

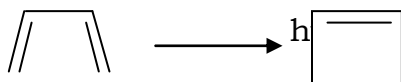
D.K.M. COLLEGE FOR WOMEN (AUTONOMOUS), VELLORE-1
MODERN SYNTHETIC METHODS AND ORGANIC PHOTOCHEMISTRY

UNIT-I

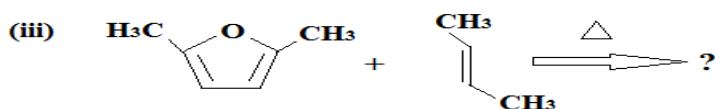
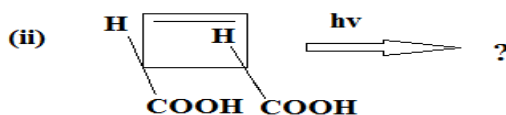
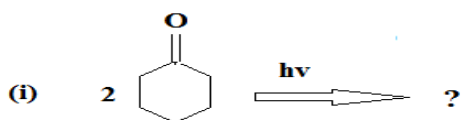
Organic Photochemistry

SECTION-A (6 marks)

1. Describe in detail about the various photophysical processes undergone by the excited molecule.
2. Using orbital correlation diagram show that the electrocyclic ring closure/ring opening shown below proceeds by disrotatory mode under photochemical condition



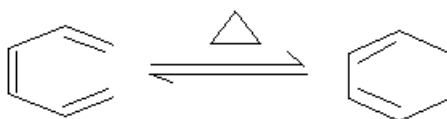
3. Write briefly on the following with suitable examples
 - (i) Paterno Buchi reaction
 - (ii) Di-pi methane rearrangement
4. $\Pi 4s + \pi 2s$ cycloaddition is symmetry allowed only under thermal condition. Substantiate with frontier molecular orbital approach.
5. Predict the product and the mechanism for the following reactions



6. Write short note on sigmatropic rearrangement.
7. Give a brief account on fluxional molecule-bullvalene.
8. What is pericyclic reaction? Explain its types in detail.

Section-B (15 marks)

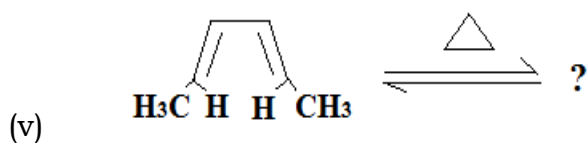
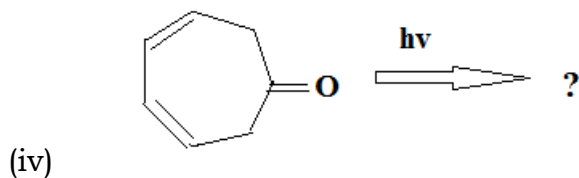
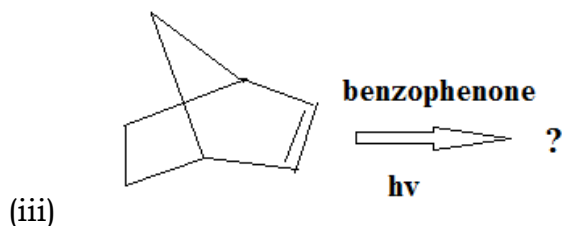
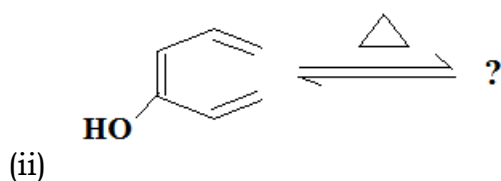
9. (a) Draw the Jablonski diagram and explain the various photophysical process (7).
- (b) Using orbital correlation diagram method, show that the following ring closure/opening reaction is symmetry allowed under disrotatory mode under thermal conditions (8)



10. (a) Construct the FMO method for $\pi 2s + \pi 2s$ addition of two molecules of ethylene. State whether the reaction is symmetry allowed under thermal or photochemical conditions (7)
 - (b) Discuss the mechanism of photochemical reduction of benzophenone in isopropanol and benzhydrol solution (8)
9. (a) Account for the following with the help of FMO approach
 - (i) Cyclobutene-1,3 butadiene interconversion under thermal condition is a conrotatory process (5).
 - (b) Give a brief account on Cope and Claisen rearrangement (10).
 10. (a) What is photosensitization? What kind of compounds will acts as good sensitizers? (7)

(b) Construct correlation diagram for the conrotatory interconversion of cyclobutene to butadiene. What inference you can draw from the diagram?(8)

