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CUET 2025

# CHEMISTRY

## SYLLABUS

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You Are Next..

# Chemistry - 306

## Syllabus for Class 12

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*Note:*

*There will be one Question Paper which will have 50 questions and no choice is given this paper.*

*The total duration of this paper will be 60 minutes*

## CHEMISTRY - 306

### Unit I: Solid State

Classification of solids based on different binding forces: molecular, ionic covalent, and metallic solids, amorphous and crystalline solids (elementary idea), unit cell in two dimensional and three-dimensional lattices, calculation of density of unit cell, packing in solids, packing efficiency, voids, number of atoms per unit cell in a cubic unit cell, point defects, electrical and magnetic properties, Band theory of metals, conductors, semiconductors and insulators and  $n$  and  $p$ -type semiconductors.

### Unit II: Solutions

Types of solutions, expression of concentration of solutions of solids in liquids, the solubility of gases in liquids, solid solutions, colligative properties – the relative lowering of vapour pressure, Raoult's law, elevation

of B.P., depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass, Vant Hoff factor.

### Unit III: Electrochemistry

Redox reactions; conductance in electrolytic solutions, specific and molar conductivity variations of conductivity with concentration, Kohlrausch's Law, electrolysis and laws of electrolysis (elementary idea), dry cell – electrolytic cells and Galvanic cells; lead accumulator, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells. Relation between Gibbs energy change and EMF of a cell, fuel cells; corrosion.

### Unit IV: Chemical Kinetics

Rate of a reaction (average and instantaneous), factors affecting rates of reaction: concentration, temperature, catalyst; order and molecularity of a reaction; rate law and specific rate constant, integrated rate equations, and half-life (only for zero and first-order reactions); concept of collision theory (elementary idea, no mathematical treatment). Activation energy, Arrhenius equation.

### Unit V: Surface Chemistry

*Adsorption* – physisorption and chemisorption; factors affecting adsorption of gases on solids; catalysis: homogenous and heterogeneous, activity and selectivity: enzyme catalysis; colloidal state: the distinction between true solutions, colloids, and suspensions; lyophilic, lyophobic multimolecular and macromolecular colloids; properties of colloids; Tyndall effect, Brownian movement, electrophoresis, coagulation; emulsions – types of emulsions.

### Unit VI: General Principles and Processes of Isolation of Elements

*Principles and methods of extraction* – concentration, oxidation, reduction electrolytic method, and refining; occurrence and principles of extraction of aluminum, copper, zinc, and iron.

### Unit VII: $p$ -Block Elements

*Group 15 elements:* General introduction, electronic configuration, occurrence, oxidation states, trends in physical and chemical properties; nitrogen – preparation, properties, and uses; compounds of nitrogen: preparation and properties of ammonia and nitric acid, oxides of nitrogen (structure only); Phosphorous-allotropic forms; compounds of phosphorous: preparation and properties of phosphine, halides ( $\text{PCl}_3$ ,  $\text{PCl}_5$ ) and oxoacids (elementary idea only).



**Group 16 elements:** General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties; dioxygen: preparation, properties, and uses; classification of oxides; ozone. 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:** General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties; compounds of halogens: preparation, properties and uses of chlorine and hydrochloric acid, interhalogen compounds, oxoacids of halogens (structures only).

**Group 18 elements:** General introduction, electronic configuration, occurrence, trends in physical and chemical properties, uses.

### **Unit VIII: *d* and *f* Block Elements**

General introduction, electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first-row transition metals – metallic character, ionization enthalpy, oxidation states, ionic radii, colour, catalytic property, magnetic properties, interstitial compounds, alloy formation. Preparation and properties of  $K_2Cr_2O_7$  and  $KMnO_4$ .

**Lanthanoids** – electronic configuration, oxidation states, chemical reactivity, and lanthanoid contraction and its consequences.

**Actinoids** – Electronic configuration, oxidation states, and comparison with lanthanoids.

### **Unit IX Coordination Compounds**

**Coordination compounds:** Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds, bonding, Werner's theory VBT, CFT; isomerism (structural and stereo) importance of coordination compounds (in qualitative analysis, extraction of metals and biological systems).

### **Unit X: Haloalkanes and Haloarenes**

**Haloalkanes:** Nomenclature, nature of C-X bond, physical and chemical properties, mechanism of substitution reactions. Optical rotation.

**Haloarenes:** Nature of C-X bond, substitution reactions (directive influence of halogen for monosubstituted compounds only).

Uses and environmental effects of – dichloromethane, trichloromethane, tetrachloromethane, iodoform, freons, DDT.

### **Unit XI: Alcohols, Phenols, and Ethers**

**Alcohols:** Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only); identification of primary, secondary, and tertiary alcohols; mechanism of dehydration, uses, with special reference to 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.

### **Unit XII: Aldehydes, Ketones, and Carboxylic Acids**

**Aldehydes and Ketones:** Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties, mechanism of nucleophilic addition, the reactivity of alpha hydrogen in aldehydes; uses.

**Carboxylic Acids:** Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.

## Unit XIII: Organic Compounds Containing Nitrogen

**Amines:** Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary secondary, and tertiary amines.

**Cyanides and Isocyanides** – will be mentioned at relevant places in context.

**Diazonium salts:** Preparation, chemical reactions, and importance in synthetic organic chemistry.

## Unit XIV: Biomolecules

**Carbohydrates** – Classification (aldoses and ketoses), monosaccharide (glucose and fructose), D-L configuration, oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen): importance.

**Proteins** - Elementary idea of  $\alpha$ -amino acids, peptide bond, polypeptides, proteins, primary structure, secondary structure, tertiary structure and quaternary structure (qualitative idea only), denaturation of proteins; enzymes.

**Hormones** –Elementary idea (excluding structure).

**Vitamins** – Classification and functions.

**Nucleic Acids:** DNA and RNA

## Unit XV: Polymers

**Classification** – Natural and synthetic, methods of polymerization (addition and condensation), copolymerization. Some important polymers: natural and synthetic like polythene, nylon, polyesters, bakelite, rubber. Biodegradable and non-biodegradable polymers.

## Unit XVI: Chemistry in Everyday Life

1. Chemicals in medicines – analgesics, tranquilizers, antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids, antihistamines.
2. Chemicals in food – preservatives, artificial sweetening agents, **elementary idea of antioxidants**.
3. Cleansing agents – soaps and detergents, cleansing action.

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