2 shall contain 8 (Eight)Short-Answer-Type-Questions. Word limit for each question is 100 words. **Candidate has to attempt any five**. Each question shall carry **Four** marks. **(5 X 4 = 20 marks)**
3. Q. No. 3 shall contain 4 (Four) Essay-Type-Questions. Word limit for each question is 500 words. **Candidate has to attempt any two**. Each question shall carry **Fifteen** marks.

(2 X 15 = 30 marks)

UNIT – I

Introduction to computers and related terminology:(Basic information only)

A. **Hardware:** CPU (Mother board, Microprocessors, , MMX technology, System clock, Address Bus, Date Bus, (PCI and ESIC) Cache Memory, Processing speed, Expansion slots (Video controller, sound Card, SCSI, Network Card), Memory – (RAM and ROM), Input and Output devices- Keyboard (The standard Keyboard layout), Mouse, Printers (Dot matrix, Inkjet, Laser Jet), Microphone, Speakers, Digital Cameras, Scanners, Storage devices – Diskette Drive (Types, Density, Formatting Boot Record, FAT, Folder, Directory), Hard Disk Drive, CD, DVD, Pen Drive, Tape Drive.

B. **Software:** Introduction to programming languages, System software (Operating Systems and Utilities), Application software (Word Processors, Spreadsheets, DBMS, Presentation Graphics, Browsers, Personal Information Managers) Introduction to Multilingual Word-Processors.

C. **Communications and Connectivity:** Data Communication System, Data Transmission (Serial, Parallel, Bandwidth, Protocols), Emails, Voice and video massaging, Video

Conferencing, Online service user connection (Types), Networking of Computers, (Node, Client, Server, LAN, WAN), Working of the internet and the Web.

UNIT – II

The Internet and Online Resources **(Working Knowledge at Common Users Level only)**: How the internet works, Introduction to (TCP/IP, and DNS Addresses. Features of the internet – (Email, News, Telnet, Chat, Channels, WWW, OnlineServices, Bulletin Board Services), Connection wizard, Overview of the internet explorer and features therein, use of search engines, Surfing, creating and use of email, Awareness about e-commerce and its advantages.

Format of the Question Paper

Q. 1 (Multiple Choice Question). Attempt all.

(i).....

(a) (b)

(c) (d)

(ii).....

(iii).....

(iv).....

(v).....

(vi).....

(vii).....

(viii).....

(ix).....

(x).....

(xi).....

(xii).....

(xiii).....

(xiv).....

(xv).....

(xvi).....

(xvii).....

(xviii).....

(xix).....

(xx).....

(1 X 20 = 20)

Q. 2 (Short Answer Type Question).Attempt any FIVE. Word limit 100 words for each.

(i).....

(ii).....

(iii).....

(iv).....

(v).....

(vi).....

(vii).....

(viii).....

(5 X 4 = 20)

Q. 3 (Essay Type Question).Attempt any TWO. Word limit 500 words for each.

(i).....

(ii).....

(iii).....

(iv).....(2 X 15 = 30)

(5)

NEW SYLLABUS

B.Sc/B.Sc (Hons.) **Semester II** **ECA** **P C 22-204**

ELEMENTARY COMPUTER APPLICATIONS

Scheme of examination: MM: 70

1. The Question paper shall be of ***TWO HOURS*** duration.
4. Q. No. 1 shall contain 20 (Twenty) objective type questions having four options, out of which one shall be correct. Each question shall carry one mark. **(1 X 20 = 20 marks)**
5. Q. No. 2 shall contain 8 (Eight)Short-Answer-Type-Questions. Word limit for each question is 100 words. **Candidate has to attempt any five**. Each question shall carry **Four** marks. **(5 X 4 = 20 marks)**
6. Q. No. 3 shall contain 4 (Four) Essay-Type-Questions. Word limit for each question is 500 words. **Candidate has to attempt any two**. Each question shall carry **Fifteen** marks.

(2 X 15 = 30 marks)

UNIT I

OPERATING SYSTEMS (Working knowledgeat common users level only):

Overview of important DOS Commands, Windows: Installation, Scandisk, Control Panel, Taskbar, Toolbars, Display settings (Background, wallpapers, screensavers, Desktop themes), Files and Folder management, Windows explorer, Finding Files and Folders, Formatting Disks and copying files, Printer settings, Modem installation, mouse installation, Adding and removing programmes, Active desktop Concepts, Winzip and its application, Antivirus and its use, Use of calculator, Paintbrush, Win amp, MPEG player and Windows help.

UNIT II

Application Software (Working knowledge at common users level only):

(a) Word processing software – MS Word

Entering, editing and formatting text, Document formats (Page size and Orientation, Headers and Footers, Columns and Sections, Page layout), Spelling and grammar checks, Thesaurus, Find and replace, cut and Paste, Table and Formatting tables, Mail Merge, Styles and Templates.

(b) Spreadsheet Programme – MS Excel

Entering Data, Labels, Cell references, Values, Dates, formulas, formats, Functions, Templates, charts and Maps, Analyzing datain a spreadsheet.

(c) DBMS – Microsoft Access

Database, Entering data into the database, Creating database tables, editing data, viewing records, sorting records, querying a database, generating reports.

Format of the Question Paper

Q. 1 (Multiple Choice Question). Attempt all.

(i).....

(a) (b)

(c) (d)

(ii).....

(iii).....

(iv).....

(v).....

(vi).....

(vii).....

(viii).....

(ix).....

(x).....

(xi).....

(xii).....

(xiii).....

(xiv).....

(xv).....

(xvi).....

(xvii).....

(xviii).....

(xix).....

(xx).....

(1 X 20 = 20)

Q. 2 (Short Answer Type Question).Attempt any FIVE. Word limit 100 words for each.

(i).....

(ii).....

(iii).....

(iv).....

(v).....

(vi).....

(vii).....

(viii).....

(5 X 4 = 20)

Q. 3 (Essay Type Question).Attempt any TWO. Word limit 500 words for each.

(i).....

(ii).....

(iii).....

(iv).....(2 X 15 = 30)

NEW SYLLABUS

B.Sc/B.Sc (Hons.) Semester I & II ECA P C 22-204

PRACTICALS: ELEMENTARY COMPUTER APPLICATIONS

MM: 50

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

The practical examination scheme should be as follows-

- Three practical exercises (including Attendance & Record performance)
    - Operating System
    - MS Word
    - MS Excel
    - Microsoft Access
    - Internet — 3 X10 = 30
- Viva-voice — 20

NEW SYLLABUS
B.Sc. Semester - I

Scheme of examination

Continuous Assessment (CA)	=	15 Marks
Term Test	=	10 Marks
Home Assignment	=	05 Marks
Semester End Examination (SEE)	=	35 Marks
Total	=	50 Marks

B.Sc. Semester I Botany Paper I P C 22-1001

Algae, Fungi and Lichens

Scheme of examination: **MM: 35**

1. In Semester End Examination the candidate has to answer five questions in all. Each question will be of 7 marks. Candidate has to answer all questions in the main answer book only.

2. Q. No. 1 will be compulsory having 07 short answer type questions (one mark each) covering entire syllabus.

3. Each paper is divided in four units. There will be two questions from each unit. Student has to answer one question from each unit.

UNIT – I

General characters of algae, Classification (F. E. Fritsch and Smith), Diverse habitat, Range of thallus structure, Photosynthetic pigments and food reserves. Reproduction (vegetative, asexual and sexual), Types of life cycles and evolution of sex in algae. Economic importance (algae as food and fodder, algae in agriculture, pharmaceuticals and industries). Isolation and culture of algae.

UNIT – II

Habitat, structure, reproduction and life cycle of following forms:

Chlorophyceae – Volvox, Coleochaete, Chara

Xanthophyceae – Vaucheria

Phaeophyceae – Ectocarpus

Rhodophyceae – Polysiphonia

UNIT – III

General characters of fungi: Definition, occurrence, thallus organization, asexual and sexual reproduction, biological and economic importance of fungi. Classification of fungi. (Saccardo and Ainsworth's).

UNIT – IV

Brief account, structure, importance and life history of the following:

Yeast, Rhizopus, Aspergillus, Peziza, Agaricus.

Lichens: General characters, habitat, structure, reproduction and economic importance of lichens, importance of lichens as colonizers and indicators of environment.

Suggested Readings:

- Bold, H. C. and Wayne, M. J. 1996. Introduction to Algae. 2nd Edition. Prentice Hall, Inc. Englewood Cliffs, New Jersey.
- Gilbart, M. S. 1985. Cryptogamic Botany. Vol. I and II second edition. Tata McGra Hill Publishing Co. Ltd., New Delhi.
- Kumar, H. D. 1998. Introductory Phycology. Affiliated East-West Press Ltd., New York.
- Lee, R.E. 2008. Phycology. Fourth Edition, Cambridge University Press, USA.
- Singh, V. Pandey, P. C. and Jain, D. K. 2001. A Text book of Botany. Rastogi Publication, Meerut.
- Van den Hoek, C., Mann, D.J. and Jahns, H.M. 1995. Algae: An introduction to Phycology. Cambridge Univ. Press., England.
- Vashitha, B. R. 2002. Botany for degree students (Algae and Bryophytes). S. Chand and Co. Ltd., New Delhi.
- Alexopoulos, C.J. and Mims, C.V. 1988. Introductory Mycology. John Wiley and Sons, New York.
- Dubey, H.C. 1989. Fungi. Rastogi publication, Meerut.
- Sarabhai, R.C. and Saxena, R.C. 1990. A textbook of Botany. Rastogi publication, Meerut.
- Vashishta, B. R. 2001. Botany for degree student's Fungi. S. Chand and company, New Delhi.

