

M.Phil. –Chemistry [Semester – II]
Paper-II (50 Marks)

(I) Stereo chemistry and confirmation (12 Marks)

1. Optical rotation and rotatory dispersion – Relation between rotation and configuration – Atomic asymmetry conformation asymmetry – optical rotatory Dispersion. The axial haloketone mle-ketal formation – stereo selective synthesis – stereo selective polymerization – Topicity.

References:

1. Organic Chemistry – Vol :2 – I.L.Finar
2. Stereo Chemistry – By R.D.Gunstone

(II) Electro Chemistry – (Industrial) (12 Marks)

1. Metal finishing – electroplating – requirements of electroplating process – The mechanism of the electro deposition of metals – performance of anodes – The plating bath – Component of plating both – Typical electroplating processes – Anodizing - The manufacturer of capacitors - Electro polishing –other related surface finishing techniques –electro chemical cleaning –electro chemical pickling –phosphating and chromating -electro phoreticpainting principles –anodic versus cathodic electropainting – the technology of electrophoretic painting
2. Batteries and fuel cell – battery characteristics – Battery specifications – Evaluation of battery performance – Battery components – the container – separators – current collectors – Electrolyte – active materials - present battery systems – Lead /Acid Batteries – Car Batteries – Nickel / Cadmium batteries – Pocket plate Batteries – Sintered plate batteries – Batteries under development – sodium / sulphur Zinc/Halogen batteries – phosphoric acid fuel cells – Molten carbonate fuel cells.

References:

1. Modern electroplating – By Lowenheim F.A.

2. Industrial electrochemistry – By Kuhn A.T.
-- By mantell (C.L.)

(III) Quantum Chemistry [13 marks]

1. Displacement functions for particle waves – de Broglie concept- Derivation of state particle – The Hamiltonian operator for total energy – some properties of linear operators- Development of time dependent wave functions – Average values for dynamic variables- Lagrange's Equation.
2. Three dimensional boxes and finite barriers- orthogonality of wave functions – Hermitian operators- The assurance of real variables- A single particle in a three dimensional box.- Allowed energy levels in a cubic box- probability densities for a particle in a cubic box- The variation method – the perturbation method – The secular equations – The valence bond theory- Molecular orbital theory- The principle of quantum statistical mechanics.

References:

1. Valency and molecular structure --By E. Cartwell
2. Foundations of Quantum Chemistry --By T.E.Peacok [John Wiley & Sons]
3. Advanced Inorganic Chemistry --By Gurdeep and Harish
[Goel Publishing House]

(IV) Polymer Chemistry [13 marks]

1. Polymer chains- chain – configuration of macromolecules – free radical polymerisation kinetics – initiator efficiency, auto accelerated and chain transfer reactions, Polymer degradation- Condensation polymerization and co-polymerisation.
2. Techniques for structural characterization – light microscopy. Scanning electron microscopy / x-ray- diffraction, thermogravimetric analysis, differential thermal analysis, differential scanning calorimetry.

References:

1. Principles of polymer Chemistry-P.J.Flory
2. Principles of Polymer Chemistry- By Revve. A.