

CHE-551**Reaction Mechanisms, Pericyclic Reactions,
Photochemistry and Stereochemistry****M. Sc. Chemistry (MSCCH-12/13/16/17)****Second Year, Examination, 2018****Time : 3 Hours****Max. Marks : 80**

Note : This paper is of **eighty (80)** marks containing **three (03)** Sections A, B and C. Attempt the questions contained in these Sections according to the detailed instructions given therein.

Section-A**(Long Answer Type Questions)**

Note : Section 'A' contains four (04) long answer type questions of nineteen (19) marks each. Learners are required to answer *two* (02) questions only.

1. Discuss the mechanism of any *three* of the following :
 - (a) Wagner–Meerwein Rearrangement
 - (b) Hoffmann Rearrangement
 - (c) Pinacole–Pinacolone Rearrangement
 - (d) Claisen Rearrangement
 - (e) Schmidt Rearrangement
 - (f) Cope-Rearrangement

2. Explain the following :
 - (a) Generation, Reactions and Stability of Carbocations or Free radical
 - (b) Effects of conformation on the reactivity of organic compounds
 - (c) Mechanism of Paterno—Buchi reaction
3. Explain Elimination Reactions. Give their classification. Discuss the mechanism of E_2 and E_{1cb} reaction with suitable example ?
4. Explain Photochemistry of Alkenes and dienes in detail.

Section–B

(Short Answer Type Questions)

Note : Section 'B' contains eight (08) short answer type questions of eight (8) marks each. Learners are required to answer *four* (04) questions only.

1. Explain the following :
 - (a) Sigmatropic reactions
 - (b) Conformation of biocyclic systems
2. Discuss the Woodward and Hoffmann's explanation for conservation of molecular orbital symmetry.
3. Discuss the mechanism of E_1 reaction. Explain orientation of double bond in β elimination reaction.
4. Explain fluorescence and phosphorescence with suitable examples.
5. Explain the following :
 - (a) Curtins rearrangement
 - (b) Diels-Alder reaction

6. Explain the following :
 - (a) Stability of carbanions
 - (b) Stability of free radicals
7. What are pericyclic reactions ? Explain their classification with suitable examples.
8. Explain the following :
 - (a) Photochemistry of azo compounds
 - (b) [3, 3] sigmatropic rearrangement

Section–C

(Objective Type Questions)

Note : Section 'C' contains ten (10) objective type questions of one (01) mark each. All the questions of this Section are compulsory.

1. Which of the following conformations of n-butane is most stable ?
 - (a) Anti
 - (b) Gauche
 - (c) Eclipsed
 - (d) Fully Eclipsed
2. Which of the following carbenes are Electrophilic in character ?
 - (a) $\ddot{\text{C}}\text{H}_2$
 - (b) $\ddot{\text{C}}\text{Br}_2$
 - (c) $\ddot{\text{C}}\text{Cl}_2$
 - (d) $(\ddot{\text{C}}\text{H}-\text{OCH}_3)$

3. Reaction intermediate in E_1 reaction is :
- (a) Free radical
 - (b) Carbene
 - (c) Carbanion
 - (d) Carbocation
4. E_2 reaction is :
- (a) One step reaction
 - (b) Four step reaction
 - (c) Two step reaction
 - (d) None of these
5. Which of the following is most stable carbanion ?
- (a) $(CH_3)_3\bar{C}$
 - (b) $(CH_3)_2\bar{C}H$
 - (c) $(CH_3)\bar{C}H_2$
 - (d) None of these
6. Trans decalin is more stable than cis decalin.
(True/False)
7. Cope rearrangement is a [3, 3] type rearrangement.
(True/False)
8. Which of the following is pericyclic reaction ?
- (a) Electrocyclic
 - (b) Cycloaddition
 - (c) Sigmatropic reaction
 - (d) All of these

9. Diels-Alder reaction is :

- (a) $[2 + 2]$ cycloaddition reaction
- (b) $[4 + 2]$ cycloaddition reaction
- (c) Both (a) and (b)
- (d) None of the above

10. Phosphorescence is a slower process than fluorescence.
(True/False)

