

ADVANCED LEVEL CHEMISTRY SYLLABUS

PART 1: PHYSICAL CHEMISTRY

SENIOR FIVE TERM I

TOPIC 1: MATTER

- ✓ Sub-Topic 1: Atoms, Molecules and Ions
- ✓ Sub-Topic 2: Mole Concept
- ✓ Sub-Topic 3: Measurement of Concentration and introduction to volumetric analysis
- ✓ Sub-Topic 4: Empirical formula and Molecular Formula and Percentage Composition by Mass
- ✓ Sub-Topic 5: Oxidation-Reduction (Redox) Reactions)
- ✓ Sub-Topic 6: Stoichiometry: Quantitative Relation in Reactions
- ✓ Sub-Topic 7: Redox Titrations
- ✓ Sub-Topic 8: Physical states of matter
- ✓ Sub-Topic 9: Gaseous State of Matter
- ✓ Sub-Topic 10: Liquid State of matter
- ✓ Sub-Topic 11: Solid State of Matter

SENIOR FIVE TERM II

TOPIC 2: ATOMIC STRUCTURE AND PERIODIC TABLE

- ✓ Sub-Topic 1: Fundamental Particles of the Atom and Radioactivity
- ✓ Sub-Topic 2: Electronic Structure of Atoms
- ✓ Sub-Topic 3: The Periodic Table

SENIOR FIVE TERM III

TOPIC 3: STRUCTURE AND BONDING

- ✓ Sub-Topic 1: Chemical Bonding
- ✓ Sub-Topic 2: Structure: Drawing Lewis Structures of Molecules and Polyatomic Ions
- ✓ Sub-Topic 3: Shapes of Molecules

TOPIC 4: THERMOCHEMISTRY (CHEMICAL ENERGETICS)

- ✓ Sub-Topic 1: Chemical Energy
- ✓ Sub-Topic 2: Types of Heat of Reactions
- ✓ Sub-Topic 3: Calorimetry
- ✓ Sub-Topic 4: Types of Enthalpy Changes

SENIOR SIX TERM I

TOPIC 5: PHYSICAL EQUILIBRIA

- ✓ Sub-Topic 1: Systems, Phases and Component

- ✓ Sub-Topic 1: Component System (Types of component systems)
- ✓ Sub-Topic 2: Types of Solutions
- ✓ Sub-Topic 3: Colligative Properties

TOPIC 6: CHEMICAL EQUILIBRIA

- ✓ Sub-Topic 1: The concept of Chemical Equilibrium
- ✓ Sub-Topic 2: Comparison between K_c and K_p
- ✓ Sub-Topic 3: Factors affecting the position of equilibrium in accordance with the Le' Chatelier's Principle
- ✓ Sub-Topic 4: Applications of factors on industrial processes

SENIOR SIX TERM II

TOPIC 7: IONIC EQUILIBRIA

- ✓ Sub-Topic 1: Acids, Bases and Salts
- ✓ Sub-Topic 2: Hydrolysis of Salts
- ✓ Sub-Topic 3: Buffer Solutions
- ✓ Sub-Topic 4: Acid-Base Titrations
- ✓ Sub-Topic 5: Solubility Equilibria

TOPIC 8: CHEMICAL KINETICS

- ✓ Sub-Topic 1: Simple Rate Equations
- ✓ Sub-Topic 2: Factors Affecting Rates of Reactions

TOPIC 9: ELECTROCHEMISTRY

- ✓ Sub-Topic 1: Electrolysis
- ✓ Sub-Topic 2: Conductance and its Measurements
- ✓ Sub-Topic 3: Electrochemical Cells

PART II: INORGANIC CHEMISTRY

SENIOR FIVE TERM I

TOPIC 10: THIRD SHORT PERIOD OF THE PERIODIC TABLE

- ✓ Sub-Topic 1: Trends in Atomic and Physical properties of the Elements
- ✓ Sub-Topic 2: Chemical Reactions of the Elements
- ✓ Sub-Topic 3: Compounds of the Elements

SENIOR FIVE TERM II

TOPIC 11: THE CHEMISTRY OF GROUP II ELEMENTS (ALKALINE EARTH METALS)

- ✓ Sub-Topic 1: Trends in Physical Properties of the Elements of Group II

- ✓ Sub-Topic 2: Chemical Reactions of Group II Elements
- ✓ Sub-Topic 3: Compounds of Group II Elements

