

Time: 2.5 hrs]

[Marks: 70

- N.B. (i) Attempt all questions
(ii) All questions carry equal marks

- Q. 1. (A) Answer the followings: 8
(1) Give classification of pericyclic reaction in brief with one example of each subdivision.
(2) Draw ONLY lobe signs of molecular orbitals of 1,3-butadiene and give the table showing their symmetry properties with respect to M and C₂.
(B) By Correlation diagram method, explain [4+2] type cycloaddition reaction between 1,3-butadiene and ethene. 6
- OR**
- Q.1. (A) Answer the followings: 8
(1) By FMO method explain [2+2] type cycloaddition reaction between two ethene molecules.
(2) Write a short note on sigmatropic rearrangement.
(B) With the help of FMO, prove that [4n+2] type electrocyclic conversion of 1,3,5-hexatriene to 1,3-cyclohexadiene is thermally disrotatory allowed process. 6
- Q.2. (A) Giving examples discuss effect of conformation on course of reaction. What do you understand by the terms 'Product development control' and 'steric approach control'? 9
(B) Cyclohexane – 1,4- dicarboxylic acid has four different conformations. One of them on heating gives an anhydride. Draw its conformation giving reasons. 5
- OR**
- Q. 2. (B) Give an account of: 14
(1) Conformational analysis of 2- substituted decalin.
(2) Draw possible conformations of perhydrophenanthrene and discuss their stability.
- Q.3. (A) Answer the followings: 8
(1) Explain cyclo-addition reaction between benzophenone and isobutene to form oxetane
(2) What is Photosensitizer? Give any three criteria for selection of a photo sensitizer.
(B) Explain 'singlet' and triplet carbenes. How are they generated? Describe different reactions they undergo. 6
- OR**
- Q.3. (A) Answer the followings: 8
(1) Discuss Norrish type II reaction with mechanism.
(2) Explain the terms in brief (a) Fluorescence (b) Phosphorescence
(B) Give a brief account of: 6
(1) Nitrenes
(2) Free radicals
- Q.4. (A) Explain the term: Heterocyclic chemistry. How are heterocyclic compounds useful in day to day life. 4
(B) Give synthesis and chemical properties of: (i) Quinolene (ii) Imidazole (iii) benzthiazole. 10

OR

- Q.4. (A) Give the classification and nomenclature of heterocyclic compounds. 4
(B) Give methods of preparations and chemical reactions of the following compounds:
(i) Isoquinoline (ii) Thiazole (iii) Indole. 10
- Q. 5. Answer the followings: 14
(A) Give Huckle's rule for aromaticity and explain this rule for benzenoid compounds and non benzenoid aromatic compounds.
(B) What is ferrocene? Give the structure of ferrocene and explain the aromaticity of ferrocene.

OR

- Q.5. Answer the followings: 14
(A) What is aromaticity? Explain important properties for aromatic behavior and give the various classes of aromatic compounds.
(B) Explain the aromaticity of cyclopentadienyl anion.