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 Chemistry Paper I **PC 22-1004**

Inorganic Chemistry

Scheme of examination: *MM: 23*

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

Covalent Bond : Valence bond theory and its limitations, directional and shapes of simple inorganic molecules and ions. Valence shell electron pair repulsion (VSEPR) theory to NH_3, H_3O^+, SF_4, ClF_3, ICl_2, H_2O.

UNIT – II

Covalent Bond : MO theory, homonuclear and heteronuclear (CO and NO) diatomic molecules, multicener bonding in electron deficient molecules bond strength and bond energy, percentage ionic character from dipole moment and electro negativity difference.

UNIT – III

Ionic Solids : Ionic structures, radius ratio effect and coordination number, limitation of radius ration 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.

UNIT – IV

Ionic Solids: Metallic bond free electron, valence bond and band theories.

Weak Interactions: Hydrogen bonding, Wander Walls forces.

UNIT – V

S-Block Element - Comparative study, diagonal relationships, salient features of hydrides, solvation and complexation tendencies including their function in bisystems, an introduction to alkyls and aryls.

NEW SYLLABUS

B.Sc Semester I Chemistry Paper II P C **22-1005**

Organic Chemistry

Scheme of examination: *MM: 23*

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 : Curved arrow notation, drawing electron movement with arrows, half-headed and double headed arrows, homolytic and heterolytic bond breaking. Types of reagents, electrophiles and nucleophiles. Types of organic reactions. Energy considerations. Reactive intermediates - carbocations, carbanions, free radicals, carbenes, arynes and nitrenes (with examples). Assigning formal charges on intermediates and other ionic species.

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

UNIT - II

Alkanes: IUPAC nomenclature of branched and unbranched alkanes, the alkyl group, classification of carbon atoms in alkanes, Isomerism in alkanes, sources, methods of formation (with special reference of Wurtz reaction, Kolbe reaction, Corey house reaction and decarboxylation of carboxylic acids). Physical properties and chemical reaction of alkanes. Mechanism of free radical halogenations of Alkanes: orientation, reactivity and selectivity.

UNIT - III

Alkenes: Nomenclature of alkenes, methods of formation, mechanism 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.

UNIT – IV

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

Dienes: Nomenclature and classification of dienes : isolated, conjugated and cummulated dienes. Structure of allenes and butadiene, methods of formation, polymerization, Chemical reaction-1,2 and 1,4 additions, Diels- Alder reaction.

UNIT – V

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 ring: banana bonds.

Cycloalkenes: Methods of formation, conformation and chemical reactions of Cycloalkenes.

NEW SYLLABUS

B.Sc. Semester I Chemistry Paper III P C **22-1006**

Physical Chemistry

Scheme of examination: *MM: 24*

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

Mathematical Concepts: Lorgarithmic relations, curve sketching, linear graphs and calculation of slopes, differentiation of function like kx, ex, xn, sin x and log x; maxima and Minima, partial differential and reciprocity relations, integration of some useful/relevant functions; permutations and combinations, Factorials, Probability.

UNIT – II

Gaseous States: Postulates of kinetic theory of gases, deviation from ideal behaviour, Vander Waals equation of state.

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

UNIT - III

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

UNIT – IV

Liquid State: Intermolecular forces, structure of liquids (a qualitative description). Structural differences between solids, liquids a gases. Liquid crystals: Difference between liquid crystal, solid and liquid. Classification, Structure of nematic and cholestric phases.

UNIT – V

Chemical Kinetics and Catalysis: Chemical kinetics and its scope, rate of a reaction, factors influencing the rate of a reaction Concentration dependence of rates, mathematical characteristics of simple chemical reactions - zero order, first order, second order pseudo order, half life and means life. Determination of the order of reaction - differential method, method of integration , method of half life period and isolation method.

NEW SYLLABUS

B. Sc. SEMESTER-II

PAPER-I INORGANIC CHEMISTRY

PC 22-2004

UNIT-I

Periodicity of p-Block Elements: Periodicity in properties of p-Block Elements with special reference to atomic and ionic radii, ionization energy, electron affinity, electronegativity, catenation (including diagonal relationship).

UNIT-II

Some important compounds of p-Block Elements-I: Hydrides of boron - diborane and higher boranes, borazine, borohydrides, fullerenes, carbides.

UNIT-III

Some important compounds of p-Block Elements-II: Fluorocarbons, silicates (structural principle), tetra-sulphur tetranitride; Basic properties of halogens, interhalogens and polyhalides.

