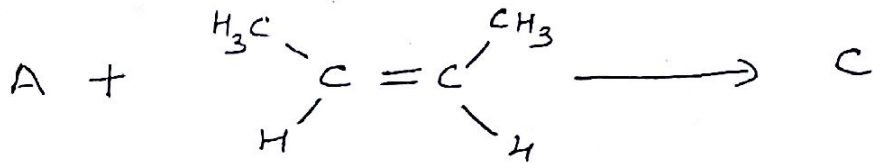
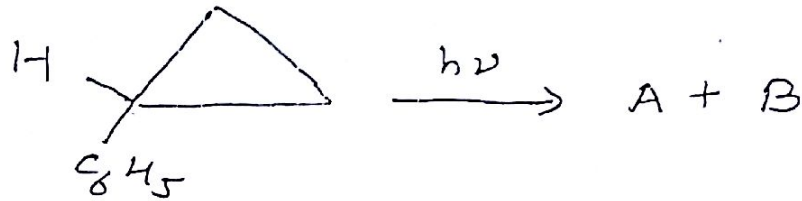


- N.B. (1) All questions are compulsory.
 (2) Figures to the right indicate full marks.

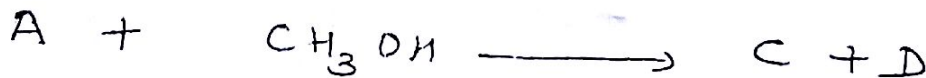
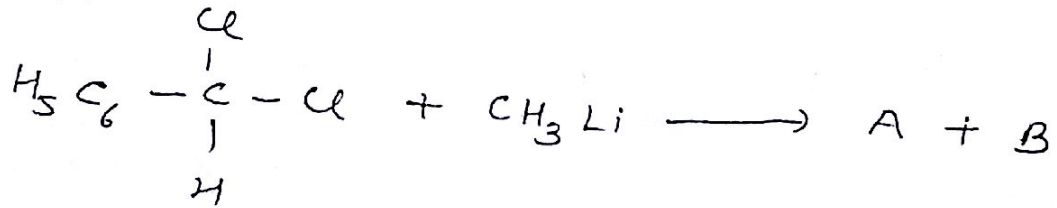
1. (a) Answer any two of the following :—

(i) Complete the following reactions and identify the reactive species generated: 4

(1)

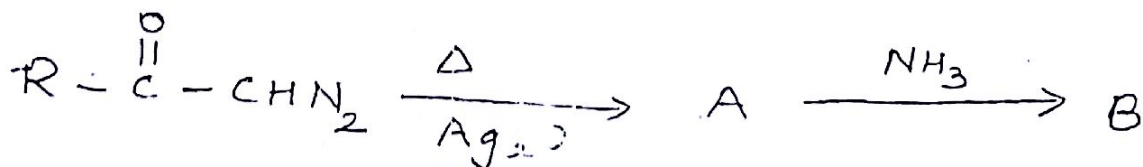


(2)



(ii) What is "neighbouring group participation" ? Give its stereochemical evidence. 4

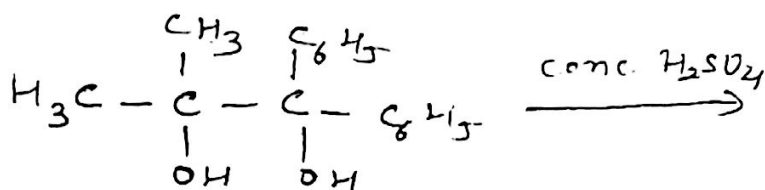
(iii) Explain mechanism of the following reaction :— 4



(iv) Draw molecular orbital structures of buta-1, 3-diene and indicate number of nodes and mirror symmetry. 4

(b) Answer any one of the following :—

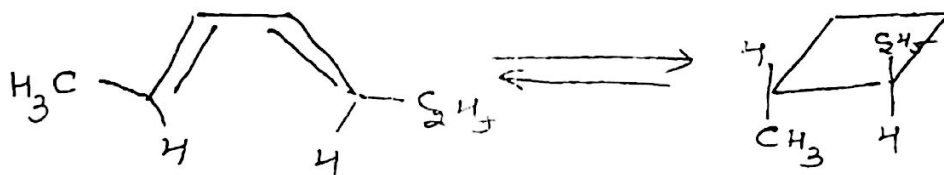
- (i) Predict the products in the following reaction and suggest a plausible mechanism : 4



- (ii) Explain hard and soft electrophiles and nucleophiles on the basis of FMO. 4

