

**B.Sc.-II (Chemistry) Semester III & IV**  
**2021-22**

**SEMESTER III**

Paper	Title	Max. Marks	Sem. Paper	Int. Asstt.	Pass Percentage
I	INORGANIC CHEMISTRY	35	26	09	35%
II	ORGANIC CHEMISTRY	35	26	09	35%
III	PHYSICAL CHEMISTRY	35	26	09	35%
I	PRACTICAL CHEMISTRY-I	45	16 (Pass Marks)		35%

**SEMESTER IV**

Paper	Title	Max. Marks	Sem. Paper	Int. Asstt.	Pass Percentage
I	INORGANIC CHEMISTRY	35	26	09	35%
II	ORGANIC CHEMISTRY	35	26	09	35%
III	PHYSICAL CHEMISTRY	35	26	09	35%
I	PRACTICAL CHEMISTRY-II	45	16 (Pass Marks)		35%

**B.Sc.-II (Chemistry) 2021-22, 2022-23 & 2023-24**

**CHEMISTRY**  
**SEM-III**

**PAPER-I**  
**INORGANIC CHEMISTRY**

Max Marks : 35  
Semester Paper : 26  
Internal Assessment: 9  
Pass Marks : 35%

30 hours  
Time allowed - 3 hrs  
3 period/week

**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 section of the syllabus and will carry 4 marks each. Section C will consist of 5 short answer questions that will cover the entire syllabus and will be of 2 marks each. Use of scientific non-programmable calculator is allowed.

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions selecting two questions from each of A & B Sections and Section C 9th question being compulsory.

**SECTION-A**

**I. Chemistry of Elements of First Transition Series**

Characteristic properties of d-block elements. Properties of the elements of the first transition series, their simple compounds and complexes illustrating relative stability of their oxidation states, coordination number and geometry. (10 Hrs.)

  
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## II. Chemistry of Lanthanide Elements

Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, occurrence and isolation of lanthanide compounds. (5 Hrs.)

### SECTION-B

## III. Chemistry of Elements of Second and Third Transition Series

General characteristics, comparative treatment with their 3d-analogues in respect of ionic radii, oxidation states. Magnetic behaviour, spectral properties & stereochemistry (10 Hrs.)

## IV. Chemistry of Actinides Elements

General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from U, similarities between the later actinides and the later lanthanides. (5 Hrs.)

## CHEMISTRY SEM-III

### PAPER II : ORGANIC CHEMISTRY

Max Marks : 35  
Semester Paper : 26  
Internal Assessment: 9  
Pass Marks : 35%

30 hours  
Time allowed - 3 hrs  
3 period/week

### 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 section of the syllabus and will carry 4 marks each. Section C will consist of 5 short answer questions that will cover the entire syllabus and will be of 2 marks each. Use of scientific non-programmable calculator is allowed.

### INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions selecting two questions from each of A & B Sections and Section C 9th question being compulsory.

#### Section - A

##### I. Alcohols

Classification and nomenclature.

Monohydric Alcohols-nomenclature, methods of formation by reduction of aldehydes, ketone, carboxylic acids and esters. Hydrogen bonding, Acidic nature, Reactions of alcohols.

Dihydric alcohols-nomenclature, methods of formation, chemical reactions of vicinal glycols-nomenclature, methods of formation chemical reaction of vicinal glycols, oxidative cleavage with  $[Pb(OAc)_4]$  and  $HIO_4$  and Pinacol-Pinacolone rearrangement.

Trihydric alcohol-nomenclature, methods of formation and chemical reactions of

glycerol.

(7 Hrs.)

## II.- Phenols

Nomenclature, structure and bonding. Preparation of Phenols, physical properties and acidic character. Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols-electrophilic aromatic substitution, acylation and carboxylation Mechanisms of Fries rearrangement. Gatterman synthesis, Hauben. Hostch reaction. Lederer-Mianasse reaction and Reimer-Tiemann reaction.

(8 Hrs.)

## Section - B

## III. Aldehydes and Ketones

Nomenclature and structure of the carbonyl group, Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1,3- dithianes, synthesis of ketones from nitrites and from carboxylic acids. Physical properties and Mechanism of nucleophilic addition to carbonyl group with particular emphasis of Benzoin, Aldol, Perkin and Knoevenagel condensations, Condensation with ammonia and its derivatives, Wittig reaction, and Mannich reaction.

Use of acetals as protecting group. Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizzaro reaction, MPV (Meerwein Ponderoff Vorley) reaction, Clemmensen, Wolff-Kishner,  $\text{LiAlH}_4$  and  $\text{NaBH}_4$  reductions. Halogenation of enolizable ketones.

An Introduction to  $\alpha$ ,  $\beta$  unsaturated aldehydes and ketones, Michael addition.

(15 Hrs.)

## CHEMISTRY SEM-III

### PAPER III : PHYSICAL CHEMISTRY

Max Marks : 35  
Semester Paper : 26  
Internal Assessment: 9  
Pass Marks : 35%

30 hours  
Time allowed - 3 hrs  
3 period/week

### 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 section of the syllabus and will carry 4 marks each. Section C will consist of 5 short answer questions that will cover the entire syllabus and will be of 2 marks each. Use of scientific non-programmable calculator is allowed.

### INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions selecting two questions from each of A & B Sections and Section C 9th question being compulsory.

## Section - A

### I. Thermodynamics-I

Definition of thermodynamics terms: system, surroundings. Types of systems, intensive and extensive properties. State and path functions and their differentials, Thermodynamic processes, Concept of heat and work, elementary idea of thermochemistry.

First Law of Thermodynamics : statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law. Joule Thomson coefficient and inversion temperature, Calculation of  $w$ ,  $q$ ,  $dU$  &  $dH$  for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process.

(10 Hrs.)

### II. Thermodynamics-II- (Part-a)

Second law of thermodynamics: need for the law, different statements of the law. Carnot cycle and its efficiency, Carnot theorem. Thermodynamic scale of temperature.

(5 Hrs.)

## SECTION-B

### III. Thermodynamics-II- (Part-b)

Concept of entropy as a state function, entropy as a function of  $V$  &  $T$ , entropy as a function of  $P$  &  $T$ , entropy change in physical change, Clausius inequality, entropy as a criterion of spontaneity and equilibrium. Entropy change in ideal gases mixing of gases.

(5 Hrs.)

### IV. Thermodynamics-III

Third law of thermodynamics, Nernst heat theorem, statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data, Gibbs and Helmholtz functions; Gibbs function ( $G$ ) and Helmholtz function ( $A$ ) as thermodynamic quantities.  $A$  &  $G$  as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of  $G$  and  $A$  with  $P$ ,  $V$  and  $T$ .

(5 Hrs.)

### V. Chemical Equilibrium

Equilibrium constant and free energy, Thermodynamic derivation of law of mass action. Le Chatelier's principle.

Reaction isotherm and reaction isochore-Clapeyron equation and Clausius-Clapeyron equation.

(5 Hrs.)

  
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**B.Sc.-II**  
**PRACTICALS CHEMISTRY-I**  
**Sem.-III**

Max. Marks: 45  
Time: 4 Hrs.  
Pass Percentage: 35%

6 Periods/week

**\*Volumetric Analysis and TLC**

**Volumetric Analysis**

- (a) Determination of acetic acid in commercial vinegar using NaOH, Alkalinity of water sample.
- (b) Determination of alkaline content of antacid.
- (c) Estimation of calcium content in chalk as calcium oxalate by permanganometry .
- (d) Estimation of hardness of water by EDT A.
- (e) Estimation of ferrous and ferric by dichromate method.
- (f) Estimation of copper using sodium thiosulphate.

**Organic Chemistry**

**Laboratory Techniques**

Thin Layer Chromatography

Determination of  $R_f$  values of different components.

- (a) Separation of green leaf pigments (spinach leaves may be used)
- (b) Preparation and separation of 2, 4-dinitrophenylhydrazones of acetone, benzophenone and cyclohexanone using toluene and light petroleum mixture (40 : 60).
- (c) Separation of a mixture of dyes.

**PRACTICALS**

**INSTRUCTIONS FOR EXAMINERS AND CANDIDATES**

The practical examination will be held in single session (morning/evening). Candidates are required to perform practicals from volumetric Analysis and TLC. Distribution of marks will be as under (Books may be consulted):

(1)	Volumetry analysis	=	20 marks
			{Initial write up 7 marks (Volumetry; equation:1, Indicator:1, end point:1 and general calculations:4) Performance and results 13 marks (initial burette reading:2, final reading:2, end point:2 calculations and result:7)}
(2)	TLC	=	10 marks (Performance and result)
(3)	Viva-Voce	=	10 marks
(4)	Note Books	=	5 marks
	<b>Total</b>	=	<b>45 marks</b>

**CHEMISTRY**  
**SEM-IV**

**PAPER I : INORGANIC CHEMISTRY**

Max Marks : 35  
Semester Paper : 26  
Internal Assessment: 9  
• Pass Marks : 35%

30 hours  
Time allowed - 3 hrs  
3 period/week

**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 section of the syllabus and will carry 4 marks each. Section C will consist of 5 short answer questions that will cover the entire syllabus and will be of 2 marks each. Use of scientific non-programmable calculator is allowed.

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions selecting two questions from each of A & B Sections and Section C 9th question being compulsory.

**Section - A**

**I. Coordination Compounds**

Werner's coordination theory and its experimental verification, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory of transition metal complexes. (10 Hrs.)

**II. Oxidation and Reduction**

Use of redox potential data-analysis of redox cycle, redox stability of water-Frost, Latimer and Pourbaix diagrams. Principles involved in the extraction of the elements. (5 Hrs.)

**Section - B**

**III. Acids and Bases**

Arrhenius, Bronsted-Lowry, the Lux-Flood solvent system and Lewis concepts of acids and bases. (7Hrs.)

**IV. Non-aqueous Solvents**

Physical properties of a solvent, types of solvents and their general characteristics, reaction in non-aqueous solvents with reference to liquid  $\text{NH}_3$  and liquid  $\text{SO}_2$  (8 Hrs.)

  
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**CHEMISTRY  
SEM-IV**

**PAPER II : ORGANIC CHEMISTRY**

**Max Marks : 35  
Semester Paper : 26  
Internal Assessment: 9  
Pass Marks : 35%**

**30 hours  
Time allowed - 3 hrs  
3 period/week**

**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 section of the syllabus and will carry 4 marks each. Section C will consist of 5 short answer questions that will cover the entire syllabus and will be of 2 marks each. Use of scientific non-programmable calculator is allowed.

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt five questions selecting two questions from each of A & B Sections and Section C 9th question being compulsory.

**Section - A**

**I. Carboxylic Acids**

Nomenclature, structure and bonding. physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Preparation of carboxylic acids, Reactions of amides, Reactions of carboxylic acids, Mechanism of decarboxylation.

Methods of formation and chemical reactions of Halo acids and Hydroxyacids. Maleic acid, tartaric acid and citric acid. (Structural Formula only).

Methods of formation and chemical reaction of unsaturated monocarboxylic acids. Dicarboxylic acids, methods of formation and effect of heat and dehydrating agents. (10 Hrs.)

**II. Carboxylic Acid Derivatives**

Structure and nomenclature of acid chlorides, esters. amides and acid anhydrides. Relative stability and reactivity of acyl derivatives.

Physical properties, interconversion of acid derivatives by nucleophilic acyl substitution.

Preparation of carboxylic derivatives, chemical reactions, Mechanism of esterification and hydrolysis (acidic and Basic). (5 Hrs.)

**SECTION-B**

**III. Ethers and Epoxides**

Nomenclature of ethers and methods of their formation, physical properties, Chemical reactions-cleavage and autooxidation, Ziesel's Method.

Synthesis of epoxides, acid and base catalysed ring opening of epoxide, orientation of ring opening reactions of Grignard and organolithium reagents with epoxide. (3 Hrs.)

#### IV. Fats, Oils and Detergents

Natural fats, edible and industrial oils of vegetable origin, common fatty acids, glycerides, hydrogenation of unsaturated oils. Saponification value, iodine value, acid value. Soaps, synthetic detergents, alkyl and aryl sulphonates. (3 Hrs.)

