

B.A./B.Sc.-Ist Year (Ist Semester)

MATHEMATICS

SESSION - 2020-21, 2021-22, 2022-23

**Paper I: Calculus-I**

Maximum Marks: 50 Marks

Pass Percentage: 35%

Maximum Time : 3 Hrs

Private/Distance Education Students

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having eight short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 7.5 marks and Section C will be of 20 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all selecting two questions from each of the Sections A and B and compulsory question of Section C.

**Section-A**

**Differential Calculus:**  $\epsilon - \delta$  definition of the limit of a function. Basic properties of limits. Continuous functions and classification of discontinuities. Differentiability, Derivative of nth order, Leibnitz theorem, Asymptotes. Test for concavity and convexity, Points of inflexion, Tracing of Curves with  $y'$  and  $y''$  (Standard curves in Cartesian form without use of Grapher).

**Section-B**

**Functions of several variables:** Limits, continuity and differentiability of two variables. Partial derivatives and its Linearization, Chain rule, Partial derivative with constrained variables. Homogeneous functions, Euler theorem and its applications, Extreme values and saddle points, Lagrange multipliers, Taylor's theorem and its linear and quadratic approximation.

**RECOMMENDED BOOKS :**

1. Malik and Arora, Mathematical Analysis, New Academic Science, 2017
2. Thomas and Finney, Calculus and Analytic Geometry, Ninth Edition.
3. R. K. Jain and S.R.K. Iyengar: Advanced Engineering Mathematics, Narosa Publishing House.

  
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## PAPER-II: DIFFERENTIAL EQUATIONS

Maximum Marks: 50 Marks

Pass Percentage: 35%

Maximum Time : 3 Hrs

### INSTRUCTIONS FOR THE PAPER-SETTER

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having eight short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 7.5 marks and Section C will be of 20 marks.

### INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all selecting two questions from each of the Section A and B and compulsory question of Section C.

#### Section-A

**First order differential equations :** Order and degree of a differential equation, Separable differential equations, Homogeneous differential equations, equations reducible to Homogenous differential equations , Exact differential equations, Linear differential equations and equations reducible to linear differential equations.

**Higher order differential equations :** Wronskian, Solution of Linear homogeneous and non-homogeneous differential equations of higher order with constant coefficients and with variable coefficients, Method of Variation of Parameters.

#### Section-B

**Higher order differential equations :** Differential operator method, Linear non-homogeneous differential equations with variable coefficients, Euler's Cauchy method.

**Series solution of Differential equation:** Regular point, ordinary point, Power Series method. Frobenius method, Bessel and Legendre Equations, Legendre and Bessel functions and their properties , recurrence relations, orthogonality, Rodrigue's formula.

#### RECOMMENDED BOOKS :

1. George F .Simmons ; Differential Equations with Aplication and historical Notes(Textbooks in Mathematics) CRC press
2. Rai Singhania : Ordinary and Partial Differential Equations , S.Chand & Company, New Delhi
3. Zafar Ahsan: Differential Equations and Their Applications, Prentice-Hall of India Pvt. Ltd. New Delhi-Second edition
4. H.T.H. Piaggio : An Elementry Treatise on Differential equations : Barman Press.

  
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## PAPER-III: LINEAR ALGEBRA

**Maximum Marks: 50 Marks**

**Pass Percentage: 35%**

**Maximum Time : 3 Hrs**

### INSTRUCTIONS FOR THE PAPER-SETTER

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having eight short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 7.5 marks and Section C will be of 20 marks.

### INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all selecting two questions from each of the Section A and B and compulsory question of Section C.

**Objective:** This course familiarizes the students with the study of matrices which is used in solving linear equations and basic notions in linear algebra that are often used in mathematics and other sciences.

#### Section-A

Elementary operation on matrices, Inverse of a matrix using Gauss Jordan Method. Linear independence of row and column vectors, Row rank, Column rank and their equivalence. Eigen values, Eigen vectors and the characteristic equation of a matrix, Diagonalization, Cayley-Hamilton theorem and its use in finding inverse of a matrix, Consistency of a system of linear equations.

#### Section-B

Vector spaces. Examples, Linear Dependence, Linear Combinations, Bases and Dimension. Subspaces, Linear transformation, Algebra of linear transformations, Matrices as linear transformations, Matrices and change of basis, Kernel and image, Rank and Nullity theorem.



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**RECOMMENDED BOOKS :**

1. Gilbert Strang: Linear Algebra and its Applications, Cengage Learning Publishers ( Fourth Edition)
2. P.B. Bhattacharya, S.K.Jain & S.R.Nagpaul : first course in Linear Algebra, New Age International (P) Limited
3. Serge Lange: Introduction to Linear Algebra, Springer
4. Kenneth Hoffman , Kunze : Linear Algebra, PHI (Second Edition)
5. Charles W. Curtis: Linear Algebra An Introductory Approach, Springer



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B.A./ B.Sc .-Ist Year (2nd Semester)

MATHEMATICS

SESSION : 2020-21, 2021-22, 2022-23

PAPER-IV: CALCULUS-II

Maximum Marks: 50 Marks

Pass Percentage: 35%

Maximum Time : 3 Hrs

*Handwritten mark*

For Private/Distance Education Students

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having eight short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 7.5 marks and Section C will be of 20 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all selecting two questions from each of the Section A and B and compulsory question of Section C.

**Objective:** The objective is to introduce Vector Analysis and the Calculus of Several Variables and their applications

**Section-A**

**Integral Calculus**

Double integrals, Double integrals in Polar Form, Change of order and change of variable in double integral. Triple integrals in Rectangular co-ordinates. Triple integrals in Cylindrical and Spherical co-ordinates. Applications to evaluation of Areas, Volume, Centre of Gravity and Moments of Inertia.

**Section-B**

Vectors in the plane . Cartesian Co-ordinates and vectors in spaces, Dot and cross products. Lines and planes in space. Line integrals, vector fields , work circulations and flux, Path independence. Potential Functions and Conservative Fields, Green theorem in Plane. surface area and surface integrals. Stokes Theorem and the divergence theorem.

**RECOMMENDED BOOKS :**

1. Malik and Arora ,Mathematical Analysis, New Academic Science, 2017
2. Thomas and Finney ,Calculus and Analytic Geometry, Ninth Edition.
3. R. K. Jain and S.R.K. Iyengar:Advanced Engineering Mathematics,Narosa Publishing House.

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## PAPER-V: PARTIAL DIFFERENTIAL EQUATIONS

Maximum Marks: 50 Marks  
Maximum Time : 3 Hrs

Pass Percentage: 35%

### INSTRUCTIONS FOR THE PAPER-SETTER

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having eight short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 7.5 marks and Section C will be of 20 marks.

### INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all selecting two questions from each of the Section A and B and compulsory question of Section C.

**Objective:** The objective of the course is to equip the students with the knowledge of Partial differential equations of first, second and higher orders and their applications

#### Section-A

**Partial differential equations :** Partial differential equation of first order, Lagrange's solution, Integral surfaces passing through a given curve, surfaces orthogonal to a given system of surfaces, Partial differential equation of first order but of any degree, Charpit's general method of solution.

**Partial differential equations of second and higher order :** Partial differential equations of the second order and their classification into hyperbolic, elliptic and parabolic types, canonical forms.

#### Section-B

Homogeneous and non-homogeneous partial differential equations with constant coefficients One dimension Wave and Heat Equation. Two dimensional Laplace equation by separation of variable method and D'Alembert's solution of wave equation.

#### RECOMMENDED BOOKS :

1. George F. Simmons : Differential Equations with Application and historical Notes (Textbooks in Mathematics) CRC press
2. Rai Singhania : Ordinary and Partial Differential Equations", S.Chand & Company, New Delhi
3. I. N. Sneddon . Elements of Partial Differential Equations, Mc Graw Hill Book Co.
4. Zafar Ahsan: Differential Equations and Their Applications, Prentice-Hall of India Pvt. Ltd. New Delhi-Second edition
5. H.T.H. Piaggio : An Elementry Treatise on Differential equations : Barman Press.

  
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**PAPER-VI : ANALYTIC GEOMETRY**

**Maximum Marks: 50 Marks**  
**Maximum Time : 3 Hrs**

**Pass Percentage: 35%**

**INSTRUCTIONS FOR THE PAPER-SETTER**

The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and Section C will consist of one compulsory question having eight short answer type questions covering the entire syllabus uniformly. Each question in Sections A and B will be of 7.5 marks and Section C will be of 20 marks.

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions in all selecting two questions from each of the Section A and B and compulsory question of Section C.

**Objective:** This course introduces two and three dimensional geometry. It familiarizes the students with the study of conics, oblique axes, cone, cylinder and conicoid

**Section-A**

**General Equation of Second Degree:** conic section, centre of conic section, principal axes and eccentricity of a conic, axis, latus rectum, vertex and focus of a parabola, tracing of cones

**Polar Equation of a conic:** tracing of the conic, chord joining two points, tangents, normals, polar, director circle and asymptotes.

**Introduction of Oblique Axes:** distance between two points, equation of a line, angle between two lines, length of perpendicular, angle between the pair of lines, oblique axes from rectangular axes, invariants, equation of circle, parabola, ellipse, hyperbola

**Section-B**

**Sphere:** Section of a sphere by a plane, sphere through a given circle. Intersection of a line and sphere, tangent line, tangent plane, angle of intersection of two spheres and condition of orthogonality

**Cone:** general second degree equation of a cone, its intersection with a plane and with a line, enveloping cone, right circular cone, the cone  $ax^2 + by^2 + cz^2 = 0$

**Cylinder:** enveloping cylinder, right circular cylinder

**RECOMMENDED BOOKS :**

1. P.K. Jain and Khalil Ahmad: Text Book of Analytical Geometry. New Age International Publishers, Third Edition
2. Shanti Narayan and P.K Mittal: Analytical Solid Geometry, 17<sup>th</sup> Revised Edition, S.Chand and Co., New Delhi, 2006.
3. N.Saran and R.S. Gupta : Analytical Geometry of Three Dimensions, Pothishala Pvt. Ltd. Allahabad.

