

# C094

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## CHE-551

### Reaction Mechanisms, Pericyclic Reactions, Photochemistry and Stereochemistry

M.Sc. CHEMISTRY (MSCCH)

2nd Year Examination, 2022 (June)

**Time : 2 Hours]**

**Max. Marks : 80**

**Note :** This paper is of Eighty (80) marks divided into *two* (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein.

### SECTION-A

#### (Long Answer Type Questions)

**Note :** Section 'A' contains Five (05) long answer type questions of Twenty (20) marks each. Learners are required to answer any Two (02) questions only.

(2×20=40)

1. Attempt any *two* of the following :
  - (a) State Curtin-Hammett principle and explain with suitable examples. .
  - (b) Discuss the boat conformation of cyclohexane. Why is the boat conformation of cyclohexane less stable than the chair conformation?
  - (c) Discuss the stereospecificity of E<sub>2</sub> reactions with suitable examples.
  
2.
  - (a) Discuss the stability of carbanions. Formulate the mechanism of an addition reaction of carbanion.
  - (b) What are pericyclic reactions? Explain their salient features.
  - (c) Explain Norrish type-I and II-type reactions with suitable examples.
  
3.
  - (a) What are Chelotropic reactions and how is it related to Diel-Adler's additions?
  - (b) How is Claisen rearrangement related to Cope-rearrangement? Give some examples of Claisen rearrangement.
  
4.
  - (a) What is Paterno-Buchi reaction? Discuss its mechanism along with the stereochemical consequences.
  - (b) What are nitrenes? How are they generated? Discuss their structure, stability and character.

5. Discuss the mechanism of any four of the followings :
- Baeyer-Villiger oxidation.
  - Hoffmann Rearrangement.
  - Wolf Rearrangement.
  - Curtius Rearrangement.
  - Schmidt Rearrangement.
  - Fries-Rearrangement.

**SECTION-B**  
**(Short Answer Type Questions)**

**Note :** Section 'B' contains Eight (08) short answer type questions of Ten (10) marks each. Learners are required to answer any Four (04) questions only. (4×10=40)

1. Explain Photochemistry of Alkenes and dienes in detail.
2. Explain the following :
  - (a) Sigmatropic reactions.
  - (b) Conformation of bicyclic systems.
3. Explain fluorescence and phosphorescence with suitable examples.
4. Explain the followings :
  - (a) Photochemistry of azo compounds.
  - (b) [3, 3] sigmatropic rearrangement.

5. Explain ElcB mechanism with suitable example. How is ElcB reaction differentiated from  $E_2$  reaction?
  6. Write a short note on:
    - (a) Photo Smilies rearrangement.
    - (b) Hofmann rule.
  7. Discuss the Woodward and Hoffmann's explanation for conservation of molecular orbital Symmetry.
  8. Define cyclo addition reaction. What are [m + n] cycloadditions? Explain with two examples.
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