

Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

M.Sc.(Applied 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) Give examples of radiative and non-radiative transitions.
- (b) Mention one example of photoaddition reaction.
- (c) Differentiate between photochemical reaction and thermal reaction.
- (d) Why the non-radiative transition is faster than radiative transition.
- (e) Give an example of a molecule which shows P-type delayed fluorescence.
- (f) State Franck-Condon principle.
- (g) Give an example of Photo-Fries rearrangement.
- (h) Write down the mathematical formula of Stern-Volmer equation.
- (i) Write down the mathematical formula for determining the quantum yield.
- (j) Give an example of photochemical reaction having low quantum yield value.

UNIT-I

2. (a) Give the mechanism of the following reaction :

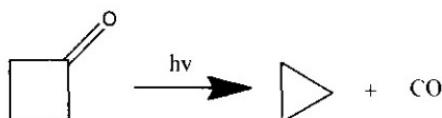


(b) Mention the examples of following photochemical reactions:

Disproportionation reaction, Intermolecular hydrogen atom abstraction by acyl radical. Write a short note on paterno-Buchi reactions.

3. (a) Briefly discuss Jablonski, diagram with various types of radiative and non-radiative transitions.

(b) Give the mechanism of the following reaction :



UNIT-II

4. (a) Briefly discuss on isomerisation reaction and rearrangement reactions in inorganic complexes with suitable examples.

(b) Write a short note on photovoltaic and photogalvanic cells.

5. (a) Describe briefly the applications of metal complexes in solar energy conversions.

(b) Write a short note on photo-assisted electrolysis of water.

UNIT-III

6. (a) Explain P-type and E-type delayed emission with suitable examples.

(b) Differentiate between spin allowed transitions and spin forbidden transitions with proper examples.

7. (a) What is meant by fluorescence quenching? Explain the reasons for fluorescence quenching.

(b) Briefly discuss on :

i) Franck-Condon principle

ii) Intersystem crossing.

UNIT-IV

8. (a) Describe a chemical actinometer. What are the characteristics of an actinometer? State its applications.
- (b) What are the reasons for observing?
- i) High quantum yield $\gg 1$) and
 - ii) low quantum yield ($\ll 1$) values of a molecule?
9. (a) Define quantum yields. How can you experimentally determine quantum yield of a sample?
- (b) Write a short note on :
- i) photosensitized reaction and
 - ii) relative and non-relative lifetime measurements.

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.