  
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# SYLLABUS OF

**B.A./B.Sc. Part-I (INFORMATION TECHNOLOGY)**  
**(Semester Ist & IInd)**  
**(2020-21, 2021-22 and 2022-23 Sessions)**



**PUNJABI UNIVERSITY PATIALA**  
**(Established under Punjab Act no. 35 of 1961)**

**B.A./B.Sc. Part-I (INFORMATION TECHNOLOGY)**  
**(Semester I)**  
**(2020-21, 2021-22 and 2022-23 Sessions)**

**PAPER BIT-101: FUNDAMENTALS OF INFORMATION TECHNOLOGY**

**External Marks: 45**

**Minimum Pass Marks: 35%**

**Internal Assessment: 15**

**Maximum Time: 3 Hrs.**

**Lectures to be delivered: 45-55**

**A) Instructions for paper-setter**

The question paper will consist of three sections A, B & C. Sections A & B will have four questions from the respective sections of the syllabus and will carry 40% marks each. Section C will have 6-12 short answer type questions which will cover the entire syllabus uniformly and will carry 20% marks in all.

**B) Instructions for candidates**

1. Candidates are required to attempt two questions each from sections A & B of the question paper and the entire section C.
2. Use of non-programmable scientific calculator is allowed.

**SECTION A**

**Computer Fundamentals:** Block diagram of a computer, characteristics of computers and generations of computers. Categories of Computers - Supercomputer, mainframe computer, network server, Workstation, Desktop computers, notebook computer, Tablet PC, handheld PC, smart phone.

**Input Devices:** Keyboard, Mouse, Joy tick, Track Ball, Touch Screen, Light Pen, Digitizer, Scanners, Speech Recognition Devices, Optical Recognition devices – OMR, OBR, OCR

**Output Devices:** Monitors, Impact Printers - Dot matrix, Character and Line printer, Non Impact Printers – DeskJet and Laser printers, Plotter.

**Memories:** Memory Hierarchy, Primary Memory – RAM, ROM, Cache memory. Secondary Storage Devices - Hard Disk, Compact Disk, DVD, Flash memory.

**Software:** Types of Software- System Software, Application Software, Firmware. Type of System Software: Operating Systems, Language Translators, Utility Programs, Communications Software.

**Commonly Used Application Software:** Word Processor, Spreadsheet, Database, Education, Entertainment Software.

**Computer Languages:** Machine language, assembly language, high level language, 4GL.

**SECTION B**

**Number System:** Non-positional and positional number systems, Base conversion, Concept of Bit and Byte, binary, decimal, hexadecimal, and octal systems, conversion from one system to the other. Binary Arithmetic: Addition, subtraction and multiplication, 1's complement, 2's complement, subtraction using 1's complement and 2's complement.

**Computer Codes:** weighted and non-weighted code, BCD, EBCDIC, ASCII, Unicode.

**Computer Network:** Network types, network topologies.

**Internet Related Concepts:** Internet, World Wide Web, Hypertext, Uniform Resource Locator, Web

Browsers, IP Address, Domain Name, Internet Services Providers, Internet Security, Web Search Engine, Net Surfing, web portal, Wiki, Blog.

**Advanced Trends in IT :** Mobile Internet, GPS, 3G, 4G, Wi-Fi, Bluetooth, Cloud Technology, Virtual LAN Technology, Firewall, E-Commerce, M-Commerce, Nanotechnology, Virtual Reality, BPO and KPO, Online shopping, Social Media - YouTube, FaceBook, LinkedIn, Twitter, Google+.

**Applications of IT:** IT in Business and Industry, IT in Education & training, IT in Science and Technology, IT and Entertainment, Current Trends in IT Application - AI, Virtual Reports, voice recognition, Robots, Multimedia Technology.

**Reference Books:**

1. Peter Nortorn, Introduction to Computers, Seventh Edition
2. V. Rajaraman, Fundamentals of Computers, PHI.
3. Larry E. Long and Nancy Long, Computers: Information Technology in Perspective, PHI.
4. N. Subramanian, Introduction to Computers, Tata McGraw-Hill.
5. D.H. Sanders, Computers Today, McGraw- Hill.

**PAPER BIT-102: PRACTICAL BASED ON PAPER BIT-101**

**Maximum Marks: 40**

**Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 35%**

**Practical Units to be conducted: 45-55 Hrs**

The laboratory course will comprise of Activities related to Windows and exercise to what is learnt under Paper BIT-101 such as:

**Windows**

**Activity 1:** Windows 7 Installation and Software & Drivers installation.

**Activity 2:** Basic components of Window-Desktop, Icons, Taskbar, Status Bar, Wallpapers, Screen Saver

**Activity 3:** Start Menu: Accessories- Notepad, Calculator, Clock, Date and Time, Disk Defragmentation, Working with Control Panel.

**Activity 4:** Taskbar properties - Maximize Minimize, Restore, and Close.

**Activity 5:** Creating Files, Folders, Shortcuts, Moving folders (right click options)

**Internet**

**Activity 1:** Connecting through Wi-fi, Blue tooth and Hot Spot.

**Activity 2:** Web Surfing, searching contents through Search Engines.

**Activity 3:** Creating and maintaining Web Blogs and Web portals

**Social Media**

**Activity 1:** Creating account, linking accounts, setting profiles and preferences.

**Activity 2:** Posting messages, replying, forwarding, tagging contents.

**Activity 3:** Online shopping, comparing prices etc.

**Activity 4:** Creating and maintaining social profiles at LinkedIn, FaceBook, Twitter etc.

The breakup of marks for the practical will be as under:

Lab Record	:	05 Marks
Viva Voce	:	10 Marks
Program Development And Execution	:	25 Marks

**B.A./B.Sc. Part-I (INFORMATION TECHNOLOGY)**  
**(Semester II)**  
**(2020-21, 2021-22 and 2022-23 Sessions)**

**PAPER BIT-103: MS-OFFICE AUTOMATION TOOLS**

**External Marks: 45**

**Minimum Pass Marks: 35%**

**Internal Assessment: 15**

**Maximum Time: 3 Hrs.**

**Lectures to be delivered: 45-55**

**A) Instructions for paper-setter**

The question paper will consist of three sections A, B & C. Sections A & B will have four questions from the respective sections of the syllabus and will carry 40% marks each. Section C will have 6-12 short answer type questions which will cover the entire syllabus uniformly and will carry 20% marks in all.

**B) Instructions for candidates**

1. Candidates are required to attempt two questions each from sections A & B of the question paper and the entire section C.
2. Use of non-programmable scientific calculator is allowed.

**SECTION A**

**MS-OFFICE:** Basic layout, components, Office Characteristics, Common Office Controls and shortcuts for Home, Insert, Page Layout, Mailing, Review and View

**MS Word 2010:** Introduction to Word Processing, Toolbars, Ruler, Menus, Keyboard Shortcut. Previewing documents, Printing documents, Formatting documents, Checking the grammar and spelling, Formatting via find and replace, Using the Thesaurus, using Auto Correct, word count, Hyphenating, Mail merge, mailing Labels Wizards and Templates, Handling Graphics, tables as Converting a word document into various formats.

**MS PowerPoint 2010:** Introduction, Elements of Power Point Package, Starting and exploring Power Point menus (Insert, Format, Tools, Slide Show, Window, Help options and all of their features, Options and sub options etc.), Creating, inserting, deleting and formatting slides, Formatting and enhancing text, Slides with graphs, Giving Animation to slides, Transfer of files between Power Point and other word processors and software packages.

**SECTION B**

**MS-EXCEL 2010:** Creating worksheet, entering data into worksheet, Entering data into worksheet, Entering, data, dates, alphanumeric, values, saving & quitting worksheet, Opening and moving and existing worksheet, Toolbars and Menus, keyboard shortcut. Working with single and multiple workbooks, working with formulation & cell referencing, formatting of worksheet.

**MS-ACCESS 2010:** Introduction to MS-ACCESS-2010 working with databases and tables, queries in Access. Introduction to forms, sorting and filtering, controls. Creating reports, Using Macro

**Reference Books**

1. Rob Tindrow, Jim Boyce, Jeffrey R. Shapiro, Windows 10 Bible, Wiley.

## **PAPER BIT-104: PRACTICAL BASED ON PAPER BIT-103**

**Maximum Marks: 40**

**Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 35%**

**Practical Units to be conducted: 45-55 Hrs**

The laboratory course will comprise of Activities related to MS-OFFICE and exercise to what is learnt under Paper BIT-103 such as:

### **MS-Word**

#### **Activity 1:**

- i. Create, open, save and close a document.
- ii. Typing, copying, moving and deleting data in word document.
- iii. Perform Save and Save as, Cut and Copy, Paste and Paste Special.

#### **Activity 2:**

Formatting of data in word Document:-

- i. Text formatting (font size, font style, font color, subscript, superscript, upper/lower case etc.)
- ii. Text Alignment and character spacing
- iii. Indention and line spacing
- iv. Border and shading
- v. Bullets and Numbering

#### **Activity 3:**

- i. Find and replace and data sorting in a document.
- ii. Protect your document.
- iii. Add chart in word document. Create different types of Charts in word.
- iv. Set a size, margin, orientation of page, Hyphenation, Columns and Line Numbers in MS-Word.

