

School of Basic Sciences

Master of Science in Chemistry
Semester End Examination - May 2024

Duration : 180 Minutes
Max Marks : 100

Sem IV - MSCH6001 - Photochemistry and Pericyclic Reactions

General Instructions

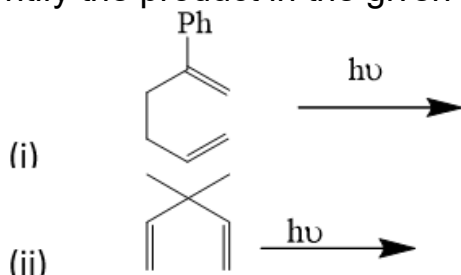
Answer to the specific question asked

Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

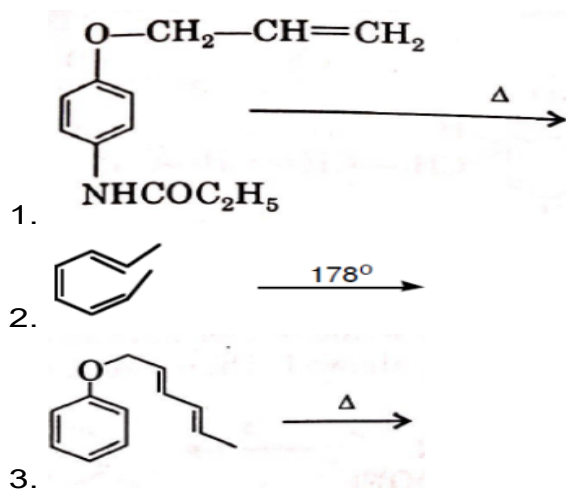
- 1) Define the photochemistry of 1,3-butadiene. K1 (3)
- 2) Illustrate Claisen rearrangement in detail. K2 (4)
- 3) With the help of proper mechanism and FMO approach, explain the stereochemistry of thermal and photo-induced electrocyclic ring closure in case of $4n \pi$ electrons system. K2 (6)

- 4) Identify the product in the given reactions: K3 (6)



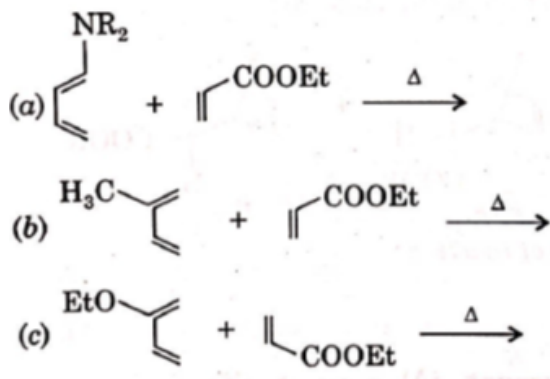
- 5) Identify Di pi methane rearrangement and its mechanism K3 (6)

- 6) Complete the following reaction and identify their mechanism: K3 (9)



7) Identify the major product in the given thermal reactions:

K3 (9)



8) Analyze the following: (i) Photolytic cleavage (ii) Fluorescence (iii) Quantum yield (iv) Energy cascade (v) ISC (vi) Phosphorescence

K4 (8)

9) With the help of proper mechanism explain FMO and FMO approach, analyze the stereochemistry of thermal and photo-induced electrocyclic ring closure in case of $4n \pi$ electrons system.

K4 (12)

10) Explain the mechanism of Norrish I and Norrish II reactions. How many types of compounds give this reaction? Give one example for each compound.

K5 (10)

11) Explain the possible routes and mechanism of 1,2 and 1,3- alkyl group shift in substituted benzene. Determine the mechanism of dimerization of ethylene.

K5 (15)

OR

Explain and construct a correlation diagram for conrotatory and disrotatory method for interconversion of cyclobutene to butadiene system. Out of these, which process is photochemically allowed? Also discuss FMO and PMO approach for this inter-conversion. Determine the Ene reactions and Stereochemical aspects

K5 (15)

12) Discuss the two types of isomerisation by Alkenes gives (i) concerted [2+2] (ii) non concerted cycloaddition.

K6 (12)

OR

Discuss the mechanism of photoreduction of benzophenone leading to the formation of benzpinacol.

K6 (12)