

Punjab Board

SYLLABUS

2024-2025

CLASS-XII
CHEMISTRY

Time: 3 Hrs **Theory: 70 Marks**
Practical: 25 Marks

INA : 5 Marks
Total: 100 Marks

SYALLBUS (THEORY)

Unit I: Solutions

Types of solutions, expression of concentration of solutions of solids in liquids, solubility of gases in liquids, solid solutions, colligative properties - relative lowering of vapour pressure, Raoults 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 II: 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, fuel cells; corrosion. Relation between Gibbs Energy change and EMF of cell.

Unit III: 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, Arrhenious equation.

Unit-IV: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, electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction and consequences.

Actenoids - Electronic configuration, oxidation states.

Unit-V: 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 (structure and stereo) importance of coordination compounds (in qualitative analysis, extraction of metals and biological systems).

Unit-VI: Haloalkanes and Haloarenes.

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

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

Uses and environmental effects of - dichloromethane, t

Unit –VII: 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-VIII: Aldehydes, Ketones aml Carboxylic Acids

Aldehydes and Ketones: Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties, and 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-IX: 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.

Dizonium Salts: Preparation, chemical reactions and importance in synthetic organic chemistry.

Unit-X: Biomolecules

Carbohydrates - Classification (aldoses and ketoses), monosaccaharides (glucose and fructose), oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); importance

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

Vitamins: Classification and functions. **Harmones:** Elementary idea (excluding structure) **Nucleic Acids:** DNA & RNA .

STRUCTURE OF QUESTION PAPER (PRACTICAL)

Marks: 25

Evaluation Scheme for Examination	Marks
Volumetric Analysis	07
Salt Analysis	07
Content Based Experiment	05
Project Work	03
Class record and viva	03
Total	25

PRACTICAL SYLLABUS

A. 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:-

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

   ii. Reaction between potassium iodate, KIO_3, and sodium sulphite: (Na_2 SO_3) using starch solution as indicator (clock reaction).

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

C. Determination of concentration/morality of $KMnO_4$, solution by

titrating it against a standard Solution of:

a. Oxalic acid.

b. Ferrous ammonium sulphate.

(Students will be required to prepare standard solutions by weighing themselves).

D. Preparation of Inorganic Compounds

a. Preparation of double salt of ferrous ammonium sulphate or potash alum.

b. Preparation of potassium ferric oxalate.

E. Preparation of Organic Compounds: Preparation of any two of the following compounds

a. Acetanilide

b. Di-benzal acetone

c. p-Nitroacetanilide,

d. Aniline yellow òr 2-Napthol aniline dye.

e. Lodoform

F. Test for the functional groups present in organic compounds: Unsaturation, alcoholic, pheholic, aldehydic, ketonic, carboxylic and amino (primary) groups.

G. Study of carbohydrates, fats and proteins in pure form and detection of their presence in given food stuffs.

H. Qualitative analysis: Determination of one catiop and one anion in a given salt.

Cations- Pb^{2+}, Cu^{2+}, As^{3+}, Al^{3+}, Fe^{3+}, M_n^{2+}, Zn^{2+},

Co^{2+}, N_i^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, Mg^{2+}, NH_4^+

Anions- : $(CO_3)^{2-}$, S^{2-}, $(SO_3)^{2-}$, $(NO_2)^-$, $(SO_4)^{2-}$, $C\ell^-$, Br^-, I^-, PO^{3-} , $(C_2O_4)^{2-}$, CH_3COO^- ,NO^-

(Note: Insoluble salts excluded)

PROJECT

Scientific investigations involving laboratory

Testing and collecting information from other sources.

A few suggested Projects

1. Study of presence of oxalate ions in guava fruit at different stages of ripening.
2. Study of quantity of casein present in different samples of milk.
3. Preparation of soyabean milk and its comparison with the natural milk with respect to curd formation, effect of temperature etc.
4. Study of the effect of potassium bisulphate as food preservative under various conditions (temperature, concentration, time etc,)
5. Study of digestion of starch by salivary amylase and effect of PH and temperature on it.
6. Comparative study of the rate of fermentation of following material wheat flour. gram flour, Potato juice, carrot juice etc.
7. Extraction of essential oils present in saunf (aniseed), Ajwain (carum) illaichi (cardamom).
8. Study of common food adulterants in fat, oil, butter, sugar, turmeric powder, chilli powder and pepper.

Note: Any investigatory project, which involves about 10 periods of work, can be chosen with the approval of the teacher.

Study Materials

aglasem.com

Model Papers

Sample Papers

Half Yearly Sample Papers

Important Resources

Periodic Table

Writing Skills / Formats

Maps of India / World

Notes

- [ ] Class 6 Notes
- [ ] Class 7 Notes
- [ ] Class 8 Notes
- [ ] Class 9 Notes
- [ ] Class 10 Notes
- [ ] Class 11 Notes
- [ ] Class 12 Notes

Books and Solutions

NCERT Books

NCERT Book Solutions

HC Verma Chapter Wise Solutions

RD Sharma Solutions

CGBSE Solutions