#### **Activity 4:**

- i. Set Page Color, Page Border, Themes, and Watermarks in MS-Word
- ii. Adding Tables, header/footers, pictures, page numbers and special symbols, Text Box in your word document.
- iii. Showing Ruler, Gridlines, Document Map, Thumbnails, Inserting Word Art, Drop Cap, Hyperlink, Equation etc. in word document

#### **Activity 5:**

- i. Arranging, splitting windows in MS-word
- ii. Perform Mail-merge in MS-word
- iii. Create and run Macros in MS-Word
- iv. Set the print properties of a word document

### **PowerPoint**

#### **Activity 1:**

- i. Create, open, save and close a Presentation
- ii. Typing, copying, moving and deleting data in presentation.
- iii. New Slide, understanding Slide Layout, adding and deleting slides.

#### **Activity 2:**

Formatting of data in slides:-

- i. Text formatting (font size, font style, font color, subscript, superscript, upper/lower case etc.)
- ii. Text Alignment and character spacing
- iii. Indention and line spacing
- iv. Border and shading
- v. Bullets and Numbering

**Activity 3:**

- i. Set a size, margin, orientation of slides in PowerPoint.
- ii. Adding Tables, header/footers, pictures, page numbers and special symbols, Text Box etc. in your presentation

**Activity 4:**

- i. Adding Animation and Transition Effects in Slides, Understanding Slide Show
- ii. Presentation Views, Understanding Formatting commands in PowerPoint

**Activity 5:**

- i. Create and run Macros in PowerPoint
- ii. Arranging, splitting windows in MS-PowerPoint.

**MS-Excel**

**Activity 1:**

- i. Create, open, save and close workbook?
- ii. Create a new worksheet, renaming and moving sheet.
- iii. Entering, copying, moving and deleting data in cells and worksheets.
- iv. Insert and delete cells, columns and rows in MS-Excel.

**Activity 2:**

- i. Formatting of data in cells:-
- ii. Text formatting (font size, font style, font color, Cell border etc.)
- iii. Text Alignment
- iv. Text Orientation, Text Direction, Text Control.

**Activity 3:**

- i. Find and replace data in a sheet
- ii. Perform data sorting and data filtering in MS-Excel
- iii. Protect your Worksheet and Workbook?
- iv. Enter and perform some basic formulas in ms-excel.

**Activity 4:**

- i. Perform some basic Functions in MS-Excel.
- ii. Create a chart in MS-Excel.
- iii. Create different types of Charts in excel.
- iv. Set a size, margin, orientation of page in Ms-Excel.
- v. The print properties of worksheet in MS-Excel.

**Activity 5:**

- i. Hide and unhide row and column in MS-Excel
- ii. Set column width and row height in MS-Excel.
- iii. Adding text Box, header/footers, pictures and special symbols in your worksheet.
- iv. Arranging, splitting and hiding windows in MS-Excel. And also freezing panes.

- v. Create and run Macros in MS-Excel.

### **MS-ACCESS 2010**

#### **Activity 1:**

- i. Creating with databases and tables
- ii. Linking various Tables
- iii. Queries in Access

#### **Activity 2:**

- i. Creating forms
- ii. Filling information in forms
- iii. Saving forms

#### **Activity 3:**

- i. Sorting data
- ii. Filtering Data

#### **Activity 4:**

- i. Creating reports,
- ii. Using Macro

The breakup of marks for the practical will be as under:

Lab Record	:	05 Marks
Viva Voce	:	10 Marks
Practical Work	:	25 Marks

## ਬੀਐੱਸ.ਸੀ. ਭਾਗ ਪਹਿਲਾ

## ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ

2020-21, 2021-22 ਅਤੇ 2022-23 ਸੈਸ਼ਨ ਲਈ

## ਸਮੇਸਟਰ ਪਹਿਲਾ

ਕੁਲ ਅੰਕ : 100

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 25 ਅੰਕ

ਬਾਹਰੀ ਪਰੀਖਿਆ: 75 ਅੰਕ

ਸਮਾਂ : 3 ਘੰਟੇ

ਵਿਸ਼ੇ ਵਿਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 35

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਵਿਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 09

ਬਾਹਰੀ ਪਰੀਖਿਆ ਵਿਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 26

(ਅਧਿਆਪਨ: 6 ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ)

## ਸਿਲੇਬਸ ਤੇ ਪਾਠ ਪੁਸਤਕਾਂ:

ਭਾਗ-ੳ: ਕਥਾ ਰੰਗ (ਸੰਪਾ. ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਅਤੇ ਡਾ. ਬਲਦੇਵ ਸਿੰਘ ਚੀਮਾ) 20 ਅੰਕ

ਭਾਗ-ਅ: (1) ਨਿਬੰਧ-ਰਚਨਾ : ਵਿਗਿਆਨ, ਤਕਨਾਲੋਜੀ, ਮਾਤ ਭਾਸ਼ਾ ਅਤੇ ਵਿਗਿਆਨ, ਸਮਕਾਲੀ ਵਿੱਦਿਆ-ਪ੍ਰਬੰਧ, ਮਾਤ ਭਾਸ਼ਾ ਤੇ ਗਿਆਨ ਪ੍ਰਸਾਰ, ਮਾਤ ਭਾਸ਼ਾ ਵਿਚ ਵਿਗਿਆਨ ਦੀ ਪੜ੍ਹਾਈ, ਮਾਤ ਭਾਸ਼ਾ ਤੇ ਵਿਗਿਆਨ ਦਾ ਅਧਿਆਪਨ ਅਤੇ ਵਾਤਾਵਰਣ ਆਦਿ ਵਿਸ਼ਿਆਂ ਨਾਲ ਸਬੰਧਤ ਨਿਬੰਧ ਰਚਨਾ। 10 ਅੰਕ

ਅ(2) ਗਿਆਨ-ਵਿਗਿਆਨ ਤੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ:

(i) ਗਿਆਨ-ਵਿਗਿਆਨ ਅਤੇ ਭਾਸ਼ਾ: ਪੰਜਾਬੀ ਵਿਚ ਵਿਗਿਆਨ ਦੀ ਪੜ੍ਹਾਈ, ਅਧਿਐਨ ਅਤੇ ਖੋਜ ਦੀਆਂ ਸਮੱਸਿਆਵਾਂ, ਵਿਗਿਆਨਕ ਤੇ ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਦਾ ਹੋਰ ਭਾਸ਼ਾਵਾਂ ਵਿਚੋਂ ਸ਼ਬਦ-ਉਧਾਰ ਅਤੇ ਸ਼ਬਦਜੋੜ ਅਤੇ ਉਚਾਰਣ-ਨਿਰਧਾਰਣ ਦੇ ਮਸਲੇ। ਪਾਠਕ੍ਰਮ ਵਿੱਚ ਦਰਜ ਤਕਨੀਕੀ/ਸੰਕਲਪਵਾਚੀ ਸ਼ਬਦਾਵਲੀ ਦਾ ਆਲੋਚਨਾਤਮਕ ਅਧਿਐਨ 05 ਅੰਕ

(ii) ਕੁਦਰਤੀ ਵਿਗਿਆਨਾਂ ਨਾਲ ਸੰਬੰਧਿਤ ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ (ਲਗਭਗ 100 ਸ਼ਬਦ): ਅਨੁਵਾਦ ਅਤੇ ਵਾਕਾਂ ਵਿਚ ਵਰਤੋਂ। 10 ਅੰਕ

ਭਾਗ-ੲ: ਭਾਗ-ੳ ਦੀ ਪੁਸਤਕ ਕਥਾ ਰੰਗ ਅਤੇ ਭਾਗ-ਅ (2) ਵਿਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ। 15x2=30 ਅੰਕ

## ਅੰਕ-ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈੱਟਰ ਲਈ ਹਦਾਇਤਾਂ:

1. ਪਾਠਕ੍ਰਮ ਦੇ ਦੋ ਭਾਗ ਲ਼ ਅਤੇ ਅ ਹੋਣਗੇ ਪਰੰਤੂ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਤਿੰਨ ਭਾਗਾਂ ਲ਼ ਅ ਅਤੇ ਲ ਵਿੱਚ ਵੰਡਿਆ ਜਾਵੇਗਾ।

2. ਭਾਗ ਲ਼ ਵਿੱਚੋਂ (i) ਕਿਸੇ ਕਹਾਣੀ ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ ਅਤੇ ਕਹਾਣੀ ਬਾਰੇ ਪਾਠਕ ਦੇ ਪ੍ਰਭਾਵ (ਤਿੰਨ ਵਿੱਚੋਂ ਇੱਕ) 10 ਅੰਕ

(ii) ਪਾਤਰਾਂ ਸੰਬੰਧੀ ਜਾਣਕਾਰੀ (ਚਾਰ ਵਿੱਚੋਂ ਦੋ) 2 x 5 = 10 ਅੰਕ

4. ਭਾਗ ਅ-(1) ਦਰਸਾਏ ਗਏ ਵਿਸ਼ਿਆਂ ਵਿੱਚੋਂ ਕਿਸੇ ਇੱਕ 'ਤੇ ਨਿਬੰਧ ਲਿਖਣ ਲਈ ਕਿਹਾ ਜਾਵੇਗਾ। (ਤਿੰਨ ਵਿੱਚੋਂ ਇੱਕ) 10 ਅੰਕ

ਅ-(2) ਗਿਆਨ-ਵਿਗਿਆਨ ਅਤੇ ਮਾਤ-ਭਾਸ਼ਾ ਵਾਲੇ ਭਾਗ (i) ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਅਤੇ ਵਿਦਿਆਰਥੀ ਦੋਵਾਂ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਦਾ ਉੱਤਰ ਲੇਖੇਗਾ। 05 ਅੰਕ

ਅ- (2) ਦੇ ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਵਾਲੇ ਉਪਭਾਗ (ii) ਵਿੱਚੋਂ ਵਿਗਿਆਨਕ ਸ਼ਬਦਾਵਲੀ ਵਿਚੋਂ ਅੰਗਰੇਜ਼ੀ ਦੇ 15 ਸ਼ਬਦ ਦਿੱਤੇ ਜਾਣਗੇ।

ਇਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ 10 ਸ਼ਬਦਾਂ ਦਾ ਪੰਜਾਬੀ ਅਨੁਵਾਦ ਦੇਵੇਗਾ ਅਤੇ ਉਨ੍ਹਾਂ ਨੂੰ ਵਾਕਾਂ ਵਿਚ ਵਰਤੇਗਾ। 10 ਅੰਕ

5. ਭਾਗ-ੲ: ਪਾਠਕ੍ਰਮ ਦੇ ਭਾਗ ਲ਼: ਕਥਾ ਰੰਗ ਅਤੇ ਭਾਗ ਅ (2) ਵਿੱਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ 15 (ਭਾਗ ਲ਼ ਵਿੱਚੋਂ 10 ਅਤੇ ਭਾਗ ਅ-2

ਵਿੱਚੋਂ 5 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਵਾਲੇ ਭਾਗ ਵਿਚ ਪਾਠਕ੍ਰਮ ਵਿਚ ਦਰਜ ਅੰਗਰੇਜ਼ੀ ਸ਼ਬਦਾਂ ਦੇ ਪੰਜਾਬੀ ਅਨੁਵਾਦ ਦੀ ਉਚਿੱਤਤਾ, ਉਨ੍ਹਾਂ ਦੇ ਸੰਭਵ ਬਦਲ, ਸ਼ਬਦਜੋੜਾਂ ਬਾਰੇ ਸਵਾਲ ਪੁੱਛੇ ਜਾ ਸਕਦੇ ਹਨ। ਵਿਦਿਆਰਥੀ ਨੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਸੰਖੇਪ ਉੱਤਰ ਦੇਣੇ

ਹੋਣਗੇ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ 2 ਅੰਕ ਹੋਣਗੇ। 15x2=30 ਅੰਕ

## ਸਹਾਇਕ ਪਾਠ ਸਮੱਗਰੀ

1। ਵਿਗਿਆਨਕ ਸ਼ਬਦਾਵਲੀ ਕੋਸ਼, ਭਾਸ਼ਾ ਵਿਭਾਗ, ਪੰਜਾਬ, ਪਟਿਆਲਾ

ਵਿਗਿਆਨ ਨਾਲ ਸੰਬੰਧਿਤ ਤਕਨੀਕੀ/ਸੰਕਲਪੀ ਸ਼ਬਦਾਵਲੀ

1. Abnormal behavior of oxygen: ਅਓਕਸੀਜਨ ਦਾ ਅਸਾਧਾਰਣ ਵਿਵਹਾਰ
2. Absorption: ਸੋਖਣ
3. Actinoid contraction: ਐਕਟੀਨਾਇਡ ਸੁੰਗੜਨ
4. Activation energy: ਉਤੇਜਨ ਊਰਜਾ
5. Adventitious roots: ਰੇਸ਼ੇਦਾਰ ਜੜ੍ਹਾਂ
6. Alkynes: ਐਲਕਾਈਨ, ਖਾਰ
7. Alpha particles: ਐਲਫ਼ਾ ਕਣ
8. Amorphous solids: ਅਕ੍ਰਿਸਟਲੀ ਠੋਸ
9. Anther: ਪਰਾਗਕੋਸ਼
10. Antibiotics: ਜੀਵਾਣੂ
11. Antielectron: ਪ੍ਰਤਿ ਇਲੈਕਟ੍ਰਾਨ
12. Apomixes: ਅਸੰਗਪ੍ਰਜਣਨ
13. Applied Physics: ਅਨੁਪ੍ਰਯੁਕਤ ਭੌਤਿਕੀ, ਵਿਹਾਰਕ ਭੌਤਿਕੀ
14. Archegonium: ਆਰਕੀਸਪੋਰੀਅਮ
15. Asexual reproduction: ਅਲਿੰਗੀ ਪ੍ਰਜਣਨ
16. Astronomical scale: ਖਗੋਲੀ ਪੱਧਰ
17. Atomic: ਪ੍ਰਮਾਣਵੀ
18. Autogamy: ਸਵੈਪਰਾਗਣ
19. Automation: ਸਵੈਚਾਲਨ
20. Average rate: ਔਸਤ ਵੇਗ
21. Binary solution: ਦੋ ਅੰਗੀ ਘੋਲ
22. Catalyst/Catalysis: ਉਤਪ੍ਰੇਰਕ/ਉਤਪ੍ਰੇਰਣ
23. Cell differentiation: ਸੈੱਲ ਵਿਭੇਦਨ
24. Cell division: ਸੈੱਲ ਵਿਭਾਜਨ
25. Cervix: ਗਰਭ ਮਾਰਗ
26. Chemical kinetics: ਰਸਾਇਣਕ ਬਲਗਤਿਕ
27. Circular orbits: ਚੱਕਰਾਕਾਰ ਆਰਬਿਟ
28. Classical Physics: ਕਲਾਸੀਕੀ ਭੌਤਿਕੀ
29. Coleorhiza: ਜੜ੍ਹ ਅੰਕੁਰ ਕਵਚ
30. Concentration of solutions: ਘੋਲਾਂ ਦੀ ਸੰਘਣਤਾ
31. Coordination compounds: ਉਪਸਹਿਸੰਯੋਜਨ ਯੋਗਿਕ
32. Coordination isomerism: ਉਪਸਹਿਸੰਯੋਜਨ ਸਮਅੰਗਕਤਾ
33. Coordination polyhedron: ਉਪਸਹਿਸੰਯੋਜਨ ਬਹੁਫਲਕ
34. Coordination theory: ਉਪਸਹਿਸੰਯੋਜਨ ਯੋਗਿਕਾਂ ਦਾ ਸਿਧਾਂਤ
35. Cyclic structure: ਚੱਕਰੀ ਸੰਰਚਨਾ
36. Depressants: ਅਵਮਨਕ
37. Dialysis: ਝਿੱਲੀ ਨਿਖੇੜਨ
38. Dioecious: ਬਿਖਮ ਲਿੰਗੀ
39. Distillation: ਕਸ਼ੀਦਣ
40. Double fertilization: ਦੋਹਰਾ ਨਿਸ਼ੇਚਨ
41. Electric circuit: ਬਿਜਲਈ ਸਰਕਟ
42. Electro Chemistry: ਬਿਜਲੀ ਰਸਾਇਣ
43. Electrodynamics: ਇਲੈਕਟ੍ਰੋਡਾਇਨਾਮਿਕਸ
44. Electromagnetic radiations: ਬਿਜਲ ਚੁੰਬਕੀ ਵਿਕਿਰਨਾ
45. Electromagnetism: ਬਿਜਲ ਚੁੰਬਕਤਾ
46. Elements: ਤੱਤ
47. Elliptical orbits: ਅੰਡਾਕਾਰ ਆਰਬਿਟ
48. Embryo sac: ਭਰੂਣ ਕੋਸ਼
49. Embryogenesis: ਭਰੂਣ ਨਿਰਮਾਣ
50. Embryonic development: ਭਰੂਣ ਵਿਕਾਸ
51. Endosperm: ਭਰੂਣਪੇਸ਼
52. Entropy: ਐਨਟਰਾਪੀ
53. Enzyme catalyst: ਐਨਜ਼ਾਈਮ ਉਤਪ੍ਰੇਰਕ
54. Epicotyl: ਬੀਜ ਪੱਤਰ ਪਰਤ

*ਸ਼ਕ*

55. Exothermic: ਤਾਪ ਨਿਕਾਸੀ
56. External fertilization: ਬਹਾਰੀ ਨਿਸ਼ੇਚਨ
57. External genitalia: ਬਹਾਰੀ ਜਣਨ ਅੰਗ
58. Fallopian tubes: ਅੰਡਵਹਿਣੀਆਂ
59. Ferromagnetism: ਧਾਤ ਚੁੰਬਕਤਾ
60. Fertilization: ਨਿਸ਼ੇਚਨ
61. Filament: ਫਿਲਾਮੈਂਟ
62. Fission: ਵਿਖੰਡਨ
63. Force: ਬਲ
64. Fossil fuel: ਪਥਰਾਟ ਬਾਲਣ
65. Galaxy: ਆਕਾਸ਼ ਗੰਗਾ
66. Gamete transfer: ਯੁਗਮਕ ਸਥਾਨਾਂਤਨਣ
67. Gametes: ਯੁਗਮਕ
68. Gametogenesis: ਯੁਗਮਕ ਬਣਨਾ
69. Geitonogamy: ਸਜਾਤੀ ਪਰਾਗਣ
70. Glans penis: ਸਿਸ਼ਨ ਮੁੰਡ
71. Gravitation: ਗੁਰੂਤਾਕਰਸ਼ਨ
72. Half-life: ਅਰਧ ਆਯੂ
73. Haploid: ਗੁਣਸੂਤਰੀ ਸੈੱਲ
74. Heat engine: ਤਾਪ ਇੰਜਣ
75. Heliocentric Theory: ਸੂਰਜ ਕੇਂਦਰੀ ਸਿਧਾਂਤ
76. Homogamete or isogamete: ਸਮਯੁਗਮਕੀ
77. Hydrogen Bond: ਹਾਈਡ੍ਰੋਜਨ ਬੰਧੇਜ
78. Hymen: ਯੋਨੀ ਪਰਦਾ
79. Hyperacidity: ਅਤੀਤੇਜਾਬੀਪਨ
80. Ideal solutions: ਆਦਰਸ਼ ਘੋਲ
81. Implantation: ਅੰਤਰ ਰੋਪਣ
82. Impurity defects: ਅਸ਼ੁੱਧਤਾ ਦੋਸ਼
83. Inner transition elements: ਅੰਦਰੂਨੀ ਅੰਤਰਕਾਲੀ ਤੱਤ
84. Insemination: ਵੀਰਜ ਸੰਚਾਰ
85. Instability constant: ਅਸਥਿਰਤਾ ਸਥਾਈ ਅੰਕ
86. Interaction: ਅੰਤਰਕਿਰਿਆ
87. Intermolecular forces: ਅੰਤਰ ਅਣਵੀ ਬਲ
88. Intermolecular: ਅੰਤਰਅਣਵੀ
89. Internal energy: ਆੰਤਰਿਕ ਊਰਜਾ
90. Internal fertilization: ਅੰਦਰੂਨੀ ਨਿਸ਼ੇਚਨ
91. Interstitial compounds: ਅੰਤਰ ਵਿੱਥੀ ਯੋਗਿਕ
92. Ionic conductance: ਆਇਨਨ ਚਾਲਕਤਾ
93. Ionic isomerism: ਆਇਨਨ ਸਮਅੰਗਕਤਾ
94. Ionization enthalpy: ਆਇਨਨ ਐਨਥੈਲਪੀ
95. Ionosphere: ਆਈਨੋਸਫੀਅਰ
96. Isomerism: ਸਮਅੰਗਕਤਾ
97. Kinetic energy: ਗਤਿਜ ਊਰਜਾ
98. Kinetic theory: ਅਣਗਤੀ ਸਿਧਾਂਤ
99. Kingdom fungi: ਉੱਲੀ ਜਗਤ
100. Magnitudes: ਪਰਿਮਾਣ

