

CHEMISTRY

For Class IX (marks 65)

1. FUNDAMENTALS OF CHEMISTRY

Introduction

1.1 Branches of Chemistry

Physical Chemistry, Organic Chemistry, Inorganic Chemistry, Biochemistry, Industrial Chemistry, Nuclear Chemistry, Environmental Chemistry, Analytical Chemistry

1.2 Basic Definitions

- 1.2.1 Elements, Compounds and Mixtures
- 1.2.2 Atomic Number, Mass Number
- 1.2.3 Relative Atomic Mass and Atomic Mass Unit
- 1.2.4 Empirical Formula, Molecular Formula
- 1.2.5 Molecular Mass and Formula Mass

1.3 Chemical Species

- 1.3.1 Ions (Cations, Anions), Molecular Ions and Free Radicals.
- 1.3.2 Types of Molecules (Monatomic, Polyatomic, Homoatomic, Heteroatomic)

1.4 Avogadro's Number and Mole

- 1.4.1 Avogadro's Number
- 1.4.2 Mole
- 1.4.3 Gram Atomic Mass, Gram Molecular and Gram Formula Mass

1.5 Chemical Calculations

- 1.5.1 Mole-Mass Calculations
- 1.5.2 Mole-Particle Calculations

2. STRUCTURE OF ATOMS

Introduction

2.1 Theories and Experiments Related To Atomic Structure

- 2.1.1 Rutherford's Atomic Model (Experiment and Postulates)
- 2.1.2 Bohr's Atomic Theory (Postulates)

2.2 Electronic Configuration

- 2.2.1 Concepts of S and P Sub-Shells
- 2.2.2 Electronic Configurations of First 18 Elements

2.3 Isotopes

- 2.3.1 Definition
- 2.3.2 Examples (H, C, Cl, U)
- 2.3.3 Uses

3. PERIODIC TABLE AND PERIODICITY OF PROPERTIES

Introduction

3.1 Periodic Table

- 3.1.1 Periods
- 3.1.2 Groups

3.2 Periodicity of Properties

- 3.2.1 Atomic Size
- 3.2.2 Ionization Energy
- 3.2.3 Electron Affinity
- 3.2.4 Shielding Effect
- 3.2.5 Electronegativity

4. STRUCTURE OF MOLECULES

Introduction

4.1 Why do Atoms Form Chemical Bonds?

4.2 Chemical Bonds

4.3 Types of Bonds

4.3.1 Ionic Bonds

4.3.2 Covalent Bonds

4.3.3 Dative Covalent Bonds

4.3.4 Polar and Non-Polar Bonds

4.3.5 Metallic Bonds

4.4 Intermolecular Forces

4.4.1 Dipole-Dipole Interactions

4.4.2 Hydrogen Bonding

4.5 Nature of Bonding and Properties

4.5.1 Ionic Compounds

4.5.2 Covalent Compounds

4.5.3 Polar and Non-Polar Compounds

4.5.4 Metals

5. PHYSICAL STATES OF MATTER

Introduction

Gaseous State

5.1 Typical Properties

(Diffusion, Effusion, Pressure, Compressibility, Mobility, Density)

5.2 Laws Related To Gases

5.2.1 Boyle's Law

5.2.2 Charles's Law

Liquid State

5.3 Typical Properties

(Evaporation, Vapour Pressure, Boiling Point, Freezing Point, Diffusion, Mobility, Density and Factors affecting them.)

Solid State

5.4 Typical Properties

(Melting Point, Rigidity, Density)

5.5 Types of Solids

5.5.1 Amorphous

5.5.2 Crystalline State

5.6 Allotropy

6. SOLUTIONS

Introduction

6.1 Solution, Aqueous Solution, Solute and Solvent

6.2 Saturated, Unsaturated, Supersaturated Solutions and Dilution of Solution

6.3 Types of Solution

6.3.1 Solution of Gases (Gases in Gases, Gases in Liquids, Gases in Solids)

6.3.2 Solution of Liquids (Liquids in Gases, Liquids in Liquids, Liquids in Solids)

6.3.3 Solutions of Solids (Solids in Gases, Solids in Liquids, Solids in Solids)

6.4 Concentration Units

6.4.1 Percentage

6.4.2 Molarity

6.4.3 Problems Involving the Molarity of a Solution

6.5 Solubility

6.5.1 Solubility and Solute – Solvent Interaction

6.5.2 Effect of Temperature on Solubility

6.6 Comparison of Solutions, Suspension and Colloids

6.6.1 Solutions

6.6.2 Colloids

6.6.3 Suspension (Turbidity)

7. ELECTROCHEMISTRY

Introduction

7.1 Oxidation and Reduction

7.2 Oxidation States and Rules for Assigning Oxidation States

7.3 Oxidizing and Reducing Agents

7.4 Oxidation - Reduction Reactions

7.5 Electrochemical Cells

7.5.1 Concept of Electrolytes

7.5.2 Electrolytic Cells

7.5.3 Galvanic Cells (Daniel Cell)

7.6 Electrochemical Industries

7.6.1 Manufacture of Sodium Metal from Fused NaCl

7.6.2 Manufacture of NaOH from Brine and its properties

7.7 Corrosion and Its Prevention

7.7.1 Rusting of Iron

7.7.2 Electroplating of Tin, Zinc, Silver and Chromium on Steel

8. CHEMICAL REACTIVITY

Introduction

8.1 Metals

8.1.1 Electropositive Character

8.1.2 Comparison of Reactivity of Alkali and Alkaline Earth Metals

8.1.3 Inertness of Noble Metals

8.2 Non- Metals

8.2.1 Electronegative Character

8.2.2 Comparison of Reactivity of the Halogens

RECOMMENDED REFERENCE BOOKS FOR CLASS IX

The question paper will be syllabus oriented. However, the following book is recommended for reference and supplementary reading:

1. An-interactive approach
Chemistry
for Class IX
National Book Foundation, Islamabad