#### V. Organic Compounds of Nitrogen

##### a) Nitro Compounds

Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanism of nucleophilic substitution in nitroarenes and their reactions in acidic, neutral and alkaline media, Picric acid. (4 Hrs.)

##### b) Amines

Reactivity, structure and nomenclature of amines, physical properties. Stereochemistry of amines. Separation of mixture of primary, secondary and tertiary amines. Structural features affecting the basicity of amines. Amine salts as phase-transfer catalyst and preparation of alkyl and aryl amines (reduction of nitro compounds and nitriles), reductive amination of aldehydic and ketonic compounds Gabriel-phthalimide reaction, Hoffmann bromamide reaction. (5 Hrs.)

### CHEMISTRY SEM-IV

#### PAPER III : PHYSICAL CHEMISTRY

Max Marks : 35  
Semester Paper : 26  
Internal Assessment: 9  
Pass Marks : 35%

30 hours  
Time allowed - 3 hrs  
3 period/week

#### 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 section of the syllabus and will carry 4 marks each. Section C will consist of 5 short answer questions that will cover the entire syllabus and will be of 2 marks each. Use of scientific non-programmable calculator is allowed.

#### INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions selecting two questions from each of A & B Sections and Section C 9th question being compulsory.

#### Section - A

##### I. Phase Equilibrium

Statement and meaning of the terms-phase, component and degree of freedom, derivation of Gibbs phase rule; phase equilibria of one component system-water and S systems.

Phase equilibria of two component systems-solid-liquid equilibria, simple eutectic Pb-Ag systems, desilverisation of lead.

Solid Solutions-compound formation with congruent melting point (Mg-Zn) and incongruent melting point, (NaCl-H<sub>2</sub>O), (FeCl<sub>3</sub>-H<sub>2</sub>O) systems. Freezing mixtures,



acetone-dry ice.

Partially miscible liquids: Lower and upper consolute temperature, Effect of impurity on consolute temperature. Immiscible liquids, steam distillation.

Nernst distribution law, thermodynamic derivation & applications. (10 Hrs.)

## II. Electrochemistry-I (a)

Electrical transport-conduction in metals and in electrolyte solutions, specific conductance and equivalent conductance with dilution.

Migration of ions and Kohlrausch law. Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's dilution law, its uses and limitations. Debye-Huckel-Onsagar's equation for strong electrolytes (elemental treatment only). (5 Hrs.)

## SECTION-B

## III. Electrochemistry-I (b)

Transport number, definition and determination by Hittorf method and moving boundary method. Applications of conductance measurements: determination of degree of dissociation, determination of  $K_a$  of acids, determination of solubility product of a sparingly soluble salts, conductometric titrations. (5 Hrs.)

## IV. Electrochemistry-II

Types of reversible electrodes--gas-metal ion, metal-metal ion, metal-insoluble salt-anion and redox electrodes. Electrode reactions, Nernst equation, derivation of cell E.M.F. and single electrode potential, standard hydrogen electrode-reference electrodes-standard electrode. potential, sign conventions, electrochemical series and its significance.

Electrolyte and Galvanic cells-reversible and irreversible cells, conventional representation of electrochemical cells.

EMF of a cell and its measurements, Computation of cell EMF. Calculation of thermodynamic quantities of cell reaction ( $G$ ,  $H$  and  $K$ ), polarization, over potential and hydrogen over voltage.

Concentration cell with and without transport, liquid junction potential, application of concentration cells, valency of ions, solubility product and activity coefficient potentiometric titrations.

Definition of pH and pK., determination of pH using hydrogen, quinhydrone and glass electrodes, by potentiometric methods.

Buffers--mechanism of buffer action, Henderson-Hassel equation, Hydrolysis of salts, Corrosion-types, theories and methods of combating it. (10 Hrs.)

## B.Sc.-II PRACTICALS CHEMISTRY-II Sem.-IV

Max. Marks: 45

6 Periods/week

Time: 4 Hrs.

Pass marks: 35%

### Qualitative Analysis

Detection of elements (N, S and halogens) and functional groups (phenolic, carboxylic, carbonyl, esters, carbohydrates, amines, amides, nitro and anilide) in

simple organic compounds.

### Physical Chemistry

1. To determine the solubility of benzoic acid at different temperatures and to determine  $\Delta H$  of the dissolution process.
2. To determine the enthalpy of neutralisation of a weak acid/weak base versus strong base/strong acid and determine the enthalpy of ionisation of the weak acid/weak base.
3. To determine the enthalpy of solution of solid calcium chloride.

### INSTRUCTIONS FOR EXAMINERS AND CANDIDATES

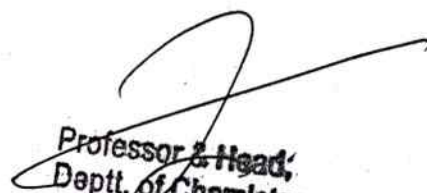
The practical examination will be held in single session (morning/evening). Candidates are required to perform practicals from Qualitative Organic Analysis and Physical Chemistry Experiments. Distribution of marks will be as under (Books may be consulted):

(1)	Organic Qualitative Analysis	=	15 marks (Detection of elements identification and confirmation of functional group by 2 confirmatory tests.)
(2)	Physical Chemistry Experiment	=	15 marks {Initial Write up 5 marks (Theory/principle:1, Procedure:2, General Calculations:2) Performance and result: 10 marks (Full credit up to 10% error)}
(3)	Viva-Voce	=	10 marks
(4)	Note Books	=	5 marks
	<b>Total</b>	=	<b>45 marks</b>

### BOOKS SUGGESTED (THEORY COURSES)

1. *Basic Inorganic Chemistry*. F.A. Cotten. G. Wilkinson and P.L. Gaus. Wiley.
2. *Concise Inorganic Chemistry*. 1.D. Lee. ELBS.
3. *Concepts of Models of Inorganic Chemistry*. B. Doaglas. D. McDaniel and 1. Alexander, John Wiley.
4. *Inorganic Chemistry*. D.E. Shriver, P. W. Aikins and C.H. Langford. <Oxford.
5. *Inorganic Chemistry*. W. W. Porterfield Addison. Wesley.
6. *Inorganic Chemistry*. A.G. Sharpe, ELBS.
7. *Inorganic Chemistry*. G.L. Miessler and O.A. Tarr, Prentice Hall.
8. *Organic Chemistry*. Morrison and Boyd, Prentice Hall.
9. *Organic Chemistry*. L.G. Wade Jr. Prentice Hall.
10. *Fundamentals of Organic Chemistry*. Solomons, John Wiley.
11. *Organic Chemistry*. Vol. I, II & III. S.M. Mukherji, S.P. Singh and R.P. Kapoor, Wiley Eastern Ltd. (New Age International)
12. *Organic Chemistry*. F.A. Aarey, McGraw Hill India.
13. *Introduction to Organic Chemistry*. Stretwieser, Heathcock and Kosover, Machmilan.
14. *Physical Chemistry*. G.M. Barrow, International Student Edition. McGraw Hill.
15. *Basic Programming with Application*. V.K. Jain, I'ata McGraw Hill.
16. *Computers and Common. Sense*. B. Ryal and Shely, Prentice Hall.

17. *University General Chemistry*. C.N.B. Rao. Macmillan.  
18. *Physical Chemistry*. R.A. Alberty, Wiley Eastern Ltd.  
19. *The Elements of Physical Chemistry*, P.w. Aikins, Oxford.  
20. *Physical Chemistry Through Problems*. S.K. Dogra and S. Dogra. Wiley Eastern Ltd.



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**BAP 201 : C PROGRAMMING AND DATA STRUCTURES**

**External Marks: 45**

**Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 35%**

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

**Internal Assessment: 15**

**For Distance Education Students**

**External Marks: 60**

**Minimum Pass Marks: 35%**

**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**

**Overview of C Language:** C Fundamental : Introduction to C, character set, identifiers, keywords, data types, constants, variable, user defined data types, arithmetic, unary, relational, logical, assignment and conditional operators & expression. Basic structure of a C program. Data I/O statement : single character I/O, formatted I/O, string I/O functions.

**Control Structure:** sequencing, alteration (if-else, switch, break, continue, go to, iteration while, do-while, for) and nested loops.

**Functions:** Defining and accessing a function, passing arguments to a function, specifying arguments data types, function prototypes, recursion.

Storage Classes- Automatic, External, Static, Register.

**Pointers and Structures:** Character pointers, pointer to arrays, array of pointers. Structure and Unions : Defining and processing structure, Unions Preprocessor Directives.

**SECTION-B**

**Basic Notations and Array (Data Structure):** Basic concept and notations, data structures, Types of data structure and data structure operations, mathematical notation and functions, algorithmic complexity, Big 'O' notation and time space trade off. Arrays: Linear array, Representation of Linear array in memory, Traversing Linear array, Insertion and deletion in an array, Multi-dimensional array: Row-Major, Column Major order, space array.

**Stacks:** Push and Pop in Stack. Representation of stack in memory (Using Arrays)

**Queues:** Insertion and deletion operations.

**Searching Techniques:** Linear and binary search

**Sorting Techniques:** Insertion sort, selection sort, bubble sort, merge sort, quick sort.

**Text Books:**

1. Byron Gottfried ,Programming with C, Second edition, Schaum' s outline series, TMH.
2. Vishal Goyal, Lalit Goyal, Pawan Kumar, A Simplified Approach to Data Structures, Shiroff Publications.
3. Shubhnandan S. Jamwal, Programming in C, Pearson Publications.

**Reference Books:**

1. Seymour Lipschutz, Theory & Practice of Data Structures, McGraw Hill, 1988.
2. B.W. Kerrighan and D.M. Ritchie, The C programming language, PHI
3. Vikram Gupta and S. S. Bhatia, Programming Fundamentals through C Language, Kalyani Publishers.

## BAP 202: PRACTICAL BASED ON PAPER BAP 201

**Max. Marks :40**  
**Min. Pass Marks: 35%**  
**For Distance Education Students**  
**External Marks:60**  
**Minimum Pass Marks:35%**

**Maximum Time: 3 hours**  
**Practical units to be conducted: 45-55 Hrs**

The laboratory course will comprise of exercise to supplement what is learnt under Paper BAP 201: C Programming & Data Structures.

### Detailed Syllabus

1. Programs to be implemented in C language such as  
Programs to be implemented in C language such as
  - (a) to find the sum of digits of a given number.
  - (b) to find the sum of odd numbers and sum of even numbers from the numbers entered through the keyboard.
  - (c) to check whether a given number is prime or not.
  - (d) Conversion from one number system to another number system.
2. Programs related to array such as:
  - (a) to find the maximum and minimum in a given array
  - (b) for matrix multiplication, addition, subtraction, etc.
3. Programs related to function, structures, pointers
  - (a) all the programs should be written with the help of user defined functions.
  - (b) String processing with the help of pointers.
  - (c) Simple programs using structures, such as printing the merit list of the students record.
4. Programs related to searching and storing.

All the techniques to be implemented in C Language which are taught in theory paper BAP 210: C Programming and data structure.

The break up of marks for the practical will be as under :

Lab Record	:	10 Marks
Viva Voce	:	10 Marks
Program Development And Execution	:	20 Marks



**BAP 203: DATABASE MANAGEMENT SYSTEM**

**External Marks: 45**

**Minimum Pass Marks: 35%**

**Internal Assessment: 15**

**For Distance Education Students**

**External Marks:60**

**Minimum Pass Marks:35%**

**Maximum Time: 3 Hrs.**

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

**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 question 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**

**Traditional file procession system:** Characteristics, limitation. **Database:** Definition, composition, **Database Management System :** Definition, Characteristic advantages over traditional file processing system, Implication Database approach, Uses of database, DBA and its responsibilities Database schema, instance.

**DBMS architecture,** data independence, mapping between different levels.

**Database language :** DDL, DML, DCL.

**Database utilities,** Data Models, Keys : Super, candidate, primary, unique, foreign.

**Entity relationship model :** concepts, mapping cardinalities, entity relationship diagram, weak sets, strong entity sets, aggregation, generalization, converting ER diagram to tables.