• Webster, J. and Weber, R. 2007. Introduction to Fungi. 3rd edition, Cambridge University Press, Cambridge.

B.Sc. Semester I Botany Paper II P C 22-1002

Microbiology and Plant Pathology

Scheme of examination: **MM: 35**

1. In Semester End Examination the candidate has to answer five questions in all. Each question will be of 7 marks. Candidate has to answer all questions in the main answer book only.

2. Q. No. 1 will be compulsory having 07 short answer type questions (one mark each) covering entire syllabus.

3. Each paper is divided in four units. There will be two questions from each unit. Student has to answer one question from each unit.

UNIT – I

Meaning and scope of **microbiology,** Developments in the field of microbiology, spontaneous generation, discovery of bacteria, germ theory of diseases, Vaccination, Antibiotics.

General account of Eubacteria: occurrence, morphology (structure, shapes), flagella, capsule, nutritional types, endospore, reproduction (binary fission, transformation, conjugation, transduction), economic and biological importance.

UNIT – II

Mycoplasma: occurrence, morphology, reproduction and importance.

Virus: General characteristics and importance. Structure of TMV and Pox virus. **Structure and multiplication of bacteriophage**.

Cyanobacteria*: Oscillatoria and Nostoc*, occurrence, morphology, reproduction and importance.

UNIT – III

What is plant disease? Animate and inanimate plant diseases. Important symptoms of plant diseases caused by fungi, bacteria, viruses, MLO's (blights, mildew – downy and powdery, rust, smut, mosaic, little leaf, galls etc.)

Brief account, structure, importance and life history and/or disease cycle and control of the following:

Albugo and white rust. **Sclerospora** and downy mildew/ green ear of Bajra.

Claviceps and ergot.

UNIT – IV

Brief account, structure, importance and life history and/or disease cycle and control of the following:

Puccinia and rusts of wheat (Black, orange, yellow)

Ustilago and loose smut of wheat and covered smut of barley.

Alternaria and early blight of tomato/potato.

Suggested Readings:

- Agrawal, K. and Sharma, J. 2014. A Text book of Mycology, Microbiology and Plant Pathology. CBH publisher, Jaipur.
- Aneja, K. R. 2003. Experiment in Microbiology, Plant Pathology and Biotechnology. New age international (P) Ltd. Publishers, New Delhi.
- Biswas, S. B. and Biswas, A. 2000. An introduction of Viruses. Vikas publications, New Delhi.
- Dubey, R. C. and Maheshwari, D. K., 2002. A Text Book of Microbiology. S. Chand and Co., New Delhi. 8
- Kumar, H. D. and Kumar, S. 1998. Modern Concepts of Microbiology. Vikas publishing house Pvt. Ltd., New Delhi.
- Madahar, C. L. 2001. Introduction of Bacteria. Mc Graw Hill Edu. Pvt. Ltd., London.
- Mckane, L. and Judy, K. 1996. Microbiology: Essentials and Applications. McGraw Hill, New York.
- Pandey, S. N. and Trivedi, P. C. 2005. A text book of Fungi, Bacteria and Virus. Vikas Publishing House, New Delhi.
- Pelczar, M.J. Microbiology. 5 th edition, Tata Mc Graw-Hill Co., New Delhi.
- Presscott, L., Harley, J. and Klein, D. 2005. Microbiology. 6 th edition, Tata Mc Graw-Hill Co., New Delhi.

- Purohit, S. S. 2002. Microbiology. Agro. Bot. Publication, Jodhpur.
- Sharma, P. D. 2003. Microbiology and Pathology. Rastogi Publication, Meerut.
- Singh, V. and Srivastava, V. 1998. Introduction of Bacteria. Vikas Publication, New Delhi.
- Singh, R. P. 2010. Microbiology. Kalyani Publishers, New Delhi.

NEW SYLLABUS

B.Sc. Semester - II

Scheme of examination

Continuous Assessment (CA)	=	15 Marks
Term Test	=	10 Marks
Home Assignment	=	05 Marks
Semester End Examination (SEE)	=	35 Marks
Total	=	50 Marks

B.Sc. Semester II Botany Paper I P C 22-2001

Bryophytes and Pteridophytes

Scheme of examination: **MM: 35**

1. In Semester End Examination the candidate has to answer five questions in all. Each question will be of 7 marks. Candidate has to answer all questions in the main answer book only.

2. Q. No. 1 will be compulsory having 07 short answer type questions (one mark each) covering entire syllabus.

3. Each paper is divided in four units. There will be two questions from each unit. Student has to answer one question from each unit.

UNIT – I

Bryophyta: General characters, Origin and evolution of Bryophyta. Classification (Eichler and Proskauer) Habitat, Range of thallus structure, Reproduction (Vegetative and Sexual) Alternation of generation, Evolution of sporophytes in Bryophytes, Economic importance of Bryophytes.

UNIT II

Habitat, structure, reproduction and alternation of generation in following forms:

Hepaticas – Riccia, Marchantia and Porella.

Anthocerotopsida - Anthoceros.

Bryopsida - Sphagnum, Funaria

UNIT III

Pteridophyta: General characters of pteridophytes, classification by Smith, Bold & Sporne.

Important characteristics of Psilopsida, Lycopsida, Sphenopsida and Pteropsida. Economic importance of Pteridophytes. Alternation of Generation. Stelar system in Pteridophytes. Heterospory and seed habit.

Unit – IV

Distribution, structure and life history of

Psilotum, Selaginella, Equisetum, Pteridium and Marsilea.

Suggested readings

- Chopra, R.N. and Kumar, P.K. 1988. Biology of Bryophytes. Wiley Eastern Ltd. New Delhi.
- Pandey, S.N., Mishra, S.P. and Trivedi, P.S. 1981. A text book of Botany vol. II, Vikas publishing House Pvt. Ltd, New Delhi.
- Parihar, N.S. 1965. An Introduction to Bryophyta. Central Book Depot, Allhabad.
- Puri, P. 1985. Bryophytes. Atmaram and Sons, Delhi.
- Smith, G.M. 1938. Crytogramic Botany Vol. II. Bryophytes and Pteridophytes. Mc Graw Hill Book Company, London.
- Sporne, K.R. 1967. The Morphology of Bryophytes. Hutchinson University Library, London.
- Tyagi, A.and Saxena, M. 2014. Algae, Lichens and Bryophyta, CBH, Jaipur
- Vashishta, B. R., Sinha, A. K. and Kumar, A. 2011. Botany for degree students, Bryophyta. S. Chand and Co. New Delhi.
- Watson E.V. 1971. The structure and life of Bryophytes. Hutchinson University Library, London
- Bierhorst, D.W. 1971. Morphology of Vascular Plants. MacMillan Co., N.Y. and CollierMacMillan Ltd., London.
- Parihar, N.S. 1996. The Biology and Morphology of Pteridophytes. Central Book Depot, Allahabad.
- Singh, V., Pandey, P. C. and Jain, D. K .2013. A text book of Botany. IV edition, Rastogi publication, Meerut.
- Sharma, O. P. 1990. Textbook of Pteridophyta, MacMillan India Ltd., Delhi.

• Vashishta, P.C. 1997. Botany for Degree Students- Pteridophyta. S. Chand and Company, New Delhi.

• Wilson, N. S. and Rothewall, G. W. 1993. Paleobotany and Evolution of Plants. (2nd Edition), Cambridge University Press, U. K.

B.Sc. Semester II Botany Paper II P C 22-2002
Gymnosperms and Palaeobotany

Scheme of examination: **MM: 35**

1. In Semester End Examination the candidate has to answer five questions in all. Each question will be of 7 marks. Candidate has to answer all questions in the main answer book only.

2. Q. No. 1 will be compulsory having 07 short answer type questions (one mark each) covering entire syllabus.

3. Each paper is divided in four units. There will be two questions from each unit. Student has to answer one question from each unit.

UNIT–I

Resemblances and characteristics of seed plants. Differences between Gymnosperms and Angiosperms. General characters and classification of Gymnosperms (Andrews, Sporne & Bierhorst), Economic importance of Gymnosperms.

UNIT-II

Systematic position, distribution, Morphology of Vegetative and reproductive parts, anatomy, reproduction and life cycle of following genera:

Cycas, Pinus and Ephedra

UNIT- III

Formation of fossils, types of fossils, techniques of study of fossils. Geological time scale. Applied aspects of paleobotany - use in coal and petroleum exploration.

UNIT -IV

Fossil Pteridophytes: Rhynia, Lepidodendron, Calamites, Lepidocarpon.

Fossil Gymnosperms: Cycadeodea, Cordaites, Williamsonia.

Suggested Readings:

• Bhatnagar, S. P. and Moitra, A. 1997. Gymnosperms. New Age International (P) Ltd., Publisher, New Delhi.

