S.S.D. GIRL's COLLEGE, BATHINDA

Multidisciplinary UG (Chemistry)
B.Sc. / B.Sc. (Honours)
Session 2025-2026
B.Sc. (Medical) Part-2, Sem-III
Chemistry Major-III
Paper Code: BM303

Max Marks: 70 Marks **Credits: 03**
External Semester Exam: 50 Marks **Time Allowed: 3 Hrs.**
Internal Assessments: 20 Marks **3 hours/week**
Pass Marks: 35%

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections, namely, Section A. B and C. Section A and B will have four questions from the respective section of syllabus. Each question will carry 08 marks and may be segregated into sub-parts. Section C will be compulsory with 09 short-answer type questions of 02 mark each covering the entire syllabus.

INSTRUCTIONS FORSTUDENTS

Students are required to attempt five questions selecting two questions from each of Section A & B while Section-C is Compulsory.

Section-A

Gaseous State

Postulates of kinetic theory of gases, van der Waals equation of states excluding its derivation, the isothenns of van der Waals equation, relationship between critical constants and van der Waals constants, Molecular velocities: Root mean square, average and most probable velocities and their relation (without derivation).

Solutions, Dilute Solutions and Colligative Properties

Difference between Ideal and non-ideal solutions, Colligative properties (qualitatively only): Elevation in boiling point, depression in freezing point, osmotic pressure and relative lowering of vapor pressure molecular weight determination, mathematical expressions involved for determination of molecular masses from these properties (without derivation) and numerical based these.

Section-B

Chemistry of Noble gases

Chemical properties of xenon, structure and bonding in xenon compounds.

Alcohols

Monohydric Alcohols (up to 5 C-atoms only)-nomenclature, methods of formation by reduction of aldehydes, ketone, and carboxylic acids. Hydrogen bonding, Acidic nature, Reactions of alcohols with HI and KMnO.

Phenols

Nomenclature, structure and bonding. Preparation of Phenol from benzene, 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, Gattermann synthesis and Reimer- Tieniann reaction.

Course Outcomes

- Gain in-depth knowledge and understanding of core concepts in Chemistry.
- Acquire laboratory and fieldwork skills, including data collection, analysis, and interpretation.
- Prepare for further studies (like M.Sc., competitive exams) or employment in education, research, industry, or government.

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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 EDTA.
(e) Estimation of ferrous and ferric by dichromate method.
(1) Estimation of copper using sodium thiosulphate.

Organic Chemistry

Laboratory Techniques

Thin Layer Chromatography

Determination of R, 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: 6

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Session 2025-2026
B.Sc. (Medical) Part-2, Sem-IV
Chemistry Major-IV
Paper Code: BM403

Max Marks: 70 marks
External Semester Exam: 50 marks
Internal Assessments: 20 marks
Pass Marks: 35%

Credits: 03
Time allowed: 3Hrs
3 hours/week

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections, namely, Section A. B and C. Section A and B will have four questions from the respective section of syllabus. Each question will cany 08 marks and may be segregated into sub-parts. Section C will be compulsory with 09 short-answer type questions of 02 mark each covering the entire syllabus.

INSTRUCTIONS FOR STUDENTS

Students are required to attempt five questions selecting two questions from each of Section A & B while Section-C is Compulsory.

Section-A

Chemistry of Lanthanide Elements

Electronic structure, oxidation states and ionic radii and lanthanide contraction, occurrence and isolation of lanthanide compounds.

Ionic Solids

Concept of close packing, Ionic structures, (NaCl type, Zinc blende, CaF_2), radius ratio rule and coordination number, Limitation of radius ratio rule, lattice defects, semiconductors, and Born- Haber cycle, Fajan's rule and numerical based on it.

Section-B

Aldehydes and Ketones

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 condensation reactions.

Colloidal State

Definition of colloids, classification of colloids; Solids in liquids (sols): properties-kinetic, optical and electrical; stability of colloids protective action, Hardy-Schulze law, gold number. Liquids in liquids (emulsions): its types, Emulsifiers, liquids in solids (gels): its Classification. General applications of colloids.

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Qualitative Analysis

Detection of elements (N, $ 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 AH of the dissolution process.
2. To determine the enthalpy of neutralization of a weak acid/weak base versus strong base/strong acid and determine the enthalpy of ionization of the weak acid/weak base.
3. To determine the enthalpy of solution of solid calcium chloride.