

Roll No.

Total No. of Pages : 03

Total No. of Questions : 19

M.Sc. (Chemistry) (Campus) (2016 to 2017) (Sem.-3)
PHOTOCHEMISTRY AND PERICYCLIC REACTIONS

Subject Code : CHL-501

M.Code : 74888

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

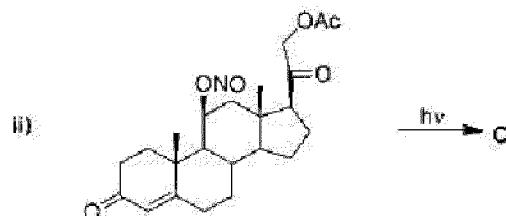
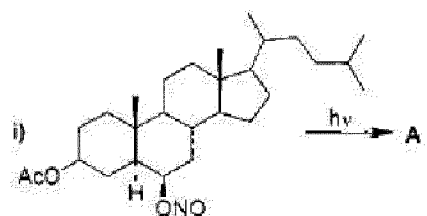
1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **SIX** questions carrying **FIVE** marks each and students have to attempt **ALL** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

SECTION-A

1. Define quantum yield. What are the reasons for low and high quantum yield?
2. Define singlet and triplet states and comment on their stability and life time?
3. Which types of carbonyl compounds give Norrish Type I and Type II reactions?
4. What is the importance of photosensitizer in photochemistry? What criteria should be fulfilled by the compound to become sensitizer?
5. What are Frontier molecular orbitals?
6. What are pericyclic reactions?
7. Define conrotatory and disrotatory motion?
8. Explain "Chelotropic reaction" with an example.
9. Define 1, 3-dipolar cycloaddition reaction?
10. "*1, 3-Sigmatropic shift of hydrogen is thermally forbidden but photochemically allowed*". Explain.

SECTION-B

11. Draw Jablonski diagram and explain the following terms :
- i) Fluorescence
 - ii) Phosphorescence
 - iii) Intersystem crossing
 - iv) Vibrational cascade
 - v) Energy cascade
12. Discuss photochemistry of 1,3-butadiene. Write the mechanism of dimerisation of 1,3-butadiene in solution in the presence of acetophenone and benzyl as sensitizer.
13. Give mechanism of Norrish Type II reaction with suitable examples. Explain why cyclopropyl ketones are the most common class of compounds for β -cleavage reactions?
14. What is Barton reaction? Write the structure of product(s) formed during the following reactions :

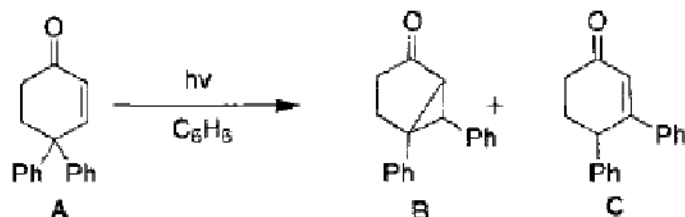


15. Explain Cope and Aza-Cope rearrangement with suitable examples.
16. With the help of FMO approach, explain whether the following reaction will be allowed thermally or photochemically?



SECTION-C

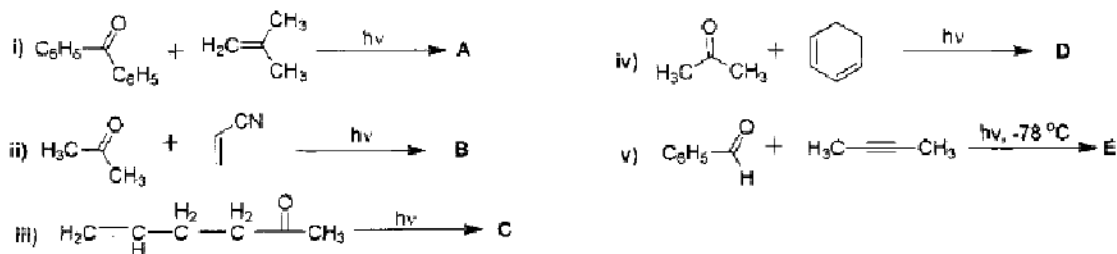
17. Discuss di-*n* methane rearrangement. Explain its mechanism with suitable examples. The irradiation of 4,4-diphenyl cyclohexanone (A) yields a mixture of two products B and C. Propose a suitable mechanism for this transformation.



18. Discuss the mechanism of Claisen rearrangement. Write the structure of product(s) formed during the following reactions :



19. Define Paterno-Buchi reaction with mechanism. Write the structure of product(s) formed during the following reactions:



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.