UNIT-IV

Chemistry of Noble Gases: Chemical properties of the Noble gases; Chemistry of xenon; Structure and bonding in xenon compounds.

UNIT-V

Nuclear Chemistry and Radiochemistry: Fundamental particles of nucleus (nucleons); Concept of nuclides and its representation; Isotopes, Isobars and Isotones (with specific examples); Forces operating between nucleons (n-n, p-p & n-p); Qualitative idea of stability of nucleus (n/p ratio). Natural and artificial radioactivity; Radioactive disintegration series; Radioactive displacement law; Radioactivity decay rates, half life and average life; Nuclear binding energy, mass defect and calculation of defect and binding energy; Nuclear reactions, Spallation, Nuclear fission and fusion.

NEW SYLLABUS

B.Sc Semester II Chemistry Paper II P C **22-2005**

Organic Chemistry

Scheme of examination: *MM: 23*

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: Concept of isomerism. Type of isomerism.

Optical Isomerism - Elements of symmetry, molecular chrirality, enantiomers, stereogenic centre, optical activity, properties of enantiomers , chiral and achera molecules with two steropgenic centres diastereomers, threo and erythro diastereomers, meso compounds, resolution of enantiomers, inversion, retention and racemization. Relative and absolute configuration, sequence rules, D & L and R & S systems of nomenclature.

UNIT – II

Geometric Isomerism : Determination of configuration of geometric isomers. E & Z system of nomenclature, geometric isomerism in oximes and alicylic compound.

Conformational isomerism: Conformational analysis of ethane and n-butane, conformation of mon subsituded cyclohexane derivatives. Newman projection and Sawhorse formulae, Fischer and flying wedge formulae. Difference between configurational conformation.

UNIT – III

Arenes and Aromaticity : Nomenclature of benzene derivatives. The aryl group, aromatic nucleus and side chain. Structure of benzene: molecular formula ad kekule structure. Stability and carbon-carbon bond

lengths of benzene, resonce structure, MO picture.

Aromaticity: The Huckel huckel rule, aromatic ions.

UNIT – IV

Aromatic electrophilic substituion - general pattern of the mechanism, role of sigma and pi complexes. Mechanism of nitration, halogenation, sulphonation, mercuration and Friedel Crafts reaction. Energy profile diagrams. Activating and deactivating substitutents, orientation and orgho/para ratio. Side chain reactions of benzenes derivatives. Birch reduction.

UNIT – V

Alkyl and Aryl Halides: Nomenclature and classes of alkyl halides, methods of formation, chemical reaction. Mechanism of nucleophilic substitution reactions of alkyl halides, SN2 and SN1 reactions with energy profile diagrams.

Polyhalogen compounds : Chloroform, Carbon tetrachloride. Methods of formation of aryl halides, nuclear and side chain reactions. The addition - elimination and the elimination-addition mechanism of nucleophilic aromatic substitution reactions.

Relatives reactivities of alkyl halides vs allyls, vinyl and aryl halides.

Synthesis and uses of DDT and BHC

NEW SYLLABUS

B.Sc Semester II Chemistry Paper III P C **22-2006**

Physical Chemistry

Scheme of examination: *MM: 24*

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

Solid State: Definition of space lattice, unit cell. Laws of crystallograph- (i) Law of constancy of interfacial angles (ii) Law of rationality of indices (iii) Law of symmetry, Symmetry elements in crystals. X-ray diffraction by crystals. Derivation of Bragg's equation. Determination of crystal structure of NaCl, and CsCl (Laue's method and powder method).

UNIT – II

Colloidal State - Definition of colloids, classification of colloids. Solids in liquids (sols) : Properties - kinetic, optical and electrical; stability of colloids, protective action. Hardy-Schulze law, Gold number. **Liquids in solids (gels) :** Classification, preparation and properties, inhibition, general application of colloids.

UNIT – III

Complex reactions and their nature: How do these reactions differ from simple reactions. Derivations of rate equation for opposing reactions. ($A \leftrightarrow B \rightarrow C$), Parallel reactions A $\rightarrow$ P, P (P's are products) and consecutive reactions ($A \rightarrow B \rightarrow C$) Characteristics of consecutive reactions.

UNIT - IV

Radioactive decay as a first order phenomenon. Experimental methods of chemical kinetics: conductomertric, potentiometric, optical methods, polarimetry and spectrophotometry. Theories of chemical kinetics: effect of temperature on rate of reaction.