**Relational Algebra :** Basic operations, additional operations.

**SECTION-B**

**Database design:** Functional dependency, decomposition, problem arising out of bad database design, normalization, multi-valued dependency. **Database design process,** database protection, database integrity, **Database concurrency:** Problems arising out of concurrency, methods of handling concurrency. **Data recovery,** database security: Authentication, authorization, methods of implementing security.

**MS-Access:** Introduction to MS-Access, working with database and tables, queries in Access, Applying integrity constraints, Introduction to forms, sorting and filtering controls, Reports and Macro: Creating reports using Macros.

**Text Book:**

- 1.C.J. Date, An Introduction to Database Systems, Narosa Publishers.

**Reference Books:**

1. Siberscharts, Korth and Sudarshan, "Database Concepts", Mcgraw Hill Publication.
2. Ivan Bayross, "Oracle 7 The complete reference", BPB Publications.
3. Jeffrey D. Ulliman, "Principles of Database Systems", 2nd Ed., Galgotia Publications.
4. D. Kroenke, "Database Processing", Galgotia Publications.

**BAP 204 : PRACTICAL BASED ON BAP 203**

**Max. Marks : 40**

**Min. Pass Marks: 35%**

**For Distance Education Students**

**External Marks:60**

**Minimum Pass Marks:35%**

**Maximum Time: 3 hours**

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

The laboratory course will comprise of exercise to supplement what is learn under Paper BAP 203: Database Management Systems.

**MS-ACCESS:** Introduction to MS-ACCESS, working with databases and tables, queries in Access Applying integrity constraints.

Introduction to forms, sorting and filtering, controls.

Reports and Macro: creating reports, using Macros.

The break up of marks for the practical will be as under:

Lab Record	:	10 Marks
Viva Voce	:	10 Marks
Program Development And Execution	:	20 Marks

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## SCHEME

### B.Sc. (Physics) Part-II (IIIrd and IVth Semester)

#### SESSION 2021-22, 2022-23, 2023-24

Code	Title of Paper	No of Lectures	Max Marks			Examination Time (Hours)
			Total	Ext.	Int.	
<b>SEMESTER -I</b>						
Paper- I	Statistical Physics and Thermodynamics-I	40	40	30	10	03
Paper- II	Optics	40	40	30	10	03
Paper - III	Quantum Mechanics-I	40	40	30	10	03
Paper - IV	Physics Practical Lab	80	30	22	08	03
<b>SEMESTER -II</b>						
Paper- I	Statistical Physics and Thermodynamics-II	40	40	30	10	03
Paper - II	Lasers	40	40	30	10	03
Paper - III	Quantum Mechanics-II	40	40	30	10	03
Paper - IV	Physics Practical Lab	80	30	22	08	03

#### 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 nonprogrammable 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 nonprogrammable calculator is allowed in practicals also.

#### SECTION A

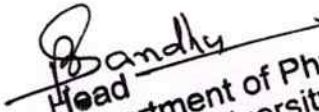
There will be four questions. Each question will carry five marks. Two questions are to be attempted

#### 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 questions are to be attempted.

  
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## SEMESTER - III

### PAPER-I: STATISTICAL PHYSICS AND THERMODYNAMICS-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 examinations, 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 carries 05 marks. Section C will carry 10 marks and each question is of 2 marks.

#### 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 has to attempt any five questions).
- 2) Use of nonprogrammable calculator is allowed in the examination centre but this will not be provided by the University/College.

#### SECTION - A

Basic ideas of statistical physics, Scope of statistical physics, Basic ideas about probability, distribution of four distinguishable particles in two compartment of equal size. Concept of macro states, microstates, thermodynamic probability, Effects of constraints on the system, Distribution of  $n$  particles in two compartments, Deviation from the state of maximum probability, equilibrium state of dynamic system, Distribution of distinguishable  $n$  particles in  $k$  compartments of unequal sizes.

#### SECTION - B

Phase space and its division into elementary cells, Three kinds of statistics. The basic approach in the three statistics, Maxwell Boltzman (MB) statistics applied to an ideal gas in equilibrium. Experimental verification of Maxwell Boltzman law of distribution of molecular speeds, Need for quantum statistics-Bose-Einstein (B.E.) statistics, Derivation of Planck's law of radiation, Deduction of Wien's displacement law and Stefan's law from Planck's law, Fermi-Dirac (F.D.) statistics, Comparison of M.B., B.E. and F.D. statistics.

#### Text Books:

1. Statistical Physics and Thermodynamics, V.S. Bhatia (Sohan Lal Nagin Chand, Jalandhar)
2. Statistical Physics and Thermodynamics, A.K. Sikri (Pardeep Publication, Jalandhar)
3. A Treatise on Heat, M.N. Saha & B.N. Srivastava, (The Indian Press Pvt. Ltd., Allahabad) 1965.

#### Reference Books

1. Statistical Mechanics: An Introductory Text, Bhattacharjee, J.K. (Allied Pub., Delhi) 2000.
2. Statistical Physics, Bhattacharjee, J.K. (Allied Pub., Delhi) 2000.
3. Statistical Mechanics, B.B. Laud (Macmillan India Ltd), 1981.

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## PAPER-II: OPTICS

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 examinations, 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 carries 05 marks. Section C will carry 10 marks and each question is of 2 marks.

### 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 has to attempt any five questions).
- 2) Use of nonprogrammable calculator is allowed in the examination centre but this will not be provided by the University/College.

### SECTION - A

**Interference:** Concept of coherence, Spatial and temporal coherence. Coherence time, Coherence length, Area of coherence, Conditions for observing interference fringes, Interference by wave front division and amplitude division, Michelson's interferometer—working, Principle and nature of fringes, Interference in thin films, Role of interference in anti-reflection and high reflection dielectric coatings. Multiple beam interference, Fabry-Perot interferometer, Nature of fringes, Newton Rings.

### SECTION - B

**Diffraction:** Huygens-Fresnel theory, half-period zones, Zone plates, Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at rectangular and circular apertures, Effects of diffraction in optical imaging, resolving power of telescope. The diffraction grating, its use as a spectroscopic element and its resolving power.

**Polarization:** Concept and analytical treatment of un-polarized, plane polarized and elliptically polarized light. Double refraction, Nicol prism, Sheet polarizer, Retardation plates, Production and analysis of polarized light (quarter and half wave plates).

#### Text Books:

1. Fundamentals of Optics, F.A. Jenkins and Harvery E. White (McGraw Hill) 4th edition, 2001.
2. Optics, Ajoy Ghatak (McMillan India) 2nd edition, 7th reprint 1997.
3. Introduction to Atomic Spectra, H.E. White (McGraw Hill Book Co.)

#### Reference Book:

1. Optics, Born and Wolf (Pergamom Press), 3rd edition, 1965.

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## PAPER-III: QUANTUM 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 examinations, 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 carries 05 marks. Section C will carry 10 marks and each question is of 2 marks.

### 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 has to attempt any five questions).
- 2) Use of nonprogrammable calculator is allowed in the examination centre but this will not be provided by the University/College.

### SECTION - A

**Formalism of Wave Mechanics:** Brief introduction to need and development of quantum mechanics, Wave-particle duality, de-Broglie hypothesis, Complimentarity and uncertainty principle, Gaussian wave-packet, Schrodinger equation for a free particle, operator correspondence and equation for a particle subject to forces. Normalization and probability  
Interpretation of wave function, Super position principle, Expectation value, probability current and conservation of probability, Admissibility conditions on the wave function. Ehrenfest theorem, Fundamental postulates of wave mechanics, Eigen functions and eigen values. Operator formalism, Orthogonal systems, Expansion in eigen functions, Hermitian operators. Simultaneous eigen functions. Equation of motion.

### SECTION - B

**Problems in one and three dimensions:** Time dependent Schrodinger equation. Application to stationary states for one dimension, Potential step, Potential barrier, Rectangular potential well, Degeneracy, Orthogonality, Linear harmonic oscillator, Schrodinger equation for spherically symmetric potential, Spherical harmonics. Hydrogen atom energy levels and eigen functions. Degeneracy, Angular momentum.

### Text Books:

1. Quantum Mechanics by V.K. Thankappan.
2. A Text Book of Quantum Mechanics, P.M. Mathews and K. Venkatesan, (Tata McGraw Hill Pub. Co. Delhi), 2002.
3. Quantum Mechanics, J.L. Powell and B. Crasemann (Narosa Pub. House, N. Delhi) 1997.

  
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## PAPER- IV: PHYSICS PRACTICAL LAB

### 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 the 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 is allotted to more than three students in any group.
6. The student should determine Standard Deviations and probable error in the calculations whereas needed.

### LIST OF EXPERIMENTS

1. Adiabatic expansion of a gas
2. Thermal expansion of crystal using interference fringes
3. Probability distribution using coloured dice coins.
4. To determine the refractive index of liquid using spectrometer
5. To determine the Cauchy's constants
6. To study the refractive index of doubly refracting prism
7. To determine the wave length of a given light using bi-prism
8. To determine the resolving power of a telescope
9. To determine the principal points of a lens system
10. Study the photoelectric effect and determine the value of Planck's constant
11. To study the gas discharge spectrum of hydrogen
12. To determine the angle of wedge using interference method

### Text and Reference Books:

1. A Laboratory Manual of Physics for Undergraduate Classes, D.P.Khandelwal.
2. B.Sc. Practical Physics, C.L. Arora.

  
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## SEMESTER-IV

### PAPER-I: STATISTICAL PHYSICS AND THERMODYNAMICS-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 examinations, 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 carries 05 marks. Section C will carry 10 marks and each question is of 2 marks.

#### 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 has to attempt any five questions).
- 2) Use of nonprogrammable calculator is allowed in the examination centre but this will not be provided by the University/College.

#### SECTION-A

Statistical definition of entropy, Change of entropy of a system, Additive nature of entropy, Law of increase of entropy, Reversible and irreversible process and their examples. Work done in a reversible process. Examples of increase of entropy in natural processes, Entropy and disorder, Brief review of terms and laws of thermodynamics, Carnot's cycle, Entropy changes in Carnot cycle. Applications of thermodynamics to thermoelectric effect. Change of entropy along a reversible path in a P.V. diagram, Entropy of a perfect gas, Equation of state of an ideal gas from simple statistical consideration, Heat death of the universe.

#### SECTION-B

Derivation of Maxwell's thermo dynamical relations, Cooling produced by adiabatic stretching, Adiabatic compression, Change of internal energy with volume, specific heat at constant pressure and constant volume, Expression for  $C_p - C_v$ , Change of state and Clayperon equation, Thermo dynamical treatment of Joule-Thomson effect, Use of Joule-Thomson effect, liquefaction of helium, Production of very low temperature by adiabatic demagnetization.

#### Text Books:

1. Statistical Physics and Thermodynamics, V.S. Bhatia (Sohan Lal Nagin Chand, Jalandhar)
2. Statistical Physics and Thermodynamics, A.K. Sikri (Pardeep Publication, Jalandhar)
3. A Treatise on Heat, M.N. Saha & B.N. Srivastava, (The Indian Press Pvt. Ltd., Allahabad) 1965.

#### Reference Books:

1. Statistical Mechanics: An Introductory Text, Bhattacharjee, J.K. (Allied Pub., Delhi) 2000.
2. Statistical Physics, Bhattacharjee, J.K. (Allied Pub., Delhi) 2000.
3. Statistical Mechanics, B.B. Laud (Macmillan India Ltd), 1981.

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## PAPER-II: LASERS

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 examinations, 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 carries 05 marks. Section C will carry 10 marks and each question is of 2 marks.

### 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 has to attempt any five questions).
- 2) Use of nonprogrammable calculator is allowed in the examination centre but this will not be provided by the University/College.

### SECTION-A

**Laser Fundamentals** : Derivation of Einstein's relations. Concept of stimulated emission and population inversion. Broadening of spectral lines, natural, collision and Doppler broadening. Line width, Line profile, Absorption and amplification of a parallel beam of light passing through a medium. Threshold condition, Introduction of three level and four level laser schemes, elementary theory of optical cavity, Longitudinal and transverse modes.