*Handwritten signature*

ਬੀਐਸ.ਸੀ. ਭਾਗ ਪਹਿਲਾ

(ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ)

2020—21, 2021-22 ਅਤੇ 2022—23 ਸੈਸ਼ਨ ਲਈ

ਸਮੇਸਟਰ ਦੂਜਾ

ਕੁਲ ਅੰਕ : 100

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 25 ਅੰਕ

ਬਾਹਰੀ ਪਰੀਖਿਆ: 75 ਅੰਕ

ਸਮਾਂ : 3 ਘੰਟੇ

ਸਿਲੇਬਸ ਤੇ ਪਾਠ ਪੁਸਤਕਾਂ:

ਵਿਸ਼ੇ ਵਿੱਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 35

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਵਿੱਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 09

ਬਾਹਰੀ ਪਰੀਖਿਆ ਵਿੱਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 26

(ਅਧਿਆਪਨ: 6 ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ)

ਭਾਗ- ਓ: ਵਾਰਤਕ ਵਿਵੇਕ (ਸੰਪਾ. ਡਾ. ਰਾਜਿੰਦਰ ਪਾਲ ਸਿੰਘ ਬਰਾੜ, ਡਾ. ਜਗਤਾਰ ਸਿੰਘ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ

10+10 + 20 ਅੰਕ

ਭਾਗ ਅ-1 ਪ੍ਰੈੱਸ ਰਿਪੋਰਟ: ਵਿਗਿਆਨ ਦੇ ਖੇਤਰ ਨਾਲ ਸੰਬੰਧਿਤ ਕਿਸੇ ਆਯੋਜਨ, ਵਿਗਿਆਨ-ਮੇਲੇ, ਇਕੱਤਰਤਾ ਜਾਂ ਸੈਮੀਨਾਰ ਕਾਨਫਰੰਸ ਦੀ ਪ੍ਰੈੱਸ ਰਿਪੋਰਟ/ ਲਿਖਣ ਦੀ ਸਿਖਲਾਈ

10 ਅੰਕ

ਅ-2 (i) ਵਿਗਿਆਨ ਨਾਲ ਸੰਬੰਧਿਤ ਕਿਸੇ ਅੰਗਰੇਜ਼ੀ ਪੈਰ੍ਹੇ ਦਾ ਪੰਜਾਬੀ ਅਨੁਵਾਦ

05 ਅੰਕ

(ii) ਕੁਦਰਤੀ ਵਿਗਿਆਨਾਂ ਨਾਲ ਸੰਬੰਧਿਤ ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ (100 ਸ਼ਬਦ): ਅਨੁਵਾਦ ਅਤੇ ਵਾਕਾਂ ਵਿਚ ਵਰਤੋਂ

10 ਅੰਕ

ਭਾਗ-ਏ ਉਪਰੋਕਤ ਸਿਲੇਬਸ ਦੇ ਭਾਗ ਓ ਅਤੇ ਭਾਗ ਅ-2 (ii) 'ਤੇ ਅਧਾਰਤ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ।

30 ਅੰਕ

ਅੰਕ-ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਂਟਰ ਲਈ ਹਦਾਇਤਾਂ:

1. ਪਾਠਕ੍ਰਮ ਦੇ ਦੋ ਭਾਗ ਓ ਅਤੇ ਅ ਹੋਣਗੇ ਪਰੰਤੂ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਤਿੰਨ ਭਾਗਾਂ ਓ ਅ ਅਤੇ ਏ ਵਿੱਚ ਵੰਡਿਆ ਜਾਵੇਗਾ।

2. ਭਾਗ ਓ ਵਿੱਚੋਂ:

(i) ਕਿਸੇ ਇਕ ਨਿਬੰਧ ਦਾ ਵਿਸ਼ਾ/ਸਾਰ/ ਮੁੱਖ ਵਿਚਾਰਾਂ/ ਪਾਠਕ ਦੇ ਪ੍ਰਭਾਵਾਂ ਬਾਰੇ ਪ੍ਰਸ਼ਨ।

ਤਿੰਨ ਵਿੱਚੋਂ ਇੱਕ) 10 ਅੰਕ

(ii) ਨਿਬੰਧਾਂ ਵਿਚਲੇ ਵਿਚਾਰਾਂ ਸਬੰਧੀ ਸੰਖੇਪ ਪ੍ਰਸ਼ਨ। (ਚਾਰ ਵਿੱਚੋਂ ਦੋ)  $2 \times 5 = 10$  ਅੰਕ

4. ਭਾਗ ਅ-1 ਵਿਗਿਆਨ ਦੇ ਖੇਤਰ ਨਾਲ ਸੰਬੰਧਿਤ ਕਿਸੇ ਆਯੋਜਨ, ਵਿਗਿਆਨ-ਮੇਲੇ, ਇਕੱਤਰਤਾ ਜਾਂ ਸੈਮੀਨਾਰ ਆਦਿ ਦੇ ਆਯੋਜਨਾਂ ਵਿੱਚੋਂ ਦੋ ਵਿਸ਼ੇ ਦੇ ਕੇ ਕਿਸੇ ਵਿਸ਼ੇ 'ਤੇ ਪ੍ਰੈੱਸ ਰਿਪੋਰਟ ਲਿਖਣ ਲਈ ਕਿਹਾ ਜਾਵੇਗਾ। (ਦੋ ਵਿੱਚੋਂ ਇੱਕ)

10 ਅੰਕ

5. ਅ-2 ਦੇ ਉਪਭਾਗ (i) ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਅਤੇ ਵਿਦਿਆਰਥੀ ਨੇ ਦੋਵਾਂ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਹੋਵੇਗਾ।

05 ਅੰਕ

6. ਅ-2 ਦੇ ਉਪਭਾਗ (ii) ਵਿੱਚ 15 ਅੰਗਰੇਜ਼ੀ ਸ਼ਬਦਾਂ ਦੇ ਕੇ 10 ਸ਼ਬਦਾਂ ਦਾ ਪੰਜਾਬੀ ਅਨੁਵਾਦ ਅਤੇ ਵਾਕਾਂ ਵਿਚ ਵਰਤੋਂ ਲਈ ਕਿਹਾ ਜਾਵੇਗਾ।

10 ਅੰਕ

5. ਭਾਗ-ਏ ਵਿਚ ਪਾਠ ਪੁਸਤਕ ਵਾਰਤਕ ਵਿਵੇਕ ਅਤੇ ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਵਾਲੇ ਭਾਗ ਵਿੱਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ 15 (ਪਾਠ ਪੁਸਤਕ ਵਾਰਤਕ ਵਿਵੇਕ ਵਿੱਚੋਂ 10 ਅਤੇ ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਵਾਲੇ ਭਾਗ ਵਿੱਚੋਂ 5 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਵਾਲੇ

ਭਾਗ ਵਿਚ ਪਾਠਕ੍ਰਮ ਵਿਚ ਦਰਜ ਅੰਗਰੇਜ਼ੀ ਸ਼ਬਦਾਂ ਦੇ ਪੰਜਾਬੀ ਅਨੁਵਾਦ ਦੀ ਉਚਿੱਤਤਾ, ਉਨ੍ਹਾਂ ਦੇ ਸੰਭਵ ਬਦਲ, ਸ਼ਬਦਜੋੜਾਂ ਬਾਰੇ ਸਵਾਲ ਪੁੱਛੇ ਜਾ ਸਕਦੇ ਹਨ। ਵਿਦਿਆਰਥੀ ਨੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਸੰਖੇਪ ਉੱਤਰ ਦੇਣੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 2 ਅੰਕ ਹੋਣਗੇ।