UNIT - V

Arrhenius equation, concept of activation energy. Simple collision theory based on hard sphere model transition state theory (equilibrium hypothesis). Expression for the rate constant based on equilibrium constant and thermodynamic aspects.

NEW SYLLABUS

CHEMISTRY PRACTICAL B.Sc. PT-I

5 hrs. Duration | 4 hrs./ week

Max. Marks: 100 | Min. Marks: 36

INORGANIC CHEMISTRY

Qualitative Analysis

Semi-micro Analysis : Cation analysis, separation and identification of ions from Groups I, II, III, IV , V and VI. Anion analysis.

Volumetric Analysis

1. Complexometric titrations (EDTA): estimation of Ca^{+2} and Mg^{+2} ions.
2. Iodometric/Iodimetric titrations.
3. Determination of total hardness of water.

ORGANIC CHEMISTRY

Laboratory techniques

Calibration of Thermometer
80-82* (Naphthalene), 113.5-114 (Acetanilide). 132.5-133* (Urea), 100* (Distilled Water)

Determination of Melting point Naphthalene 80-82*, Benzoic acid 121.5-122*
Urea 132-133*, Succinic acid 184.4-185*
Cubbanuc acid 132.5-144*, m-Dinitrobenzene 90*
p-Dichlorobenzene 52*, Aspirin 135*

Determination of boiling point
Ethanol 78*, Cyclohexance 81.4*, Toluene 1106*, Benzebe 80*

Mixed melting point determination
Urea-Cinnamic acid mixture of various composition (1:4, 1:1, 4:1)

Distillation
Simple distillation of ethanol-water mixture using water
condenser distillation of nitrobenzene and aniline using air condenser.

Crystallization.
Concept of induction of cyrstallization.
Phthalic acid from hot water (using fluted filter paper and stemless funnel).
Acetanilide from boiling water.
Napthalene from ethonal.
Benzoic acid from water.

Decolorisation and crystallization using charcoal
Decolorisation of brown of impure napthanlene (100 g of nephalene mixed with 0.3 Congo Red using 1g decolorizing carbon) from ethanol.

Sublimation (Simple and vacuum)
Camphor, Naphthalene, Phthalic acid and succinic acid.

Qualitative Analysis
Detection of extra elements (N.S.and halogens) and functional groups (carboxylic, carboyni, esters, carbohydates, amines, amides, nitro and anilide) in simple organic compounds.

PHYSICAL CHEMISTRY

Distribution Law

1. To study the distribution of Iodine between water and CCl_4
2. To study the distribution of benzoic acid between benzene and water.

Viscosity, Surface Tension

1. To determine the percentage composition of a given mixture (non interacting systems) by viscosity method.
2. To determine the viscosity the excess viscosity of these solutions.

To determine the percentage composition of a given binary mixture by surface tension method (acetone & ethylmethyl ketone).

Chemical Kinetics

1. To determine the specific reaction rate of the hydrolysis of methyl acetate/ethyl acetate catalyzed ions and room temperature.
2. To study the effect of acid strength on the hydrolysis of an ester.
3. To compare the strengths of HCl and H_2SO_4 by studying the kinetics of hydrolysis of ethylacetate.
4. To study kinetically the reaction rate of decomposition of iodide by H_2O_2.

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

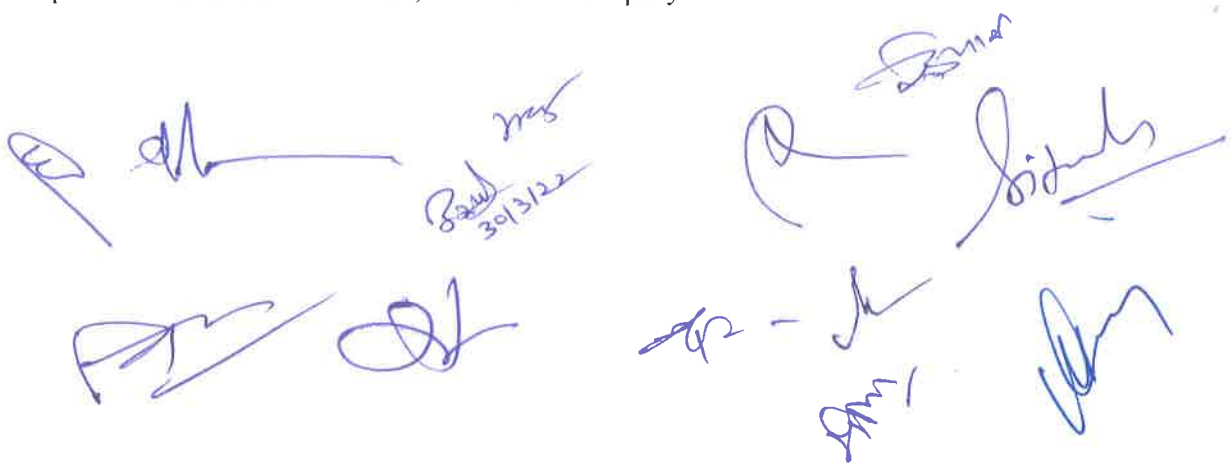
Centre of Mass: Introduction about centre of mass, centre of mass frame: collision of two particles in one and two dimensions, slowing down of neutron in a moderator, motion of a system with varying mass, angular momentum concept, conservation and charge particle scattering by a n nucleus