### SECTION-B

**Laser Systems** : types of lasers, Ruby and Nd: YAG lasers, He-Ne and CO<sub>2</sub> lasers-construction, mode of creating population inversion and output characteristics. Semiconductor lasers, Dye lasers, Q-switching, Mode locking, Applications of lasers—a general outline. Basics of holography.

### Text Books:

1. Laser Fundamentals, W.T. Silfvast (Foundation Books), New Delhi, 1996.
2. Lasers and Non-linear Optics, B.B. Laud (New Age Pub.), 2002.

### Reference Book:

1. Lasers, Svelto (Plenum Press), 3rd Ed., New York.

  
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## PAPER-III: QUANTUM 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 examinations, 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 carries 05 marks. Section C will carry 10 marks and each question is of 2 marks.

### 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 has to attempt any five questions).
- 2) Use of nonprogrammable calculator is allowed in the examination centre but this will not be provided by the University/College.

### SECTION-A

**One Electron Atomic Spectra:** Excitation of atom with radiation. Transition probability, Spontaneous transition, Selection rules and life time, Spectrum of hydrogen atom. Frank Hertz Experiment, Line structure, Normal Zeeman effect, Electron spin, Stern Gerlach experiment, Spin orbit coupling (electron magnetic moment, total angular momentum), Hyperfine structure, Examples of one electron systems, Anomalous, Zeeman effect, Lande-g factor (sodium D-lines).

### SECTION-B

**Many Electron System Spectra:** Exchange symmetry of wave functions, exclusion principle, Shells, Sub shells in atoms, atomic spectra (Helium), L.S. coupling, Selection rules, Regularities in atomic spectra, Interaction energy, X-ray spectra, Mosley law, Absorption spectra, Auger effect. Molecular bonding, Molecular spectra, Selection rules, Symmetric structures, Rotational, vibrational electronic level and spectra of molecules, Raman spectra.

### Text Books:

1. Concepts of Modern Physics, Arthur Beiser (McGraw Hill Pub. Co., Delhi, 9th ed.), 1995.
2. Elements of Modern Physics, S.H. Patil (McGraw Hill), 1998.

### Reference Books:

1. Quantum Mechanics, E. Merzbacher (John Wiley, 2nd ed.)
2. Fundamental of Molecular Spectroscopy, C.N. Banwell (Tata McGraw Hill Pub. Co., Delhi), 2001.
3. Atomic Spectra, H.G. Kuhn (Longmans), 2nd ed., 1969.
4. Introduction to Quantum Mechanics, L. Pauling and E.B. Wilson (Tata McGraw Hill Pub. Co., Delhi), 2002.
5. Quantum Mechanics, W. Greiner (Springer Verlag), 1994.

  
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## PAPER-IV: PHYSICS PRACTICAL LAB

### 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 the 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 whereas needed.

#### LIST OF EXPERIMENTS

1. Thermal conduction in poor conductor (variation with geometry) by Lee's method
2. Thermo e.m.f. calibration comparison
3. Total radiation law, temperature dependence of radiation
4. Study of rotation of plane of polarization with a polarimeter.
5. Set up Newton's rings to determine wave length of sodium light
6. To determine the wave length and dispersive power using plane diffraction grating (Use Hg source)
7. To determine the resolving power of a grating
8. To measure an inaccessible height using sextant
9. To determine the divergence and wave length of a given laser source.
10. To study the absorption spectra of iodine vapours
11. To determine the ionization potential of mercury
12. Study of variation of light intensity using photovoltaic cell/inverse square law

#### Text and Reference Books:

1. A Laboratory Manual of Physics for Undergraduate Classes, D.P. Khandelwal.
2. B.Sc. Practical Physics, C.L. Arora.

  
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**B. A. \ B.Sc (Mathematics) III semester  
(Sessions 2021-22. 2022-23, 2023-24)**

**Paper-I: Analysis-I**

**For Regular Students**

Maximum Marks: 50 Marks

University Exam: 40

**For Distance Education Students /Private Students**

Maximum Marks: 50 Marks (No Internal Assessment)

**Maximum Time: 3 Hrs.**

Teaching Hours : 50

Internal Assessment: 10

**INSTRUCTIONS FOR THE PAPER-SETTER(Regular Students)**

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 06 marks and Section C will be of 16 marks.

**INSTRUCTIONS FOR THE PAPER-SETTER(Distance Education/ Private Students)**

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**

**Sequence:** Definition of a sequence, Bounded and Monotonic sequences, Convergent sequence, Cauchy sequences, Cauchy's Convergence Criterion, Theorems on limits of sequences. Sub-sequence, Sequential continuity.

**Infinite Series:** Definition of a series, Tests of convergence, Comparison test. Cauchy's integral Ratio test, condensation test, Raabe's test, Logarithmic test, Gauss test, Cauchy's root test, Alternating series. Leibnitz's test. Absolute convergence and conditional convergence. Weierstrass M-Test for Uniform convergence of sequence of functions and series of functions. Simple applications. Determination of Radius of convergence of power series. (All Test without proofs only applications)

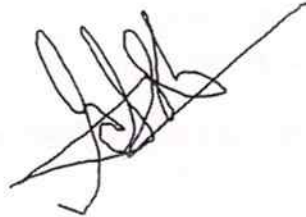

**SECTION-B**

**Improper integrals:** Definition, statements of their conditions of existence. Test of the convergence of improper integral, beta and gamma functions and their convergence. Abel's and Dirichlet's tests.

**BOOKS RECOMMENDED:**

1. Tom.M. Apostol: *Mathematical Analysis*, Second Edition, Addison-Wesley Publishing Company, 1974.
2. W. Rudin: *Principles of Mathematical Analysis*, third edition. McGraw Hill, 2013.
3. S.C Malik, S. Arora: *Mathematical Analysis*, New Age International Publishers, 1992.

Chandhal



## **PAPER-II: Linear Programming**

### **For Regular Students**

Maximum Marks: 50 Marks

University Exam: 40

### **For Distance Education Students /Private Students**

Maximum Marks: 50 Marks (No Internal Assessment)

**Maximum Time: 3 Hrs.**

Teaching Hours : 50

Internal Assessment: 10

### **INSTRUCTIONS FOR THE PAPER-SETTER(Regular Students)**

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 06 marks and Section C will be of 16 marks.

### **INSTRUCTIONS FOR THE PAPER-SETTER(Distance Education/ Private Students)**

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**

**Linear Programming:** Formation of LPP, Graphical Method. Theory of the Simplex Method, Standard form of LPP, Feasible solution to basic feasible solution, Improving BFS, Optimality Condition, Unbounded solution, Alternative optimal solution, Correspondence between BFS and extreme points. Simplex Method, Simplex Algorithm, Simplex Tableau. Simplex Method Case of Degeneracy, Big-M Method, Infeasible solution, Alternate solution, Solution of LPP for unrestricted variable.

### **SECTION-A**

**Transportation Problem:** Formation of TP, Concepts of solution, feasible solution, Finding Initial Basic Feasible Solution by North West Corner Method, Matrix Minima Method, Vogel's Approximation Method. Optimal Solution by MODI method, Unbalanced and maximization type of TP.

**Assignment Problem:** Maximization, Minimization, Unbalances, With restriction Assignment problems, Algorithm, Hungarian method.

### **BOOKS RECOMMENDED:**

### Paper-III: MECHANICS

#### For Regular Students

Maximum Marks: 50 Marks

University Exam: 40

#### For Distance Education Students /Private Students

Maximum Marks: 50 Marks (No Internal Assessment)

Maximum Time: 3 Hrs.

Teaching Hours : 50

Internal Assessment: 10

#### INSTRUCTIONS FOR THE PAPER-SETTER(Regular Students)

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 06 marks and Section C will be of 16 marks.

#### INSTRUCTIONS FOR THE PAPER-SETTER(Distance Education/ Private Students)

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

**Statics:** Basic notation, Newton Laws of motion, system of two forces, parallelogram law of forces, resultant of two collinear forces, resolution of forces, moment of a force, couple, theorem on moments of a couple, coplanar forces, resultant of three coplanar concurrent forces, theorem of resolved parts, resultant of two forces acting on a rigid body. Varignon's theorem, generalized theorem of moments.

Equilibrium of two concurrent forces, equilibrium condition for any number of coplanar concurrent forces, Lami's theorem.  $\lambda - \mu$  theorem, theorems of moments, resultant of a force and a couple. Equilibrium conditions for coplanar non-concurrent forces.

#### SECTION-B

Motion of a particle with constant acceleration, acceleration of falling bodies, motion under gravity, motion of a body projected vertically upward, motion of a two particles connected by a string, motion along a smooth inclined plane, constrained motion along a smooth inclined plane. Variable acceleration, Simple harmonic motion, Projectile.

#### BOOKS RECOMMENDED:

1. S.L. Loney: *The Elements of Statics and Dynamics*, 5<sup>th</sup> edition, Cambridge University Press, 1947.
2. John I. Synge Byron A. Griffith: *Principles of Mechanics*, 3<sup>rd</sup> Edition, McGraw-Hill

**B. A. \ B.Sc (Mathematics) IV semester**

**PAPER-IV: Analysis-II**

**For Regular Students**

Maximum Marks: 50 Marks

University Exam: 40

**For Distance Education Students /Private Students**

Maximum Marks: 50 Marks (No Internal Assessment)

**Maximum Time: 3 Hrs.**

Teaching Hours : 50

Internal Assessment: 10

**INSTRUCTIONS FOR THE PAPER-SETTER(Regular Students)**

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 06 marks and Section C will be of 16 marks.

**INSTRUCTIONS FOR THE PAPER-SETTER(Distance Education/ Private Students)**

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.

**Objective:** This course continues the study of Analysis started in Paper II (Analysis I) and will students will study Uniform Convergence, Power Series and Vector Calculus.

**SECTION-A**

**Functions of bounded Variation and Rectifiable Curves:** Properties of Monotonic Functions, Functions of Bounded Variation, Total variation, Additive property of total variation, Total Variation on  $[a, x]$  as a function of  $x$ , functions of bounded variation expressed as the difference of increasing functions, continuous functions of bounded variation, rectifiable curves and arc length. Additive and continuity Property of Arc Length, Equivalence of Paths and Change of Parameter.

**SECTION-B**

**The Riemann-Stieltjes integrals:** Definition, elementary properties, integration by parts, change of variable, reduction to Riemann integral, step functions as integrators. Reduction of

Riemann's Condition, Comparison Theorems, Integrators of bounded variation, Mean value theorems for Riemann-Stieltjes integrals, Fundamental theorem of integral calculus, Mean value theorems for Riemann Integrals.

**BOOKS RECOMMENDED:**

1. T. M. Apostol: *Mathematical Analysis*, Norosa Publishing House, New Delhi, 1985.
2. S. Kumaresan: *Topology of Metric Space*, Alpha Science International Ltd. 2005
3. S. C. Malik, Savita Arora: *Mathematical Analysis*, Wiley, 1984.

The image shows several handwritten signatures and initials in black ink. On the left, there is a signature that appears to be 'Chandul' followed by a circular mark. To its right is another signature that looks like 'Anand'. Further right, there is a large, complex scribble that could be a signature or a set of initials. To the right of that is a signature that looks like 'S. C. Malik'. Finally, on the far right, there is a signature that looks like 'S. Arora'.

## Paper-V: Numerical Methods

### For Regular Students

Maximum Marks: 50 Marks

University Exam: 40

### For Distance Education Students /Private Students

Maximum Marks: 50 Marks (No Internal Assessment)

Maximum Time: 3 Hrs.

Teaching Hours : 50

Internal Assessment: 10

### INSTRUCTIONS FOR THE PAPER-SETTER(Regular Students)

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 06 marks and Section C will be of 16 marks.

### INSTRUCTIONS FOR THE PAPER-SETTER(Distance Education/ Private Students)

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

**Measures of Errors:** Relative, absolute and percentage errors. Types of errors: Inherent error, Round-off error and Truncation error.

Bisection method, Regula-Falsi method, Secant method, Fixed-point iteration, Intermediate value theorem. Iteration methods based on first degree equation: Newton-Raphson method, Birge-Vieta method, Bairstrow method.

## SECTION-B

**Linear System of Equations:** Gauss-Elimination method, Pivot element, Pivoting strategies, Partial and complete Pivoting, Gauss Jordan and Triangularization method, Jacobi Method, Gauss Seidel Method, Eigen value problem.