• Clark, D. L. 1976. Fossils, Palaeobotany and Evolution. W.M.C. Brown Company, New York.

• Meyen, S. V. 1978. Fundamentals of Palaeobotany. Chapman and Hall, London.

• Sharma, O. P. 1997. Gymnosperms. Pragati Prakashan, Meerut, India.

• Sporne, K. R. 2002. The Morphology of Gymnosperms. B. I. Pub. Pvt. Ltd. Mumbai, Kolkata, Delhi.

• Thomas, B. A. and Spice, R. A. 1986. The Evolution and Palaeobotnay of land Plants. Publ. Crom. Helm London and Sydney.

• Vasishta P.C. 1980. Gymnosperms. S. Chand and Co. Ltd., New Delhi.

B. Sc. BOTANY PRACTICAL EXAMINATION

SEMESTER I & II

SKELETON PAPER

MAX. MARKS: 100 TIME 4 HOURS

Q. No.	Practical	Marks
1.	Make suitable stained glycerine preparation of any one alga from the given mixture 'A' Draw its labelled diagram, assign it to its systematic position giving reasons.	08
2.	Make suitable preparation of the reproductive structure of material "B" Draw labelled diagrams, identify giving reasons.	10
3.	Make suitable stained preparation of material 'C' (Vegetative/ Reproductive) Draw a labelled diagram, identify giving reasons.	10
4.	Make suitable preparation of material 'D' (Vegetative/Reproductive) Draw a labelled sketch, identify giving reasons.	10
5.	Make a suitable preparation of material "E" (Vegetative/Reproductive) Draw a labelled sketch, identify giving reasons.	10
6.	One microbiology experiment for comments or Gram staining.	08
7.	Comment upon the spots (1-6), Identify giving reasons (3 Minutes for each Spot)	24
8.	Viva-Voce	10
9.	Practical Record	10
	Total	**100**

Suggested Laboratory Exercises:

1. Microscopic preparations and study of the following algal material:

   Nostoc, Oscillatoria, Volvox, Coleochaete, Vaucheria, Chara, Ectocarpus and Polysiphonia.

2. Study of class work material by making suitable temporary slides and study of permanent slides of:
   Yeasts, Aspergillus, Peziza, Agaricus.
3. Study of Specimen, permanent slides and by making suitable temporary slides: *Albugo , Sclerospora , Claviceps, Ustilago , , Puccinia Alternaria*
4. Study of External morphology and preparations of slides of vegetative and reproductive parts of following Bryophytes: *Riccia, Marchantia, Anthoceros, Sphagnum.*
5. Study of External morphology and preparations of stained slides of vegetative and reproductive parts of following Pteridophytes: *Selaginella, Equisetum and Marsilea.*

   Microscopic examination of fossil slides, specimen/photograph-

   Rhynia, Lepidodendron, Calamites and Lepidocarpon.
6. Study of External morphology and preparations of suitable section of vegetative/ reproductive parts of following Gymnosperms: Cycas, Pinus and Ephedra

   Cycas

i. Study through permanent slides - normal root (T.S.), stem (T.S.) (if sections are not available show photographs), ovule (L.S.).

ii. Study through hand sections or dissections - coralloid root (T.S.), rachis (T.S.), leaflet (T.S.), microsporophyll (T.S.), pollen grains (W.M.)

Pinus

i. Study through permanent slides - root (T.S.), female cone (L.S.), ovule (L.S.), embryo (W.M.) showing polyembryonic condition.

ii. Study through hand sections- young stem (T.S.), old stem (wood) (T.L.S. and R.L.S.), needle (T.S.), male cone (L.S.), male cone (T.S.), pollen grains (W.M.)

Ephedra

i. Permanent slides - female cone (L.S.).

ii. Hand sections/dissections - node (T.S.), internode (T.S.), male cone (T.S. and L.S.), pollen grains.

7. Study of bacteria using curd or any other suitable material by Gram staining of bacteria:

   Study of Mycoplasma, TMV, Pox virus, bacteriophage (photographs)

   Study of symptoms of plant diseases - Downy mildew of Bajra, Green ear of bajra, Mosaic of bhindi, White rust of crucifers, Loose smut of wheat and Covered smut of barley, Rusts of wheat.

NEW SYLLABUS

B.Sc Semester I Maths Paper I PC 22-1007

DISCRETE MATHEMATICS

Scheme of examination: **MM: 35**

Note: In all five questions are to be answered. First question will be short answer type, compulsory and will cover the entire syllabus. There shall be two questions from each unit. A student has to answer at least one question from each unit.

UNIT - I

Set Theory, Cardinality, Countable sets, Mathematical induction, Principle of inclusion and exclusion.

UNIT - II

Relations; Binary relations, Equivalence relations and partitions. Partial ordered relations and lattices, Chains and antichains. Pigeons hole principle.

UNIT - III

Discrete numeric functions and generating functions. Recurrence relation and recursive algorithms, Linear recurrence relations with constant coefficients. Homogeneous solutions, Particular solution, Total solution, Solution by the method of generating functions.

UNIT - IV

Approved

Boolean algebras-lattices and algebraic structure, Duality, Distributive compliment lattices. Boolean lattices, Boolean functions and expressions.

Chairman & Principal
R. R College Alwar

26/10/2021 26.10.21 26.10.21 26.10.21 26.10.2021

Antima 26/10/2021 26-10-21 26.10.21 26/10/2021

26/10/21
(Dr Ravikant Sharma)

NEW SYLLABUS

B.Sc Semester I Maths Paper II P C 22-1008

DIFFERENTIAL CALCULUS

Scheme of examination: **MM: 35**

Note: In all five questions are to be answered. First question will be short answer type, compulsory and will cover the entire syllabus. There shall be two questions from each unit. A student has to answer at least one question from each unit.

UNIT - I

Series : Infinite series and convergent series, test for convergence of a series; comparison test, D' Alembert's test Cauchy's test, Raabe's test, De-Morgan and Bertrand's test, Cauchy's condensation test, gauss test, alternating series, absolute convergence (derivation of test is not required).

UNIT - II

Taylor' s theorem. Machlaurin's theorem, power series expansion of sin x, cos x, e^x, $\log_e (1+x)$, $(1 - x)^n$, derivative of the length of an arc, pedal equations.

UNIT - III

Curvature. Asymptotes,

UNIT - IV

Multiple points, curve tracing of standard curves (Cartesian and polar coordinates), Envelopes.

NEW SYLLABUS

B.Sc Semester I Maths Paper III P C 22-1009

THREE DIMENSIONAL GEOMETRY

Scheme of examination: **MM: 35**

Note: In all five questions are to be answered. First question will be short answer type, compulsory and will cover the entire syllabus. There shall be two questions from each unit. A student has to answer at least one question from each unit.

UNIT - I

Sphere

UNIT - II

Cone, Cylinder.

UNIT - III

Central conicoids; ellipsoid, hyperboloid of one and two sheets condition of tangency for a plane, normals plane sections

UNIT - IV

Generating lines of hyperboloid of one sheet and its properties. Reduction of a general equations of second degree in three dimensions standard forms.

NEW SYLLABUS

B.Sc Semester II Maths Paper I PC 22-2007

GRAPH THEORY

Scheme of examination: **MM: 35**

Note: In all five questions are to be answered. First question will be short answer type, compulsory and will cover the entire syllabus. There shall be two questions from each unit. A student has to answer at least one question from each unit.

UNIT - I

Logic and propositional calculus, Propositions Simple and compound, Basic logical operations.

Truth tables, Tautologies and contradictions, proportional functions, quantifiers.

Graphs: Basic terminologies, Simple Graph, Multigraph, Regular graph, Complete graph, Cycle, Wheel, Complete bipartite graph.

UNIT II

Operations of Graphs: Union, Join, product and composition of graphs, Subgraph, Isomorphism of graphs, Self complementary graphs, Euler graphs, Hamiltonian graph.

UNIT III

Weighted graphs, Shortest path problem, Travelling salesmen problem, Planer graphs and Geometric dual graphs, Simple digraph, Symmetric digraph, Antisymmetric digraph, Balance digraph.

UNIT IV

Matrix representation of graphs and digraphs. Trees, Rooted trees, Binary tree, Spanning tree, Minimal spanning tree.

NEW SYLLABUS

B.Sc Semester II Maths Paper II P C 22-2008

INTEGRAL CALCULUS

Scheme of examination: **MM: 35**

Note: In all five questions are to be answered. First question will be short answer type, compulsory and will cover the entire syllabus. There shall be two questions from each unit. A student has to answer at least one question from each unit.

UNIT - I

Partial derivatives. Chain rules, Euler's theorem for homogeneous functions. Differentiation of implicit functions. Maxima and Minima of functions of two variables. Lagrange's multipliers.

UNIT II

Double integrals, Change of order of integration.

UNIT III

Triple integrals, Dirichlet's integral, Areas.

UNIT IV

Lengths, Volumes and Surfaces.

NEW SYLLABUS

B.Sc Semester II Maths Paper III P C 22-2009

OPTIMIZATION THEORY

Scheme of examination: **MM: 22**

Note: In all five questions are to be answered. First question will be short answer type, compulsory and will cover the entire syllabus. There shall be two questions from each unit. A student has to answer at least one question from each unit.

