For the Year 2026

Chemistry – 306

Syllabus for CUET (UG)

CHEMISTRY

Unit I: Solutions

Introduction to solution and its type, expressing concentration of solutions, solubility of a solid in liquid, solubility of a gas in a liquid, Henry's Law, vapour pressure of liquid-liquid solutions, Raoult's law Vapour Pressure of Solutions of Solids in Liquids, Ideal & Non Ideal Solutions, Azeotropes (elementary idea only), Colligative properties and Determination of Molar Mass: Relative Lowering of Vapour Pressure, Elevation of Boiling Point, Depression of Freezing point, Osmosis and Osmotic Pressure, Reverse Osmosis & Water Purification, Abnormal Molar Masses, Van't Hoff factor

Unit II: Electrochemistry

Electrochemical Cells, Galvanic Cells, Standard Electrode potential and its measurement, EMF of cell, Nernst Equation & its applications (calculation of equilibrium constant and E_{cell} calculations), Electrochemical Cell & Gibbs Energy of the reaction, Conductance of electrolytic Solutions, Measurement of the conductivity of Ionic Solutions, Specific & Molar Conductivity, Variation of Conductivity and molar conductivity with Concentration, Kohlrausch law & its applications, Electrolytic Cells & Electrolysis, Faraday's Laws of Electrolysis, Products of Electrolysis, Batteries- Primary & Secondary batteries, fuel cell, Corrosion.

Unit III: Chemical Kinetics

Introduction to chemical kinetics, Rate of a chemical reaction (Average and instantaneous rate of reactions), factors influencing rate of reaction: concentration, temperature, catalyst, Rate law and rate constant, order and molecularity of a reaction, integrated rate equations and half-life of a reaction (for zero and first order reactions only), pseudo first order reactions, Arrhenius equation, activation energy, collision theory for a bimolecular elementary chemical reactions and its limitations.

Unit IV: d and f Block Elements

General introduction to d and f-block elements, Position of d- and f-block elements in the periodic Table, Electronic configurations of the d- and f-block elements, general properties of the transition elements & their trends:- Physical properties, atomic & ionic sizes- lanthanoid contraction, Ionisation Enthalpies, Oxidation states, Standard electrode potential trends for M^{2+}/M & $M^{3+/}M^{2+,}$

Stability of Higher oxidation states, Chemical reactivity and E° values, Magnetic properties, Formation of coloured Ions, Formation of Complex compounds, Catalytic properties, Formation of Interstitial Compounds, Alloy Formation, Nature of Oxides & Oxanions of d-block Metals, Some important compounds of transition elements- $K_2Cr_2O_7$ and $KMnO_4$, f-block elements:

Lanthanoids & actinoids: general properties, Atomic & Ionic sizes, Oxidation States, Comparison of actinoids with Lanthanoids, Applications of d-and f- Block elements,

Unit V: Coordination Compounds

General Introduction to Coordination/complex compounds, Werner's theory, double salts, Basic definitions: coordination entity, central atom/ion, Ligands, coordination number, coordination sphere, coordination polyhedron, oxidation number of central atom, homoleptic and heteroleptic complexes, IUPAC nomenclature of coordination compounds, Isomerism in coordination compounds, Bonding in coordination compounds- Valence Bond theory (VBT) and its limitations, crystal field theory (CFT): applications (magnetic properties and colour of complex compounds) and limitations, spectrochemical series, Shape and Bonding in metal carbonyls, Importance & Applications of coordination compounds.

Unit VI: Haloalkanes and Haloarenes

Introduction, Classification of haloalkanes and Haloarenes, Nomenclature of Haloalkanes & Haloarenes, nature of C-X Bond, Methods of preparation of Haloalkanes & Haloarenes, Physical properties of Haloalkanes & Haloarenes (like Melting & boiling Point, Density and Solubility), Chemical Properties of Haloalkanes and Haloarenes, Stereochemical aspects (optical activity, Chirality, retention, inversion, racemization etc) of S_N- Reactions of Haloalkanes, Important Polyhalogen Compounds (CH_2Cl_2, $CHCl_3$,CHI_3, CCl_4, freons & DDT).

Unit VII: Alcohols, Phenols and Ethers

Classification & nomenclature of alcohols, phenols & Ethers, Structures of functional groups (alcohol, phenols & ethers), Methods of preparation of alcohols, Phenols and Ethers, Physical properties of alcohols, phenols and Ethers (boiling point & solubility), Chemical properties of alcohols involving cleavage of –C-OH bond & -CO-H bond, Chemical properties of phenols including oxidation & Reduction, Chemical properties of Ethers, Some Commercially important Alcohols like methanol & Ethanol.

Unit VIII: Aldehydes, Ketones and Carboxylic Acids

General introduction to carbonyl compounds, Nomenclature of Aldehydes, Ketones and carboxylic acids, structure of Carbonyl group, Methods of preparation of Aldehydes & Ketones, Physical properties of aldehydes & ketones (boiling point & solubility), Chemical properties of

aldehydes & ketones, Uses of Aldehydes & Ketones, Structure of Carboxyl group, Methods of preparation of Carboxylic Acids, Physical properties (Boiling point & Solubility) and Chemical properties of carboxylic acids, Uses of Carboxylic Acids.

Unit IX: Amines

General Introduction, Structure of Amines, Classification & Nomenclature of amines, Methods of preparation of Amines, Physical properties of amines (Boiling point & solubility), Basic Character & Chemical properties of amines, Aliphatic & aromatic Diazonium salts: Method of preparation, Physical and chemical properties, Importance of Diazonium Salts in Synthesis of aromatic Compounds.

Unit X: Biomolecules

Carbohydrates: Classification of carbohydrates, Methods of preparation of glucose, Structure of Glucose, D&L configuration of monosaccharides, method of preparation of fructose, structure of fructose, disaccharides: sucrose, maltose and lactose, polysaccharides: starch, cellulose and glycogen, importance of carbohydrates, amino acids and their classifications, structure and types of proteins, denaturation of proteins, enzymes, mechanism of enzyme action (elementary idea), Vitamins: Types, sources and deficiency diseases, Nucleic acids: types, composition, structure and biological importance, Hormones: classification, biological importance and deficiency diseases.

CHEMISTRY