

**SYLLABUS FOR THE SUBJECT OF CHEMISTRY
PAPER-I**

Total Marks: 100

(A). Physical Chemistry.

1. Quantum Theory & Atomic Structure

Quantum theory. The Schrodinger Wave Equation, particle in one dimensional box and its application for Hydrogen atom. Quantum Numbers. Chemical Bonding. Eigen Values and Eigen functions. Degeneracy. Tunnel Effect.

2. Chemical Thermodynamics

First Law of Thermodynamic and Enthalpy changes. Entropy and second Law of Thermodynamics. Standard Free Energy and Chemical equilibrium. Concept of Residual Entropy.

3. Electrochemistry

Conductance and its measurement. Activity and Activity coefficients. Measurement of Activity coefficient of strong electrolytes. Debye-Huckel Theory and its applications for strong electrolytes. Electrodes, Electrode Potential and its measurement. Corrosion and its prevention.

4. Nuclear Chemistry

Radioactivity, detection and its measurement, Kinetics of Radioactive decay, Nuclear Fission, Nuclear Fusion, Artificial Radioactivity, uses of Radioactive isotopes and Nuclear Reactors.

(B). Inorganic Chemistry

1. Modern Theory of Chemical Bonding

Modern Theories of Chemical bonding. Valence Bond theory, hybridization of orbital, molecular Orbital theory, comparison of valence Bond and Molecular orbital theories, shapes of inorganic molecules, application of VSEPR concept.

2. Chemistry d-Block Elements

General Characteristics of d-Block elements, Chemistry of First Transition Series, Transition metal complexes, structure of coordinate complex compounds, Postulates and applications of Werner's Chelates, Nomenclature and Isomerism in coordinate compounds.

3. Inorganic Chemical Industries

Sulphuric acid, Chemical Fertilizers, cements, Ceramics, Soda Ash and Caustic Soda.

4. **Environmental Chemistry**

Concept of Environmental chemistry, Environmental Pollution, green House Effect, Air Pollution, Water Pollution and Chemical Toxicology.

PAPER-II

TOTAL MARKS: 100

(A) Organic Chemistry

1. Structure and Reactivity

Inductive effect, delocalized chemical bond, resonance effect, tautomerism, hyper-conjugation, steric effect and hydrogen bonding.

2. UV and IR Spectroscopy

Principle of UV-Visible and IR-Spectroscopy, terms involved in spectroscopy. -max, bathochromic shift, hypsochromic shift, finger print region, overtones and applications in functional group identification of organic compounds.

3. Chemistry of Carbonyl Group

Preparation and properties of Aldehydes and ketones. Acid and base catalyzed Aldol condensation reactions and nucleophilic additions to carbonyl group.

4. Chemistry of Aromatic Compounds

Mechanism and applications of Electrophilic aromatic substitution reactions, Arenium ion mechanism, orientation and reactivity. Aromaticity and condensed simple aromatics systems.

5. Stereochemistry

Stereoisomerism, conformational analysis of cycloalkanes, chirality and optical activity, racemization, epimerization and geometrical isomerism.

(B) Selected Topics in Applied Chemistry

1. Bio-molecules

Introduction, classification, structure and metabolism of carbohydrates. Primary, Secondary & Tertiary structure of Proteins. Lipids and their classification.

2. Chromatography

Principle and types of chromatography. Thin layer and column Chromatography with their applications.

3. Material Chemistry

Introduction and applications of Polymers, Semi-conductors, composites and liquid crystals.