

SCHOOL OF CHEMISTRY ANDHRA UNIVERSITY
II Semester
CH-204 PHYSICAL CHEMISTRY-II
(Effective from the admitted batch of 2015-16)

UNIT-I:

Physical methods of molecular structural elucidation: Magnetic properties of molecules- theories of magnetic susceptibility- measurement of magnetic susceptibility. Principle and theory of NMR spectroscopy- Nature of spinning particle and its interaction with magnetic field. Chemical shift and its origin. Spin-Spin interaction-experimental methods. Application of NMR to structural elucidation- Structure of ethanol, dimethylformamide, styrene and acetophenone.

UNIT-II:

Electron Spin Resonance: Principle and experimental technique- g-factor, line shapes and line widths- hyperfine interactions- applications of ESR studies to the structure of free radicals, metal complexes and biological systems.

UNIT-III:

Electrochemistry I: Electrochemical cell- Galvanic and electrolytic cell. Concentration cell with and without transference- effect of complexation on redox potential- ferricyanide/ferrocyanide couple, Iron(III) phenanthroline/ Iron(II) phenanthroline couple. Determination of standard potential. Activity coefficient from EMF data. Primary and secondary cells, batteries examples. Fuel cells.

UNIT-IV:

Electrochemistry II: The electrode-electrolyte interface. The electrical double layer. The Helmholtz-Perrin parallel-plate model, the Gouy-Chapman diffuse-charge model and the Stern model. Electrode reactions: Charge transfer reactions at the electrode-electrolyte interface. Exchange current density and overpotential. Derivation of Butler-Volmer equation. High field approximation, Tafel equation, Low field equilibrium, Nernst equation. Voltametry- Concentration polarization, experimental techniques.

Text Books:

4. Physical Chemistry by Peter Atkins and Julio de Paula, Oxford University Press.
5. Physical Chemistry by G.W. Castellon, Narosha Publishing House
6. Physical chemistry by K.L. Kapoor

Reference Books:

6. Introduction to Electrochemistry, S.Glasstone.
7. Fundamentals of Molecular Spectroscopy, Banwell
8. Spectroscopy by Barrow.