

# Content Directory

## Class XI **Part I**

### 1. Some Basic Concepts of Chemistry [1-15](#)

- Properties of Matter and their Measurement
- Physical and Chemical Properties
- Laws of Chemical Combination
- Atomic and Molecular Masses
- Formula mass
- Mole concept and molar mass

### 2. Structure of Atom [16-38](#)

- Atomic and mass number, isotopes, isobars and isotones
- Rutherford's model and its limitations
- Development leading to Bohr's model of atom
- Line emission spectrum of hydrogen atom
- Bohr's model for Hydrogen atom
- de Broglie's principle, Heisenberg's uncertainty principle
- Quantum mechanical model of atom
- Quantum numbers, shapes of atomic orbitals, Energies of Orbital
- Aufbau principle, Pauli's exclusion principle and Hund's rule, electronic configuration of elements, stability of half filled and completely filled orbitals

### 3. Chemical Bonding [39-55](#)

- Valency and its electronic concept
- Lewis symbol and its significance
- VSEPR theory
- Valence bond theory
- Concept of hybridisation involving , and orbitals
- Molecular orbital theory
- Hydrogen bonding
- Bond parameters
- Polar character of covalent bond
- Covalent character of ionic bond
- Resonance

### 4. Redox Reactions [56-68](#)

- Redox reactions in terms of electron transfer
- Types of redox reactions
- Oxidation number & Stock notation
- Balancing redox reactions
- Redox reaction and Electrode potential
- Standard electrode potential

### 5. Elements of Group 1 and 2 [69-82](#)

- Alkali metals and alkaline earth metals
- Electronic configuration and Trends in atomic and physical properties of Group 1 and 2
- Chemical properties of elements of group 1 and 2
- Uses of elements of group 1 and 2
- Preparation and properties of some important compounds of s-block element : Sodium hydroxide and Lithium aluminium hydride

### 6. States of Matter : Gaseous and Liquids States [83-102](#)

- Three states of matter
- Intermolecular forces
- Characteristic properties of gases
- Gas laws : Boyle's law, Charles law, Gay Lussac's law, Avogadro's law
- Ideal gas equation
- Dalton's law of partial pressure, kinetic molecular theory of gases
- Different types of molecular velocities, Ideal and Real gas, Deviation from ideal behaviour
- Compressibility factor and van der Waals' equation
- Liquid State–Vapour pressure, viscosity and surface tension (qualitative idea only, no mathematical derivations)

## 7. Adsorption and Colloids

(Surface chemistry)

[103-115](#)

- Adsorption – physisorption and chemisorption
- Factors affecting adsorption of gases on solids
- Application of adsorption
- Catalyst and catalysis, Types of catalysis, Characteristics of catalysts, Important features of solid catalysts
- Enzyme catalysis, its characteristics and mechanism
- Colloidal state : distinction between solutions, colloids and suspensions; Classification of colloids
- Properties of colloids : Physical, mechanical & optical
- Emulsion – types of emulsions
- Application of colloids

## 8. Basic Principles of Organic Chemistry

[116-137](#)

- Structural representation of organic compound, Fisher, Newman and Sawhorse projection formula
- Classification and IUPAC nomenclature of organic compounds
- Isomerism : Structural and stereoisomerism
- Homolytic and heterolytic fission of a covalent bond
- Types of reagents, Reaction intermediates
- Types of organic reactions
- Electronic displacements in a organic reactions; inductive effect, electromeric effect, mesomeric effect, resonance and hyperconjugation

## 9. Hydrocarbons

[138-162](#)

- Classification of hydrocarbons
- **Alkanes** : Nomenclature, isomerism, conformations (ethane only), physical properties, chemical properties & uses.
- **Alkenes** : Structure, Nomenclature, isomerism, method of preparation, physical properties, Chemical properties;
- **Alkynes** : Nomenclature, physical properties. Methods of preparation, chemical properties: acidic character of alkynes elimination reactions, addition reaction of hydrogen, halogens, hydrogen halides, water, uses of alkynes.

- **Aromatic Hydrocarbons** : Introduction, benzene, aromaticity (Huckel's rule), method of preparation, physical properties and chemical properties benzene, Addition reaction, mechanism of electrophilic substitution. Nitration, sulphonation, halogenation, directive influence of functional group, Carcinogenicity and toxicity.

## Class XII Part II

### 10. Solid State

[163-183](#)

- Types of Solid, Isomorphism and Polymorphism
- Crystal lattice and Unit cells
- Unit cell in two dimensional and three dimensional lattices
- Calculation of density of unit cell
- Packing in solids, voids, number of atoms per unit cell in a cubic unit cell
- Crystal defects

### 11. Solutions

[184-223](#)

- Types of solutions
- Solubility, solubility of gas in liquid, solubility of solid in liquid, solid solutions
- Vapour pressure of solution of liquid (Raoult's law),
- Ideal and non-ideal solutions
- Colligative properties –Relative lowering of vapour pressure, elevation of boiling point, depression of freezing point, osmosis, osmotic pressure, Reverse osmosis,
- Colligative properties for solution of electrolyte.