$15 \times 2 = 30$  ਅੰਕ

ਸਹਾਇਕ ਪਾਠ ਸਮੱਗਰੀ

2। ਵਿਗਿਆਨਕ ਸ਼ਬਦਾਵਲੀ ਕੋਸ਼, ਭਾਸ਼ਾ ਵਿਭਾਗ, ਪੰਜਾਬ, ਪਟਿਆਲਾ

ਕੁਦਰਤੀ ਵਿਗਿਆਨਾਂ ਨਾਲ ਸੰਬੰਧਿਤ ਮੁੱਢਲੀ ਸ਼ਬਦਾਵਲੀ

1. Mammary glands: ਦੁੱਧ ਗ੍ਰੰਥੀਆਂ
2. Mass: ਪੁੰਜ
3. Maxwell's equations: ਮੈਕਸਵੈੱਲ ਸਮੀਕਰਨ
4. Mechanics: ਮਕੈਨਿਕਸ
5. Mega-sporangium: ਗੁਰੂਬੀਜਾਣੂਕੋਸ਼
6. Menstrual cycle: ਮਾਸਿਕ ਚੱਕਰ
7. Metallic solids: ਧਾਤਵੀ ਠੋਸ
8. Metallurgy: ਧਾਤਕਰਮਕੀ
9. Microscope: ਖੁਰਦਬੀਨ
10. Microscopic and Macroscopic: ਸੂਖਮ ਅਤੇ ਸਬੂਲ
11. Microsporangium: ਲਘੂਬੀਜਾਣੂਕੋਸ਼
12. Minerals: ਖਣਿਜ
13. Mitosis: ਸਮਸੂਤਰੀ ਵਿਭਾਜਨ
14. Molecular Asymmetry: ਅਣਵੀ ਅਸਮਮਿਤਾ
15. Molecular orbit theory: ਅਣਵੀ ਆਰਬਿਟਲ ਸਿਧਾਂਤ
16. Molecular solids: ਅਣਵੀ ਠੋਸ
17. Molecular: ਅਣਵਿਕ
18. Multiple fission: ਬਹੁਖੰਡਨ
19. Natural Sciences: ਕੁਦਰਤੀ ਵਿਗਿਆਨ
20. Newtonian mechanics: ਨਿਊਟਨ ਦਾ ਯੰਤਰਕੀ ਸਿਧਾਂਤ
21. Non polar molecular solids: ਅਧੁਰਵੀ ਅਣਵੀ ਠੋਸ
22. Non-ideal solutions: ਅਣ-ਆਦਰਸ਼ਕ ਘੋਲ
23. Nuclear Model: ਨਾਭਿਕੀ ਮਾਡਲ
24. Octahedra: ਅੱਠਫਲਕੀ ਵਿੱਖਾਂ
25. Oestrus cycle: ਮਦ ਚੱਕਰ
26. Optics: ਪ੍ਰਕਾਸ਼ਕੀ
27. Osmotic pressure: ਪਰਾਸਰਣ ਦਾਬ
28. Ostwald process: ਓਸਟਵਾਲਡ ਪ੍ਰਕਿਰਿਆ
29. Outbreeding devices: ਬਾਹਰੀ ਪ੍ਰਜਣਨ ਢੰਗ
30. Ovaries: ਅੰਡਕੋਸ਼
31. Ovary: ਅੰਡਕੋਸ਼
32. Oviparous: ਅੰਡੇ ਦੇਣ ਵਾਲੇ ਜੀਵ
33. Ovulation: ਅੰਡ-ਉਤਸਰਜਨ
34. Ovule: ਅੰਡਾਣੂ
35. Oxidation number: ਔਕਸੀਕਰਣ ਸੰਖਿਆ
36. Oxidation state: ਔਕਸੀਕਰਣ ਅਵਸਥਾ
37. Ozone: ਓਜ਼ੋਨ
38. Para magnetism: ਅਨੁਚੁੰਬਕਤਾ
39. Parthenogenesis: ਨਿਸ਼ੇਚਨ ਰਹਿਤ
40. Penetrating ray: ਪਰਵੇਸ਼ਕੀ ਕਿਰਨ
41. Photoelectric effect: ਪ੍ਰਕਾਸ਼ ਬਿਜਲ ਪ੍ਰਭਾਵ
42. Photoelectric effect: ਫੋਟੋਇਲੈਕਟ੍ਰਿਕ ਪ੍ਰਭਾਵ
43. Physical quantities: ਭੌਤਿਕ ਰਾਸ਼ੀਆਂ
44. Physics: ਭੌਤਿਕੀ
45. Pollen grain: ਪਰਾਗਣ
46. Pollen-pistil interaction: ਪਰਾਗ-ਇਸਤਰੀਕੇਸਰ ਅੰਤਰ-ਕਿਰਿਆ
47. Pollination: ਪਰਾਗਣ
48. Poly-embryony: ਬਹੁਭਰੂਰਣਤਾ
49. Positron: ਪਾਜ਼ੀਟਰਾਨ
50. Pre fertilization: ਨਿਸ਼ੇਚਨ ਪੂਰਵ
51. Pregnancy: ਗਰਭ ਧਾਰਨ
52. Primary valence: ਪ੍ਰਾਇਮਰੀ ਸੰਯੋਜਕਤਾ



53. Pseudo solutions: ਆਭਾਸੀ ਠੋਸ
54. Pyro metallurgy: ਤਾਪ ਧਾਤਕਰਮ
55. Qualitative: ਗੁਣਤਾਮਕ
56. Quantitative: ਮਾਤਰਾਤਮਕ
57. Quantum Mechanics: ਕੁਆਂਟਮ ਭੌਤਿਕੀ
58. Reduction: ਨਿਊਨੀਕਰਨ
59. Reproduction: ਪ੍ਰਜਣਨ
60. Reverse osmosis: ਉਲਟ-ਕ੍ਰਮ ਪਰਾਸਰਣ
61. Rigid and deformable bodies: ਦ੍ਰਿੜ ਤੇ ਵਿਚੂਪਣਸ਼ੀਲ ਪਿੰਡ
62. Rocket propulsion: ਰਾਕੇਟ ਨੇਦਨ
63. Scientific Method: ਵਿਗਿਆਨਕ ਵਿਧੀ
64. Scrotum: ਪਤਾਲੂ ਥੈਲੀ
65. Semiconductors: ਅਰਧਚਾਲਕ
66. Seminiferous tubules: ਸੁਕਰਾਣੂਜਣਨ ਨਾਲੀਆਂ
67. Semipermeable membrane: ਅਰਧ ਪਾਰਗਮਨ ਝਿੱਲੀ
68. Semisynthetic polymers: ਅਰਧ ਸੰਸਲਿਸ਼ਤ ਬਹੁਲਕ
69. Sexual reproduction: ਲਿੰਗੀ ਪ੍ਰਜਣਨ
70. Shape selective catalysts: ਆਕਾਰਚੋਣਾਤਮਕ ਉਤਪ੍ਰੇਰਕ
71. Solid state: ਠੋਸ ਅਵਸਥਾ
72. Solubility: ਘੁਲਣਸ਼ੀਲਤਾ
73. Sound waves: ਧੁਨੀ ਤਰੰਗਾਂ
74. Spermatogenesis: ਸੁਕਰਾਣੂਜਣਨ
75. Sporulation: ਬੀਜਾਣੂਜਣਨ
76. Statistical mechanics: ਅੰਕਤਾ ਯੰਤਰਕੀ
77. Stimulated emission: ਉਦੀਪਤ ਉਤਸਰਜਨ
78. Super cooled liquids: ਅਤਿਸ਼ੀਤਿਤ ਦ੍ਰਵ
79. Superconductivity: ਅਤੀਚਾਲਕਤਾ
80. Syngamy: ਯੁਗਮਕ ਸੁਮੇਲ
81. Telescope: ਦੂਰਬੀਨ
82. Temperature: ਤਾਪਮਾਨ
83. Terrestrial: ਧਰਤ-ਸੰਬੰਧੀ
84. Testes: ਪਤਾਲੂ
85. Thalamus: ਪੁਸ਼ਪਆਸਨ ਜਾਂ ਪੁਸ਼ਪਦਲ
86. Theory of relativity: ਸਾਪੇਖਕਤਾ ਦਾ ਸਿਧਾਂਤ
87. Thermodynamics: ਥਰਮੋਡਾਇਨਾਮਿਕਸ
88. Transfer of heat: ਤਾਪ ਸਥਾਨਾਂਤਰਨ
89. Ultrafiltration: ਅਤਿਸੂਖਮ ਫਿਲਟਰੀਕਰਨ
90. Unification: ਏਕੀਕਰਨ
91. Unit cell: ਯੂਨਿਟ ਸੈੱਲ
92. Uterus: ਗਰਭਕੋਸ਼
93. Vagina: ਯੋਨੀ
94. Vapor pressure: ਵਾਸ਼ਪ ਦਾਬ
95. Viviparous: ਬੱਚੇ ਦੇਣ ਵਾਲੇ ਜੀਵ
96. Water hyacinth: ਜਲਕੁੰਡੀ
97. White phosphorous: ਸਫੇਦ ਫਾਸਫੋਰਸ
98. Womb: ਬੱਚੇਦਾਨੀ
99. Zoospores: ਅਲਿੰਗੀ ਚਲ ਬਿਜਾਣੂ
100. Zygote: ਗੁਗਮਜ

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## B.Sc. (Physics) Part-I ( Ist and Second Semester)

### SCHEME

#### SESSION 2020-21, 2021-22, 2022-23

Code	Title of Paper	No of Lectures	Max Marks			Examination Time (Hours)
			Total	Ext.	Int.	
<b>SEMESTER -I</b>						
Paper A	Mechanics-I	40	40	30	10	03 HRS.
Paper B	Vibrations and Waves-I	40	40	30	10	03 HRS.
Paper C	Electricity and Magnetism-I	40	40	30	10	03 HRS.
	Practicals	80	30	22	08	03 HRS.
<b>SEMESTER -II</b>						
Paper A	Mechanics-II	40	40	30	10	03 HRS.
Paper B	Vibrations and Waves-II	40	40	30	10	03 HRS.
Paper C	Electricity and Magnetism-II	40	40	30	10	03 HRS.
	Practicals	80	30	22	08	03 HRS.

