Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

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

PHOTOCHEMISTRY

Subject Code : MSCH-412

Paper ID : [A2812]

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.**

Q1. Answer briefly :

a) How the absorption bands of formaldehyde and ethylene in UV would vary?

b) Explain the term vibrational cascade.

c) Non-bonding orbitals (n) do not possess the anti-bonding (n*) counter-part. Why?

d) What is meant by predissociation in photochemical transitions?

e) How phosphorescence is different from incandescence?

f) Assign three reasons for low quantum yield.

g) What is a phototropism?

h) What is a photoexchange process?

i) Mention the nature of $n \rightarrow \pi^*$ & $n \rightarrow \sigma^*$ transitions? Give reasons.

j) What is a sensitised chemiluminescence? (10x2 =20)

UNIT-I

Q2 a) 1,2-Cycloaddition of olefins to aromatic compounds is stereospecific. Explain.

b) Write short notes on the following :

i) Photolysis of cyclic ketones in gas phase.

ii) Formation of Photoenols. (7,7,6)

Q3 a) Photolysis of a solution of phenol ester provides o- and p-acylphenols. Discuss.

b) Pinacols can be obtained by the reduction of ketones. Explain.

c) Discuss the mechanism of Intramolecular Peterno-Buchi reaction. (8,6,6)

UNIT-II

Q4 a) Describe the photoaquation reaction of inorganic complexes giving at least one example in each case.

b) Briefly discuss the following :

i) Photoracemisation

ii) Linkage photoisomerisation (7,7,6)

Q5 a) Discuss the intra- and intermolecular photo-redox reaction of complexes taking suitable examples.

b) Explain the working of a photoelectrochemical cell. (10,10)

UNIT-III

Q6 a) Discuss the theory of radiationless transition.

b) Giving appropriate example, explain the relation between structure of the molecule and flourescence.

c) What is Frank-Codon principle? Explain. (8,6,6)

Q7 a) What do you understand by spin allowed and spin forbidden transitions? Discuss with examples.

b) Write a short note on dynamic quenching.

c) Discuss the factors affecting the fluorescence. (6,6,8)

UNIT-IV

Q8 a) Account for the devices used for measurement of light intensity in actinometry.

b) Discuss any five applications of photochemistry.

c) Write a short note on the factors on which quantum yield depends. (10,5,5)

Q9. a) Discuss the following :

i) Reinecke's salt actinometer.

ii) Ferrioxalate actinometer.

b) Describe a non-steady/relative method for lifetime measurement of photochemical process. (6,6,8)