CY-205 INORGANIC CHEMISTRY II

Transition Elements (3d series): General group trends with special reference to electronic configuration, variable valency, colour, magnetic and catalytic properties, ability to form complexes and stability of various oxidation states (Latimer diagrams) for Mn, Fe and Cu.

Lanthanides and actinides: Electronic configurations, Oxidation states, colour, magnetic properties, lanthanide contraction, separation of lanthanides (ionexchange method only).

Coordination Chemistry: Valency Bond Theory (VBT): Inner and outer orbital complexes of Cr, Fe, Co, Ni and Cu (coordination numbers 4 and 6). Structural and stereoisomerism in complexes with coordination numbers 4 and 6. Drawbacks of VBT. IUPAC system of Nomenclature.

Crystal Field Theory: Crystal field effect, octahedral symmetry. Crystal field stabilization energy (CFSE), Crystal field effects for weak and strong fields. Tetrahedral symmetry. Factors affecting the magnitude of D. Spectrochemical series. Comparison of CFSE for Oh and Td complexes, Tetragonal distortion of octahedral geometry. Jahn-Teller distortion, Square planar coordination.

Molecular Orbital Theory: Molecular Orbital Energy diagrams of octahedral, tetrahedral and square planar complexes, Writing molecular orbital configuration of octahedral, tetrahedral and square planar complexes, bonding in complexes and its effect on Crystal Field Splitting Energy.

Magnetic Properties of Complex ions: Paramagnetic and diamagnetic complexes, Calculation of μs, μs+L, μeff and the relationship between the three.

Electronic Absorption Spectrum of Transition metal Complexes: Octahedral and tetrahedral complexes, d^2-d^8 ions Energy level diagram, Charge transfer spectra.

Chemistry of 3d metals: Oxidation states displayed by Cr, Fe, Co, Ni and Co. A study of the following compounds (including preparation, industrial application and important properties); Peroxo compounds of Cr, $K_2Cr_2O_7$, $KMnO_4$, $K_4[Fe(CN)_6]$, sodium nitroprusside, $[Co(NH_3)_6]Cl_3$, $Na_3[Co(NO_2)_6]$.