

GROUP - (A) ELECTIVE PAPERS
PAPER II. PHOTOINORGANIC CHEMISTRY

M.M. - 75

60 Hrs. (2 Hrs./Week)

Units	Topics	
I	<p>Basics of Photochemistry</p> <p>Absorption, excitation, photochemical laws, quantum yield, electronically excited states-life times-measurements of the times. Flash photolysis, stopped flow techniques. Energy dissipation by radiative and non-radiative processes, absorption spectra, Franck-Condon principle, photochemical stages - primary and secondary processes.</p>	10 Hrs.
II	<p>Properties of Excited States</p> <p>Structure, dipole moment, acid-base strengths, reactivity. Photochemical kinetics-calculation of rates of radiative processes. Bimolecular deactivation quenching.</p> <p>Excited States of Metal Complexes</p> <p>Excited states of metal complexes: comparison with organic compounds, electronically excited states of metal complexes, charge-transfer spectra, charge transfer excitations, methods for obtaining charge-transfer spectra.</p>	10 Hrs. 8 Hrs.
III	<p>Ligand Field Photochemistry</p> <p>Photosubstitution, photooxidation and photoreduction, lability and selectivity, zero vibrational levels of ground state and excited state, energy content of excited state, zero-zero spectroscopic energy, development of the equations for redox potentials of the excited states.</p>	8 Hrs.
IV	<p>Redox Reactions by Excited Metal Complexes</p> <p>Energy transfer under conditions of weak interaction and strong interaction exciplex formation; conditions of the excited states to be useful as redox reactants, excited electron transfer, metal complexes as attractive candidates (2,2 - bipyridine and 1, 10- phenanthroline complexes), illustration of reducing and oxidising character of Ruthenium²⁺ (bipyridal complex, comparison with Fe (bipy)₃; role of spin-orbit coupling - life time of these complexes. Application of redox processes of electronically excited states for catalytic purposes, transformation of low energy reactants into high energy products, chemical energy into light.</p>	16 Hrs.
V	<p>Metal Complex Sensitizers</p> <p>Metal complex sensitizer, electron relay, metal colloid systems, semiconductor supported metal or oxide systems, water photolysis, nitrogen fixation and carbon dioxide reduction.</p>	8 Hrs.