UNIT - I

The linear programming problem Formulation. L.P.P. matrix notation. Graphical solution of linear programming problems. Basic solution. Some basic properties of convex sets, Theorems based on convex sets.

UNIT II

Fundamental theorem of L.P.P. Application of the Simplex method for solution of a L.P.P. to simple problems.

UNIT III

Duality. Fundamental theorem of duality, Properties and Simple problems of duality.

UNIT IV

Assignment problems, Transportation problems.

NEW SYLLABUS

B.Sc. Part-I Semester I

PHYSICS -I PC 22-1010

MECHANICS-I (MM 33)

Note: 33 marks assigned to theory papers are distributed in following manner

Continuous evaluation	**10 marks**
Term End Main Exam	**23 marks**

Max marks: 33 **Duration: 3 hour**

Note: - In all five questions are to be set. Four questions will be out of the four units taking one question from every unit with 100% internal choice. Fifth question will be of short answer type covering entire course with no choice. The candidates will be required to attempt all the five questions.

Unit I

Physical law and frame of reference

(a) Inertial and non-inertial frames, Transformation of displacement, Velocity, acceleration between different frames of references involving translation, Galilean transformation and Invariance of Newton's laws

(b) Coriolis Force, Transformation of displacement, velocity and acceleration between rotating frame, Pseudo Forces, motion relative to earth, Foucault's Pendulum

UNIT-II

Conservation of Forces: Introduction about conservation and non -conservation Forces, Rectilinear motion under conservation forces, Discussion of potential energy curve and motion of a particle.

Unit-III

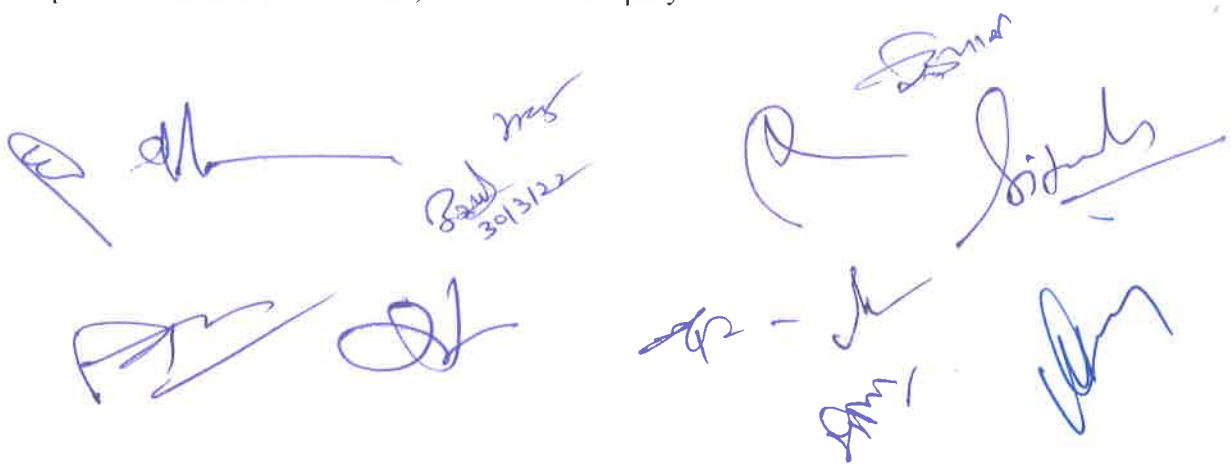
Centre of Mass: Introduction about centre of mass, centre of mass frame: collision of two particles in one and two dimensions, slowing down of neutron in a moderator, motion of a system with varying mass, angular momentum concept, conservation and charge particle scattering by a n nucleus

Unit-IV

Rigid body: Equation of motion of a rigid body ,Inertial Coefficient, Case of J not parallel to w, Kinetic energy of rotation and idea of principal Axes, Precessional motion of a spinning top

Reference Books-

1. Fundamental University Physics", Vol. I and II, Addison Wesley, Reading Mars, LISA.
2. "Berkley Physics Course", Vol. I, Mc. Graw Hill, New York.
3. "The Feynmann Lectures in Physics", Vol. 1, R. P. Feynman, R.B. Leighton and M. Sands, B.I. Publications, Bombay, Delhi, Calcutta, Madras.
4. "Physics",Part 1, David Halliday and Resnick , John Wiley and Sons, Inc. Newyork.
5. "Properties of Matter", D.S.Mathur, S.Chand & Company.



NEW SYLLABUS

B.Sc.Part-1 Semester 1

PHYSICS -II PC 22-1011

ELECTROMAGNETISM -I (MM 33)

Note: 33 marks assigned to theory papers are distributed in following manner

Continuous evaluation	**10 marks**
Term End Main Exam	**23 marks**

Max marks: 33 **Duration : 3 hour**

Note:- In all five questions are to be set. Four questions will be out of the four units taking one question from every unit with 100% internal choice. Fifth question will be of short answer type covering entire course with no choice. The candidates will be required to attempt all the five questions.

Unit –I

Scalar and Vector Field: Concept of field, Scalar and vector fields, Gradient of scalar field, Physical significance and formalism of gradient, Divergence and curl of vector field in Cartesian coordinates system, divergence and curl operators, Concept of solid angle, Gauss divergence and Stokes theorem. Gauss law from inverse square law. Differential form of Gauss law

Unit –II

Electric field and potential energy: Invariance of charge, Potential energy of system of (i) Discrete N charges (ii) Continuous charge distributions. Energy required to build a uniformly charged sphere, classical radius of electron, Electric fields due to short electric dipole with external Uniform and non-uniform electric field, potential due to a uniformly charged spherical shell.

Unit-III

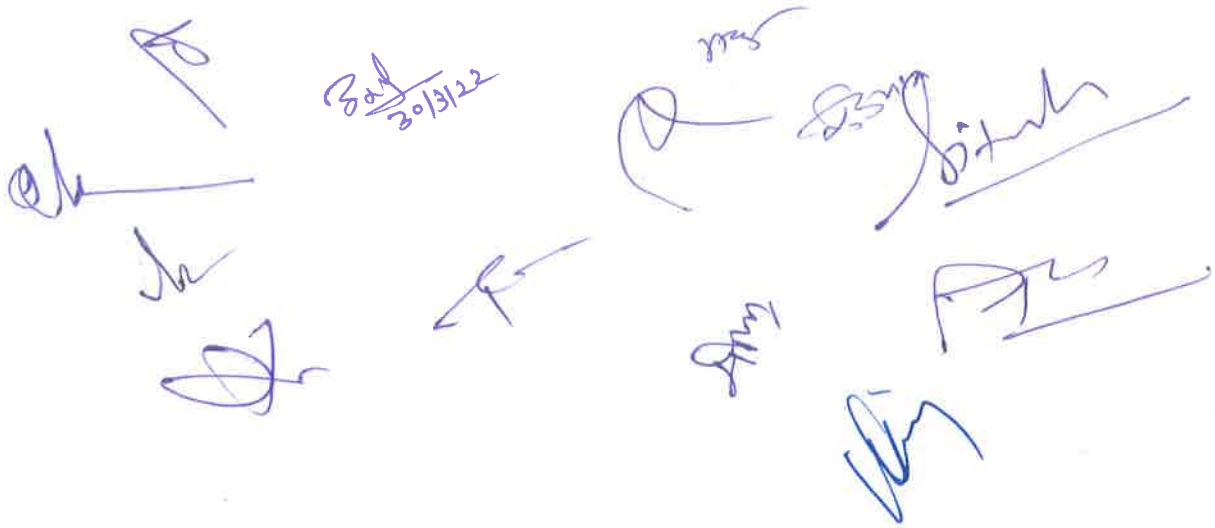
Poisson's and Laplace equations in Cartesian co-ordinates and their applications to solve the problems of electrostatics, Invariance of Charge, Gaussian and SI units and their inner conversions, Electric field measure in moving frames, Electric field of a point charge moving with constant velocity

Unit- IV

Electric field in matter: Multipole expansion, definition of moments of charge distribution, Dielectrics, induced dipole moments, polar and non-polar molecules, Free and bound charges, Polarization, Atomic polarizability, electric displacement vector, electric susceptibility, dielectric constant relation between them.

Reference Books

1. "Electricity and Magnetism with Electronics", K.K.Tewari, S.Chand & Co. Ltd. (2001)
2. "Electricity and Magnetism", D.Chattopadhyay, P.C.Rakshit, New Central Book Agency (P) Ltd
3. "Berkley Physics Course", Vol. I, Mc. Graw Hill, New York.
4. "Electricity and Magnetism", W.J.Duffin , Mc Graw Hill Book Co., Fourth edition.
5. "Electromagnetics", B.B.Laud ,New Age International Publishers, Second edition.
6. "Principles of Electricity and Magnetism",S.Palit, Narosa Publishing House.



NEW SYLLABUS

B.Sc.Part-1 Semester 1

PHYSICS-III PC 22-1012

OPTICS -I (MM 34)

Note: 34 marks assigned to theory papers are distributed in following manner

Continuous evaluation	**10 marks**
Term End Main Exam	**24 marks**

Max marks: 34 **Duration: 3 hour**

Note:- In all five questions are to be set. Four questions will be out of the four units taking one question from every unit with 100% internal choice. Fifth question will be of short answer type covering entire course with no choice. The candidates will be required to attempt all the five questions.

