



Avinashilingam Institute for Home Science and Higher Education for Women

Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD (now MoE)

Re-accredited with A++ Grade by NAAC. CGPA 3.65/4, Category I by UGC

Coimbatore - 641 043, Tamil Nadu, India

Master's Degree Examination – May 2025 II Semester

Class : I P.G.
Major : Chemistry

Time: 3 Hours
Max. Marks: 100

23MCHC07 Organic Chemistry-II

Course Outcomes:

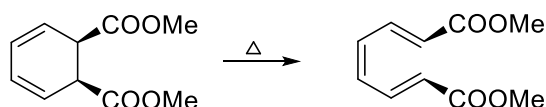
- CO1: Molecular orbital symmetry and be able to evaluate concerted reactions via FMO and PMO approach, electrocyclic reactions, cycloadditions and sigmatropic rearrangements
- CO2: Photochemical reactions of alkenes, carbonyl and aromatic compounds
Identify the mechanism of various photochemical reactions
- CO3: Able to predict the stereochemistry and mechanism of addition and elimination Reactions
- CO4: Assess the mechanism and reactivity of electrophilic substitution reactions
- CO5: Expertise in identifying the transformations, the reagents and planning organic synthesis

Part A Choose the Correct Answer

10 x 1 = 10

1. The following reaction is an example of

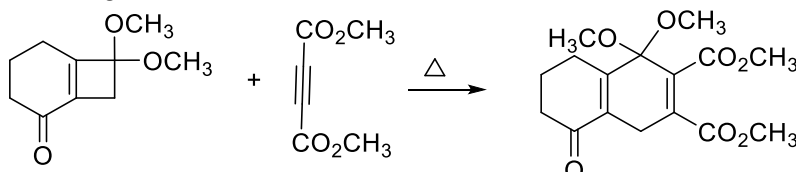
CO1K3



- a. Electrocyclic b. sigmatropic c. Cycloaddition d. Group transfer reaction

2. The following transformation is

CO1K3



- a. 4π ring opening followed by [2+2] cycloaddition
b. 4π ring opening followed by [4+2] cycloaddition
c. [2+2] cycloaddition followed by 6π opening
d. [2+2] cycloaddition followed by 4π opening

3. Which state is involved in many photochemical reactions of conjugated unsaturated ketones due to its lower energy?

CO2K1

- a. Singlet state b. Doublet state c. Triplet state d. Quadruplet state

4. When a carbonyl compound absorbs light, which of these transitions is commonly observed?

CO2K3

- a. $\sigma - \sigma^*$ b. $\pi - \pi^*$ c. $n - \pi^*$ d. $n - \sigma^*$

5. What is the rate-determining step in an E_1 elimination reaction?

CO3K2

- a. Breaking of a C-C single bond b. Removal of a molecule of hydrogen
c. Formation of carbocation d. Removal of a halogen atom

6. In a Hofmann elimination, which product is generally formed?

CO3K3

- a. The most substituted alkene b. The least substituted alkene
c. Aromatic compound d. Dienes

7. In nitration of benzene using conc. Sulfuric acid and conc. Nitric acid, the role of nitric acid is
 a. an acid b. an oxidizing agent c. a base d. a reducing agent CO4K2
8. Which of the following compounds are most likely to undergo electrophilic aromatic substitution?
 a. Benzaldehyde b. Acetophenone c. Nitrobenzene d. Anisole CO4K3
9. What is the synthetic equivalent of $^+\text{CH}_2\text{OH}$?
 a. Methanol b. formaldehyde c. acetaldehyde d. water CO5K2
10. Which is the correct protecting group of alcohol?
 a. HCl b. PhMgBr c. THP (tetrahydropyran) d. isobutylene CO5K3