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

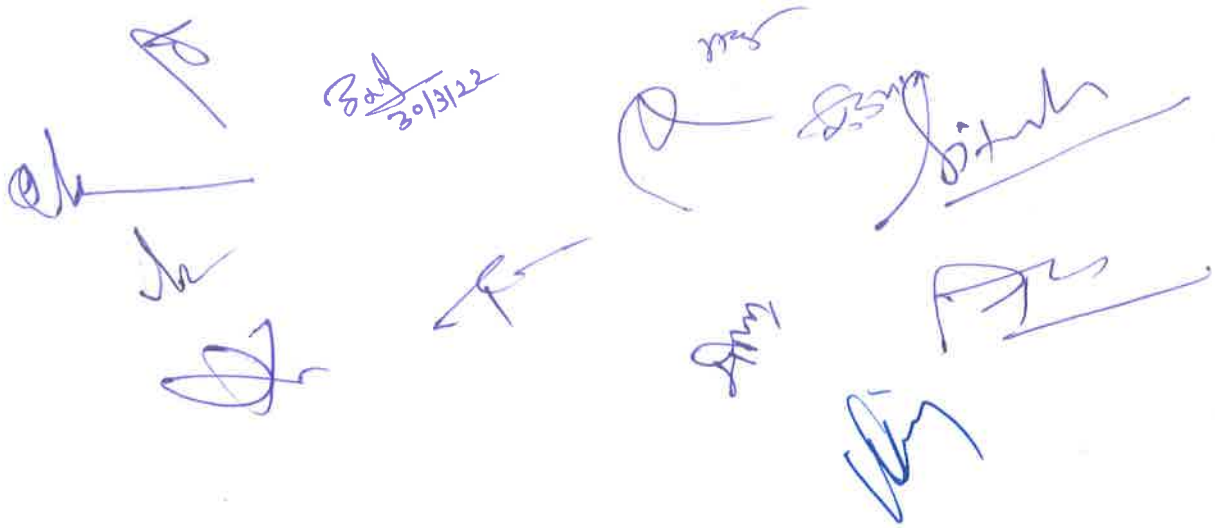
Poisson's and Laplace equations in Cartesian co-ordinates and their applications to solve the problems of electrostatics, Invariance of Charge, Gaussian and SI units and their inner conversions, Electric field measure in moving frames, Electric field of a point charge moving with constant velocity

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

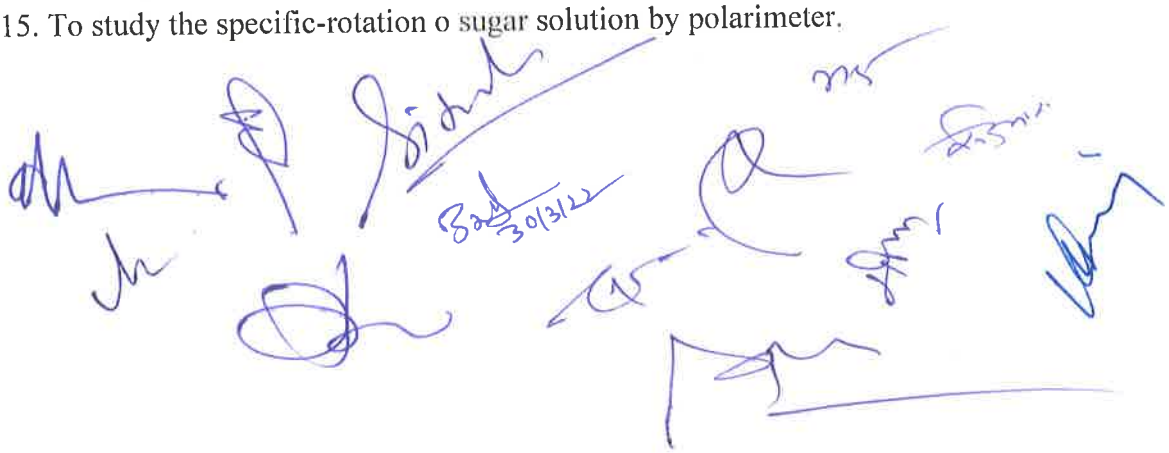
Note:- Total number of experiments to be performed by the students during the session should be 16 selecting and 8 from each section.

