

ALLIED CHEMISTRY – II SEMESTER - IV

(75 Hrs 4 Credits)

(For Mathematics and Physics)

Unit 1 CO-ORDINATION CHEMISTRY

(15 HOURS)

- 1.1 Introduction-some basic definitions: central metal ion-ligand-oxidation state of central metal ion-coordination sphere-Coordination number-classification of ligands-Nomenclature (simple complexes)– Chelation (EDTA and its applications)
- 1.2 Theories of Bonding: Postulates of Werner's theory – Sidgwick theory (Effective Atomic Number –EAN rule) – Pauling's Valence Bond Theory– geometry, hybridization and magnetic property of $[\text{Ni}(\text{CO})_4]$, $[\text{Ni}(\text{CN})_4]^{2-}$, $[\text{Co}(\text{CN})_6]^{3-}$ - Merits and demerits of Werner and Pauling's Valence Bond Theory.
- 1.3 Applications of co-ordination of compounds: qualitative analysis - separation of copper and cadmium ions using KCN, identification of metal ions like Cu and Fe-quantitative analysis – estimation of Nickel using DMG and estimation of aluminium using oxine.
- 1.4 Bio-inorganic complexes-Hemoglobin and chlorophyll- central metal ion-oxidation state-ligand-coordination sites- Biological role (elementary idea only). Blue baby syndrome-(elementary idea)

Unit 2 BIOMOLECULES

(15 HOURS)

- 2.1 Classification, preparation and reactions of glucose and fructose. Discussion of open and ring structure of glucose, mutarotation. Interconversion of glucose to fructose and vice versa –
- 2.2 Preparation and properties of sucrose-Properties of starch.
- 2.3 Cellulose and derivatives of cellulose. RNA and DNA (elementary idea only).
- 2.4 Amino acids: Classification, preparation, and properties of glycine and alanine (Gabriel Phthalimide synthesis and Strecker's synthesis only)– preparation of dipeptide using Bergman method. Proteins and enzymes (elementary idea)

Unit 3 PHASE EQUILIBRIA

(15 HOURS)

- 3.1 Phase rule:Definition of terms-Phase-Component-Degrees of freedom
- 3.2 Application of phase rule to water and CO_2 system
- 3.3 Reduced phase rule and its application to Pb-Ag system.
- 3.4 Freezing mixtures –NaCl-water system
- 3.5 Freezing mixtures and soldering

Unit 4 ELECTROCHEMISTRY

(15 HOURS)

4.1 Galvanic cells – *emf* – standard electrode potential – reference electrodes. Difference between electrolytic cell and galvanic cell.

4.2 Electrochemical series and its applications –Determination of p^H using hydrogen electrode. Different type of cells, primary cell, Secondary cell-Lead acid battery merits and demerits Nickel-cadmium battery-fuel cells (H_2-O_2 fuel cells and its advantages- advantage over heat engine)

4.3 Corrosion and its prevention- Electroplating process- Nickel and Chrome plating

4.4 Conductometric titrations- Buffer solution – Henderson's equation. Application of p^H and buffer in biological processes.

Unit 5 ANALYTICAL CHEMISTRY

(15 hours)

5.1 Concentration terms- Molarity, Normality, molality, formality and mole fraction (elementary problems), Principle of volumetric analysis.

5.2 Separation techniques – extraction –solvent extraction - distillation –fractional distillation

5.3 Purification techniques – factors affecting purity of a compound – crystallization-fractional crystallization-sublimation.

5.4 Chromatographic separations – Principles and application of column, paper, thin layer and ion-exchange chromatography.

BOOKS FOR REFERENCE

1. Dr. Veeriyar V., Text Book of Ancillary chemistry , Highmount publishing house, Chennai – 14 Edition 2006 (Both in Tamil and English)
2. Vaithyanathan S. and others, Textbook of Ancillary Chemistry, Priya Publications, Karur – 2- Edition –2006.
3. Soni P.L. and others, Textbook of Organic chemistry, Sultan Chand and Company, New Delhi, Edition – 2006.
4. Soni P.L. and others, Textbook of Inorganic chemistry, Sultan Chand and Company, New Delhi, Edition – 2006
5. Puri B.R. Sharma and pathania, Text book of physical chemistry, Vishal Publishing Co., New Delhi, Edition – 2006.
6. Dara S.S., Textbook of Environmental Chemistry and pollution Control – S.Chand and Co., New Delhi, Edition 2006.