**Interpolation:** Finite differences, Divided differences, Newton Gregory Forward and Backward formula, Lagrange's Formula, Newton's Formulae, Central Differences, Stirling, Bessel's and Everett's formulae, Error in linear and quadratic interpolation.

### BOOKS RECOMMENDED:

3. S.S. Sastry: *Introductory Methods Of Numerical Analysis*, Fifth Edition, Eastern Economy edition, PHI Learning Pvt. Ltd., New Delhi, 2012.
4. Kendall E. Atkinson: *An Introduction to Numerical Analysis*, Wiley, 1978.

Chandhal  
Alind  
~~John~~  
JR



## Paper-VI: Number Theory

### For Regular Students

Maximum Marks: 50 Marks

University Exam: 40

### For Distance Education Students /Private Students

Maximum Marks: 50 Marks (No Internal Assessment)

Maximum Time: 3 Hrs.

Teaching Hours : 50

Internal Assessment: 10

### INSTRUCTIONS FOR THE PAPER-SETTER(Regular Students)

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 06 marks and Section C will be of 16 marks.

### INSTRUCTIONS FOR THE PAPER-SETTER(Distance Education/ Private Students)

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

Divisibility, Greatest common divisor, Fundamental Theorem of arithmetic, congruence, residue classes and reduced residue classes, Euler-Fermat theorem, Wilson's theorem, Linear congruence, Chinese Remainder theorem.

### SECTION-B

An Application to cryptography, primitive roots, indices, quadratic residues, Legendre Symbol, Euler's criterion, Gauss Lemma., Quadratic reciprocity Law, Jacobi Symbol. Arithmetic functions  $\mu(n)$ ,  $d(n)$ ,  $\varphi(n)$ ,  $\sigma_\alpha(n)$ , Mobius inversion Formula.

### BOOKS RECOMMENDED:

1. David M. Burton: *Elementary Number Theory*, 3rd Edition, McGraw-Hill Higher Education, (scope as in Chapters I-II), 2007.
2. I. Niven, Herbert S. Zuckerman: *An Introduction to the Theory of Numbers*, Wiley Eastern (Scope as in Chapters 1-7), 1976.
3. G.H. Hardy, E.M. Wright: *Number Theory*, Oxford Univ. Press (Scope as in Chapter 19), 2008.

ਬੀ.ਏ. ਦੂਜਾ, ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ (ਸਮੈਸਟਰ ਤੀਜਾ ਅਤੇ ਚੌਥਾ)  
ਰੈਗੂਲਰ ਪ੍ਰੀਖਿਆਰਥੀਆਂ ਲਈ  
2021-22, 2022-23 ਅਤੇ 2023-24 ਸੈਸ਼ਨ ਲਈ  
(ਸਮੈਸਟਰ ਤੀਜਾ)

ਕੁਲ ਅੰਕ : 100

ਵਿਸ਼ੇ ਵਿਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 40

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 25 ਅੰਕ

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਵਿਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 10

ਬਾਹਰੀ ਪਰੀਖਿਆ: 75 ਅੰਕ

ਬਾਹਰੀ ਪਰੀਖਿਆ ਵਿਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 30

ਸਮਾਂ : 3 ਘੰਟੇ

(ਅਧਿਆਪਨ: 50 ਪੀਰੀਅਡ, 6 ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ)

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੀ ਰੂਪ-ਰੇਖਾ  
ਭਾਗ-ੳ

ੳ-1: ਨਾਵਲ ਕੀ ਹੁੰਦਾ ਹੈ, ਨਾਵਲ ਦਾ ਸਰੂਪ, ਨਾਵਲ ਅਤੇ ਨਾਵਲੈੱਟ ਵਿਚ ਅੰਤਰ, ਨਾਵਲ ਅਤੇ ਕਹਾਣੀ ਵਿਚ ਅੰਤਰ

ੳ-2: ਨਾਵਲ: ਰੋਹੀ ਬੀਆਬਾਨ (ਕਰਮਜੀਤ ਸਿੰਘ ਕੁੱਸਾ),

ਨੋਟ: ਵਿਦਿਆਰਥੀ ਨੂੰ ਨਾਵਲ ਪੜ੍ਹਨ ਲਈ ਉਤਸ਼ਾਹਿਤ ਕੀਤਾ ਜਾਵੇਗਾ ਅਤੇ ਨਾਵਲ ਬਾਰੇ ਉਸ ਨੂੰ ਆਪਣੀ ਰਾਇ ਬਨਾਉਣ ਅਤੇ ਪਾਠਕੀ ਹੁੰਗਾਰੇ ਨੂੰ ਦਰਜ ਕਰਨਾ ਸਿਖਾਇਆ ਜਾਵੇਗਾ

ਭਾਗ-ਅ

ਅ-1: ਪੰਜਾਬੀ ਪੱਤਰਕਾਰੀ:

ੳ) ਖ਼ਬਰ ਅ) ਵਿਸ਼ੇਸ਼ ਅਖ਼ਬਾਰੀ ਰਿਪੋਰਟ ਏ) ਫ਼ੀਚਰ ਲੇਖਣ ਸ) ਇਸ਼ਤਿਹਾਰ ਲੇਖਣ ਹ) ਇਸ਼ਤਿਹਾਰੀ ਖ਼ਬਰ: ਸੰਕਲਪ ਅਤੇ ਅਭਿਆਸ

(ਇਸ ਖੰਡ ਦੇ ਆਧਾਰ 'ਤੇ ਵਿਦਿਆਰਥੀ ਤੋਂ ਇੱਕ ਅਭਿਆਸ-ਪੁਸਤਕ ਤਿਆਰ ਕਰਵਾਈ ਜਾਵੇਗੀ। ਉਸ ਵਿਚ ਵਿਦਿਆਰਥੀ ਕੁਲ 20 ਪੰਨੇ ਦੀਆਂ ਖ਼ਬਰਾਂ, ਵਿਸ਼ੇਸ਼ ਅਖ਼ਬਾਰੀ ਰਿਪੋਰਟਾਂ, ਨਿਊਜ਼ ਫ਼ੀਚਰ, ਇਸ਼ਤਿਹਾਰ ਅਤੇ ਇਸ਼ਤਿਹਾਰੀ ਖ਼ਬਰਾਂ ਤਿਆਰ ਕਰੇਗਾ। ਹਰ ਵੰਨਗੀ ਦੀਆਂ ਘੱਟ ਤੋਂ ਘੱਟ ਦੋ ਲਿਖਤਾਂ ਜ਼ਰੂਰ ਸ਼ਾਮਲ ਕੀਤੀਆਂ ਜਾਣਗੀਆਂ। ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਵਿਚ ਅਸਾਈਨਮੈਂਟ ਦੇ ਨੰਬਰ ਇਸ ਅਭਿਆਸ ਪੁਸਤਕ ਦੇ ਆਧਾਰ 'ਤੇ ਦਿੱਤੇ ਜਾਣਗੇ।)

ਅ-2 ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿੱਪੀ ਨਾਲ ਜਾਣ-ਪਛਾਣ:

ੳ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਇਤਿਹਾਸ ਅਤੇ ਇਲਾਕਾਈ ਵੰਨਗੀਆਂ

ਅ) ਗੁਰਮੁਖੀ ਲਿੱਪੀ ਦਾ ਇਤਿਹਾਸ ਅਤੇ ਗੁਰਮੁਖੀ ਆਰਥੋਗਰਾਫ਼ੀ

ੲ) ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ: ਸਵਰ, ਵਿਅੰਜਨ, ਖੰਡੀ ਅਤੇ ਅਖੰਡੀ ਧੁਨੀਆਂ

ਭਾਗ-ੲ

ਪਾਠਕ੍ਰਮ ਦੇ ਭਾਗ ੳ ਅਤੇ ਅ ਵਿਚੋਂ ਸੰਖੇਪ ਉਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ।

### ਅੰਕ-ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈੱਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਪਾਠਕ੍ਰਮ ਦੇ ਦੋ ਭਾਗ ਓ ਅਤੇ ਅ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਤਿੰਨ ਭਾਗ ਓ, ਅ ਅਤੇ ਏ ਹੋਣਗੇ।
2. ਭਾਗ ਓ-1) ਵਿੱਚੋਂ 2 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿੱਚੋਂ ਵਿਦਿਆਰਥੀ ਇੱਕ ਪ੍ਰਸ਼ਨ ਦਾ ਉੱਤਰ ਦੇਵੇਗਾ। ਇਹ ਪ੍ਰਸ਼ਨ ਦਿੱਤੇ ਗਏ ਗਲਪ ਰੂਪਾਂ ਦੇ ਸਰੂਪ, ਤੱਤਾਂ ਬਾਰੇ ਜਾਂ ਇਨ੍ਹਾਂ ਵਿਚਕਾਰ ਸਮਾਨਤਾਵਾਂ ਜਾਂ ਅੰਤਰਾਂ ਬਾਰੇ ਹੋਣਗੇ। 10 ਅੰਕ
3. ਭਾਗ ਓ-2 ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿੱਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ ਇੱਕ ਦਾ ਉੱਤਰ ਦੇਣਾ ਹੋਵੇਗਾ। ਨਾਵਲ ਬਾਰੇ ਪਾਠਕੀ ਹੁੰਗਾਰਾ, ਨਾਵਲ ਬਾਰੇ ਵਿਦਿਆਰਥੀ ਦੇ ਪ੍ਰਭਾਵ, ਨਾਵਲ ਦੇ ਮੰਤਵ ਅਤੇ ਜੀਵਨ ਨੂੰ ਸਮਝਣ ਵਿਚ ਨਾਵਲ ਦੇ ਮਹੱਤਵ ਬਾਰੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛਿਆ ਜਾ ਸਕਦਾ ਹੈ। ਇਸ ਭਾਗ ਵਿਚ ਪਾਤਰਾਂ ਬਾਰੇ ਵੀ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾ ਸਕਦੇ ਹਨ। ਨਾਵਲ ਦੇ ਵਿਸ਼ੇ-ਵਸਤੂ, ਵਿਚਾਰਧਾਰਾ, ਸਮਕਾਲੀ ਜੀਵਨ ਵਿਚ ਨਾਵਲ ਦੇ ਵਿਸ਼ੇ ਦੇ ਮਹੱਤਵ, ਪਾਤਰਾਂ ਦੀ ਘਾਤਤ, ਮਨਪਸੰਦ ਪਾਤਰ, ਪਾਤਰਾਂ ਦੇ ਸੁਭਾਅ ਦਾ ਵਿਸ਼ਲੇਸ਼ਣ ਕਰਨ ਲਈ ਕਿਹਾ ਜਾ ਸਕਦਾ ਹੈ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਬਣਾਉਣ ਲੱਗਿਆਂ ਧਿਆਨ ਰੱਖਿਆ ਜਾਵੇ ਕਿ ਵਿਦਿਆਰਥੀ ਦੇ ਆਪਣੇ ਵਿਚਾਰਾਂ ਦੇ ਪ੍ਰਗਟਾਵੇ ਨੂੰ ਉਤਸ਼ਾਹਿਤ ਕੀਤਾ ਜਾਵੇ। 10 ਅੰਕ
4. ਭਾਗ ਅ-1 ਵਿਚ ਦਰਜ ਪੱਤਰਕਾਰੀ ਰੂਪਾਂ ਦੀ ਪਰਿਭਾਸ਼ਾ, ਸਰੂਪ, ਪ੍ਰਕਾਰਜ ਅਤੇ ਮਹੱਤਵ ਦੇ ਨਾਲ ਨਾਲ ਇਨ੍ਹਾਂ ਰੂਪਾਂ ਦੇ ਆਪਸੀ ਨਿਖੇੜੇ ਬਾਰੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾ ਸਕਦੇ ਹਨ। ਇਸ ਭਾਗ ਵਿੱਚੋਂ ਕੁਲ 4 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿੱਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ 2 ਪ੍ਰਸ਼ਨ ਦਾ ਉੱਤਰ ਇੱਕ-ਡੇਢ ਪੰਨੇ ਵਿਚ ਦੇਣਾ ਹੋਵੇਗਾ।  $5 \times 2 = 10$  ਅੰਕ
5. ਭਾਗ ਅ-2 ਵਿੱਚੋਂ ਵੀ 5 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿੱਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ 3 ਪ੍ਰਸ਼ਨ ਦਾ ਉੱਤਰ ਇੱਕ-ਡੇਢ ਪੰਨੇ ਵਿਚ ਦੇਣਾ ਹੋਵੇਗਾ।  $5 \times 3 = 15$  ਅੰਕ
6. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਭਾਗ ਏ ਵਿਚ ਪਾਠਕ੍ਰਮ ਦੇ ਭਾਗ ਓ ਅਤੇ ਅ ਵਿੱਚੋਂ 15 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਵਿਦਿਆਰਥੀ ਨੇ ਇਨ੍ਹਾਂ ਸਾਰੇ ਪ੍ਰਸ਼ਨਾਂ ਦਾ ਉੱਤਰ 5-6 ਸਤਰਾਂ ਵਿਚ ਦੇਣਾ ਹੋਵੇਗਾ।  $15 \times 2 = 30$  ਅੰਕ

