

Class – XI
REVISED SYLLABUS
(For the Session of 2020-21 Only)
Chemistry
(THEORY)

Unit I: Some Basic Concepts of Chemistry

General Introduction: Importance and scope of chemistry. Historical approach to particulate Atomic and molecular masses mole concept and molar mass: percentage composition, empirical and molecular formula chemical reactions, stoichiometry and calculations based on stoichiometry.

Unit II: Structure of Atom

Bohr's model and its limitations, concept of shells and subshells, dual nature of matter and light, de Broglie's relationship, Heisenberg uncertainty principle, concept of orbitals, quantum numbers, shapes of s, p, and d orbitals, rules for filling electrons in orbitals - Aufbau principle, Pauli exclusion principle and Hund's rule, electronic configuration of atoms, stability of half filled and completely filled orbitals.

Unit III: Classification of Elements and Periodicity in Properties

Modern periodic law and the present form of periodic table, periodic trends in properties of elements -atomic radii, ionic radii. Ionization enthalpy, electron gain enthalpy, electro negativity, valence.

Unit IV: Chemical Bonding and Molecular Structure

Valence electrons, ionic bond, covalent bond: bond parameters. Lewis structure, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridization, involving s, p and d orbitals and shapes of some simple molecules, molecular orbital; theory of homo nuclear diatomic molecules (qualitative idea only), hydrogen bond.

Unit V: States of Matter: Gases and Liquids

Three states of matter. Intermolecular interactions, type of bonding, melting and boiling points. Role of gas laws in elucidating the concept of the molecule, Boyle's law. Charles law, Gay Lussac's law, Avogadro's law. Ideal behaviour, empirical derivation of gas equation, Avogadro's number. Ideal gas equation. Derivation from ideal behaviour.

Unit VI: Thermodynamics

Concepts Of System, types of systems, surroundings. Work, heat, energy, extensive and intensive properties, state functions. First law of thermodynamics - internal energy and enthalpy, measurement of ΔU and ΔH , Hess's law of constant heat summation, enthalpy of: bond dissociation, combustion, formation, atomization, sublimation. Phase transformation, ionization, and solution. Introduction of entropy as a state function, free energy change for spontaneous and nonspontaneous processes.

Unit VII: 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, concept of pH. Buffer solutions, solubility product, common

ion effect (with illustrative examples).

Unit VIII: Redox Reactions

Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions.

Unit IX: Hydrogen

Position of hydrogen in periodic table, occurrence, isotopes, preparation, properties and uses of hydrogen; hydrides - ionic, covalent and interstitial; physical and chemical properties of water, heavy water; hydrogen peroxide-preparation, properties and structure; hydrogen as a fuel.

Unit X: s- Block Elements (Alkali and Alkaline earth metals)

Group 1 and Group 2 elements:

General introduction, electronic configuration, occurrence, anomalous properties of the first element of each group, diagonal relationship, trends in the variation of properties (such as ionization enthalpy, atomic and ionic radii), trends in chemical reactivity with oxygen, water, hydrogen and halogens; uses.

Unit XI: Some p-Block Elements

General Introduction to p-Block Elements

Group 13 elements: General introduction, electronic configuration, occurrence. Variation of properties, oxidation states, trends in chemical reactivity, anomalous properties of first element of the group; Boron- physical and chemical properties.

Group 14 elements: General introduction, electronic configuration, occurrence, variation of properties, oxidation states, trends in chemical reactivity, anomalous behaviour of first element, catenation, allotropic forms, physical and chemical properties.

Unit XII: Organic Chemistry - Some Basic Principles and Techniques

General introduction, classification and IUPAC nomenclature of organic compounds Electronic displacements in a covalent bond: inductive effect, electromeric effect, resonance and hyper conjugation. Homolytic and heterolytic fission of a covalent bond: free radicals, carbocations, carbanions; electrophiles and nucleophiles, types of organic reactions

Unit XIII: Hydrocarbons

Classification of hydrocarbons

Alkanes - Nomenclature, isomerism, conformations (ethane only), physical properties, chemical reactions including Alkenes-Nomenclature, structure of double bond (ethene) geometrical isomerism, physical properties, methods of preparation; chemical reactions: addition of hydrogen, halogen, water, hydrogen halides (Markovnikov's addition and peroxide effect), ozonolysis, oxidation, mechanism of electrophilic addition. Alkynes - Nomenclature, structure of triple bond (ethyne), physical properties. Methods of preparation, chemical reactions: acidic character of alkynes, addition reaction of - hydrogen, halogens, hydrogen halides and water. Aromatic hydrocarbons: Introduction, IUPAC nomenclature; benzene: resonance aromaticity; chemical properties: mechanism of electrophilic substitution. - nitration sulphonation, halogenation, Friedel Craft's alkylation and acylation: directive influence of functional group in mono-substituted benzene; carcinogenicity and toxicity.