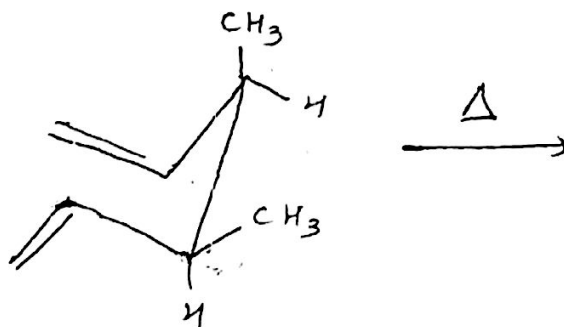
2. (a) Answer any two of the following :—

- (i) With the help of Frontier Molecular Orbital approach, explain whether the following reaction will be allowed thermally or photochemically : 4

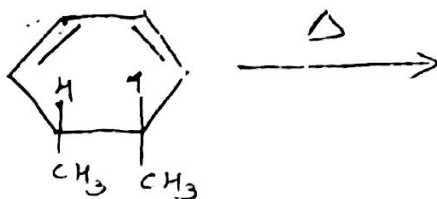


- (ii) Draw the correlation diagram for $4\pi + 2\pi$ cycloaddition reaction. 4
 (iii) Explain the mechanism of Claisen rearrangement. 4
 (iv) Complete the following reactions :— 4

(1)

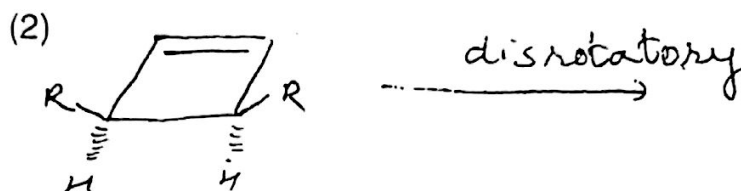
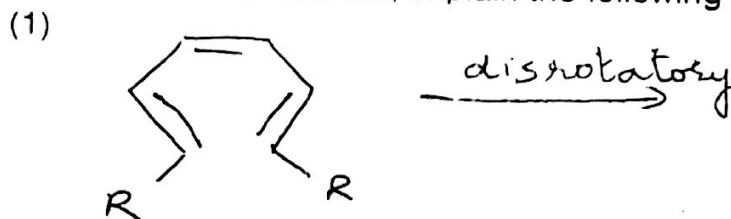


(2)



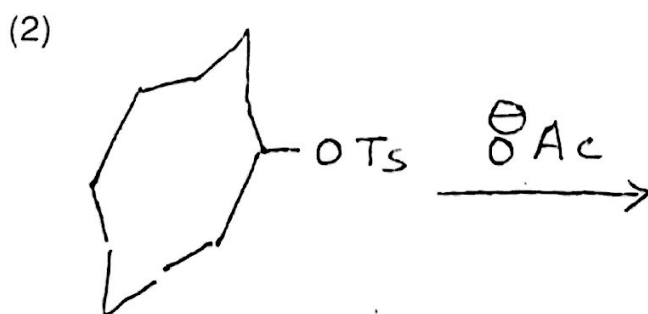
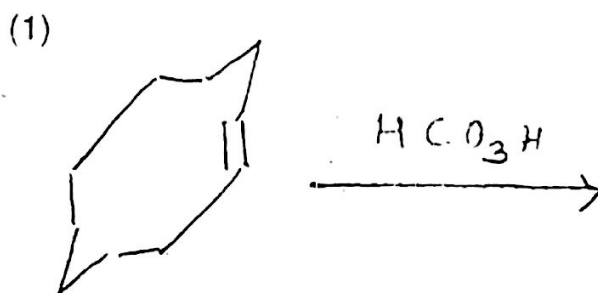
(b) Answer any **one** of the following :—

- (i) Give the synthesis of Vitamin D from 7-dehydrocholesterol. 4
 (ii) On the basis of PMO method, explain the following reactions : 4



3. (a) Answer any **two** of the following :—

- (i) "Chromic acid oxidation of an axial alcoholic group is faster than that of an equatorial alcoholic group in cyclohexanol." Explain this statement. 4
 (ii) Discuss in detail the Curtin-Hammett principle and cite a suitable example. 4
 (iii) What is meant by torsional angle of junction ? Explain it with respect to decalin. Draw the conformation of cis-decalin exhibiting ring inversion and torsional angle of junction. 4
 (iv) Complete the following reactions with their appropriate stereochemical outcome : 4

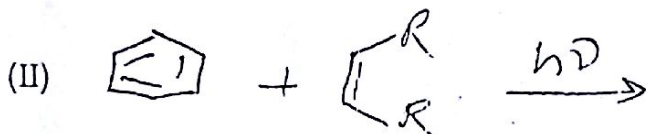
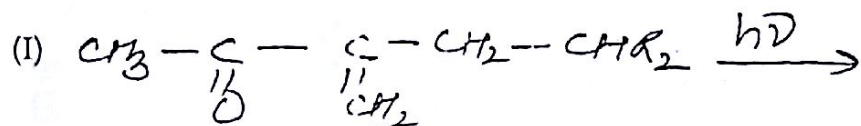