### ਸਹਾਇਕ ਪਾਠ ਸਮੱਗਰੀ

1. ਰਾਜਿੰਦਰਪਾਲ ਸਿੰਘ ਬਰਾੜ, ਬਲਦੇਵ ਸਿੰਘ ਚੀਮਾ, ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਸਾਹਿਤ ਰੂਪਾਕਾਰ: ਸਿਧਾਂਤ ਅਤੇ ਰੂਪਾਂਤਰਣ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, 2011
2. ਸਾਹਿਤ ਕੋਸ਼, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, 1989
3. ਡਾ. ਪਰਮਿੰਦਰ ਸਿੰਘ ਤੇ ਕਿਰਪਾਲ ਸਿੰਘ ਕਸੇਲ, ਸਾਹਿਤ ਦੇ ਰੂਪ, ਲਹੌਰ ਬੁੱਕ ਸ਼ਾਪ, 1977
4. ਡਾ. ਟੀ. ਆਰ, ਵਿਨੋਦ, ਨਾਵਲ ਆਲੋਚਨਾ ਸ਼ਬਦਾਵਲੀ ਕੋਸ਼, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, 1999
5. ਗਿ. ਲਾਲ ਸਿੰਘ ਤੇ ਹਰਕੀਰਤ ਸਿੰਘ, ਕਾਲਜ ਪੰਜਾਬੀ ਵਿਆਕਰਣ, ਪੰਜਾਬ ਸਟੇਟ ਯੂਨੀਵਰਸਿਟੀ ਟੈਕਸਟਬੁੱਕ ਬੋਰਡ, ਚੰਡੀਗੜ੍ਹ
6. ਸੰਤ ਸਿੰਘ ਸੇਖੋਂ, ਸਾਹਿਤਆਰਥ, ਲਾਹੌਰ ਬੁੱਕ ਸ਼ਾਪ, ਲੁਧਿਆਣਾ
7. ਖੋਜ ਪੜ੍ਹਕਾ (ਗਲਪ ਵਿਸ਼ੇਸ਼ ਅੰਕ), ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ

ਬੀ.ਏ. ਭਾਗ ਦੂਜਾ, ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ (ਸਮੈਸਟਰ ਤੀਜਾ ਅਤੇ ਚੌਥਾ)

ਰੈਗੂਲਰ ਪਰੀਖਿਆਰਥੀਆਂ ਲਈ

2021-22, 2022-23, 2023-24 ਸੈਸ਼ਨਾਂ ਲਈ

(ਸਮੈਸਟਰ ਚੌਥਾ)

ਕੁਲ ਅੰਕ : 100

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ : 25 ਅੰਕ

ਬਾਹਰੀ ਪਰੀਖਿਆ: 75 ਅੰਕ

ਸਮਾਂ : 3 ਘੰਟੇ

ਵਿਸ਼ੇ ਵਿਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 40

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ ਵਿਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 10

ਬਾਹਰੀ ਪਰੀਖਿਆ ਵਿਚੋਂ ਪਾਸ ਹੋਣ ਲਈ ਅੰਕ : 30

(ਅਧਿਆਪਨ: 50 ਪੀਰੀਅਡ, 6 ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ)

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੀ ਰੂਪ-ਰੇਖਾ

ਭਾਗ-ੳ

ਕਾਵਿ ਲਹਿਰਾਂ (ਸੰਪਾ. ਲਖਵੀਰ ਸਿੰਘ, ਡਾ. ਜਸਵਿੰਦਰ ਸਿੰਘ, ਡਾ. ਇੰਦਰਜੀਤ ਸਿੰਘ ਚੀਮਾ, ਪਬਲੀਕੇਸ਼ਨ ਬਿਓਰੇ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ)

ਭਾਗ-ਅ

ਅ-1: ਪੰਜਾਬੀ ਕੰਪਿਊਟਰ ਸਿਖਲਾਈ:

ੳ) ਗੁਰਮੁਖੀ ਫ਼ੋਂਟ: ਆਰੰਭ ਅਤੇ ਵਿਕਾਸ

ਅ) ਫ਼ੋਂਟ ਬਦਲੀ ਤਕਨੀਕ (ਫ਼ੋਂਟ ਕਨਵਰਟਰ): ਮੁੱਢਲੀ ਜਾਣਕਾਰੀ

ੲ) ਯੂਨੀਕੋਡ ਪ੍ਰਣਾਲੀ ਨਾਲ ਜਾਣ-ਪਛਾਣ

(ਇਸ ਹਿੱਸੇ ਲਈ ਵਿਦਿਆਰਥੀ ਅਭਿਆਸ-ਪੁਸਤਕ ਤਿਆਰ ਕਰੇਗਾ, ਇਹ ਅਭਿਆਸ ਪੁਸਤਕ ਸੋਫਟ ਰੂਪ ਵਿਚ ਹੋਵੇਗੀ। ਅਧਿਆਪਕ ਉਸ ਦੇ ਸੋਫਟ ਰੂਪ ਦਾ ਮੁਲਾਂਕਣ ਕਰੇਗਾ ਪਰ ਵਿਦਿਆਰਥੀ ਰਿਕਾਰਡ ਹਿਤ ਇਸ ਦਾ ਪ੍ਰਿੰਟ ਕਢਵਾ ਕੇ ਅਧਿਆਪਕ ਨੂੰ ਜਮ੍ਹਾਂ ਕਰਵਾਏਗਾ। ਉਹ ਆਪਣੇ ਮੁੱਖ ਵਿਸ਼ਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ 20 ਤੋਂ 25 ਪੰਨੇ (ਰਾਵੀ ਯੂਨੀਕੋਡ ਫ਼ੋਂਟ ਮਾਪ 12, ਸਤਰਾਂ ਵਿਚ ਵਿੱਥ 1.5, ਡਿਫਾਲਟ ਪੇਜ ਸੈਟਿੰਗ) ਲਿਖੇਗਾ, ਜਿਸ ਵਿਚ ਘੱਟ ਤੋਂ ਘੱਟ 10 ਲਿਖਤਾਂ ਜ਼ਰੂਰ ਹੋਣ।

ਅ-2 ਵਿਆਕਰਣ:

ੳ) ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ: ਨਾਂਵ, ਪੜਨਾਂਵ, ਕਿਰਿਆ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ, ਸੰਬੰਧਕ, ਯੋਜਕ

ਅ) ਵਿਆਕਰਣਕ ਵਰਗ: ਲਿੰਗ, ਵਚਨ, ਕਾਲ, ਕਾਰਕ, ਪੁਰਖ, ਵਾਚ, ਪੱਖ (ਇਨ੍ਹਾਂ ਦੀ ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਹਵਾਲੇ ਨਾਲ ਇਨ੍ਹਾਂ ਦੀ ਸਮਝ)

ੲ) ਗੁਰਬਾਣੀ ਵਿਆਕਰਣ ਨਾਲ ਜਾਣ-ਪਛਾਣ (ਭੂਮਿਕਾ (ਪੰਨਾ ੳ ਤੋਂ ਖ ਤਕ) ਸ਼ਬਦਾਰਥ ਸ੍ਰੀ ਗੁਰੂ ਗ੍ਰੰਥ ਸਾਹਿਬ ਜੀ, ਪੇਥੀ ਪਹਿਲੀ, (ਪ੍ਰਕਾਸ਼ਕ ਸ਼੍ਰੋਮਣੀ ਗੁਰਦੁਆਰਾ ਪ੍ਰਬੰਧਕ ਕਮੇਟੀ, ਸ੍ਰੀ ਅੰਮ੍ਰਿਤਸਰ) ਦੇ ਪ੍ਰਸੰਗ ਵਿਚ)

ਭਾਗ-ੲ

ਪਾਠਕ੍ਰਮ ਦੇ ਭਾਗ ੳ ਅਤੇ ਅ ਵਿਚੋਂ ਸੰਖੇਪ ਉਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ।

ਅੰਕ-ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਂਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਭਾਗ ਓ ਵਿਚੋਂ ਕਿਸੇ ਕਵਿਤਾ ਦਾ ਵਿਸ਼ਾ ਵਸਤੂ/ ਸਾਰ/ ਪਾਠਕੀ ਹੁੰਗਾਰਾ/ ਕਵਿਤਾ ਦਾ ਸੁਨੇਹਾ ਅਤੇ ਜੀਵਨ ਵਿਚ ਮਹੱਤਵ (ਤਿੰਨ ਵਿਚੋਂ ਇੱਕ) 10 ਅੰਕ
2. ਭਾਗ ਓ ਵਿਚੋਂ ਹੀ ਕਵਿਤਾ ਦੀ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ (ਦੋ ਵਿਚੋਂ ਇੱਕ) 10 ਅੰਕ
3. ਭਾਗ ਅ-1 ਦੇ ਕੰਪਿਊਟਰ ਸਿਖਲਾਈ ਵਾਲੇ ਭਾਗ ਵਿਚੋਂ 4 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਦੇ ਪ੍ਰਸ਼ਨ ਦਾ ਉੱਤਰ ਇੱਕ-ਡੇਢ ਪੰਨੇ ਵਿਚ ਲਿਖੇਗਾ। 2x5=10 ਅੰਕ
4. ਭਾਗ ਅ-2 ਵਿਚਲੇ ਵਿਆਕਰਣ ਨਾਲ ਸੰਬੰਧਿਤ ਵਿਸ਼ਿਆਂ ਵਿਚੋਂ 5 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ 3 ਦਾ ਉੱਤਰ ਇੱਕ-ਡੇਢ ਪੰਨੇ ਵਿਚ ਲਿਖੇਗਾ। 3X5 =15 ਅੰਕ
5. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਭਾਗ ਏ ਵਿਚ 15 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਵਿਦਿਆਰਥੀ ਨੇ ਇਨ੍ਹਾਂ ਸਾਰਿਆਂ ਦੇ ਸੰਖੇਪ ਉੱਤਰ ਲਿਖਣੇ ਹੋਣਗੇ। ਇਹ ਪ੍ਰਸ਼ਨ ਪਾਠਕ੍ਰਮ ਦੇ ਭਾਗ ਓ, ਅ-1 ਅਤੇ ਅ-2 ਵਿਚ ਦਰਜ ਵਿਸ਼ਿਆਂ ਦੇ ਆਧਾਰ 'ਤੇ ਹੋਣਗੇ 15x2=30 ਅੰਕ

