

Exam. Code : 210403

Subject Code : 4942

M.Sc. Chemistry 3<sup>rd</sup> Semester (Batch 2020-22)

**PHOTOCHEMISTRY AND PERICYCLIC  
REACTIONS**

Paper : Course-XX

Time Allowed—3 Hours]

[Maximum Marks—50

**Note** :—Attempt **FIVE** questions in all, selecting at least **ONE** question from each section. The **fifth** question may be attempted from any section. All questions carry equal marks.

**SECTION—A**

- (a) What is perturbation of molecular orbital approach ? How is it useful to explain pericyclic reaction would proceed via thermal or photochemical pathway ?

(b) Discuss classification of pericyclic reaction. 6,4
- (a) Sketch a diagram for frontier molecular orbitals of allyl system.

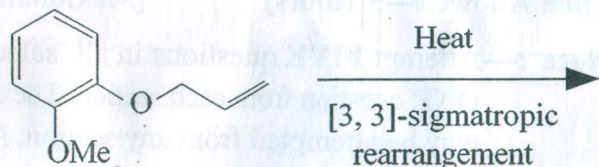
(b) What do you mean by cycloaddition reaction ? Discuss stereochemical effects on the rate of cycloaddition reaction by taking suitable examples.

(c) What do you understand by Suprafacial and Antarafacial additions ? 2,5,3



### SECTION—B

3. (a) Discuss [1, 2]-Sigmatropic shifts which involves (i) retention and (ii) inversion of configuration of carbon groups.
- (b) What do you understand by fluxional tautomerism and disrotatory motion. 6,4
4. (a) Write the possible product(s) for the following reaction with mechanism :



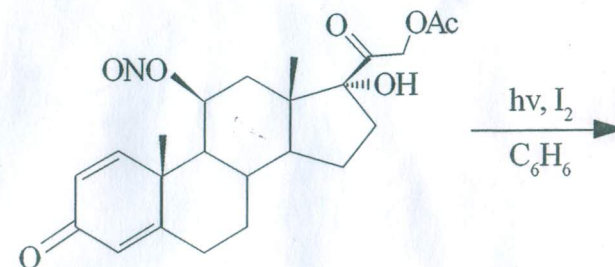
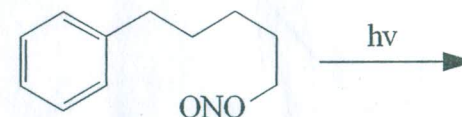
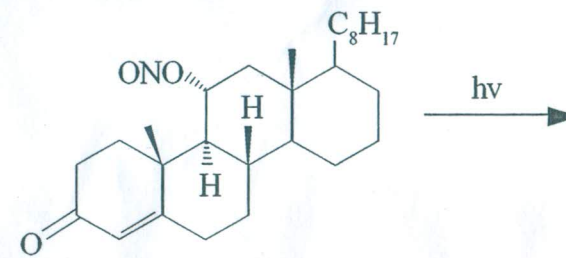
- (b) For butadiene to cyclobutene cyclization reaction sketch correlation diagram. 4,6

### SECTION—C

5. (a) How the rate of photochemical reaction be affected with intensity of light ? Discuss with example.
- (b) What do you mean by rate constant and life time of excited state ? How will you determine the rate constant of reactions ?
- (c) Discuss cyclization reaction of stilbene by taking suitable substrate. 3,5,2
6. Write short notes on :
- (a) Geometrical isomerism
- (b) Fate of excited molecule
- (c) Photodissociation. 3,4,3

### SECTION—D

7. (a) Discuss photochemical isomerization reaction of aromatic compounds by taking suitable examples.
- (b) Lumiketone rearrangement. 5,5
8. Write the possible product(s) for the following reactions :



4,3,3