(b) Answer any one of the following :—

- (i) "The products of deamination of 2-aminocyclohexanol depend upon the conformation of the substrate." Explain this observation with mechanism. 4
- (ii) Draw the conformations of cyclooctane and discuss the evidences in favour of its most stable conformation. 4

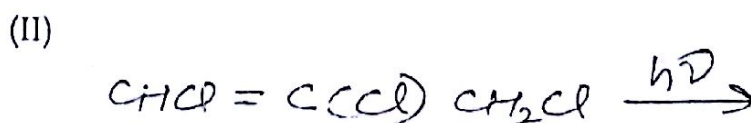
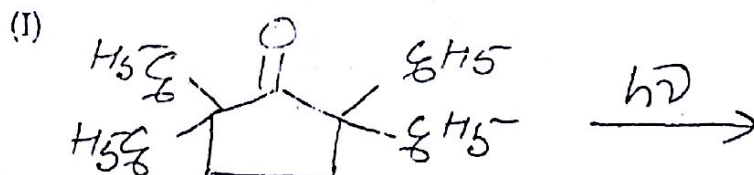
4. (a) Answer any two of the following :—

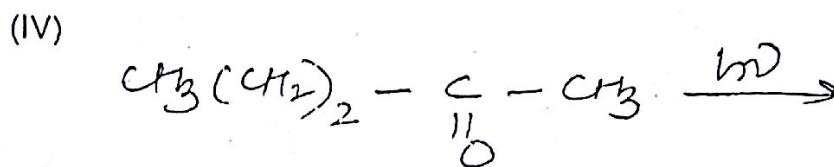
- (i) What is photoreduction ? Discuss the mechanism of photoreduction of benzophenone in the presence of isopropyl alcohol. 4
- (ii) Give two examples each of photo-oxygenation reactions and singlet oxygenation reactions. 4
- (iii) What is Paterno-Buchi reaction ? Give its mechanism and stereochemical consequences. 4
- (iv) Complete the following reactions and give their mechanism : 4



(b) Answer any one of the following :—

- (i) Explain the following :— 4
- (I) Quantum Yield
- (II) Aza Di- π -methane rearrangement reaction.
- (ii) Complete the following reactions (give only major products) : 4





5. Answer any four of the following :—

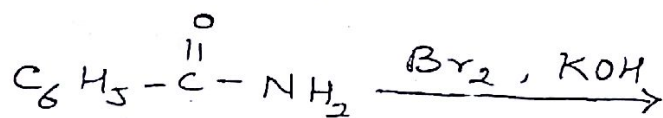
(a) How is aryne generated from :—

(i) Anthranilic acid

(ii) Aryl halide

(iii) Phthaloyl peroxide.

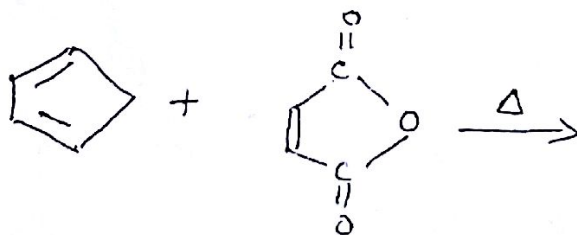
(b) Write the mechanism of following reaction and identify the reactive intermediate formed in this reaction :



(c) What is ene reaction ? Give its mechanism.

(d) Complete the following reactions :—

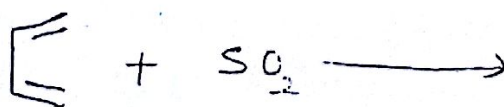
(i)



(ii)



(iii)



(e) Explain the I-Strain concept.

3

(f) Assign point group to the following molecules :—

3

(i) Ferrocene

(ii)

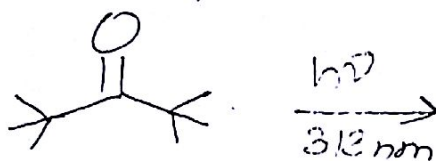


(iii) CHCl_3

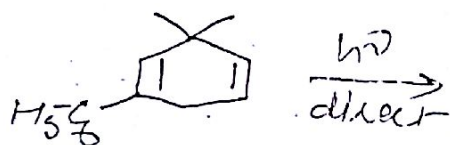
(g) Complete the following reactions :

3

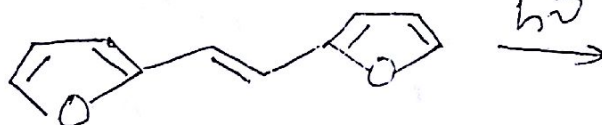
(i)



(ii)



(iii)



(h) Explain the mechanism of photosensitization.

3

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