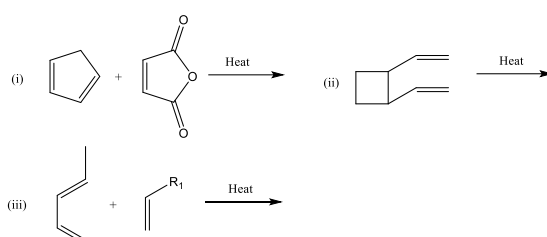
Part B

5 x 6 = 30

Answer ALL questions

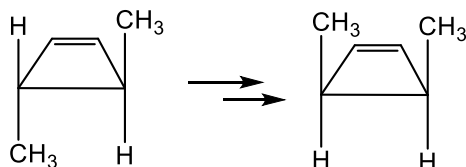
Each answer should not exceed 400 words or two pages

- 11.a. Predict the products with correct stereochemistry. CO1K5



(or)

- 11.b. Find out the mechanism and explain. CO1K3

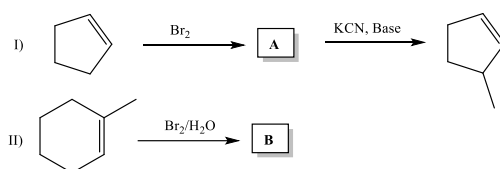


- 12.a. Explain the Jablonski diagram. CO2K2

(or)

- 12.b. Discuss the Norrish type-II reaction with examples. CO2K4

- 13.a. Identify the products A and B with reaction mechanism (4+2) CO3K3



(or)

- 13.b.i. Discuss the region selectivity with example. (3) CO3K4

- ii) Discuss about pyrolytic cis elimination. (3) CO3K4

- 14.a. Briefly discuss $\text{S}_{\text{E}}1$ and $\text{S}_{\text{E}}2$ reactions with examples. (3+3) CO4K4

(or)

- 14.b. Explain the following reactions. (3+3) CO4K2

- i) Vilsmeier-Hack reaction ii) Reimer-Tiemann reaction

- 15.a. Explain the term 'Umpolung' and its reactivity with examples. CO5K4

(or)

- 15.b. Demonstrate the functional group interconversion of azide and nitrile. CO5K4

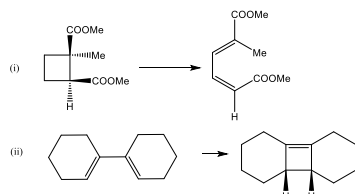
Part C
Answer ALL questions

5 x 12 = 60

Each answer should not exceed 800 words or four pages

16.a.i. Draw the orbital correlation diagram for CON rotatory ring closure of 1,3 butadiene. (8)

ii. State whether the groups' CON rotatory or DIS rotatory motion is involved in the following reactions. Identify whether thermal or photochemical condition. (4) CO1K3



(or)

16.b. Explain the molecular Orbital Correlation diagram method for pericyclic reaction under thermal and photochemical conditions. CO1K3

17.a. Explain the following reactions with examples. (6+6) CO2K3

i. Norrish type-I ii. Paterno- Buchi reaction
(or)

17.b. Explain the following reactions with examples. (6+6) CO2K3

i. Photo-Fries rearrangement
ii. photochemistry of 1,3 butadiene in detail

18.a. Explain E₁, E₂, E₁CB with examples. (4+4+4) CO3K3
(or)

18.b. Discuss the reaction mechanism of the following reactions.(4+4+4) CO3K3

i. Michael addition ii. Free radical addition
iii. Stobbe reaction

19.a.i. What is an energy profile diagram? Explain with examples.

ii. Discuss the structure and reactivity of disubstituted benzene in an aromatic electrophilic substitution reaction. (6+6) CO4K3
(or)

19.b. Explain the following reactions. (4+4+4) CO4K3

i. Gattermann-Koch ii. Bradsher reaction iii. Diazonium coupling

20.a. Explain the following reactions (4+4+4) CO5K3

i. Wittig reaction ii. Shapiro reaction iii. Robinson annulation
(or)

20.b. i. Explain the disconnection of any two 1,2 dicarbonyl compounds. (6) CO5K3

ii. What is retrosynthesis? Explain the term synthon and synthetic equivalent with suitable examples. (6) CO5K4
