M.PHIL (CHEMISTRY SEM : I)
Paper-II (50 Marks)

(I) Stereo chemistry and confirmation (13 Marks) [11 Marks]

1. Introduction – Optical and Geometrical isomerision – Polarimetry – Molecular dissymmetry – Optical isomerism due to asymmetric carbon atoms - Recemic modifications – Formation of Recemic modifications – Properties of Recemic Modifications Resolution - Resolution by mechanical separation of crystals – Resolution by formation of Diastereo isomers – second order asymmetric transformations – Bio chemical asymmetric transformation – Absolute asymmetric synthesis – Criteria of optical purify – Axial chirality – Planer chirality – Helicity

   [08 Marks]

2. Configuration – Absolute configuration. – Relative configuration – Chemical inter conversion Not affecting bonds to the asymmetric atom – Chemical correlation – The method of quasi racemates – optical comparission –configuration based on asymmetric – synthesis – synthesis of optically active compounds. [05 Marks]

References:

1. Stereo Chemistry of carbon compounds

-Ernest L.Eliel

2. Stereo Chemistry of organic compounds

-- Nasipuri

(II) Electro Chemistry – (Industrial)

(13 Marks) [11 Hours]

1. Organic electro synthesis – Basic principles and parameters available - the hydro dimerization of Acrylonitrile mechanism –Monsanto process – developments from the early Monsanto process – The new Monsanto process – Mechanism – other hydro dimerization reaction – Advantages and drawbacks. [05 Marks]

2. Metals processing – Electro forming – Electro chemical machining – Electro chemical machining system – Tool design – electro chemical grinding electro chemical deburring principle – electro chemical etching . [04 Marks]

3. Water Treatment and environmental protection – Metal Iron removal and metal recovery – Hypochlorite and low tonnage chlorine electrolysers – Electro-dialysis – Electrolytic methods of phase separation - other electrochemical processes – Electro analytical procedures. [04 Marks]

References:

1. Industrial electrochemistry --By Derek Pletcher[Chapman & Hall]
2. Organic electrochemistry – By Baiser M.M.
3. Fuel cells and their electrochemistry – By Bockris J and Srinivasan S. [Mc Graw-Hill]

(III) Quantum Chemistry
[12 marks]

1. Orbital – Interpretation of Atomic orbital – Schrodinger's wave equation. Time depentant equation- Eigen values and Eigen functions - Normalization and orthogonality-Degeneracy – Forbidden transitions – Application of wave mechanics - particles in one and three dimensional box – The Sapce wave function for the electron in the Hydrogen atom.

References:

1. Valence- By C.A. Coulson [Oxford university press]
2. Quantum Chemistry – An introduction -- By Walter Kauzmann (Acadamic press)

(IV) Polymer Chemistry
[12 marks]

1. Concepts of mass and Number average molecular weights. Methods of determining molecular weights – osmometry. Viscosity diffusion, gel and light scattering methods. [4 Marks]

2. Flory- Huggin theory, Entropy of mixing, polymer solutions – ideal & non ideal, viscosity of polymer solutions – crystalline and amorphous polymers, - glass transition temperature- melting point-tacticity & Crystallinity. [4 Marks]

3. Measurement of viscosity and normal stresses, Newtonian and non-Newtonian and visco- elastic fluids. Physical and chemical modification of polymers- Block & Graft polymers, High temperature polymers, polymers for biomedical application. [4 Marks]

References:

1. Polymer Chemistry – By F.Billemeyer
2. Gowarikar V.R.Viswanathan N.V. and Sreedhar J.
   -Polymer Science (New age international publishers)