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BR—174—2016

FACULTY OF SCIENCE

M.Sc. (Second Year) (Fourth Semester) EXAMINATION

OCTOBER/NOVEMBER, 2016

(Revised Course)

INORGANIC CHEMISTRY

Paper XVIII (CH-542/1)

(Photoinorganic Chemistry)

(Saturday, 19-11-2016)

Time : 2.00 p.m. to 5.00 p.m.

Time—3 Hours

Maximum Marks—50

N.B. :— (i) Attempt All questions.

(ii) Figures to the right indicate full marks.

1. Answer any *five* of the following : 10

- (a) Write salient features of Franck-Codon principle.
- (b) Explain how energy is dissipated by non-radiative process.
- (c) Give *two* examples of photo rearrangement reactions.
- (d) Compare prompt and delayed photochemical reaction.
- (e) Explain ligand field excited states of Ir(III) complexes.
- (f) Write examples of two photochemical process.
- (g) Discuss the emission mechanism of photoradiations.
- (h) Describe the features of photographic system.

2. Answer any *four* from the following : 10

- (a) What are the essential conditions for metal to ligand charge Transfer ?
- (b) Discuss the process of absorption of radiation by complexes with different excited states.

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- (c) Draw the energy levels of electronic transition of ML_6 complexes.
- (d) Comment on absorption spectra of photochemical reactions.
- (e) Write experimental details of stopped flow technique.
- (f) What is integrated charge transfer spectrum ?
3. Answer any *two* from the following : 10
- (a) Draw Jablonski diagram and explain how it provides information.
- (b) Discuss mechanism of flash photolysis.
- (c) Describe different stages of photochemical reaction.
4. Answer any *two* from the following : 10
- (a) What are the applications of photophysical reactions ?
- (b) Explain the photochemical reactions of Cr^{3+} ion complexes.
- (c) Describe the conditions of charge transfer to solvent state.
5. (A) Choose the *correct* option from the following alternatives : 5
- (i) During, photoexcited state is de-activated by a chemical reagent.
- (a) Inhibition (b) Heating
- (c) Quenching (d) De-activation
- (ii) Photochemical reactions are faster than thermal reactions as fast as
- (a) 10^{-8} seconds (b) 10^{-10} seconds
- (c) 10^{-9} seconds (d) 10^{-6} seconds

- (iii) Compounds with heavy atoms and species increases the rate of inter-system crossing.
- (a) Diamagnetic (b) Paramagnetic
(c) Ferromagnetic (d) Antiferromagnetic
- (iv) The side chain of riboflavin can split off to form lumiflavin by
- (a) Photo fragmentation (b) Photo substitution
(c) Photo oxidation (d) Photo rearrangement
- (v) The Grothuss law states that “Light must be by a chemical substance in order for photochemical reaction to take place.”
- (a) Absorbed (b) Emitted
(c) Adsorbed (d) Penetrate
- (B) Write short notes on (any *two*) :
- (a) Photosynthesis
(b) Solar energy conversion
(c) Photolysis rules.

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