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AG—114—2018

FACULTY OF SCIENCE

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

OCTOBER/NOVEMBER, 2018

(CBCS Pattern)

INORGANIC CHEMISTRY

(Photo Inorganic Chemistry)

Paper XVIII [CH-542/1]

(Thursday, 29-11-2018) **Time : 2.00 p.m. to 5.00 p.m.**

Time—3 *Hours* *Maximum Marks*—75

N.B. :— *All* questions are compulsory.

1. Answer any *three* out of five : 15

   (*a*) Describe the conditions for excited state of ML_6 complexes.

   (*b*) Discuss the importance of solar energy ratio.

   (*c*) Explain the features of Frank Codon principle.

   (*d*) How energy is dissipated during non-radiative process ?

   (*e*) Write salient features of Grotthuss-Draper law.

2. Answer any *three* out of five : 15

   (*a*) Draw and explain Jablonski diagram of energy.

   (*b*) Explain the relaxation process involved in excited ion.

   (*c*) Explain with examples the mechanism of delayed reactions.

   (*d*) Give examples of Photo-physical processes.

   (*e*) Comment on coordination of Cr(III) complexes.

3. Answer the following :

   (*a*) Discuss the origin of charge transfer spectra and discuss its significance. 8

P.T.O.

Or

State and explain the absorption of radiation by transition metal complexes.

(*b*) What are the essential predictions made from MLCT spectra ? 7

Or

Write and explain the photolysis reactions.

4. Answer the following :

(*a*) Enlist features of photochemical laws. 8

Or

What are the photo reduction reactions ? Explain with examples.

(*b*) Explain the principle of photographic system. 7

Or

Describe the experimental details of Stop Flow technique.

5. (*a*) Choose the correct option from the given alternatives : 5

(1) A chemical reaction caused by absorption of infrared radiation is in the range .....

(*a*) 100 to 400 nm

(*b*) 400 to 750 nm

(*c*) 759 to 2500 nm

(*d*) 250 to 350 mm

(2) According to ..... for each photon of light absorbed by a chemical system, no more than one molecule is activated for a photochemical reaction.

(*a*) Law of photolysis

(*b*) Second law of photochemistry

(*c*) First law of photochemistry

(*d*) Third law of potochemistry

(3) A charge-transfer complex is an association of two or more molecules in which a fraction of electronic charge is transferred between the .....

(*a*) Atomic entities

(*b*) Ionic entities

(*c*) Molecular entities

(*d*) Compound

(4) Molecules that exhibit only small spin-orbit coupling type of non-radiative transition can give rise to .....

(*a*) Phosphorescence

(*b*) Fluorescence

(*c*) Chemiluminescene

(*d*) Photoluminescene

(5) Some photochemical reactions are faster than thermal reactions by magnitude of :

(*a*) 10^{-1} seconds

(*b*) 10^{-4} seconds

(*c*) 10^{-6} seconds

(*d*) 10^{-9} seconds

(*b*) Write brief notes on (any *two*) : 10

(*a*) Photo rearrangement reaction

(*b*) Absorption spectra of $[Cu(OH_2)_6]$ complexes

(*c*) Quantum yield.