

Unit Name	Marks
Solid State	04
Solutions	05
Electrochemistry	05
Chemical Kinetics	05
Surface Chemistry	04
General principles and processes of Isolation of Elements	03
p-Block Elements	08
d-and f- Block Elements	05
Coordination Compounds	03
Haloalkanes and Haloarenes	04
Alcohols, Phenols and Ethers	04
Aldehydes, Ketones and Carboxylic acids	06
Organic Compounds containing Nitrogen	04
Bio molecules	04
Polymers	03
Chemistry in Everyday Life	03
Total	70

The complete latest syllabus of WBCHSE of Class 12 Chemistry is mentioned below along with the subtopics.

Unit – I: Solid State

Classification of solids based on different binding forces: molecular, ionic, covalent and metallic solid, amorphous and crystalline solids (elementary idea), unit cell in two dimensional and three dimensional lattices, packing efficiency, calculation of density of unit cell, packing in solids, 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 & p-type semiconductors.

Unit – II: Solutions

Types of solutions, expression of concentration of solution of solids in liquids, solubility of gases in liquids, solid solutions, colligative properties – relative lowering of vapour pressure, Raoult's law, elevation of boiling point, depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass, van't Hoff factor and calculations involving it.

Unit – III: Electrochemistry

Red ox 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. Reaction 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 reactions; 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, distinction between true solutions, colloids and suspensions; lyophilic, lyophobic, multimolecular colloids; properties of colloids; Tyndall effect, Brownian movement, electro phoresis, coagulation; emulsion – types of emulsions. Elementary idea of nanomaterials.

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

Principles and methods of extraction – concentration, oxidation, reduction electrolysis method and refining; occurrence and principles of extraction of aluminium, 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); Phosphorus – allotropic forms; compounds of phosphorus; preparation and properties of phosphine, halides (PCl_3 , 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 dioxide; sulphuric acid: industrial process of manufacture, properties and uses, other oxides and 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 (structure 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 $\text{K}_2\text{Cr}_2\text{O}_7$ 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 shape, IUPAC nomenclature of mononuclear coordination compounds. Bonding (Werner's theory, VBT and CFT); structural and stereo isomerism, importance of coordination compounds (in qualitative inclusion of 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. Stability of carbonations, R-S and d-l configurations

Haloarenes:

Nature of C-X bond, substitutions reactions (directive influence of halogen for monosubstituted compound only, stability of carbocations R-S and d-l configurations)

Uses and environmental effects of – dichloromethane, trichloromethane, tetrachloromethane, iododorm, 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 of methanol and ethanol.

Phenols: Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophilic substitution reactions, uses of phenol.

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, 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

Nitro compounds: General methods of preparation and chemical reactions.

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: Bio molecules

Carbohydrates – Classification (aldoses and Ketoses), monosaccharides (glucose and fructose), D-L configuration, oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); importance.

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

Lipids and hormones, their classification and functions.

Vitamins: Classification and functions.

Nucleic Acids: DNA & RNA.

Unit – XV: Polymers

Classification – natural and synthetic, methods of polymerization (addition and Condensation), copolymerization. Some important polymers: natural and synthetic like poly, nylon, polyesters, Bakelite, rubber, biodegradable and non-biodegradable polymers.

Unit – XVI: Chemistry in Everyday Life

1. Chemicals in medicines- analgesics, tranquilizers, antiseptics, disinfectants, antimicrobials, anti fertility drugs, antibiotics, antacids, antihistamines, antioxidants.
2. Chemicals in food – preservatives, artificial, sweetening agents.
3. Cleansing agents – soaps and detergents, cleansing action.

Class 12 Chemistry Practical syllabus

Evaluation Scheme for Examination	Marks
Volumetric analysis	10
Salt Analysis	08
Content Based Experiment	06
Class Record, Viva and Project work	06
Total	30

Surface Chemistry.

a) Preparation one lyophilic and one lyophobic sol. Lyophilic sol – starch albumin and gum, Lyophobic sol – aluminium hydroxide, ferric hydroxide, arsenious sulphide.

b) Study of the role of emulsifying agents in stabilizing the emulsions of different oils.

Chemical kinetics

a) Effect of concentration and temperature on the rate of reaction between sodium thiosulphate and hydrochloric acid.

b) Study of reaction rates of any one of the following:

Reaction of iodide ion with hydrogen peroxide at room temperature using different concentrations of iodide ions.

Reaction between potassium iodide, KIO_3 and sodium sulphate: (Na_2SO_3) using starch solution as indicator (clock reaction).

Thermo chemistry

Any of the following experiments

1. Enthalpy of dissolution copper sulphate or potassium nitrate.
2. Enthalpy of neutralization of strong acid (HCl) and strong base (NaOH)
3. Determination of enthalpy change during interaction (hydrogen bond formation) between acetone and chloroform

Electro chemistry

Variation of cell potential in $Zn/Zn^{2+}/Cu^{2+}/Cu$ with change in concentration of electrolytes ($CuSO_4$ or $ZnSO_4$) at room temperature.

Chromatography

1. Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of R_f Values.
2. Separation of constituents present in an inorganic mixture containing two cations only (constituents having large difference in R_f values to be provided).

Preparation of Inorganic Components

1. Preparation of double salt of ferrous ammonium sulphate or potash alum
2. Preparation of potassium ferric oxalate

Preparation of Organic compounds

Preparation of any two of the following compounds

1. Acetanilide
2. Di benzal acetone
3. p-Nitroacetanilide
4. Aniline yellow or 2-Naphthal aniline dye.
5. Iodoform

Tests for the functional groups present in organic compounds:

Unsaturation, alcoholic, phenolic, aldehydic, ketonic, carboxylic and amino (primary) groups.

Characteristic test of carbohydrates, fats and proteins in pure samples and their detection in given food stuffs.

Determination of concentration/ minority of KMnO₄ solution by titrating it against a standard solution of:

1. Oxalic acid
2. Ferrous ammonium sulphate (students will be required to prepare standard solution by weighing themselves)

Qualitative analysis

Determination of one cation and one anion in a given salt.

Cations – Pb²⁺, Cu²⁺, As³⁺, Al³⁺, Fe³⁺, Mn²⁺, Ni²⁺, Zn²⁺, Co²⁺, Ca²⁺, Sr²⁺, Ba²⁺, Mg²⁺, NH₄⁺

Anions – CO₃²⁻, S²⁻, SO₃²⁻, NO₂⁻, Cl⁻, Br⁻, I⁻, PO₄³⁻, C₂O₄²⁻, CH₃COO⁻

(Note; Insoluble salts excluded)

Project work- where feasible may include

1. Model preparation
2. Investigatory project
3. Science exhibits
4. Participation in science fairs
5. Testing of purity of food articles like butter, pulse and milk etc.