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 (Hons.) Semester I Maths Paper I **PC 22-1020**

DISCRETE MATHEMATICS

Scheme of examination: MM: 70

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. All questions will carry equal marks.

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

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

NEW SYLLABUS

B.Sc (Hons.) Semester I Maths Paper II P C 22-1021

DIFFERENTIAL CALCULUS

Scheme of examination: MM: 70

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. All questions will carry equal marks.

UNIT – I

Series - Infinite series and Convergent series. Tests for convergence of a series - Comparison test, D'Alembert's test, Cauchy's test, Raabe's test, De-Morgan-Bertrand's test, Cauchy's condensation test, Gauss's test, Alternating series. Absolute convergence. (Derivation of tests is not required).

UNIT – II

Taylor's theorem. Maclaurin'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 (Hons.) Semester I Maths Paper III P C 22-1022

THREE-DIMENSIONAL GEOMETRY

Scheme of examination: MM: 70

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. All questions will carry equal marks.

UNIT – I

Sphere.

UNIT – II

Cone and Cylinder.

UNIT – III

Central Conicoids - Ellipsoid, Hyperboloid of one and two sheets, Condition of tangency for a plane, Normal plane sections.

UNIT – IV

Generating lines of hyperboloid of one sheet and its properties. Reduction of general equation of second degree in three-dimensions to standard forms.

NEW SYLLABUS

B.Sc (Hons.) Semester I Maths Paper IV P C 22-1023

THEORY OF NUMBERS – I

Scheme of examination: MM: 70

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. All questions will carry equal marks.

UNIT – I

Divisibility - Division Algorithm, the Greatest Common Divisor, Euclidean algorithm. Greatest Common Divisor of more than two integers, least common multiple, least common multiple of n integers.

UNIT – II

Linear Diophantine equations, the equations - $ax + by = c$, $ax + by + cz = d$, Prime Numbers, Infinitude of primes, Fundamental theorem of Arithmetic. The sieve of Eratodhenes, the Goldbach conjecture, Fibonacci sequence.

UNIT – III

Congruence, properties of Congruence, Linear conguruence, Chinese remainder theorem. Congruence of higher degree.

UNIT – IV

Fermat's Factorization Method, Fermat's little theorem, Fermat's Last theorem, Wilson theorem, Euler's Factorization Method, Mersenne's Factorization Method.

NEW SYLLABUS

B.Sc. (Hons.) Semester II Maths Paper I PC 22-2020

GRAPH THEORY

Scheme of examination: MM: 70

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. All questions will carry equal marks.

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 (Hons.) Semester II Maths Paper II P C 22-2021

INTEGRAL CALCULUS

Scheme of examination: MM: 70

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. All questions will carry equal marks.

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

Length, Volumes and Surfaces.

NEW SYLLABUS

B.Sc (Hons.) Semester II Maths Paper III P C 22-2022

OPTIMIZATION THEORY

Scheme of examination: MM: 70

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. All questions will carry equal marks.

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. Total Marks

NEW SYLLABUS

B.Sc (Hons.) Semester II Maths Paper IV P C22-2023

THEORY OF NUMBERS - II

Scheme of examination: MM: 70

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. All questions will carry equal marks.

UNIT – I

Number theoretic functions, the multiplicative function. The function ζ & σ, The Mobius function, Greatest integer function, Euler's Φfunction, properties of Φfunction. Application to Cryptography.

UNIT II

Quadratic Residues, Elementary properties, Legendre symbols, Quadratic Reciprocity Law, Quadratic Congruence.

UNIT III

The Fermat Conjecture, Pythagorean Triples, Fermat's last theorem.

UNIT IV

Representation of integers as sum of two squares, sum of three or more squares. The Diophantine equation $X^2 + Y^2 = Z^2$, $X^4 + Y^4 = Z^4$, General integral solution of the equation $X^2 + Y^2 + Z^2 = W^2$, $(X,Y,Z,W)=1$