

Please check whether you have got the right question paper.

- N. B: 1. **All** questions are compulsory.
 2. **Answers to the same question must be written together.**
 3. **Figures to the right** indicate **full** marks.

- Q. 1 Attempt any **five** of the following:
- Give an account of E_T -solvatochromism scale. 3
 - What are photochemical reaction quenchers? Discuss the principle involved in photo-quenching process. 3
 - Explain I-strain concept with suitable examples. 3
 - Nor-bornylene on treatment with KMnO_4 gives exo-norbornadiol. Justify the same. 3
 - Give two methods of generation of benzyne. How does benzyne react with anthracene? Give the reaction. 3
 - How is carbene generated from diazomethane? Discuss the cycloaddition and insertion reaction of carbenes with one example each. 3
 - Give synthesis of L-DOPA by Knowles's Monsanto process. 3
 - How asymmetric α -amino acid is synthesised using cyclic hydrazone intermediate? 3

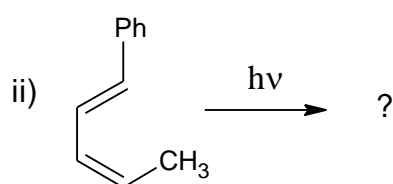
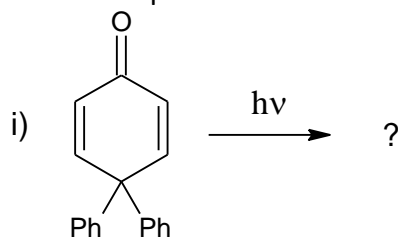
- Q. 2 (a) Discuss the cleavage of the bond β to the carboxyl group in photochemical reactions of ketone. 6

Or

- What are specific acid and specific base catalysis reactions? Derive the rate expression for the same. 6
- Discuss the following: 5
 - Bell-Evans-Polanyi principle
 - Secondary kinetic isotope effect
- With suitable examples, explain how cross-over experiments help in establishing the mechanism of a reaction. 4

Or

- (c) Predict the products in the following reactions and give their mechanism: 4



- Q. 3 (a) Discuss the structural and symmetry features of cis and trans decalins. Compare the stability with reference to their enthalpies. 6

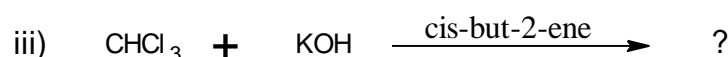
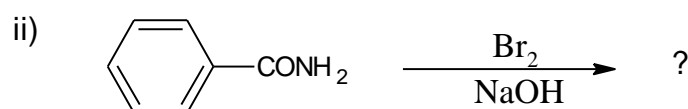
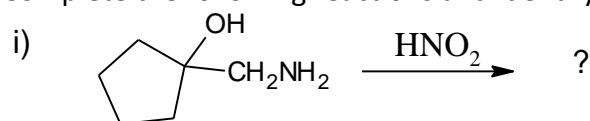
Or

- (a) Account for the following observations: 6
- Trans-cyclodecene on bromination gives trans-1,6-dibromocyclodecane.
 - Menthyl chloride undergoes dehydrohalogenation on treatment with base at a sluggish rate and gives 2-menthene as the major product.
 - Cyclohexanone undergoes reduction reaction with $LiAlH_4$ at a faster rate compared to cyclopentanone.
- (b) Illustrate the phenomenon of circular birefringence and circular dichroism. 5
- (c) Give an account of Bredt's rule. 4

Or

- (c) Discuss the use of chiral stationary phase in determination of enantiomeric composition by chromatographic method. 4

- Q. 4 (a) Complete the following reactions and identify the reactive species generated:- 6



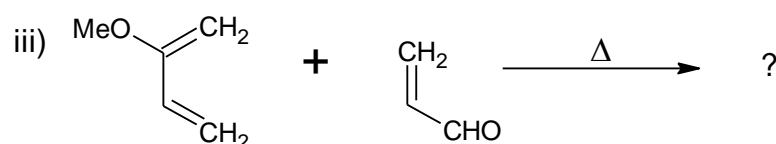
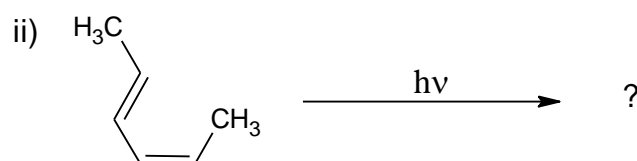
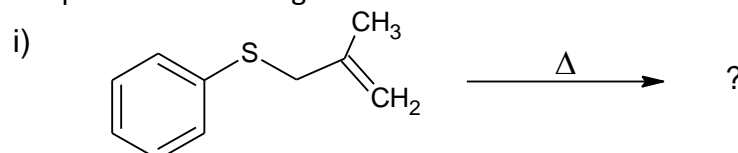
Or

- (a) Give an account of applications of BINAPs as part of chiral catalyst for asymmetric transformations. 6
- (b) What are salient features of Sharpless epoxidation? Explain how it can be used for kinetic resolutions of racemic allylic alcohols. 5
- (c) Give an account of enantioselective dihydroxylations of alkenes using OsO_4 . 4

Or

- (c) Explain with suitable example how asymmetric Diels-Alder reaction can be effectively achieved by using chiral dienophile. 4

- Q. 5 (a) Complete the following reactions:- 6



Or

- (a) Discuss the bonding in ferrocene and also discuss the physical and chemical properties of ferrocene. 6
- (b) Give the mechanism and explain the stereochemistry of Claisen rearrangement reaction with suitable example. 5
- (c) Give an account of sigmatropic rearrangement. 4

Or

- (c) Interpret Frost-Musulin geometrical structure with reference to $(4n+2)\pi$ electron rule applying to benzene. 4
