

PRACTICAL SYLLABUS

| No. | Name of the Experiment | No. of hours |
|--------------|---|-----------------|
| 1. | Preparation of standard solution (Sodium carbonate or oxalic acid) | 01 |
| 2. | Estimation of sodium hydroxide using standard hydrochloric acid | 02 |
| 3. | Estimation of potassium permanganate using standard oxalic acid | 02 |
| 4. | Estimation of Iodine using standard sodium thiosulphate (hypo) | 02 |
| 5. | Qualitative tests for carbohydrates | 02 |
| 6. | Qualitative tests for proteins | 02 |
| 7. | Qualitative analysis of simple inorganic salts | 02 |
| 8. | Purification of an organic compound. | 02 |
| 9. | Determination of melting point of a organic samples and comparing it with the standard value. | 02 |
| 10 | Determination of boiling point of a organic liquid and explaining the correction to be applied. | 02 |
| 11. | To find the pH of ferric chloride, sodium carbonate and potassium chloride. Classifying them into acid, neutral and basic salts on the basics | 01 |
| Total | | 20 hours |

BLOW- UP SYLLABUS

SECTION - A

Unit 1: Some Basic concepts of Chemistry- 2 Hours

Importance of Chemistry, Nature of matter, properties of matter & their measurement. Laws of chemical combinations, Dalton's Atomic Theory. Names of important elements and their symbol, valency, writing the formula of certain compounds, SI units, drawing the relation between SI and non-SI units, Atomic & molecular masses, Percentage Composition. Writing the dimension for physical quantities like volume, pressure, force, area, viscosity and surface tension

Unit 2: Structure of an atom- 3 Hours

Sub-atomic particles, Atomic models, Bohr's model for Hydrogen atom. Atomic weight, Molecular weight, Equivalent weight of an element – definition, determination of equivalent weight of magnesium by hydrogen displacement method and copper by oxide method.

Unit 3: Acids, Bases and Salts- 3 Hours

Examples for each type. Indicators mentioning the colour change at the end point. Acidity, Basicity, equivalent mass calculation, oxidizing and reducing agent examples, Normality, Molarity, Molality, PPM, volumetric analysis, $V_1N_1 = V_2N_2$ – problems

Unit 4: Hydrogen peroxide- 1 Hour

Preparation, properties and uses.

Unit 5: Sulphuric acid- 1 Hour

Properties and uses

Unit 6: Nitric acid-2 Hours

Manufacture, properties and uses

Unit 7: Halogens- 3 Hours

Comparative study of preparation, properties and uses. Fluorocarbons and their applications.

Unit 8: Co-ordination compounds- 2 Hours

Examples and applications of coordination compounds in biological reactions.

Unit 9: Radioactivity- 3 Hours

Natural radioactivity – Properties of alpha, beta and gamma particles. Half-life period, Isotopes – applications of Co_{60} , P_{32} , I_{131} , Na_{24}

Unit 10: Caustic soda- 3 Hours

Manufacture, properties and uses. Sodium Carbonate (washing soda) -preparation, properties and uses.

Unit 11: Calcium compounds- 1 Hours

Including plaster of Paris, Bone composition & Uses.

Unit 12: X-Ray- 1 Hour

Production and its applications.

Unit 13: Colloids- 4 Hours

Differences between colloids and crystalloids. Classification of colloids – methods of preparation of sols, dialysis-Tyndall effect and Brownian movement– applications of colloids in medicine, food. Cottrell's electrical precipitator. Role of sodium, potassium, calcium, chloride, bicarbonate ions in the fluid.

Unit 14: Electro Chemistry- 5 Hours

Electrolytes and non-electrolytes, example for each. Lowry and Bronsted concept of acids and bases. Hydrogen ion Concentration, meaning of pH & pOH. pH values of biological fluids and their importance. Buffer solutions-definition, different types of buffers and examples for each. Henderson's equation determination of pH by buffer solution method. Importance of buffer in medicine

Unit 15: Classification of elements and periodicity in properties- 6 Hours

Development of Periodic Table. Modern and long form periodic table.

Periodic trends in atomic radii, Ionic radii, Ionization energy, Electron gain enthalpy, electro negativity and Valency. Hydrogen bonding. Anomalous properties of water.

SECTION - B**Unit 16: Hydrocarbons- 3 Hours**

Saturated and unsaturated: Alkanes –methane, ethane preparation, properties and uses. Alkene – ethene-preparation, properties and uses. Alkyne-acetylene-preparation, properties and uses.

Unit 17: Ethyl Alcohol- 2 Hours

Manufacture from molasses- Properties-Reaction with bleaching powder, Preparation of Iodoform, Chloroform and uses, Benzyl alcohol, two chemical properties and uses

Unit 18: Phenol- 2 Hours

Manufacture from coal tar – Properties, anisole, salol, cresols.

Unit 19: Aldehydes- 2 Hours

Formaldehyde, acetaldehyde, benzaldehyde- preparation, properties and uses.

Unit 20: Acetone- 1 Hour

Preparation & three important properties and uses

Unit 21: Carboxylic Acids- 1 Hour

Properties of carboxylic acids- Acids strength on the basis of pka values.

Unit 22: Diethyl Ether- 2 Hours

Preparation, properties and uses.

Unit 23: Amines- 1 Hour

Classification, Basicity on the basis of pK_b values

Unit 24: Carbohydrates- 6 Hours

Classification, open and ring structures of glucose, fructose. Ring structure of Maltose, sucrose and lactose. Partial representation of structure of Cellulose, Starch and Glycogen. Carbohydrates as a source of energy.

Unit 25: Proteins: Amino acids- 3 Hours

Classification. Formulae of amino acids such as glycine, alanine, serine, cysteine, aspartic acid, lysine & tyrosine. Peptide bond. Functional properties of proteins such as enzymes, antibodies, transport agents & biochemical messengers (Hormones)

Unit 26: Nucleic acid- 2 Hours

DNA and RNA –purine and pyrimidine bases. Biological importance of nucleic acids

Unit 27: Enzymes- 2 Hours

Examples of different types of enzymes, their function in biological reactions.

Unit 28: Environmental Chemistry-4 Hours

Pollution of air, water, soil, major atmospheric pollutant, smog, acid rain effect on Ozone layer. Global warming. Strategies to control environmental pollution

Unit 29: Basic principles and technique in organic chemistry- 5 Hours

Qualities and quantitative analysis, IUPAC naming. Electronic displacement in covalent bond- Inductive, electrometric, resonance and hyper conjugation effect. Homolytic and Heterolytic fission of covalent bond. Free radicals, carbonations, carbocations, electrophiles and nucleophiles.

Unit 30: Aromatic Hydrocarbons- 2 Hours

Preparation and isolation of Benzene and Toluene. Important properties of Benzene and Toluene. Friedel-Crafts reaction.

Unit 31: Chemical equilibrium- 3 Hours

Rate of a reaction, rate equation expression, factors influencing the rate. The law of mass action. Equilibrium constant. Reversible reaction with example, Writing K_c and K_p for the reactions. Ammonia, phosphorus, penta chloride and hydrogen iodide. Discussion of Le Chatelier's principle to the synthesis of sulphur trioxide, problems.

Unit 32: Chemical bonding- 2 Hours

Octet rule, covalent bond, examples. Ionic or Electrovalent bond, bond length, sp^1 , sp^2 and sp^3 hybridization. Example for each type. Ethyne, ethane and methane. Writing the structure of NH_3 and water molecule.

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