

Exam. Code : 210403

Subject Code : 4836

M.Sc. Chemistry 3<sup>rd</sup> Semester

**PHOTOCHEMISTRY & PERICYCLIC REACTIONS**

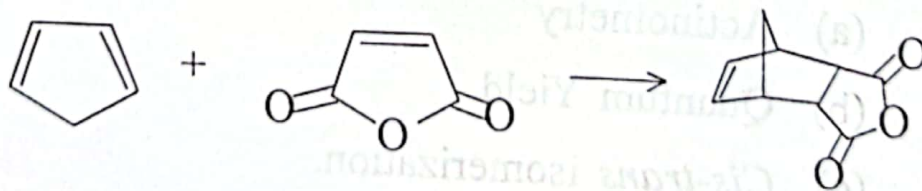
**Course-XX**

Time Allowed—Three Hours] [Maximum Marks—50

**Note :—** Candidates are to attempt **FIVE** questions, **ONE** from each Section. **Fifth** question may be attempted from any Section. All questions carry equal marks.

**SECTION—A**

1. (a) Based on frontier molecular orbital (FMO) approach, determine the following cycloaddition reaction is symmetry allowed under thermal or photochemical conditions ?



- (b) What is Cheletropic reaction ? Discuss this reaction by citing suitable examples.

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2. (a) Draw frontier orbitals of 1, 3-butadiene, 1, 3, 5-hexatriene and allyl system.
- (b) Discuss perturbation of molecular orbital (PMO) approach for explaining the feasibility of any pericyclic reaction under thermal or photochemical condition.

### SECTION—B

3. Write brief explanatory notes on following :
- (a) Ene reaction
- (b) Fluxional tautomerism
- (c) Aza-cope rearrangement.
4. (a) Discuss correlation diagram for conrotatory and disrotatory cyclization of butadiene to cyclobutene.
- (b) Write selection rule for sigmatropic rearrangements involving migration of hydrogen or carbon in tabulated form.

### SECTION—C

5. Write short notes on :
- (a) Actinometry
- (b) Quantum Yield
- (c) *Cis-trans* isomerization. 3,3,4
6. (a) Discuss the reaction(s) of alkene which shows involvement of Rydberg excited state.

- (b) What are the different photochemical reactions ? Discuss gas-phase photolysis reaction with examples.

#### SECTION—D

7. (a) Describe in detail photochemical formation of Smog.  
(b) Explain Norrish type II reaction with suitable examples.
8. (a) Explain the mechanism of photodegradation of polymer with example.  
(b) The combination of carbonyl and alkene leads to the formation of photoadduct. Give name and discuss mechanism of such reaction in detail.