4. Detection of Halogen in the given organic compound.

Note: The above practicals may be carried out in an experiential manner rather than recording observations.

Prescribed Books:
1. Chemistry Part – I, Class-XI, Published by NCERT.
2. Chemistry Part – II, Class-XI, Published by NCERT.

CLASS XII (2023-24) (THEORY)

Time : 3 Hours

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Title</th>
<th>No. of Periods</th>
<th>Marks</th>
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<tbody>
<tr>
<td>1</td>
<td>Solutions</td>
<td>10</td>
<td>7</td>
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<tr>
<td>2</td>
<td>Electrochemistry</td>
<td>12</td>
<td>9</td>
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<td>3</td>
<td>Chemical Kinetics</td>
<td>10</td>
<td>7</td>
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<td>4</td>
<td>d-and f-Block Elements</td>
<td>12</td>
<td>7</td>
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<td>5</td>
<td>Coordination Compounds</td>
<td>12</td>
<td>7</td>
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<tr>
<td>6</td>
<td>Haloalkanes and Haloarenes</td>
<td>10</td>
<td>6</td>
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<td>7</td>
<td>Alcohols, Phenols and Ethers</td>
<td>10</td>
<td>6</td>
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<tr>
<td>8</td>
<td>Aldehydes, Ketones and Carboxylic Acids</td>
<td>10</td>
<td>8</td>
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<td>9</td>
<td>Amines</td>
<td>10</td>
<td>6</td>
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<tr>
<td>10</td>
<td>Biomolecules</td>
<td>12</td>
<td>7</td>
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</tbody>
</table>

Total 70 Marks

Unit II: Solutions

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

Unit III: Electrochemistry

Redox reactions, 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, conductance in electrolytic solutions, specific and molar conductivity, variations of conductivity with concentration, Kohlrausch's Law, electrolysis and law of electrolysis (elementary idea), dry cell-electrolytic cells and Galvanic cells, lead accumulator, fuel cells, corrosion.
Unit IV: Chemical Kinetics

Rate of a reaction (Average and instantaneous), factors affecting rate 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 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 K₂Cr₂O₇ and KMnO₄.

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, and CFT; structure and stereoisomerism, importance of coordination compounds (in qualitative analysis, extraction of metals and biological system).

Unit X: Haloalkanes and Haloarenes.

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

Haloarenes: Nature of C–X bond, substitution reactions (Directive influence of halogen in 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, electrophillic substitution reactions, uses of phenols.

Ethers: Nomenclature, methods of preparation, physical and chemical properties, uses.
Unit XII: Aldehydes, Ketones and Carboxylic Acids 10 Periods

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: Amines 10 Periods

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

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

Unit XIV: Biomolecules 12 Periods

Carbohydrates - Classification (aldoses and ketoses), monosaccharides (glucose and fructose), D-L configuration oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); Importance of carbohydrates.

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

Vitamins - Classification and functions.

Nucleic Acids: DNA and RNA.

PRACTICALS

<table>
<thead>
<tr>
<th>Evaluation Scheme for Examination</th>
<th>Marks</th>
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<tbody>
<tr>
<td>Volumetric Analysis</td>
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<tr>
<td>Salt Analysis</td>
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<td>Content Based Experiment</td>
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<tr>
<td>Project Work</td>
<td>04</td>
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<tr>
<td>Class record and viva</td>
<td>04</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
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PRACTICAL SYLLABUS 60 Periods

Micro-chemical methods are available for several of the practical experiments. Wherever possible, such techniques should be used.
A. Surface Chemistry
   (a) Preparation of one lyophilic and one lyophobic sol
       Lyophilic sol - starch, egg albumin and gum
       Lyophobic sol - aluminium hydroxide, ferric hydroxide, arsenous sulphide.
   (b) Dialysis of sol-prepared in (a) above.
   (c) Study of the role of emulsifying agents in stabilizing the emulsion of different oils.

B. 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, (KIO₃) and Sodium Sulphite: (Na₂SO₃) using starch solution as indicator (clock reaction).

C. Thermochemistry
   Any one of the following experiments
   i) Enthalpy of dissolution of Copper Sulphate or Potassium Nitrate.
   ii) Enthalpy of neutralization of strong acid (HCl) and strong base (NaOH).
   iii) Determination of enthalpy change during interaction (Hydrogen bond formation) between Acetone and Chloroform.

D. Electrochemistry
   Variation of cell potential in Zn/Zn²⁺ || Cu²⁺/Cu with change in concentration of electrolytes (CuSO₄ or ZnSO₄) at room temperature.

E. Chromatography
   i) Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of Rf values.
   ii) Separation of constituents present in an inorganic mixture containing two cations only (constituents having large difference in Rf values to be provided).

F. Preparation of Inorganic Compounds
   Preparation of double salt of Ferrous Ammonium Sulphate or Potash Alum. Preparation of Potassium Ferric Oxalate.

G. Preparation of Organic Compounds
   Preparation of any one of the following compounds
   i) Acetanilide ii) Di-benzalAcetone iii) p-Nitroacetanilide iv) Aniline yellow or 2 - Naphthol Anilinedye.

H. Tests for the functional groups present in organic compounds:
   Unsaturation, alcoholic, phenolic, aldehydic, ketcnic, carboxylic and amino (Primary) groups.
I. Characteristic tests of carbohydrates, fats and proteins in pure samples and their detection in given foodstuffs.

J. Determination of concentration/molarity of KMnO₄ solution by titrating it against a standard solution of:
   i) Oxalic acid,
   ii) Ferrous Ammonium Sulphate
   (Students will be required to prepare standard solutions by weighing themselves). K.

Qualitative analysis

   Determination of one cation and one anion in a given salt.
   Cation: Pb²⁺, Cu²⁺, As³⁺, Al³⁺, Fe³⁺, Mn²⁺, Zn²⁺, Cu²⁺, Ni²⁺, Ca²⁺, Sr²⁺, Ba²⁺, Mg²⁺, NH₄⁺
   Anions: (CO₃)²⁻, S²⁻, (SO₄)²⁻, (NO₃)⁻, (SO₄)²⁻, Cl⁻, Br⁻, I⁻, PO₄³⁻, (C₂O₄)²⁻, CH₃COO⁻, NO₃⁻
   (Note: Insoluble salts excluded)

PROJECT

Scientific investigations involving laboratory testing and collecting information from other sources A few suggested Projects.

- Study of the presence of oxalate ions in guava fruit at different stages of ripening.
- Study of quantity of casein present in different samples of milk.
- Preparation of soybean milk and its comparison with the natural milk with respect to curd formation, effect of temperature, etc.
- Study of the effect of Potassium Bisulphate as food preservative under various conditions (temperature, concentration, time, etc.)
- Study of digestion of starch by salivary amylase and effect of pH and temperature on it.
- Comparative study of the rate of fermentation of following materials: wheat flour, gram flour, potato juice, carrot juice, etc.
- Extraction of essential oils present in Sauf (aniseed), Ajwain (carum), Illaichi (cardamom).
- Study of common food adulterants in fat, oil, butter, sugar, turmeric powder, chilli powder and pepper.
   Note: Any other investigatory project, which involves about 10 periods of work, can be chosen with the approval of the teacher.

Practical Examination for Visually Impaired Students of Classes XI and XII Evaluation Scheme

Time Allowed: Two hours  Max. Marks: 30

| Identification/Familiarity with the apparatus | 5 marks |
| Written test (based on given/prescribed practicals) | 10 marks |
| Practical Record | 5 marks |
| Viva | 10 marks |
| Total | 30 marks |