Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

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M.Sc.(Chemistry) (2015 to 2017 Batch E-II) (Sem.–4)

PHOTOCHEMISTRY

Subject Code : MSCH-412

M.Code : 71680

Time : 3 Hrs. Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. Attempt FIVE questions in ALL including COMPULSORY questions no. 1.
2. Selecting ONE each from UNIT-I to IV.
3. All Questions carry equal marks.

1. Answer briefly :

a) Define the terms : suprafacial and antarafacial w.r.t photochemical reactions.

b) What do you mean by Norrish type-II reaction?

c) Describe internal conversion.

d) Discuss oxetane formation with chemical reaction.

e) What is resonance fluorescence? Give an example.

f) Define Stark-Einstein law.

g) Discuss the physical significance of extinction coefficient.

h) What is meant by primary and secondary process in photochemistry?

i) What do you mean by spin forbidden transitions? Give the selection rules governing them.

j) Discuss Photosensitization reaction with example.

SECTION-B

UNIT-I

2. a) Describe Photo-Fries rearrangement and formation of peroxy compounds.

b) Discuss photochemical isomerization in details with mechanism.

3. a) Trans-3,4-dimethylcyclobutene can open by two conrotatory paths to give either [2E, 4E] or [2Z, 4Z]-hexadiene. Explain why both products are symmetry allowed, and then account for the fact that only [2E, 4E] isomer is obtained in practice?

   b) Discuss the mode of energy transfer from one molecule to the other. Also explain n-π^* and π-π^* excitation with the example of benzophenone molecule.

UNIT-II

4. a) Discuss in details the photo-assisted electrolysis of water.

   b) Write a detailed note on photo-rearrangement reaction with mechanism.

5. a) Describe laser action with reference to a three level laser and a four level laser.

   b) Describe photo-substitution reaction in Inorganic Complexes.

UNIT-III

6. a) What do you understand by quenching of fluorescence? Describe and derive Stern-Volmer equation.

   b) Discuss in details about photochemical equilibrium. Give two examples.

7. a) What do you mean by free energy? What is free energy change of photochemical reactions? Comment on the same giving reasons.

   b) Describe in details theory of radiation less transition in photochemistry.

UNIT-IV

8. a) Describe the measurement of non-relative lifetime in a photochemical reaction.

   b) Describe in details, the photochemistry of vision.

9. a) Write a detailed note on mercury photosensitized reactions with mechanism and different processes involved in the same.

   b) Describe chemical actinometry in details.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.