

UCB001 CHEMISTRY

Electrochemistry: Migration of ions, Transference number, Determination of transference number by Hittorf's method, Diffusion and ionic mobility, Conductometric titrations, Debye Huckel theory of strong electrolytes; Types of electrodes, Concentration cells with and without transference, Liquid junction potential, Potentiometric titrations.

Phase Rule: Definitions of terms, Derivation of phase rule, One component and two component systems.

Polymers: Condensation and addition polymerization, Copolymerization, Stereochemistry of polymers, conducting polymers M_n , M_w , M_v , Physical properties of polymers, Structure property relationship.

Coordination and Organometallic Chemistry: Crystal field theory, Crystal field splitting in octahedral, tetrahedral and square planar complexes, Jahn-Teller distortion.

Spectroscopic Techniques: Law of absorption of light, Limitations/deviations and applications of Beer's law, Grothuss-Draper Law, Jablonski diagram, Stark Einstein Law; Types of molecular spectra, Introduction to atomic spectroscopy, Principle and applications of atomic absorption spectroscopy, UV/VIS spectrophotometry, Infra-red spectrometry.

Reaction Mechanism: Aliphatic nucleophilic substitution reactions (S_N^1 and S_N^2). Elimination reactions of a and b type, Electrophilic, Nucleophilic and free radical addition reactions.

Application of catalysis in organic reactions: Willikinson catalyst, Grubbs catalyst, Hydroformylation, Walker process.

Nanochemistry: Introduction to nanochemistry.

Corrosion: Mechanism of dry and wet corrosion.

Laboratory work:

Volumetric titrations, Conductometric, Potentiometric and pH metric titrations; Colorimetry, Adsorption and blueprinting.

Text Books:

1. Morrison, R.T. and Boyd, R.N. *Organic Chemistry*, PHI (2008) 6th ed.
2. Puri, B.R., Sharma, L.R. and Pathania, M.S., *Principles of Physical Chemistry*, Vishal Publishing Co. (2008).
3. Huheey, J.E., Keiter, E.A. and Keiter, R.L., *Inorganic Chemistry-Principles of Structure and Reactivity*, Dorling Kingsley (1997).

Reference Books:

1. Atkins, P.W. and Paula J de, *Atkin's Physical Chemistry*, Oxford University Press (2006) 7th ed.
2. Willard, H.H., Merritt, L.B., Dean, J.A. and Settle, F.A., *Instrumental Methods of Analysis*, C.B.S. Publishers (2006) 7th ed.
3. Mukherjee, S.M. and Singh, S.P., *Reaction Mechanism in Organic Chemistry*, MacMillan (2004).
4. Misra, G.S., *Introductory Polymer Chemistry*, New Age International (1993).