ਸਹਾਇਕ ਪਾਠ-ਸਮੱਗਰੀ

1. ਡਾ. ਜੋਗਿੰਦਰ ਸਿੰਘ ਪੁਆਰ ਅਤੇ ਹੋਰ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਵਿਆਕਰਣ ਭਾਗ-1, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ ਜਲੰਧਰ, 1991, ਪੰਨਾ 67-73
2. ਡਾ. ਜੋਗਿੰਦਰ ਸਿੰਘ ਪੁਆਰ ਅਤੇ ਹੋਰ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਵਿਆਕਰਣ ਭਾਗ-1।, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ ਜਲੰਧਰ, 1992
3. ਗਿ. ਲਾਲ ਸਿੰਘ ਤੇ ਹਰਕੀਰਤ ਸਿੰਘ, ਕਾਲਜ ਪੰਜਾਬੀ ਵਿਆਕਰਣ, ਪੰਜਾਬ ਸਟੇਟ ਯੂਨੀ. ਟੈਸਕਟ ਬੁੱਕ ਬੋਰਡ, ਚੰਡੀਗੜ੍ਹ
4. ਰਾਜਿੰਦਰ ਪਾਲ ਸਿੰਘ, ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਵਿਤਾ ਪੁਨਰ ਚਿੰਤਨ, ਲੋਕਗੀਤ ਪ੍ਰਕਾਸ਼ਨ, ਚੰਡੀਗੜ੍ਹ।
5. ਰਾਜਿੰਦਰ ਪਾਲ ਸਿੰਘ, ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਵਿਤਾ ਦਾ ਇਤਿਹਾਸ, ਪੰਜਾਬੀ ਅਕਾਦਮੀ, ਦਿੱਲੀ।
6. ਜਸਵਿੰਦਰ ਸਿੰਘ, ਨਵੀਂ ਪੰਜਾਬੀ ਕਵਿਤਾ ਪਛਾਣ ਚਿੰਨ੍ਹ, ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ
7. ਸੰਤ ਸਿੰਘ ਸੇਖੋਂ, ਸਾਹਿਤਆਰਥ, ਲਾਹੌਰ ਬੁੱਕ ਸ਼ਾਪ, ਲੁਧਿਆਣਾ
8. ਸੀ. ਪੀ. ਕੰਬੋਜ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਕੰਪਿਊਟਰੀਕਰਨ, ਗਰੇਸੀਅਸ ਬੁੱਕਸ, ਪਟਿਆਲਾ
9. ਸੀ. ਪੀ. ਕੰਬੋਜ, ਕੰਪਿਊਟਰ ਵਿਗਿਆਨ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ



ਅੰਡਰ-ਗ੍ਰੈਜੂਏਟ ਪੱਧਰ ਦੇ ਸਾਰੇ ਕੋਰਸਾਂ ਲਈ ਸਾਂਝਾ ਸਿਲੇਬਸ ਭਾਗ-ਦੂਜਾ, ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ (ਮੁੱਢਲਾ ਗਿਆਨ)

(ਸਮੈਸਟਰ ਤੀਜਾ ਅਤੇ ਚੌਥਾ)

2018-19, 2019-20 ਅਤੇ 2020-21 ਸੈਸ਼ਨ B bJh

2021-22, 2022-23 ਅਤੇ 2023-24 ਸੈਸ਼ਨ B bJh

(ਸਮੈਸਟਰ ਤੀਜਾ)

epb nē L 100

ndoBh wpleD L 25 nē

pkj oh gohfynkL 75 nē

; wK L 3 xN/

ft; iftuA gk; j D bJh nē L 35

ndoBh wpleD ftuA gk; j D bJh nē L 09

pkj oh gohfynk ftuA gk; j D bJh nē L 26

(nfXnkgBL 6 ghohrv gsh j csk)

### ਪਾਠਕ੍ਰਮ ਅਤੇ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੀ ਰੂਪ-ਰੇਖਾ

Gkr^T

ਨਿਰਧਾਰਤ ਪੁਸਤਕ : ਪੰਜਾਬੀ ਦੀ ਪਾਠ ਪੁਸਤਕ, ਪ੍ਰੋ. ਬਲਦੇਵ ਸਿੰਘ ਚੀਮਾ, ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, (ਇਸ ਪੁਸਤਕ ਵਿੱਚੋਂ ਕੇਵਲ ਕਵਿਤਾ ਵਾਲਾ ਭਾਗ ਇਸ ਸਮੈਸਟਰ ਦੇ ਸਿਲੇਬਸ ਵਜੋਂ ਪੜ੍ਹਿਆ ਜਾਣਾ ਹੈ)

Gkr^n

ਅ-1 L ਵਿਸ਼ਰਾਮ ਚਿੰਨ ਦੀ ਵਰਤੋ

ਅ-2 ਸ਼ਬਦ ਜੋੜਾਂ ਦੀ ਸੁਧਾਈ

ਅ-3 ਪੈਰ੍ਹਾ ਰਚਨਾ : ਵਿਦਿਅਕ ਜਾਂ ਸੈਰ ਸਪਾਟੇ ਨਾਲ ਸਬੰਧਤ

ਭਾਗ-ੲ

ਉਪਰੋਕਤ ਪਾਠਕ੍ਰਮ ਤੇ ਅਧਾਰਤ ਸੰਖੇਪ ਉਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ ।

ਅੰਕ-ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਂਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਵਿਦਿਆਰਥੀਆਂ ਨੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ ਦਾ ਮੁਢਲਾ ਗਿਆਨ ਪ੍ਰਾਪਤ ਕੀਤਾ ਹੈ । ਇਸ ਲਈ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਭਾਸ਼ਾ ਅਤੇ ਲਿਪੀ ਦੇ ਗਿਆਨ ਨੂੰ ਧਿਆਨ ਵਿਚ ਰਖਦਿਆਂ ਸਰਲ, ਸਪਸ਼ਟ ਅਤੇ ਛੋਟੇ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣ ।

2। ਸਾਰੇ ਭਾਗਾਂ ਵਿੱਚੋਂ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣ ।

3. ਸਰਲ ਅਤੇ ਸਪਸ਼ਟ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣ ।

4. ਵਰਣਾਤਮਕ ਪ੍ਰਸ਼ਨ ਨਾ ਪੁੱਛੇ ਜਾਣ ।

5. ਲੋੜ ਅਨੁਸਾਰ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਛੋਟੇ ਜਾਂ ਚੋਣ ਦੇਣੀ ਲਾਜ਼ਮੀ ਹੈ ।

6. ਭਾਗ ਓ ਵਿੱਚੋਂ ਕਿਸੇ ਕਵਿਤਾ ਦੇ ਸਰਲ ਅਰਥ ਜਾਂ ਸਾਰ (ਪੰਜ ਵਿੱਚੋਂ ਦੋ) 2X05=10 ਅੰਕ

7. ਕਿਸੇ ਕਾਵਿ ਟੁਕੜੇ ਤੇ ਭਾਵ ਅਰਥ (ਤਿੰਨ ਵਿੱਚੋਂ ਇਕ) 05 ਅੰਕ

8. 15 ਸ਼ਬਦ ਦੇ ਕੇ 10 ਸ਼ਬਦਾਂ ਦੇ ਸ਼ਬਦ ਜੋੜ ਸੁੱਧਕਰਨੇ 10 ਅੰਕ

9. ਕਿਸੇ ਦਿੱਤੇ ਪੈਰੇ ਜਾਂ ਵਾਕਾਂ ਵਿਚ ਵਿਸ਼ਰਾਮ ਚਿੰਨਾਂ ਦੀ ਵਰਤੋ 10 ਅੰਕ

10. ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਜੀਵਨ ਦੇ ਕਿਸੇ ਆਮ ਵਿਸ਼ੇ ਨਾਲ ਸਬੰਧਿਤ ਪੈਰ੍ਹਾ ਰਚਨਾ 10 ਅੰਕ

11. ਭਾਗ ਏ ਵਿਚ ਪਾਠ ਪੁਸਤਕ (ਕਵਿਤਾਵਾਂ) ਤੇ ਆਧਾਰਤ ਸੰਖੇਪ ਉਤਰਾਂ ਵਾਲੇ 15 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਵਿਦਿਆਰਥੀ ਨੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦਾ ਉੱਤਰ 3-4 ਸਤਰਾਂ ਵਿਚ ਦੇਣਾ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 2 ਅੰਕ ਹੋਣਗੇ

15X02=30 ਅੰਕ

ਅੰਡਰ-ਗ੍ਰੈਜੂਏਟ ਪੱਧਰ ਦੇ ਸਾਰੇ ਕੋਰਸਾਂ ਲਈ ਸਾਂਝਾ ਸਿਲੇਬਸ ਭਾਗ-ਦੂਜਾ, ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ (ਮੁਢਲਾ ਗਿਆਨ)

(ਸਮੈਸਟਰ ਤੀਜਾ ਅਤੇ ਚੌਥਾ)

2018-19, 2019-20 ਅਤੇ 2020-21 ਸੈਸ਼ਨ B bJh

(ਸਮੈਸਟਰ ਚੌਥਾ)

ep næ L 100

ndoBh wpleD L 25 næ

pkj oh gohfynkL 75 næ

; wK L 3 xN/

ft; iftuA gk; j D bJh næ L 35

ndoBh wpleD ftuA gk; j D bJh næ L 09

pkj oh gohfynk ftuA gk; j D bJh næ L 26

(nfXnkgBL 50 ghohnv)

### ਪਾਠਕ੍ਰਮ ਅਤੇ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੀ ਰੂਪ-ਰੇਖਾ

Gkr^T

ਨਿਰਧਾਰਤ ਪੁਸਤਕ : ਪੰਜਾਬੀ ਦੀ ਪਾਠ ਪੁਸਤਕ, ਪ੍ਰੋ. ਬਲਦੇਵ ਸਿੰਘ ਚੀਮਾ, ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ, ਇਸ ਪੁਸਤਕ ਵਿੱਚੋਂ ਕਹਾਣੀ ਅਤੇ ਨਾਟਕ ਵਾਲਾ ਭਾਗ ਸਿਲੇਬਸ ਵਜੋਂ ਪੜ੍ਹਿਆ ਜਾਣਾ ਹੈ।

Gkr^n

ਅ-1 L ਨਿੱਜੀ ਚਿੱਠੀ/ਪੱਤਰ

ਅ-2 ਸ਼ਬਦਾਂ ਦਾ ਅਨੁਵਾਦ (ਪੰਜਾਬੀ ਤੋਂ ਅੰਗ੍ਰੇਜ਼ੀ ਅਤੇ ਅੰਗ੍ਰੇਜ਼ੀ ਤੋਂ ਪੰਜਾਬੀ)

ਭਾਗ-ੲ

ਉਪਰੋਕਤ ਪਾਠਕ੍ਰਮ ਤੇ ਆਧਾਰਤ ਸੰਖੇਪ ਉਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ।

#### ਅੰਕ-ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਂਟਰ ਲਈ ਹਦਾਇਤਾਂ

1. ਵਿਦਿਆਰਥੀਆਂ ਨੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ ਦਾ ਮੁਢਲਾ ਗਿਆਨ ਪ੍ਰਾਪਤ ਕੀਤਾ ਹੈ। ਇਸ ਲਈ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਭਾਸ਼ਾ ਅਤੇ ਲਿਪੀ ਦੇ ਗਿਆਨ ਨੂੰ ਧਿਆਨ ਵਿਚ ਰਖਦਿਆਂ ਸਰਲ, ਸਪਸ਼ਟ ਅਤੇ ਛੋਟੇ ਉੱਤਰਾਂ ਵਾਲੇ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣ।

2# ਸਾਰੇ ਭਾਗਾਂ ਵਿੱਚੋਂ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣ।

3. ਸਰਲ ਅਤੇ ਸਪਸ਼ਟ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣ।

4. ਵਰਣਾਤਮਕ ਪ੍ਰਸ਼ਨ ਨਾ ਪੁੱਛੇ ਜਾਣ।

5. ਲੋੜ ਅਨੁਸਾਰ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਛੋਟੇ ਜਾਂ ਚੋਣ ਦੇਣੀ ਲਾਜ਼ਮੀ ਹੈ।

6. ਭਾਗ ਓ ਵਿੱਚੋਂ ਕਿਸੇ ਕਹਾਣੀ ਦਾ ਸਾਰ (ਦੇ ਵਿੱਚੋਂ ਇਕ) 08 ਅੰਕ

7. ਕਿਸੇ ਪਾਤਰ ਸਬੰਧੀ ਸੰਖੇਪ ਜਾਣਕਾਰੀ (ਦੇ ਵਿੱਚੋਂ ਇਕ) 04 ਅੰਕ

8. ਨਾਟਕ ਦੇ ਪਾਤਰਾਂ ਸਬੰਧੀ ਜਾਣਕਾਰੀ (ਤਿੰਨ ਵਿੱਚੋਂ ਇਕ) 08 ਅੰਕ

9. ਨਿੱਜੀ ਚਿੱਠੀ ਜਾਂ ਪੱਤਰ (ਦੇ ਵਿੱਚੋਂ ਇਕ) 09 ਅੰਕ

10. ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਆਮ ਜੀਵਨ ਨਾਲ ਸਬੰਧਿਤ ਸ਼ਬਦਾਵਲੀ ਦਾ ਅੰਗ੍ਰੇਜ਼ੀ ਅਤੇ ਪੰਜਾਬੀ ਅਨੁਵਾਦ 8+8=16 ਅੰਕ

11. ਭਾਗ ਏ ਵਿਚ ਪਾਠ ਪੁਸਤਕ ਤੇ ਆਧਾਰਤ ਸੰਖੇਪ ਉਤਰਾਂ ਵਾਲੇ 15 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਵਿਦਿਆਰਥੀ ਨੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦਾ ਉੱਤਰ 3-4 ਸਤਰਾਂ ਵਿਚ ਦੇਣਾ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 2 ਅੰਕ ਹੋਣਗੇ

15X02=30 ਅੰਕ



mt327

**B.A. Part – II (Semester-III)**  
**English (Communication Skills)**  
**(For Sessions 2022-23, 2023-24, and 2024-25)**

One paper of 75 marks to be attempted in three hours  
Time: 3 hours  
(Six periods per week)  
Number of teaching periods: 75

Written Examination: 75 Marks  
Internal Assessment: 25 Marks  
Pass marks: 35%

**COURSE CONTENT:**

1. *Gleanings from Home and Abroad* (Orient BlackSwan).