Unit-I

Interference-I: Concept of spatial and temporal coherence, coherence length, coherence current time, definition and propagation of a wavefront, Huygen,s principle of secondary wavelet. Young's double slit experiment, types of interference, interference by division of wavefront, Fresnel's biprism, measurement of wavelength λ and thickness of thin transparent sheet, interference by division of amplitude, interference in thin film of constant thickness in transmitted and reflected waves, interference produced by a wedge shaped film.

Unit-II

Interference-II: Newton's ring, determination of wavelength and refractive index by Newton's rings, fringe of equal inclination (Haidinger a fringes) equal thickness (fizeau fringes) Michelson's interferometer, shapes of fringes, (measurements of wave length, difference between two spectral lines and thickness of thin transparent sheet).

Unit III

Diffraction I: Fresnel's diffraction, half period zone, Fresnel's diffraction at a circular aperture, straight edge, and at a rectangular slit, Zone plate, multiple foci of Zone plate, comparison between zone plate and convex lens.

Unit-IV

Diffraction II: Fraunhoffer's Diffraction, Fraunhoffer's diffraction by N parallel slit with two slit as a special case, missing order, plane diffraction grating and its use in determining wavelength, dispersion by grating, criterion of resolution, resolving power of telescope and grating.

Reference Books

1. "A textbook of Optics", Brijlal and Subramaniam, S.Chand & Company Ltd.,23rd edition.
2. "Text books of Optics and Atomic Physics", D.P. Khandelwal, Himalaya Publishing House.
3. "Optics", Ajoy Ghatak ,Tata Mc Graw Hill Pub.Co. Ltd, 2007.
4. "Physics Part II", D.Halliday and R.Resnick, John Wiley & Sons, Inc., Newyork.
5. "Principles of Optics" B.K.Mathur

NEW SYLLABUS

B.Sc.Part-1 Semester II

PHYSICS-I PC 22-2010

MECHANICS –II (MM 33)

Note: 33 marks assigned to theory papers are distributed in following manner

Continuous evaluation	**10 marks**
Term End Main Exam	**23 marks**

Max marks: 33 **Duration: 3 hour**

Note:- In all five questions are to be set. Four questions will be out of the four units taking one question from every unit with 100% internal choice. Fifth question will be of short answer type covering entire course with no choice. The candidates will be required to attempt all the five questions.

Unit-I

Motion Under central force: Introduction about central forces, Motion under central forces, Gravitational interaction, Inertia and gravitational mass, general solution under gravitational Interaction, Kepler laws, Discussion about trajectories, Cases of elliptical and circular orbits, Rutherford scattering

Unit-II

Damped harmonic oscillations: Introduction about oscillation in a potential well, Damped force and motion under damping, Damped Simple Harmonic Oscillator, Power dissipation, Anharmonic Oscillator and simple pendulum as an example

Unit –III

Driven Harmonic oscillation: Driven Harmonic oscillator with damping, Frequency response, phase relation, Quality factor, Resonance series and parallel of LCR circuit, Electromechanical system-Ballistic Galvanometer, coupled Oscillations

Unit-IV

Equation of motion of two coupled simple harmonic oscillators, Normal modes, motion in mixed modes, transient behaviour, Dynamic of number of oscillation with neighbour interaction

Reference Books-

6. Fundamental University Physics", Vol. I and II, Addison Wesley, Reading Mars, LISA.
7. "Berkley Physics Course", Vol. I, Mc. Graw Hill, New York.
8. "The Feynmann Lectures in Physics", Vol. 1, R. P. Feynman, R.B. Leighton and M. Sands, B.I. Publications, Bombay, Delhi, Calcutta, Madras.
9. "Physics",Part 1, David Halliday and Resnick , John Wiley and Sons, Inc. Newyork.

"Properties of Matter", D.S.Mathur, S.Chand & Company

NEW SYLLABUS

B.Sc.Part-1 Semester II

PHYSICS -II PC 22-2011

ELECRTROMAGNETISM –II (MM 33)

Note: 33 marks assigned to theory papers are distributed in following manner

Continuous evaluation	**10 marks**
Term End Main Exam	**23 marks**

Max marks: 33 **Duration : 3 hour**

Note:- In all five questions are to be set. Four questions will be out of the four units taking one question from every unit with 100% internal choice. Fifth question will be of short answer type covering entire course with no choice. The candidates will be required to attempt all the five questions.

Unit -I

Electric potential and electric field due to uniformly polarized sphere (i) outside the sphere (ii) at the surface of the sphere (ii) inside the sphere, Electric fields due to a dielectric sphere placed in a uniform electric field (a) outside sphere (b) inside surface, Electric field due to a charge placed in dielectric medium and Gauss law, Clausius-Mossoti relation in dielectrics

Unit–II

Magneto statics and Magnetic field in a matter: Lorentz force, properties of magnetic field, Ampere's law, Field due to a current carrying solid conducting cylinder (a) Outside(b) At the surface and (c) Inside the cylinder, Ampere's law in different form, Introduction of magnetic vector potential, Possion's equation for vector potential, Deduction of Bio Savart's law using Magnetic vector potential , Differential form of Ampere's law

Unit-III

Atomic Magnet, Gyro magnetic ratio, Bohr Magnetron, Larmour frequency, induced magnetic moment and diamagnetism, spin magnetic moment, Para and Ferro magnetism, Intensity of magnetization, Magnetic permeability and susceptibility, free and bound current densities, Magnetic field due to a uniformly magnetized material and non-uniform magnetized material

Unit-IV

Displacement current, Maxwell's equations in differential and integral form. Electromagnetic waves, Electromagnetic waves in isotropic medium, Properties of Electromagnetic waves, Energy density of electromagnetic waves, Poynting Vector, Radiation pressure of free space, Electromagnetic waves in dispersive medium, Spectrum of Electromagnetic waves.

Reference Books

1. "Electricity and Magnetism with Electronics", K.K.Tewari, S.Chand & Co. Ltd. (2001)
2. "Electricity and Magnetism", D.Chattopadhyay, P.C.Rakshit, New Central Book Agency (P) Ltd
3. "Berkley Physics Course", Vol. I, Mc. Graw Hill, New York.
4. "Electricity and Magnetism", W.J.Duffin , Mc Graw Hill Book Co., Fourth edition.
5. "Electromagnetics", B.B.Laud ,New Age International Publishers, Second edition.
6. "Principles of Electricity and Magnetism",S.Palit, Narosa Publishing House.

NEW SYLLABUS

B.Sc.Part-1 Semester II

PHYSICS -III PC 22-2012

OPTICS –II (MM 34)

Note: 34 marks assigned to theory papers are distributed in following manner

Continuous evaluation	**10 marks**
Term End Main Exam	**24 marks**

Max marks: 34 **Duration: 3 hour**

Note:- In all five questions are to be set. Four questions will be out of the four units taking one question from every unit with 100% internal choice. Fifth question will be of short answer type covering entire course with no choice. The candidates will be required to attempt all the five questions.

Unit –I

Polarization: polarization, plane circular and elliptical polarized light, polarization by (i) reflection (ii) refraction (iii) double refraction (iv) dichroism(polaroid). Identification of polarize light. Huygens's theory of double refraction.

Unit –II

Production of circularly and elliptically polarized light, quarter wave and half wave plates. Analysis of polarized light, Optical activity, Laws of optical activity, Fresnel explanation of optical activity, specific rotation. Polarimeter, types of polarimeters (i) Laurent's half shade polarimeter (ii) Biquartz polarimeter.

Unit-III

Laser: Spontaneous and stimulated emission, Einstein's A &B coefficients. Energy density of radiation as a result of stimulated emission and absorption populated emission and absorption, Population inversion, Methods of optical pumping, Energy level schemes, Helium-Neon, Ruby and Carbon dioxide laser.

Unit-IV

Holography: Basic concept of holography principal, theory, construction and reconstruction of image application of holography.

Fiber optics: Introduction to optical fiber, necessity of cladding, optical fiber system, optical fiber cable, total internal reflection, explanation of propagation of light through an optical fiber.