11. Predict the product of the following and account for the stereochemistry



12. Explain in detail about photodimerization and photoisomerization reaction(15).

UNIT-II Modern synthetic methods and Reagents

Section-A (6 Marks)

1. Write the uses of 1,3-Dithiane.

2. Write the uses of DIBAL.

3. How will you synthesis nitriles from alkyl halides using PTC.
4. Explain the synthesis of oligosaccharides
5. Explain the use of DCC and DIBAL

Section-B (15 Marks)

6. a). Describe in detail about the principles and synthetic processes involving phase transfer catalysis(10).
b) Give a brief account on trimethyl silyl iodide and 1, 3-Dithiane (5)
7. (a) Explain the uses of 1,3-dithiane in organic synthesis.
b) Give an account on 9-BBN.
8. What is the principles of micro oven in the synthesis of organic compounds? Explain the esterification and hydrolysis reactions using micro oven technique.
9. Explain the synthesis of oligosaccharides through polymer supported reagents.
10. Explain the synthesis of nitriles from alkyl halides.
11. Explain the principle and synthetic uses of phase transfer catalyst.

UNIT-III Planning Organic Synthesis and Retrosynthetic Analysis

Section-A (6 Marks)

1. Define Synthon, Synthetic equivalent, Target molecule.
2. What is retero synthesis reaction and explain it.
3. Explain the functional group interconversion and group disconnection methods.
4. Write a short note on one group disconnection of alcohols and ketones with suitable examples.

5. Briefly discuss the one group disconnection of olefins with suitable examples.
6. Explain the retro diels alder reaction.
7. Explain the logical disconnections.
8. Describe the illogical disconnections.
9. Briefly explain the 1,2 and 1,4 of two group disconnections.
10. Write note on 1,3 , 1,5 and 1,6 of dicarbonyl compound of two group disconnections.
11. Explain the retrosynthesis of heterocyclic compound contains two nitrogen atoms.

SECTION-B (15 Marks)

12. Describe in detail about the logical and illogical disconnection reactions.
13. Write note on
 - i. Functional group interconversion
 - ii. Synthon, Synthetic equivalent, Target molecule
 - iii. Group disconnections of olefins.
14. i. Explain the retrosynthesis of heterocyclic compound contains two nitrogen atoms.(7)
 ii. Discuss the disconnection reaction of two group disconnection of 1,3 , 1,5 and 1,6 skeletons.(8)
15. i. Discuss the Disconnection of alcohols, olefins and ketones (80)
 ii. Explain the Retro diels alder reaction.

UNIT-IV Organic Synthesis

Section-A (6 marks)

1. Explain the protection of R-OH group in organic synthesis.
2. Explain Diels-Alder reaction.
3. Explain about Stock enamine alkylation reaction
4. Discuss about phosphorus ylides with suitable examples
5. Explain about Grignard reaction

6. a) Explain the protection and deprotection of functional group R-OH

Section-B (15 marks)

7. .Explain mechanism of Robinson annulations with examples.
8. Write short note on Grignard reactions and alkylation of enamines
9. a). Discuss in detail about the protection and deprotection of functional groups.(10)
- b). Give a brief account on Phosphorus and sulphurylides (5)
10. a). Discuss about the protection and deprotection of R-CHO and R-NH₂ groups. (7)
- b). Explain briefly about Phosphorus and sulphurylides with suitable examples. (8)
11. a. Explain in detail about the Grignard reaction and Diels-alder reactions.
- b. Briefly explain the protection and deprotection of functional groups.
12. Write a note on Acetylation and Alkylation using enamines.
13. Give an account on synthesis of organic molecules using Phosphorus and Sulphur ylides.

UNIT-V Green Chemistry

Section-A (6 marks)

1. Explain the green synthesis of adipic acid and methyl methacrylate.
2. Give a brief account on ultrasound assisted esterification and reduction reaction.
3. Discuss in detail about the coupling and condensation reactions carried out in presence of ultrasound using green method.
4. Write short note on green photochemical reactions
5. Ennumerate in detail about the green synthesis using fluorous solvents

6. Describe in detail about the green alternatives to molecular rearrangements.

Section-B (15 marks)

7. Explain in detail about the twelve principles of green chemistry (15)
8. Outline green synthesis of adipic acid, paracetamol and ciproflaxacin (15)
9. Describe in detail about the green synthesis carried out using supercritical carbon dioxide (15).
10. Give a brief account on the green synthesis done under the influence of ionic liquids as solvent (15)
11. Explain the following ultrasound assisted green reactions
- (i) Esterification (2)
 - (ii) Reduction (3)
 - (iii) coupling reactions (5)
 - (iv) condensation reactions (5)