The following essays from this book are prescribed:

1. Toasted English - R.K. Narayan
2. Work Brings Solace- A.P.J. Abdul Kalam
3. On Letter-Writing - A.G. Gardiner
4. Towards Creating a Poverty-Free World – Muhammad Yunus
5. Wikileaks, Facebook and the End of Discretion - Mukul Kesavan
6. Issues in the Writing of Environmental History- Mahesh Rangarajan
7. Why I Want a Wife - Judy Brady
8. Universal Declaration of Human Rights - Leah Levin

2. *English Grammar in Use* by Raymond Murphy (Cambridge University Press).  
Prescribed Units: 92-120

**Recommended Reading**

*Composition and Writing Skills*. Orient BlackSwan. (For the questions dealing with Composition).

*The Student's Companion* by Wilfred D. Best.

**TESTING**

**UNIT-I**


- I. The candidate shall attempt one essay type question (with internal choice) on theme, central idea or substance from the first four prescribed essays from *Gleanings from Home and Abroad*. The answer shall not exceed 250 words  
10 marks
- II. The candidate shall attempt one essay type question (with internal choice) on theme, central idea or substance from last four (5-8) prescribed essays from *Gleanings from Home and Abroad*. The answer shall not exceed 250 words.  
10 marks

**UNIT-II**

- III. Five short-answer questions to be attempted (in about 50 words each) out of given seven questions from the prescribed essays from *Gleanings from Home and Abroad*.  
5x3=15 marks
- IV. Letter-writing: Personal letters, letters to the editor on current issues, applications.  
The candidate shall write one out of the given choice of two.  
10 marks

**UNIT-III**

- V. This question shall be based on *English Grammar in Use* by Raymond Murphy. Prescribed Units: 92-120  
Candidates shall be required to do as directed on the basis of prescribed exercises. The examiner shall set 25 sentences from the prescribed exercises in the syllabus out of which the candidates shall attempt any 20.

  
Professor and Head  
Department of English  
Dunishi University, Patiala,

25% of the questions shall be set from the prescribed literary text and remaining 75% shall be based on the exercises prescribed in *English Grammar in Use*.

Each sentence shall be of 1.5 marks.

20x1½=30 marks.



**Professor and Head  
Department of English  
Punjabi University, Patiala.**

**B.A. Part – II (Semester-IV)**  
**English (Communication Skills)**  
**(For Sessions 2022-23, 2023-24, and 2024-25)**

One paper of 75 marks to be attempted in three hours  
Time: 3 hours

Written Examination: 75 Marks  
Internal Assessment: 25 Marks  
Pass marks: 35%

No. of teaching periods: 75  
(Six periods per week)

**COURSE CONTENT:**

(A) *Pride and Prejudice* by Jane Austen. Orient Longman College Classics. Abridged Classics. Simplified and Abridged by Manju Sambhunath Sen. Consultant Editor, Bikram K. Das. Orient Longman, Hyderabad, 2003. Reprinted, 2007.

(B) *English Grammar in Use* by Raymond Murphy (Cambridge University Press).

Prescribed Units: 121-145, Appendix 7 and Additional Exercises (Complete)

**Recommended Reading**

1. *Composition and Writing Skills*. Orient BlackSwan. (For questions dealing with Composition).
2. *The Student's Companion* by Wilfred D. Best.

**TESTING**

**UNIT-I**

- Q. No.1 One essay type question of about 250 words with an internal alternative on theme, plot, narrative or incident from *Pride and Prejudice*. 10 marks
- Q. No 2 One essay type question of about 250 words with an internal alternative on character/characters from *Pride and Prejudice* 10 marks

**UNIT-II**

- Q. No. 3 Four short-answer questions to be attempted (in about 50 words each) out of given six questions from *Pride and Prejudice*. 4x3=12 marks
- Q. No.4 (i) Dialogue-writing: Transcoding a given prose passage into a dialogue. 06 marks
- (ii) Paragraph on one out of the given four topics in about 250 words. 07 marks

**UNIT-III**

- Q. No. 5 This question shall be based on *English Grammar in Use* by Raymond Murphy. Prescribed Exercises: 121-145, Appendix 7 and Additional Exercises (Complete).

Candidates shall be required to do as directed on the basis of prescribed exercises. The examiner shall set 25 sentences set from the prescribed exercises in the syllabus out of which the candidates shall attempt any 20.

25% of the questions shall be set from the prescribed literary text and remaining 75% shall be based on the exercises prescribed in *English Grammar in Use*.

Each sentence shall be of 1.5 marks.

20x1½=30 marks.



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Department of English  
Punjabi University, Patiala.

**Punjabi University, Patiala, All UG Courses - IInd Year (3<sup>rd</sup> Semester) Environmental and Road Safety Awareness Session: 2019-20, 2020-21 & 2021-22**

**All UG Courses - II<sup>nd</sup> Year (3<sup>rd</sup> Semester)  
Environmental and Road Safety Awareness  
Session: 2019-20, 2020-21 & 2021-22**

Total Marks : 100  
Theory : 60 marks  
Internal Assessment: 15  
(5 for Attendance & 10 for MST)  
Mandatory field visit to PG  
Science City & Report : 25 Marks

Max Time: 3 hrs.  
Lectures per week 5  
**Credits: 04**

**INSTRUCTIONS FOR THE PAPER SETTERS (Regular Students)**

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus. Each question shall carry 9 marks. Section C will consist of 12 short answer type questions of 2 marks each.

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt any two questions from each section A and B. Section C is compulsory.

**PRIVATE/DISTANCE EDUCATION STUDENTS**

Max Marks: 100

Max Time: 3hrs.  
Lectures per week 5

**INSTRUCTIONS FOR THE PAPER SETTERS**

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus. Each question shall carry 15 marks. Section C will consist of 20 short answer type questions of 2 marks each.

**INSTRUCTIONS FOR THE CANDIDATES**

Candidates are required to attempt any two questions from each section A and B. Section C is compulsory.

**SECTION-A**

**INTRODUCTION TO ENVIRONMENTAL STUDIES:**

The multidisciplinary nature of environmental studies. Definition, scope and importance  
Concept of Biosphere – Lithosphere, Hydrosphere, Atmosphere.

**ECOSYSTEM & BIODIVERSITY CONSERVATION**

Ecosystem and its components, Types of Ecosystems  
Biodiversity - Definition and Value, Threats to biodiversity and its conservation  
Level of biological diversity: genetic, species and ecosystem diversity; bio-geographic zones of India; biodiversity patterns and global biodiversity hot spots.  
India as Mega-biodiversity nation; Endangered and endemic species of India.  
Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and informational value.

## **NATURAL RESOURCES–RENEWABLE AND NON RENEWABLE RESOURCES**

Land resources and land use change; land degradation, soil erosion and desertification.

Deforestation: causes and impacts due to mining, dam building on environment, Forests, Biodiversity and tribal populations.

Water: Use and over-exploitation of surface and ground water, Floods, droughts, conflicts over water (international & inter-state)

Energy resources: renewable and nonrenewable energy sources, use of alternate energy sources, growing energy needs, case studies.

### **Environmental Pollution**

Environmental Pollution : types, causes, effects and controls; Air, Water, Soil and noise pollution. Nuclear hazards and human health risks Solid waste management, Source Segregations : Control measures of urban and Industrial waste. Pollution case studies.

## **SECTION-B**

### **ENVIRONMENTAL PROTECTION LAWS IN INDIA**

Environmental protection act for; Air (Prevention and control of pollution), Water (Prevention and Control of pollution), Wild life, Forest Conservation, Issues involved in the enforcement of environmental legislation. Role of an individual in prevention of pollution.

Environmental policies & Practices; Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.

### **Human Communities and the Environment**

Human population growth: Impacts on environment, human health and welfare, Sanitation & Hygiene. Resettlement and rehabilitation of project affected persons; case studies. Disaster management: floods, earthquake, cyclones and landslides. Environment movements: Chipko, Silent valley, Bishnois of Rajasthan. Environmental ethics: Role of Indian and other religions and cultures in environmental conservation for a Clean-green pollution free state.

Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi)

### **ROAD SAFETY AWARENESS**

Concept and significance of Road safety, Traffic signs, Traffic rules, Traffic Offences and penalties, How to obtain license, Role of first aid in Road Safety.

### **Stubble Burning**

Meaning of Stubble burning.

Impact on health & environment.

Management and alternative uses of crop stubble.

Environmental Legislations and Policies for Restriction of Agriculture Residue Burning in Punjab.

### **Field Work**

Visit to an area to document environmental assets: river/Forest/Flora/Fauna, etc.

Visit to Local polluted site –urban/Rural/Industrial/Agricultural.

Study of common Plants, Insects, Birds and basic principles of identification.

Study of simple ecosystems-pond, river, Delhi Ridge, etc.

**Suggested Readings :**

1. Carson, R.2002. Silent Spring, Houghton Mifflin Harcourt.
2. Gadgil. M., & Guha,R.1993. This Fissured Land : An Ecological History of India. Univ. of California Press.
3. Gleeson, B. and Low, N.(eds.)1999. Global Ethics and Environment, London, Routledge.
4. Gleick,P.H.1993. Water in Crisis.Pacific Institute for Studies in Dev. Environment & Security. Stockholam Env. Institute, Oxford Univ. Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. Principles of Conservation Biology. Sunderland : Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalays dams. Science,339:36-37.
7. McCully,P.1996. Rivers no more: the environmental effects of dams (pp.29-64). Zed Books.
8. McNeill, John R. 2000. Something New Under the Sun : An Environmental History of the Twentieth Century.
9. Odum, E.P., H.T & Andrews, J.1971. Fundamentals of Ecology. Philadelphia : Saunders.
10. Pepper, I.L., Gerba ,C.P & Brusseau, M.L. 2011. Environmental and Pollution Sciences. Academic Press.
11. Rao, M.N. & Datta, A.K.1987. Waste Water Treatment. Oxford and IBH Publishing Co. Pvt.Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R.2012,Environment. 8Th edition. John Wiles & Sons.
13. Rosencranz, A., Divan, S., & Nobie, M.L. 2001. Environmental law and policy in India. Tripathi 1992
14. Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.
16. Sodhi, N.S. Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons.
17. Thapar, V. 1998. Land of the Tiger: A Natural History of the Indian Subcontinent.
18. Warren, C.E. 1971. Biology and Water Pollution Control. WB Saunders.
19. Wilson, E.O. 2006. The Creation: An appeal to save life on earth. New York: Norton.
20. World commission on Environment and Development. 1987. Our Common Future. Oxford University Press.