Reference Books

6. "A textbook of Optics". Brijlal and Subramaniam. S.Chand & Company Ltd.,23rd edition.
7. "Text books ofOplics and Atomic Physics". D.P. Kliandelwal. Himalaya Publishing House.
8. "Optics". Ajoy Ghatak ,Tata Me Graw Hill Pub.Co. Ltd, 2007.
9. "Physics Part II". D.Halliday and R.Resnick, John Wiley & Sons, Inc., Nevvyork.
10. "Principles of Optics" B.K.Malhur

NEW SYLLABUS

B. Sc Part I

PHYSICS PRACTICALS SYLLABUS

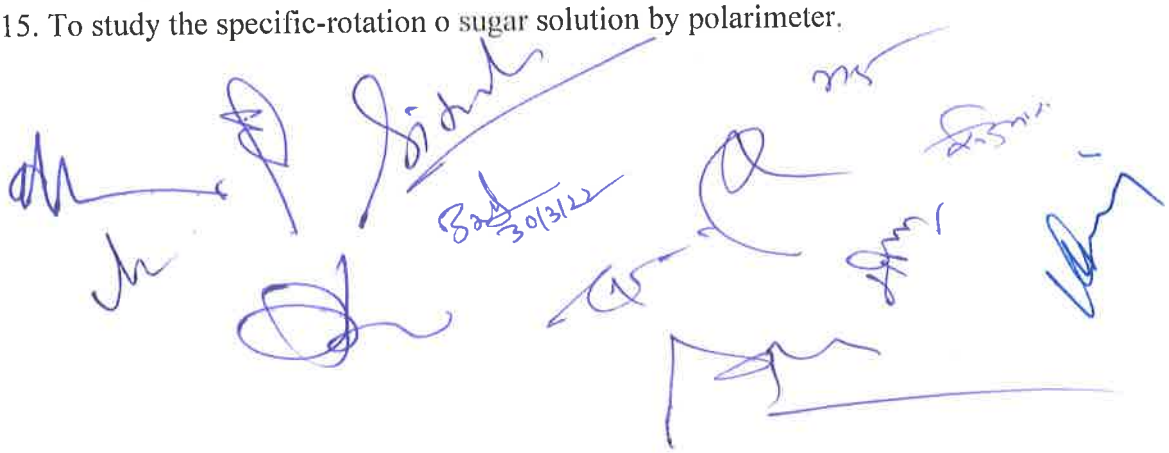
Note:- Total number of experiments to be performed by the students during the session should be 16 selecting and 8 from each section.

Section – A

1. To study the variation of power transfer by two different loads by a DC source and to verify maximum power transfer theorem.
2. To study the variation of charge and current in a RC circuit with a different time constant (using a DC source).
3. To study the behavior of a RC circuit with varying resistance and capacitance using AC mains as a power source and also to determine the impedance and phase relations.
4. To study the rise and decay of current in an LR circuit with a source of constant emf.
5. To study the voltage and current behavior of an LR circuit with an AC power source Also determine power factor, impedance and phase relations.
6. To study the characteristics of a semi- conductor junction diode and determine forward and reverse resistances.
7. To study the magnetic field along the axis of a current carrying circular coil. Plot the necessary graph and hence find radius of the circular coil.
8. To determine the specific resistance of a material and determine difference between two small resistance using Carey Fosters Bridge.
9. To convert a galvanometer into a ammeter of a given range.
10. To convert a galvanometer into a voltmeter of a given range.

Section B

1. To study the random decay and determine the decay constant using the statistical board.
2. Using compound pendulum study the variation of time period with amplitude in large angle oscillations.
3. To study the damping using compound pendulum.
4. To study the excitation of normal modes and measure frequency splitting using two coupled oscillators.
5. To study the frequency of energy transfer as a function of coupling strength using coupled oscillators.
6. To study the viscous fluid damping of a compound pendulum and determining damping coefficient and Q of the oscillator.
7. To study the electromagnetic damping of a compound pendulum and to find the variation of damping coefficient with the assistance of a conducting lamina.
8. To find J by Callender and Barn's Method.
9. To determine Youngs modulus by bending of beam.
10. To determine Y, σ and η by Searle's method.
11. To ensure Curie temperature of Monel alloy.
12. To determine modulus of rigidity of a wire using Maxwell's needle.
13. Study of normal modes of a coupled pendulum system. Study of oscillations in mixed modes and find the period of energy exchange between the two oscillators.
14. To study variation of surface tension with temperature using Jaegger's method.
15. To study the specific-rotation o sugar solution by polarimeter.



NEW SYLLABUS

B.Sc Semester I Zoology Paper I P C 22-1013

STRUCTURE AND FUNCTION OF INVERTEBRATES - I

Scheme of examination: ***MM: 35***

1. *In Semester End Examination there will be 10 questions in all, 2 from each unit. Candidate has to answer any 5 questions, taking one from each unit.*

UNIT – I

TAXONOMY

- Hierarchy, Binomial & Trinomial nomenclature, Rules of nomenclature, Concept of Five kingdom.
- Basis of Classification - Grade of organization, Symmetry, Coelom, Embryogeny, Segmentation.
- Classification of Invertebrate phyla upto class level.

UNIT - II

Phylum Protozoa:

- Type study *Amoeba, Euglena, Paramecium* (Habit, Habitat & Salient features with particular reference to locomotion, nutrition and reproduction).
- Economic Importance of Protozoa.

UNIT – III

Phylum Porifera

- Type study- *Sycon*
- Canal system of Sponges, Skeletal system,
- Economic Importance and larvae of porifera

UNIT – IV

Phylum Coelenterata

- Type study – *Obelia,*
- Polymorphism
- Coral and Coral reefs
- Larvae of coelentrates

UNIT - V

Phylum Platyhelminthes

- Type study- *Taenia (External features and life cycle)*

Phylum Nemathelminthes

- *Ascaris* (External features and life cycle)
- Parasitic adaptations of Helminthes,
- Common Helminthes Diseases. Larval forms of helminthes.

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NEW SYLLABUS

B.Sc Semester I Zoology Paper II P C22-1014

CELL BIOLOGY

Scheme of examination: ***MM: 35***

1. *In Semester End Examination there will be 10 questions in all, 2 from each unit. Candidate has to answer any 5 questions, taking one from each unit.*

UNIT – I

- Principles & Applications of light and electron Microscopy.
- Cell- Diversity of cell size & shape
- Characteristics of Prokaryotic & Eukaryotic cells.
- Cell theory, Exceptions of cell theory: Virus.

UNIT - II

- Cell membrane – composition & ultrastructure
- Membrane models – Danielli & Davson, unit membrane, Fluid Mosaic model),
- Transport across cell membrane – Permeability, Passive and Active transport, Exocytosis, Endocytosis (Pinocytosis, Phagocytosis).

UNIT - III

Cell organelles: structure, composition & function-

- Endoplasmic reticulum, Golgi complex, Ribosome, Lysosomes
- Mitochondria: biogenesis, electron transport chain, generation of ATP molecules (Chemiosmotic hypothesis of Mitchele)
- Peroxisomes, Microtubules & Centrioles, cilia & flagella

UNIT – IV

- **Nuclear Organization:**Ultrastructure of Nucleus - nuclear envelope, nuclear matrix and nucleolus,
- Chromosomes: Morphologyamd structure
- Special type of Chromosome - Polytene&Lampbrush
- Chromosomal Organization

UNIT - V

- **Cell Division** - Cell cycle (S, G1, G2, M phase)
- Mitosis: Phases & process of mitosis
- Meiosis: Phases & Process of meiosis
- Cancer- types, properties of cancer cell, carcinogens.

----------X----------

NEW SYLLABUS

B.Sc Semester II Zoology Paper I P C 22-2013

STRUCTURE AND FUNCTION OF INVERTIBRATES - II

Scheme of examination: ***MM: 35***

1. *In Semester End Examination there will be 10 questions in all, 2 from each unit. Candidate has to answer any 5 questions, taking one from each unit.*

UNIT – I

Type study- Earthworm (Habit, Habitat, Salient features, structural organization)

- Metamerism
- Larval forms of annelida

UNIT - II

Type study- Prawn (Habit, Habitat, Salient features, structural organization)

- Larval forms of Arthropods
- Metamorphosis in insects
- Social organization in Termites & Honey bee.

UNIT III

Type study-Pila (Habit, Habitat, Salient features, structural organization)

- Larval forms of Mollusca
- Torsion

UNIT IV

Type study- Starfish (Habit, Habitat, Salient features, structural organization)

- Larval forms of Echinodermata
- Water vascular system

UNIT V

- Vermiculture
- Sericulture
- Apiculture
- Lac culture
- Prawn culture
- Pearl culture.

----------X----------

NEW SYLLABUS

B.Sc Semester II Zoology Paper II P C 22-2014

MOLECULAR BIOLOGY AND GENETICS

Scheme of examination: ***MM: 35***

1. *In Semester End Examination there will be 10 questions in all, 2 from each unit. Candidate has to answer any 5 questions, taking one from each unit.*

UNIT – I

DNA structure (Watson & Crick's model), Polymorphism (A, B, Z type), Replication (Semiconservative mechanism), Replication forks (both Unidirectional & Bidirectional), Leading & lagging strand, Okazaki fragments. Experiments of Messelson & Stahl. Elementary idea about Polymerases, Topoisomerases, Single stranded binding protein, RNA Primer, DNA repair

UNIT II

- RNA- Structure & types,
- Genetic code,
- Protein synthesis – Transcription & Translation,
- Gene expression – Gene concept, gene regulation (lac operon).

UNIT III

Mendelism – I

- Mendel's work and laws.
- Interactions of Genes: Co-dominance and incomplete dominance, Complementary, Supplementary, Epistasis, Polymorphic genes.
- Multiple alleles- Inheritance of human blood group-(A, B, O) & Rh factor.

UNIT IV

Mendelism – II

- Chromosomal theory of inheritance.
- Linkage & linkage maps.
- Crossing over- Mechanism, theories, Cytological detection & significance
- Mutations- Chromosomal & Gene, mutagens. Cytoplasmic inheritance.