### 12. Ionic Equilibria

[224-243](#)

- Types of electrolyte
- Degree of dissociation
- Acid, base and salts, Various concepts of acid and bases: Arrhenius theory, Bronsted-Lowry concept, Lewis concept
- Ionisation of acids & base, Oswald's Dilution law, Relative strength of mono acidic bases
- Auto-ionisation of water
- pH Scale, Hydrolysis of salts
- Solubility Product, Common Ion effect
- Buffer Solution and its applications

### 13. Chemical Thermodynamics [244-275](#)

- Terms used in thermodynamics : System, surroundings, Types of system.
- Extensive and intensive properties, state and path functions
- Thermodynamic process
- Nature of heat and work, Internal energy
- First law of thermodynamics
- Enthalpy, enthalpy of physical transformations
- Thermochemistry, Enthalpy of chemical reaction, combustion, formation
- Hess' law of constant heat summation

### 14. Electrochemistry [276-310](#)

- Electrical conduction, Electrical conductance of solution
- Conductivity, variations of conductivity with concentration
- Kohlrausch's Law
- Cell constant, cell –electrolytic and galvanic cells
- Electrode potential, cell potential
- Electrochemical series
- Nernst equation and its application to chemical cells
- Thermodynamics of galvanic cells, Galvanic cell uses in day to day life, corrosion

### 15. Chemical kinetics [311-340](#)

- Rate of reaction (average and instantaneous), factors affecting rate of reaction, Reaction concentration, Rate law and specific rate constant
- Order and molecularity of a reaction
- Integrated rate equations and half life (only for zero and first order reactions)
- Presence of catalyst on reaction rate

### 16. Elements of Group 16, 17 and 18 [341-365](#)

- **Group 16 elements** : Oxygen family General introduction, occurrence, general & physical properties, chemical properties, Anomalous behaviour of oxygen, Sulphur – allotropic forms; compounds of sulphur; preparation, properties and uses of sulphur dioxide; sulphuric acid; industrial process of manufacture, properties and uses, oxoacids of sulphur (structures only).

- **Group 17 elements**: Halogens General introduction, occurrence, General and physical properties, chemical properties; Chlorine : Preparation, properties and uses of chlorine, Interhalogen compounds and its uses.
- **Group 18 Elements** : Nobel gases General introduction, Occurrence, General and physical properties, chemical properties, uses of He, Ne and Ar.

### 17. Transition and Inner Transition Elements [366-396](#)

- Transition Elements : Position in periodic, electronic configuration.
- General characteristics of d-block elements : Oxidation states, physical properties.
- General trends in atomic properties of 1st transition series : Atomic and ionic size, ionisation enthalpy, colour, catalytic property, magnetic properties, formation of interstitial compounds, alloy formation.
- Extraction of metals, Some commercial alloys of iron.
- Inner-Transition Elements, Lanthanoids – lanthanoid contraction and its consequences. General characteristics of lanthanoids, chemical reactivity of lanthanoids. Actinoids properties of Actinoids – Electronic configuration, oxidation states. Comparison with lanthanoid, Postactinoid elements

### 18. Coordination compounds [397-425](#)

- Coordination compounds – Introduction, ligands and its classification, Terms used in coordination compounds, Coordination entity, Complex Ion, Coordination number
- Werner's theory of coordination complex
- IUPAC nomenclature of coordination compounds
- Effective Atomic number
- Isomerism in coordinate compounds
- Theories of Bonding in complex (VBT)
- Importance of coordination compounds

### 19. Halogen derivatives [426-460](#)

- Classification of Halogen Derivatives
- Nomenclature of halogen derivatives
- Preparation of Haloalkenes
- Nature of C—X bond

- Physical and chemical properties of haloalkanes
- Haloarenes & its preparation
- Physical & chemical properties of haloarenes.

## 20. Alcohols, phenols and ethers [461-515](#)

- **Alcohols**: Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only); Mechanism of dehydration, uses of methanol and ethanol.
- **Phenols**: Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophilic substitution reactions, uses of phenols.
- **Ethers**: Nomenclature, methods of preparation, physical and chemical properties, uses.

## 21. Aldehydes, ketones and carboxylic acid [516-564](#)

- **Aldehydes and ketones** : Nomenclature, nature of carbonyl group, methods of preparation. Physical and chemical properties, mechanism of nucleophilic addition, reactivity of alpha hydrogen in aldehydes; uses.
- **Carboxylic acid** : Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.

## 22. Amines [565-603](#)

- **Amines** : Classification, structure, Nomenclature, methods of preparation, physical and chemical properties, uses.
- **Diazonium salts** : Preparation, physical properties, chemical properties and importance of diazonium salt in synthetic of organic compounds.

## 23. Biomolecules [604-630](#)

- Carbohydrates and its classification
- Nomenclature of monosaccharides
- **Glucose** : Preparation, physical properties, chemical properties, optical isomerism and structure of glucose
- **Fructose** : Preparation, chemical reaction and structure of fructose

- **Oligosaccharides** : Preparation and properties of sucrose, lactose and maltose
- Tests for carbohydrates, importance of carbohydrates
- **Proteins** : Preparation, classification of amino acids
- Classification, Tests and Denaturation of proteins.
- Enzymes and its mechanism
- Nucleic acids & its biological function
- Nucleic acids : DNA and RNA

## 24. Introduction to Polymer Chemistry [631-654](#)

- **Classification of polymers** : Based on source, structure, mode of polymerisation (Addition and condensation), molecular forces, type of different monomers.
- **Some important polymers** : Polythene or polyethylene, polytetrafluoroethene, polyacrylonitrile, polyamides, polyesters, Rubber, synthetic rubber.
- Biodegradable & non-biodegradable polymers
- Polymers of commercial importance

## 25. Green Chemistry and Nanochemistry [655-663](#)

- Green chemistry, sustainable development
- Principles of green chemistry
- Role of green chemistry
- Introduction to nanochemistry, characteristic feature of nanoparticles, Analysis or characterisation of nanomaterials, History of nanotechnology,
- Applications of nanomaterials, Nanoparticles and nanotechnology.
- Advantages and disadvantages of nanoparticles and nanotechnology.

**Mock Test (1-5)** [665-684](#)

**MHT CET Solved Paper 2023** [687-693](#)

**MHT CET Solved Paper 2024** [697-704](#)