#### **General Instructions**

- 1) There will be three papers of theory and one laboratory (practical) course.
- 2) The number of lectures per week will be three for each theory paper.
- 3) The number of lectures per week will be six for practicals.
- 4) The examination time for each theory will be 3 hours.
- 5) The examination time for practical will also be 3 hours.
- 6) The use of non programmable calculator will be allowed in the examination centre but this will not be provided by the University/College.
- 7) Each theory paper will consist of three sections A,B and C . Section C is compulsory
- 8) Use of scientific non programmable calculator is allowed in practicals also.

#### SECTION A

There will be four questions. Each question will carry five marks. Two questions are to be attempted

#### SECTION B

There will be four questions. Each question will carry five marks. Two questions are to be attempted.

#### SECTION C

There will be seven questions of short answer type covering the whole syllabi. Each question will carry two marks. Any five question to be attempted.

## Semester -I

### PAPER A: MECHANICS-I

Maximum Marks : External 30  
Internal 10  
Total 40

Time Allowed: 3 Hours  
Total Teaching hours: 40  
Pass Marks: 35 %

Out of 40 Marks, internal assessment (based on two mid-semester tests/ internal examination, written assignment/project work etc. and attendance) carries 10 marks, and the final examination at the end of the semester carries 30 marks.

#### Instruction for the Paper Setter

The question paper will consist of three sections A, B and C . Each of sections A and B will have four questions from respective sections of the syllabus. Section C will have 07 short answer type questions (Candidate is to attempt any five questions), which will cover the entire syllabus uniformly. Each question of sections A and B carry 05 marks. Section C will carry 10 marks of 2 marks each.

#### Instruction for the candidates

- 1) Candidates are required to attempt two questions each from section A and B, and the entire section C is compulsory and Consist of seven questions (Candidate is to attempt any five questions).
- 2) Use of non programmable calculator is allowed in the examination centre but this will not be provided by the University/College.

#### SECTION A

Cartesian and spherical polar co-ordinate systems, area, volume, displacement, velocity and acceleration in these systems, Solid angle, Various forces in Nature (brief introduction), Centre of mass, Equivalent one body problem, Central forces, Equation of motion under central force, Equation of orbit in inverse square, Force field and turning points, Kepler laws and their derivations.

#### SECTION B

Relationship of conservation laws and symmetries of space and time. Inertial frame of reference. Galilean transformation and invariance, Non-inertial frames of reference, Coriolis force and its applications. Variation of acceleration due to gravity with latitude. Foucault pendulum (qualitative). Elastic collision in Laboratory and C.M.system, velocities, angles and energies, Cross section of elastic scattering . Rutherford scattering (qualitative).

#### Text Books:

1. Mechanics : Berkeley Physics Course, vol. I by C.Kittel, W.D.Knight and M.A.Ruderman, Mc Graw-Hill Publication
2. Mechanics : H.S.Hans and S.P.Puri, Tata McGraw Hill, New Delhi

## Semester –I

### PAPER B: VIBRATIONS AND WAVES-I

Maximum Marks : External 30  
Internal 10  
Total 40

Time Allowed: 3 Hours  
Total Teaching hours: 40  
Pass Marks: 35 %

Out of 40 Marks, internal assessment (based on two mid-semester tests/ internal examination, written assignment/project work etc. and attendance) carries 10 marks, and the final examination at the end of the semester carries 30 marks.

#### Instruction for the Paper Setter

The question paper will consist of three sections A, B and C . Each of sections A and B will have four questions from respective sections of the syllabus. Section C will have 07 short answer type questions (Candidate is to attempt any five questions), which will cover the entire syllabus uniformly. Each question of sections A and B carry 05 marks. Section C will carry 10 marks of 2 marks each.

#### Instruction for the candidates

- 1) Candidates are required to attempt two questions each from section A and B, and the entire section C is compulsory and Consist of seven questions (Candidate is to attempt any five questions).
- 2) Use of non programmable calculator is allowed in the examination centre but this will not be provided by the University/College.

### SECTION A

Simple harmonic motion, energy of a Simple Harmonic Oscillation (SHO). Compound pendulum, Electrical oscillations. Transverse vibrations of a mass on a string, composition of two perpendicular SHM of same period and of period ratio 1 : 2. Anharmonic oscillations. Decay of free vibrations due to damping. Differential equation of motion, types of damping. Determination of damping co-efficient-logarithmic decrement, relaxation time and Q-Factor. Electromagnetic damping (Electrical oscillator).

### SECTION B

Differential equation for forced mechanical and electrical oscillators. Transient and steady state oscillation. Displacement and velocity variation with driving force frequency, variation of phase with frequency resonance, Power supplied to an oscillator and its variation with frequency, Q value of a forced oscillator and band width. Q-value as an amplification factor of low frequency response.

#### Text Books:

1. Physics of Vibrations and Waves by H.J.Pain, Wiley & Sons, New Delhi
2. Fundamentals of Vibrations and Waves by S.P.Puri, Tata McGraw Hill, New Delhi.
3. Waves and Oscillations, by E.Crawford, Berkeley Physics Course, McGraw-Hill Publications.

## Semester-I

### PAPER C: ELECTRICITY AND MAGNETISM-I

Maximum Marks:	External	30
	Internal	10
	Total	40

Time Allowed:	3 Hours
Total Teaching hours:	40
Pass Marks:	35 %

Out of 40 Marks, internal assessment (based on two mid-semester tests/ internal examination, written assignment/project work etc. and attendance) carries 10 marks, and the final examination at the end of the semester carries 30 marks.

#### Instruction for the Paper Setter

The question paper will consist of three sections A, B and C . Each of sections A and B will have four questions from respective sections of the syllabus. Section C will have 07 short answer type questions (Candidate is to attempt any five questions), which will cover the entire syllabus uniformly. Each question of sections A and B carry 05 marks. Section C will carry 10 marks of 2 marks each.

#### Instruction for the candidates

- 1) Candidates are required to attempt two questions each from section A and B, and the entire section C is compulsory and Consist of seven questions (Candidate is to attempt any five questions).
- 2) Use of non programmable calculator is allowed in the examination centre but this will not be provided by the University/College.

#### SECTION A

Basic ideas of Vector Calculus, Gradient, Divergence, curl and their physical significance, Laplacian in rectangular. Coulomb's Law for point charges and continuous distribution of charges. Electric field due to dipole line charge and sheet of charge. Electric flux. Gauss's Law and its applications. Gauss's divergence theorem and differential form of Gauss's Law. Green's's theorem.

#### SECTION B

Work and potential difference. Potential difference as line integral of electric field. Electric potential due to a point charge, a group or point charges, dipole and quadruple moments, long uniformly charged wire, charged disc. Stoke's theorem and its application in Electrostatic field, curl  $E=0$ . Electric field as gradient of scalar potential. Calculation of E due to a point charge and dipole from potential. Potential due to arbitrary charge distribution and multipole moments. Poisson and Laplace's Equation and their solutions in Cartesian and concept of electrical images. Calculation of electric potential and field due to a point charge placed near an infinitely conducting sheet.

#### Text Books:

1. Fundamentals of Electricity and Magnetism by Author F.Kipp.
2. Electricity and Magnetism. Berkeley Physics Course. Vol. II by E.M Purcell, McGraw-Hill, 1965.
3. Introduction to classical Electrodynamics by David Griffith.
4. EM waves and Radiating systems by Edward C. Jordan and K.G Balmain.

## B.Sc. (Physics)

### General Guidelines for Physics Practical Examination

Maximum Marks :	External	22
	Internal	08
	Total	30

1. The student will be asked to perform one experiment out of the experiments mentioned in syllabus.
2. The distribution of marks is as follows :
  - (i) One full experiment requiring the student to take some data, analyse it and draw conclusions-(candidates are expected to state their results with limits of error. (10)
  - (ii) Brief theory (04)
  - (iii) Viva-Voce (04)
  - (iv) Record(Practical File) (04)
3. There will be one session of 03 hours duration. The paper will consist of 06 experiments out of which an examinee will mark 04 experiments and one of these is to be allotted by the external examiner.
4. Number of candidates in a group for practical examination should not exceed 12.
5. In a single group no experiment be allotted to more than three students in any group.
6. The student should determine Standard Deviations and probable error in the calculations where needed.

### Semester- I

(75 Hours)

1. Analysis of experimental data by :
  - i) Fitting of given data to a straight line.
  - ii) Calculation of probable error.
2. To establish relationship between torque and angular acceleration using fly wheel and hence to find inertia of flywheel.
3. To determine the Young's Modulus by bending of beam.
4. To study one-dimensional collision using two hanging spheres of different materials.
5. Determination of Poisson's ratio for rubber.
6. Study the dependence of moment of inertia on distribution of mass (by noting time periods of oscillations) using objects of various geometrical shapes but of same mass.
7. To set up CRO for Sine and Square wave and to find their frequency and amplitude.
8. Study the dependence of solenoidal field on number of turns and current.
9. To study the magnetic field produced by a current carrying solenoid using a search coil and to find the value of permeability of air.
10. To determine the value of air capacitance by de-Sauty method and to find the permittivity of air and also to determine the dielectric constant of medium.
11. To study the efficiency of an electric kettle/heater element with varying input voltages.
12. To study the working of energy meter.

### Text and Reference Books:

1. B.Sc. Practical Physics, By C.L.Arora, S.Chand & Co.
2. A Laboratory Manual of Physics for undergraduate classes by D.P.Khandelwal

## Semester –II

### PAPER A: MECHANICS-II

Maximum Marks : External 30  
Internal 10  
Total 40

Time Allowed: 3 Hours  
Total Teaching hours: 40  
Pass Marks: 35 %

Out of 40 Marks, internal assessment (based on two mid-semester tests/ internal examination, written assignment/project work etc. and attendance) carries 10 marks, and the final examination at the end of the semester carries 30 marks.