UNIT V

- Determination of Sex – Chromosomal mechanism, Genic Balance Theory, sexual function of X &Y chromosome, Non disjunction, Gyandromorphs. Sex linked inheritance in man. Y linked genes, Sex limited genes, Sex influenced genes,
- Human genetics – Human Chromosomes, Karyotype & Idiogram.
- Chromosomal abnormalities (Autosomes & Sex chromosomes),
- Genetics counseling, Eugenics & Euthenics.
- Genetic Disorders- Downs, Turner's, Klinefeltr's syndromes, Color blindness, Hemophilia, Phenylketoneuria.

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NEW SYLLABUS

B.Sc (HC) Semester I Chemistry Paper I P C **22-1016**

Inorganic Chemistry

Scheme of examination: MM: 52

1. In Semester End Examination there will be 10 questions in all, 2 from each unit. Candidate has to answer any 5 questions, taking one from each unit.

UNIT – I

Ionic bond: General Characteristic, types of ions, size effects radius ratio and coordination number, Madelung-constant, Born-Haber Cycle Application of lattice energy. Polarizing power polariability, Fajan's Rules, Hydration energy, solubility of ionic compounds, Defects in crystal structures Frankel and Schattky defects, Non-stoichoimetric compounds.

UNIT – II

Solids: Metallic bond: qualitative idea of free electron, valence bond and band theories, semiconductors and insulators, conduction in ionic solids, electrical and magnetic properties of solids, introduction to super conductors and super conductivity.

UNIT – III

Covalent Bond :- General characteristic, valence bond theory and its limitations, Directional characteristics of Covalent bond resonance and resonance energy, Hybridization involving s, p & d orbitals, Valence shell electron pair repulsion (VSEPR) theory to NH_3, H_2O, H_3^+O, SF_6, CLF_3, ICL_2, shapes of simple inorganic molcules and ions. Dipole moment, percentage ionic character from dipole moment and electronegativity difference.

UNIT – IV

Molecular orbital theory: Detailed description of linear combination of atomic orbitals (LCAO), homonuclear (H2, He_2, B_2, C_2, N_2 O_2 F_2) and

heteronuclear diatomic molecules (CO, NO) and their ions, comparison of valence bond and molecular orbital theories.

Multicenter bonding in electron deficient molecules, bond strength and bond energy.

Weak interactions: Hydrogen Bond, Theories of hydrogen bonding, valence bond treatment, weak intermolecular forces of attraction. Vander Waal,s forces.

UNIT – V

Chemistry of noble gases: Position in the periodic table, discovery, Isolation, important compounds of noble gases with special reference to xenon compounds; Synthesis, bonding and their stereochemistry.

NEW SYLLABUS

B.Sc (HC) Semester I Chemistry Paper II P C **22-1017**

Organic Chemistry (Paper Code 1017)

Scheme of examination: MM: 52

1 In Semester End Examination there will be 10 questions in all, 2 from each unit. Candidate has to answer any 5 questions, taking one from each unit.

UNIT – I

Mechanism of Organic Reactions:- Free Radical and ionic reactions, hemolytic and heterolytic bond breaking. Electrophiles and nucleophiles. Types of organic reactions. Energy considerations, transition states, Reactive intermediates-Carbocations, Carbanions, Free Radicals, Carbenes, arynes and nitrenes, Assigning formal charge on intermediates and other ionic species. Methods of determination of Reaction Mechanism.

UNIT – II

Alkanes and Cycloalkanes :- Nomenclature of branched and unbranched alkanes. Classification of carbon atoms in alkanes. Isomerism in alkanes. Methods of formation (with special reference of Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids) physical properties and chemical reactions of alkanes. Mechanism of free-radical halogenation of alkanes: orientation, reactivity and selectivity.

Cycloalkanes: Nomenclature, Methods of formation, chemical reactions. Baeyer's strain theory and its limitations. Ring strain in small rings (cyclo-propane and cyclo-butane). Theory of strainless rings. The case of cyclopropane rings : banana bonds.

UNIT – III

Alkeanes and Cycloalkenes :- Nomenclature of alkenes, Methods of formation, Mechanism of dehydration of alcohols and

dehydrobalogenation of alkyl halides, Regioselectivity in alcohol dehydration. The Saytzeff rule, Hofmann elimination, Physical properties and relative stabilities of alkenes. Chemical reactions of alkenes-mechanism involved in hydrogenation, electrophilic and free radical additions, Markownikoffs 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 ethane and propene.

Cycloalkens:- Methods of formation, conformations and chemical reactions.

UNIT – IV

Dienes and Alkynes:- Dienes:- Nomenclature and classification, Isolated, conjugated and cumulated dienes, structure of allenes and butadienes, methods of formation, polymerization, chemical reactions-1,2 and 1,4 additions. Diels – Alder reaction

Alkynes:- Nomenclature, structure and bonding, Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration-oxidation, metal-ammonia reduction, oxidation and polymerization.

UNIT – V

Electromagnetic spectra :-Absorpation spectra: Ultraviolet (UV) absorption Spectroscopy: Absorption laws (Bear-Lambert law), Molar absorptivity, presentation and analysis of UV spectra, types of electronic transitions, effect of conjugation. Concept of chromophore and auxochrome. Bathochromic, hypsochromic, hyperchromic and hypochromic shifts. Absorption bands of simple molecules like alkenes, conjugated dienes, carbonyl compounds, enones, acids & aromatic compounds.

NEW SYLLABUS

B.Sc (HC) Semester I Chemistry Paper III P C **22-1018**

Physical Chemistry

Scheme of examination: MM: 52

1 In Semester End Examination there will be 10 questions in all, 2 from each unit. Candidate has to answer any 5 questions, taking one from each unit.

UNIT – I

Ideal gases:- Concept of molar mass and molar volume. Determination of molar mass of gas and volatile substances. The barometric distribution law Maxwell distribution law of molecular velocities. The Maxwell energy distribution law and its experimental verification.

UNIT – II

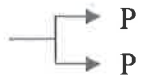
Real gases:- Causes of deviation from ideal gas behavior. Vander walls equation and its implications. Isotherms of Vander wall gas. Critical phenomena and critical constants. Reduced equations of state and the law of corresponding states.

UNIT – III

Chemical Dynamics:- Rate, initial rate, specific rate, rate constant and units. Methods of Determination of initial rate, Order, molecularity and tachometry of the reactions. Methods of Determination of order of a reaction. Derivation of integrated rate equations Zero order, First order, Second order, Third order. Graphical applications of these equations for the determination of rate constant. Effect of temperature on the rate constant, Arrhenius equations, Energy of activation and its Determination.

UNIT – IV

Complex reactions and their nature: How do these reactions differ from simple reactions. Derivations of rate equation for opposing

reactions. (A↔B→C), Parallel reactions A  (P's are products) and consecutive reactions (A→B→C) Characteristics of consecutive reactions.

UNIT – V

Solutions:- Solutions of gases in liquids. Henry's law and its applications to respiration. Solutions of solids in liquids and distribution law. Distribution law and extraction processes.

Osmosis, Osmotic pressure. Determination of osmotic pressure. Lowering of vapuor pressure relative. Lowering of vapour pressure and Raoult's Depression in freezing point and elevation in boiling point. Vont's Hoff factor and its implications.

NEW SYLLABUS

B.Sc (HC) Semester I Chemistry Paper IV P C 22-1019

Analytical Chemistry

Scheme of examination: MM: 52

1 In Semester End Examination there will be 10 questions in all, 2 from each unit. Candidate has to answer any 5 questions, taking one from each unit.

UNIT – I

Principle of Gravimetric analysis, precipitation methods, saturation and ppt. formation, the purity of the ppt, coprecipitation, post precipitation.

UNIT – II

Conditions of precipitation, precipitation from homogeneous solution, washing of the ppt. Ignition of the ppt, masking and demasking agents.

UNIT – III

Solvent extraction; principles and process of solvent extraction, the distribution law and the partition coefficient. Liquid- liquid extraction, factors favouring solvent extraction, choice of solvent for solvent extraction, stripping, solid - liquid extraction, organic reagents used in solvent extraction.

UNIT – IV

Organic reagents in quantitative inorganic analysis; application of the following organic reagents-DMG, cupferron, 8-hydroxquinoline, cupron, salicylaldehyde, oxim, 1-nitronapthol, 4-bromoandelic acid, nitron, tannic acid, arsenic acid, pyridine, anthralic acid, pyrogallal, ethylenediamine.

UNIT – V

Compilation of gravimetric results, compilation of results, reliability of results-accuracy and precision, cleaning and calibration of glassware, standard deviation,t,Q and F tests, correction, significant figures, errors in analysis.

Inorganic Chemistry

Scheme of examination: *MM: 52*

1. *In Semester End Examination there will be 10 questions in all, 2 from each unit. Candidate has to answer any 5 questions, taking one from each unit.*

UNIT – I

s – Block elements: Comparative study, diagonal relationship, salient features of hydrides, salvation and complexation tendencies including their function in biosystems, an introduction to alkyls and aryls.

UNIT – II

p – Block Elements: Comparative studies of the p - block elements, Group trends, electronic configuration, Physical and Chemical properties, Atomic and ionic radii, Ionization potentials, Electron affinity, Electronegativity and oxidation states, Oxidation state diagrams on the basis of redox potentials, inert pair effect catenation.

