Class 11 Physical Chemistry

UNIT 1: Some Basic Concepts of Chemistry

Matter and its nature, Dalton's atomic theory, laws of chemical combination, concept of elements, atoms, and molecules, atomic and molecular masses, mole concept and molar mass, percentage composition, empirical and molecular formulae, chemical reactions, stoichiometry

UNIT 2: Structure of Atom

Discovery of electron, proton, and neutron, atomic number, isotopes and isobars, Thompson's model and its limitations, Rutherford's model and its limitations, Bohr's model and its limitations, concept of shells and subshells, dual nature of matter and light, de Broglie's relationship, Heisenberg uncertainty principle, the concept of orbitals, quantum numbers, shapes of s, p and d orbitals, rules for filling electrons in orbitals – Aufbau principle, Pauli exclusion principle, Hund's rule, electronic configuration of atoms, stability of half-filled and filled orbitals

UNIT 3: Classification of Elements and Periodicity in Properties

Significance of classification, development of the periodic table, modern periodic law and the present form of the periodic table, periodic trends in properties of elements – atomic radii, ionic radii, ionization enthalpy, electron gain enthalpy, electronegativity, valence

Class 12 Physical Chemistry

UNIT 4: Chemical Bonding and Molecular Structure

Valence electrons, ionic bond, covalent bond, bond parameters, Lewis structure, the polar character of covalent bond, the covalent character of ionic bond, valence bond theory, resonance, the geometry of covalent molecules, VSEPR theory, the concept of hybridization involving s, p, and d orbitals, molecular orbital theory of homonuclear diatomic molecules (qualitative idea only), hydrogen bond

UNIT 5: States of Matter: Gases and Liquids

Three states of matter, intermolecular interactions, types of bonding, melting and boiling points, role of gas laws in elucidating the concept of the molecule, Boyle's law, Charle's law, Gay Lussac's law, Avogadro's law, ideal behavior, empirical derivation of gas equation, Avogadro number, ideal gas equation, kinetic energy and molecular speeds (elementary idea), deviation from ideal behavior, liquefaction of gases, critical temperature, Liquid State – Vapour pressure, viscosity, and surface tension (qualitative idea only, no mathematical derivations)

UNIT 6: Thermodynamics

Concepts of system, types of systems, surroundings, work, heat, energy, extensive and intensive properties, state functions, the first law of thermodynamics – internal energy and enthalpy, heat capacity and specific heat, measurement of ΔU and ΔH , Hess's law of constant heat summation, enthalpy of bond dissociation, combustion, formation, atomization, sublimation, phase transition, ionization, solution, and dilution, the introduction of entropy as a state function, the second law of thermodynamics, Gibbs energy change for spontaneous and non-spontaneous process, criteria for equilibrium, the third law of thermodynamics – a brief introduction

UNIT 7: Equilibrium

Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium – Le Chatelier's principle, ionic equilibrium – ionization of acids and bases, strong and weak electrolytes, degree of ionization, ionization of polybasic acids, acid strength, concept of pH., Hydrolysis of salts (elementary idea), buffer solutions, Henderson equation, solubility product, common ion effect (with illustrative examples)

UNIT 8: Redox Reactions

Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions in terms of loss and gain of electron and change in oxidation numbers, applications of redox reactions

Class 11 Inorganic Chemistry

UNIT 9: Classification of Elements and Periodicity in Properties

Modern periodic law and the current form of the periodic table; s, p, d, and f-block elements; Periodic trends in properties such as atomic and ionic radii, ionization enthalpy, electron gain enthalpy, valence, oxidation states, and chemical reactivity.

Class 12 Inorganic Chemistry

UNIT 10: P-Block Elements

General Introduction; Electronic configuration; General trends in physical and chemical properties; Unique behavior of the first element of each group; Group 13 to Group 18 elements.

UNIT 11: d- and f-Block Elements

General introduction, electronic configurations, occurrence, and characteristics of transition elements; General trends in properties such as physical properties, ionization enthalpy, oxidation states, atomic radii, color, catalytic behavior, magnetic properties, complex formation; Preparation, properties, and uses of compounds like K₂Cr₂O₇ and KMnO₄; Lanthanoids and actinoids, including electronic configurations, oxidation states, and lanthanoid contraction.

UNIT 12: Coordination Compounds

Introduction to coordination compounds; Werner's theory; Ligands, coordination number, denticity, chelation; IUPAC nomenclature of mononuclear coordination compounds; Isomerism; Bonding: Valence bond approach and basic ideas of Crystal field theory; Color and magnetic properties; Importance of coordination compounds in qualitative analysis, extraction of metals, and in biological systems.

NEET 2025 Syllabus for Class 11 Organic Chemistry

UNIT 13: Purification and Characterisation of Organic Compounds

Purification methods (crystallization, sublimation, chromatography, distillation, differential extraction); qualitative and quantitative analysis including detection of elements (N, S, P, halogens) and calculations of empirical and molecular formulas.

UNIT 14: Some Basic Principles of Organic Chemistry

Tetra-valency of carbon, hybridization, classification based on functional groups, isomerism, nomenclature, types of organic reactions (substitution, addition, elimination, rearrangement), electronic effects (inductive, electromeric, resonance, hyperconjugation).

UNIT 15: Hydrocarbons

Classification and isomerism; Alkanes, Alkenes, and Alkynes – structure, properties, and reactions; Aromatic hydrocarbons – structure, aromaticity, electrophilic substitution reactions.

Class 11 Organic Chemistry

UNIT 16: Organic Compounds Containing Halogens

Preparation, properties, and reactions of haloalkanes and haloarenes; environmental effects of compounds like chloroform and DDT.

UNIT 17: Organic Compounds Containing Oxygen

Properties and reactions of alcohols, phenols, ethers, aldehydes, ketones, carboxylic acids; important organic reactions such as nucleophilic addition and condensation.

UNIT 18: Organic Compounds Containing Nitrogen

Amines and diazonium salts – preparation, properties, reactions, and uses; importance in synthetic organic chemistry.

UNIT 19: Biomolecules

Classification and functions of carbohydrates, proteins, vitamins, nucleic acids; structure and function of biomolecules in biological processes.

UNIT 20: Principles Related to Practical Chemistry

Detection of elements and functional groups in organic compounds; principles involved in the preparation of specific inorganic and organic compounds; qualitative and quantitative analysis including titrimetric and gravimetric analysis.