#### Instruction for the Paper Setter

The question paper will consist of three sections A, B and C . Each of sections A and B will have four questions from respective sections of the syllabus. Section C will have 07 short answer type questions (Candidate is to attempt any five questions), which will cover the entire syllabus uniformly. Each question of sections A and B carry 05 marks. Section C will carry 10 marks of 2 marks each.

#### Instruction for the candidates

- 1) Candidates are required to attempt two questions each from section A and B, and the entire section C is compulsory and Consist of seven questions (Candidate is to attempt any five questions).
- 2) Use of non programmable calculator is allowed in the examination centre but this will not be provided by the University/College.

#### SECTION A

Rigid body motion: Rotational motion, principal moments and axes. Euler's equations; precession and elementary gyroscope. Galilean transformation and Invariance, Non-Inertial frames, concept of stationary universal frame of reference and ether. Michelson-Morley experiment and its result.

#### SECTION B

Postulates of special theory of relativity. Lorentz transformations, Observer and viewer in relativity. Relativity of simultaneity. Length, Time, Velocities, Relativistic Doppler effect. Variation of mass with velocity, mass-energy equivalence, rest mass in an inelastic collision, Relativistic momentum and energy, their transformation, concepts of Minkowski space, four vector formulation.

#### Text Books:

1. Mechanics : Berkeley Physics Course, vol. I by C.Kittel, W.D.Knight and M.A.Ruderman, Mc Graw-Hill Publication
2. Mechanics : H.S.Hans and S.P.Puri, Tata Mc Graw Hill Publication, New Delhi

## Semester -II

### PAPER B: VIBRATIONS AND WAVES-II

Maximum Marks : External 30  
Internal 10  
Total 40

Time Allowed: 3 Hours  
Total Teaching hours: 40  
Pass Marks: 35 %

Out of 40 Marks, internal assessment (based on two mid-semester tests/ internal examination, written assignment/project work etc. and attendance) carries 10 marks, and the final examination at the end of the semester carries 30 marks.

#### Instruction for the Paper Setter

The question paper will consist of three sections A, B and C . Each of sections A and B will have four questions from respective sections of the syllabus. Section C will have 07 short answer type questions (Candidate is to attempt any five questions), which will cover the entire syllabus uniformly. Each question of sections A and B carry 05 marks. Section C will carry 10 marks of 2 marks each.

#### Instruction for the candidates

- 1) Candidates are required to attempt two questions each from section A and B, and the entire section C is compulsory and Consist of seven questions (Candidate is to attempt any five questions).
- 2) Use of non programmable calculator is allowed in the examination centre but this will not be provided by the University/College.

#### SECTION A

Stiffness coupled oscillators. Normal co-ordinates and normal modes of vibration. Inductance coupling of electrical oscillators, Types of waves, Wave equation (transverse) and its solution, The string as a forced oscillator, Characteristic impedance of a string. Impedance matching. Reflection and transmission of energy, Reflection and Transmission Energy, Reflection and transmission of string, wave and group velocity. Standing waves on a string of fixed length. Energy of vibrating energy string,wave and group velocity.

#### SECTION B

Physical interpretation of Maxwell's equations. Electromagnetic waves and wave equation in a medium having finite permeability and permittivity but with conductivity  $\sigma=0$ . Pointing vector. Impedance of a dielectric to EM waves, EM waves in a conducting medium and skin depth. EM waves velocity in a conductor an anomalous dispersion. Response of a conducting medium of EM waves. Reflection and transmission of EM waves at a boundary of two dielectric media for normal incidence. Reflection of EM waves from the surface of a conductor at normal incidence.

#### Text Books:

1. Fundamentals of Vibrations and Waves by S.P.Puri, Tata McGraw Hill, New Delhi.
2. Physics of Vibrations and Waves by H.J.Pain, Wiley & Sons, New Delhi
3. Waves and Oscillations, by E.Crawford, Berkeley Physics Course, McGraw-Hill Publications, New Delhi.
4. EM Waves and Radiating Systems by Edward C.Jordan and K.G.Balmain, Prentice Hall of India, New Delhi.

## Semester-II

### PAPER C: ELECTRICITY AND MAGNETISM-II

Maximum Marks:	External	30
	Internal	10
	Total	40

Time Allowed: 3 Hours  
Total Teaching hours: 40  
Pass Marks: 35 %

Out of 40 Marks, internal assessment (based on two mid-semester tests/ internal examination, written assignment/project work etc. and attendance) carries 10 marks, and the final examination at the end of the semester carries 30 marks.

#### Instruction for the Paper Setter

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from respective sections of the syllabus. Section C will have 07 short answer type questions (Candidate is to attempt any five questions), which will cover the entire syllabus uniformly. Each question of sections A and B carry 05 marks. Section C will carry 10 marks of 2 marks each.

#### Instruction for the candidates

- 1) Candidates are required to attempt two questions each from section A and B, and the entire section C is compulsory and Consist of seven questions (Candidate is to attempt any five questions).
- 2) Use of non programmable calculator is allowed in the examination centre but this will not be provided by the University/College.

#### SECTION A

Current and current density, equation of continuity. Microscopic form of Ohm's Law. ( $J = \sigma E$ ) and conductivity. Failure of Ohm's Law. Invariance of charge.  $E$  in different frames of reference. Field of a point charge moving with constant velocity. Interaction between moving charges and force between parallel currents. Behaviour of various substances in magnetic field. Definition of  $M$  and  $H$  and their relation to free and bound currents. Permeability and susceptibilities and their inter-relationship. Orbital motion of electrons and diamagnetism. Electron spin and paramagnetism. Ferromagnetism. Domain theory of Ferromagnetism. Hysteresis Loss. Magnetisation curve. Ferrites..

#### SECTION B

Lorentz's force. Definition of  $B$ . Biot Savart's Law and its applications to long straight wire, circular current loop and solenoid. Ampere's Circuital law and its application. Divergence and curl of  $B$ . Hall effect expression and co-efficient. Vector potential, Definition and derivation of current density-definition its use in calculation or change in magnetic field at a current sheet. Transformation equation of  $E$  and  $B$  from one frame to another. Faraday's Law of EM induction. Displacement current. Maxwell's equations. Mutual inductance and reciprocity theorem. Self inductance  $L$  for solenoid. Coupling of Electrical circuits. Analysis of LCR series and parallel resonant circuits.  $Q$ -factor. Power consumed power factor..

#### Text Books:

1. Fundamentals of Electricity and Magnetism by Author F.Kipp.
2. Electricity and Magnetism. Berkeley Physics Course. Vol. II by E.M Purcell, McGraw-Hill, 1965.
3. Introduction to classical Electrodynamics by David Griffith.
4. EM waves and Radiating systems by Edward C. Jordan and K.G Balmain.

## **B.Sc. (Physics)**

### **General Guidelines for Physics Practical Examination**

Maximum Marks :	External	22
	Internal	08
	Total	30

1. The student will be asked to perform one experiment out of the experiments mentioned in syllabus.
2. The distribution of marks is as follows :
  - (i) One full experiment requiring the student to take some data, analyse it and draw conclusions-(candidates are expected to state their results with limits of error. (10)
  - (ii) Brief theory (04)
  - (iii) Viva-Voce (04)
  - (iv) Record(Practical File) (04)
3. There will be one session of 03 hours duration. The paper will consist of 08 experiments out of which an examinee will mark 06 experiments and one of these is to be allotted by the external examiner.
4. Number of candidates in a group for practical examination should not exceed 12.
5. In a single group no experiment be allotted to more than three students in any group.
6. The student should determine Standard Deviations and probable error in the calculations where needed.

### **Practical Semester II**

**(75 hours)**

1. To study the variation of time period with distance between centre of suspension and centre of gravity for a bar pendulum and to determine
  - i) Radius of gyration of bar pendulum about an axis through its Centre of Gravity and perpendicular to its length.
  - ii) Value of Centre of Gravity,  $g$ .
2. Determination of  $g$  by Kater's pendulum.
3. Determination of modulus of rigidity of material of a wire using Maxwell's needle.
4. Measurement for logarithmic decrement, co-efficient of damping, relaxation time and quality factor of a damped simple pendulum.
5. To determine the frequency of AC mains using a sonometer and an electro magnet.
6. To determine the low resistance using Carey Foster Bridge.
7. Determination of unknown capacitance by flashing and quenching of neon lamp.
8. Study the phase relationships between voltage and current using impedance triangle.
9. To study the resonance in series and parallel LCR circuits for different resistances and calculate Q-value.
10. To determine the given inductance by Anderson's bridge.
11. Verify laws of electromagnetic induction.
12. To study the induced emf as function of velocity.

### **Text and Reference Books:**

1. B.Sc. Practical Physics, By C.L.Arora, S.Chand & Co.
2. A Laboratory Manual of Physics for undergraduate classes by D.P.Khandelwal

**B.SC. (PHYSICS) PART-I (Ist & IInd SEMESTER  
SESSION 2020-21, 2021-22, 2022-23**

**PAPER A : Mechanics -I**

**PAPER A : Mechanics-II**

- 1 Dr. Manjitinder Kaur,  
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- 2 Dr. Makhan Singh,  
Department of Physics, Govt. Rajindra College, Bathinda.  
Mobile No : 98154-92001
- 3 Dr. Gurdeep Singh Sekhon  
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- 4 Dr. Harvinder Singh ,  
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Mobile No 95017-58600
- 5 Surinder Singla  
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- 6 Dr. Baljit Singh,  
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**PAPER B : VIBRATIONS AND WAVES-I**

**PAPER B : VIBRATIONS AND WAVES-II**

- 1 Dr. Manju Midha,  
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- 2 Dr. Harvinder Singh,  
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- 4 Dr. Meera Rani,  
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**Paper C Electricity and Magnetism-II**

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