UNIT – III

Compounds of p – Block Elements: Hydrides of Boron, diborane and higher boranes, borazine, borohydrides, fullerenes, carbides, fluorocarbons, silicates (structural principle), silicones, oxygenfluorides, per-acids of sulphur, tetrasulphur, tetranitride, basic properties of halogens. interhalogen-compounds and polyhalides.

UNIT – IV

d – Block Elements: Chemistry of the elements of first transition series: Electronic configuration and comparative study with respect to atomic and ions radii, oxidation states and ionization potential. Redox potential, oxidation state diagrams on the basis of redox potentials binary compounds and complexes illustrating relative stability of their oxidation

states co-ordination numberand geometry, metallic nature magnetic properties, catalytic, colour and spectrul properties of transition metal ions.

UNIT – V

Chemistry of the elements of second and third transition series: Electronic configuration general characteristics, comparative treatment with their 3d-analogues in respect of ionic radii, oxidation states, magnetic behaviours, special properties and stereochemistry.

NEW SYLLABUS

B.Sc (HC) Semester II Chemistry Paper II P C 22-2017

Organic Chemistry

Scheme of examination: *MM: 52*

1. *In Semester End Examination there will be 10 questions in all, 2 from each unit. Candidate has to answer any 5 questions, taking one from each unit.*

UNIT – I

Stereochemistry of Organic compounds (Part I):

Concept of isomerism, Types of isomerism. Conformational isomerism: conformational analysis of ethane and n-butane.

Newman projection and saw horse formulae. Fisher and flying wedge formulae. Differences between configuration and conformation.

UNIT – II

Stereochemistry of Organic compounds (Part II):

Optical isomerism: Elements of symmetry, molecular chirality, enantiomers, stereogenic center, 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, Asymmetric synthesis. Relative and absolute configuration, sequence rules. D and L and R and S systems of vnomenclature.

Geometrical isomerism: Determination of configuration of geometrical isomers, E & Z system of nomenclature, Geometrical isomerism in oximes and alicyclic compounds.

UNIT – III

Arenes and aromaticity: Nomenclature of benzene derivatives. The aryl group, aromatic nucleus and side chain. Structure of benzene: Molecular formulae & Kekule structure. Stability and carbon-carbon bond lengths of benzene, resonance structure, MO picture. Aromaticity: The Huckle rule

and its applications. Energy level of p- molecular orbitals (ethane,1,3-butadine benzene).

Aromatic electrophilic substitution: General pattern of mechanism, role of sigma and pi complexes, mechanism of nitration, halogenation, sulphonation, mercuration and Friedel-Crafts reaction.

Effect of substitution groups (inductive, mesomeric and hyperconjugative effect), activating and deactivating groups, determination of orientation up to disubstituted derivatives, ortho/para ratio, Birch reduction. Method of formation and chemical reactions of benzene, alkyl benzenes and biphenyl.

UNIT – IV

Alkyl and Aryl halides: Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanism of nucleophilic substitution, rection of alkyl halides SN^2 and SN^1 rections with energy profile diagrams. Methods of formation of aryl halides, nuclear and side chain reactions. The addition-elimination and the elimination-addition mechanism of nucleophilic aromatic substitution reactions.

Relative reactivities of alkyl halides v/s allyl, vinyl and aryl halides. Praparation and properties of vinyl, allyl and benzyl halides: synthesis and uses of DDT and BHC.

UNIT – V

Electromagnetic Spectrum: Absorption Spectra

Infrared (IR) Absorption Spectroscopy: Molecular vibrations, Hook's Law, selection rules, Intensity and position of IR bands, measurement of IR spectrum, finger print region, characteristic absorption of simple organic compounds, alkanes, alkenes, alkynes, alcohols, aldehydes, ketones, carboxylic acids and their derivatives.

NEW SYLLABUS

B.Sc (HC) Semester II Chemistry Paper III P C 22-2018

Physical Chemistry

Scheme of examination: *MM: 52*

1. *In Semester End Examination there will be 10 questions in all, 2 from each unit. Candidate has to answer any 5 questions, taking one from each unit.*

UNIT – I

Liquid State: Thermal expansion and compressibility. Heat of vaporization vapour pressure and heat of vaporization. Disorder in liquid state and structure of liquid water. Intermolecular forces Cohesion of liquid. Eyring Theory of liquids.

UNIT – II

Solid State: Crystalline and amorphous states. Isotropy and anisotropy. Elements of symmetry Law of rational indices. Weiss and Miller indices and equation of plane in intercept form. Law of constancy of interfacial Angeles. Unit cell and lattices, powder method of X-ray examination of crystals.

UNIT – III

Thermodynamics-I: Definition of thermodynamic terms. Concept of work and heat. Work of Expansion and compression. Zeroth Law of thermodynamics. First law of thermodynamics under isothermal and adiabatic conditions respectively. Enthalpy and changes are constant temperature and pressure. Concept of Cp and Cv and their thermodnamic relationship.

UNIT – IV

Thermodynamics-II: Application of First Law of Thermodynamics. The heat of reactions and heat of formation. Hess's Law. Heat of reactions at constant pressure and volume. Variation of heat of reaction with temperature. Bond enthalpies and Bond energies.

UNIT – V

Phase Equilibria: Explanation of terms phase, component and degrees of freedom. Phase rule and its thermodynamic derivation. Restricted phase rule. Analysis of (a) One component system such as Sulfur and water. (b) Two component system - Lead Silver system.

NEW SYLLABUS

B.Sc (HC) Semester II Chemistry Paper IV P C 22-2019

Analytical Chemistry

Scheme of examination: *MM: 52*

1. *In Semester End Examination there will be 10 questions in all, 2 from each unit. Candidate has to answer any 5 questions, taking one from each unit.*

UNIT – I

Volumetric Analysis: Principal and applications of reagents used in titration, Iodometry and Iodimetry theory of complexation titration, methods of end point detection. EDTA as titrant, types of titration, titration of mixtures, selectivity masking and demasking agents metal indicators.

UNIT – II

Distillation methods of organic solvents, steams, fractional, vacuum distillations and monostates. Analysis of oil and fats, saponification value, iodine value, RM value, acid value. Quantitative estimation of following functional groups- alcoholic, phenolic, carboxylic acid and unsaturated groups (olefinic and ethylenic).

UNIT III

Polarimetry: Basic principal, instrumentation, experimental techniques, determination of (a) specific rotation of a substance (b) concentration of the substance and applications and elementary idea, refractrometry, interferometry circulat dichroism and optical rotatory dispersion.

UNIT IV

Water pollutants and their analysis: Water analysis pollutant, Analysis of water for DO, BOD, and COD Biological treatment methods, prevention of water pollution by treatment of industrial waste with special reference to cement industry, fertilizer industries and dying industries.

UNIT V

Air pollution: General consideration, types of air pollutants, measurement, sampling, monitoring and analysis of CO and CO_2 in atmosphere, effect of air pollutants on plants and human health, methods for pollution control, specially for pollution by automobiles.

NEW SYLLABUS

CHEMISTRY PRACTICAL B.Sc. (Hons.) PT-I

5 hrs. Duration

4 hrs./ week

Max. Marks: 200

Min. Marks: 72

Inorganic Chemistry Practicals

Quantitative :

1. Volumetric exercises- involving :
   (i) Complexometric titrations (EDTA) : Estimation of Ca^{2+} & Mg^{+}
   (ii) Iodometric and Iodimetric titrations.
   (iii) Determination of total hardness of water.
   (iv) Determination of number of molecules of water. Crystallization in oxalic acid crystals.
   (v) Estimation of sodium carbonate and bicarbonate in mixed solution.
   (vi) Estimation of sodium carbonate and sodium hydroxide in a mixed solution.
   (vii) Estimation of Ferrous and Ferric sulphates in a mixed solution.

Qualitative : To analyse the given mixture containing six radicals (three acidic radicals and six basic radicals including Fluoride, borate, oxalate and Phosphate) and excluding insolubles.

Organic Chemistry Practicals :

1. Identification of functional groups in organic compounds and preparation of suitable derivative : unsaturation, alcoholic (-OH), phenolic (-OH), aldehyde, ketonic, carboxylic, esters ,cabohydrate, nitro, amido, amino, sulphonic acids and halogen derivatives.
2. Purification of solid substance by recrystallization.
3. Separation of two miscible liquids by fractional distillation.
4. Preparation of acetanilide from aniline.
5. Extraction of nicotine from tobacco by steam distillation.
6. Preparation of an azo-dye.
7. Determination of m.p. and mixed m.p.

Physical Chemistry Practicals :

1. Determine the relative viscosity of a liquid by using viscometer.
2. Determine the relative surface tension of a liquid by using stalagnometer
3. Determine the heat of reaction and verify Hess's law.
4. Determine the heat of neutralization of an acid by alkali.
5. To study the solubility curve of salts such as potassium nitrate etc.
6. To study the solubility curve of phenol in water and hence study the effect of separate addition of substance such naphthalene, potassium chloride and acetic acid.
7. Determination of pH of different buffer solutions and evaluation the Pk of an acid by Handerson equation.
8. Determine the molecular complexity of benzoic acid in benzene by distribution