SENIOR FIVE TERM II

TOPIC 12: THE CHEMISTRY OF GROUP IV ELEMENTS

- ✓ Sub-Topic 1: Trends in Physical Properties of Group IV Elements
- ✓ Sub-Topic 2: Chemical Reactions of the Elements
- ✓ Sub-Topic 3: Compounds of the Group IV Elements

SENIOR SIX TERM I

TOPIC 13: THE CHEMISTRY OF GROUP VII ELEMENTS

- ✓ Sub-Topic 1: Trends in Physical Properties of the Elements
- ✓ Sub-Topic 2: Chemical Reactions of the Elements of Group VII of Periodic Table
- ✓ Sub-Topic 3: Compounds of the Elements

SENIOR SIX TERM II

TOPIC 14: THE CHEMISTRY OF THE D-BLOCK TRANSITION ELEMENTS

- ✓ Sub-Topic 1: The d-Block Transition Elements
- ✓ Sub-Topic 2: Chemical Properties of the Elements and their Compounds

PART III: ORGANIC CHEMISTRY

SENIOR FIVE TERM I

TOPIC 15: INTRODUCTION TO ORGANIC CHEMISTRY

- ✓ Sub-Topic 1: Introduction

Topic 16: Hydrocarbons (Alkanes, Alkenes and Alkynes)

- ✓ Sub-Topic 1: Introduction to Alkanes and their Physical Properties
- ✓ Sub-Topic 2: Chemical Properties and uses of Alkanes

- ✓ Sub-Topic 3: Introduction to Alkenes and their Physical Properties
- ✓ Sub-Topic 4: Chemical Properties and Uses of Alkenes

SENIOR FIVE TERM II

- ✓ Sub-Topic 5: Introduction to Alkynes and their Physical Properties
- ✓ Sub-Topic 6: Chemical Properties and Uses of Alkynes

TOPIC 17: HALOGEN COMPOUNDS (ALKYL HALIDES)

- ✓ Sub-Topic 1: Introduction to Halogen Compounds and Their Physical Properties
- ✓ Sub-Topic 2: Chemical Properties and Uses of Halogen Compounds

TOPIC 18: BENZENE AND METHYL BENZENE

- ✓ Sub-Topic 1: Introduction to Benzene and its Physical properties of Benzene
- ✓ Sub-Topic 2: Chemical Properties of Benzene
- ✓ Sub-Topic 2: Introduction to Methyl benzene
- ✓ Sub-Topic 3: Physical Properties of Methyl Benzene

SENIOR FIVE TERM III

TOPIC 19: ALCOHOLS AND PHENOLS

- ✓ Sub-Topic 1: Introduction to Alcohols and their Physical Properties
- ✓ Sub-Topic 2: Chemical Properties of Alcohols
- ✓ Sub-Topic 3: Introduction to Phenol and its physical properties
- ✓ Sub-Topic 4: Chemical Properties and Uses of Phenols

SENIOR SIX TERM I

TOPIC 20: CARBONYL COMPOUNDS (KETONES AND ALDEHYDES)

- ✓ Sub-Topic 1: Introduction to Carbonyl Compounds and their Physical Properties
- ✓ Sub-Topic 2: Chemical Properties and Uses of Carbonyl Compounds

TOPIC 21: CARBOXYLIC (ALKANOIC) ACIDS

- ✓ Sub-Topic 1: Introduction to Carboxylic Acids and their Physical Properties
- ✓ Sub-Topic 2: Chemical Properties and Uses Carboxylic Acids
- ✓ Sub-Topic 3: Soaps and Soapless Detergents

TOPIC 22: ESTERS

- ✓ Sub-Topic 1: Introduction to Esters and their Physical properties
- ✓ Sub-Topic 2: Chemical Properties and Uses of Esters

SENIOR SIX TERM II

TOPIC 23: AMINES

- ✓ Sub-Topic 1: Introduction to Amines and their physical properties
- ✓ Sub-Topic 2: Chemical properties and uses of Amines

TOPIC 24: POLYMERS AND POLYMERISATION

- Sub-Topic 1: Introduction to Polymers
- Sub-Topic 2: Rubber
- Sub-Topic 3: Fibres
- Sub-Topic 4: Plastics

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