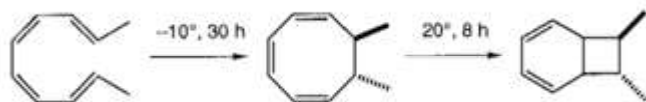


- (b) Draw the pi-molecular orbitals of Pentadienyl cation marking its HOMO and LUMO as GS and ES. 2
- (c) Using FMO method visualize when [1, 3]-alkyl shift will undergo inversion of configuration. 4
- (d) What is Cheletropic reaction? Provide an example. 1+1=2
10. (a) Using correlation diagram, check the feasibility of cycloaddition reaction between 2-butene and Pent-1,3-diene under photochemical condition. 4
- (b) What is sigmatropic rearrangements? Provide an example of [3,3]- sigmatropic rearrangement. How does sigmatropic rearrangement differs from Group transfer reaction? 1+1+1=3
- (c) What is Nazarov Cyclization? Provide mechanism. 1+2=3
- (d) The following reaction has two electrocyclic steps. Indicate disrotatory/conrotatory movement for each step. 1+1=2



- (e) What is Cope rearrangement. 2

PG EVEN SEMESTER EXAMINATION, 2023

CHEMISTRY

2nd Semester

Course No. : CHM - 552

(**Organic Chemistry II**)

Full Marks : 70

Pass Marks : 28

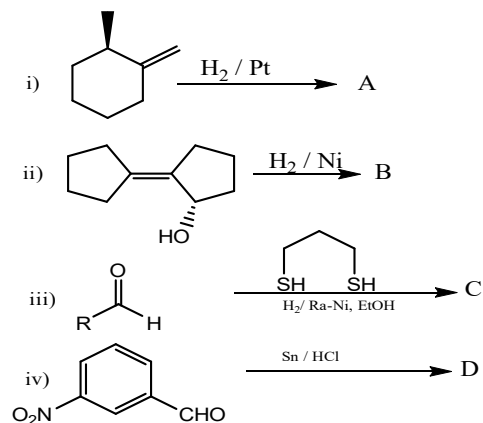
Time : 3 hours

The figures in the margin indicate full marks for the questions

(Answer five questions, selecting one from each unit)

UNIT - I

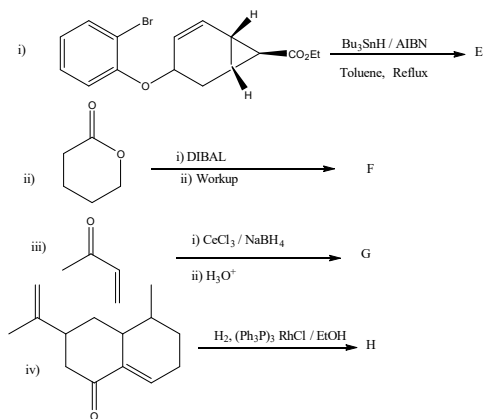
1. (a) Suggest the product(s) of the following reactions. 1x4=4



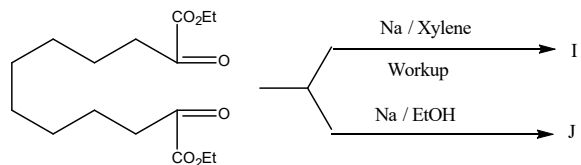
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(2)

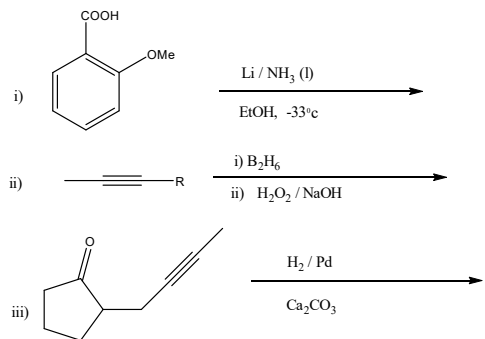
- (b) Write the product(s) and suggest plausible mechanism for the following conversions. $3+2+2+2=10$



2. (a) Write the structure of I and J. Suggest plausible reaction mechanism. 6



- (b) Write product(s) and plausible mechanism of the following reaction: $3+3+2=8$

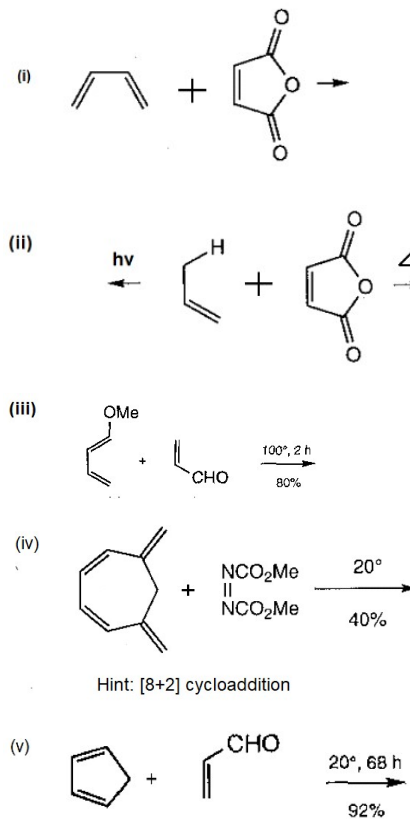


(9)

- (c) Delineate the photochemical outcome of molecular oxygen in the presence of a sensitizer. Provide the different spin states along with energy differences of the outcome. 2

UNIT - V

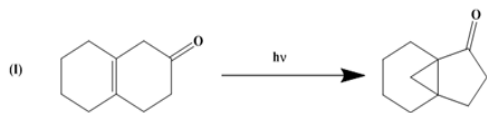
9. (a) Complete the following reactions: $1 \times 6 = 6$



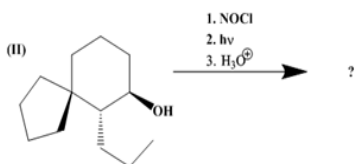
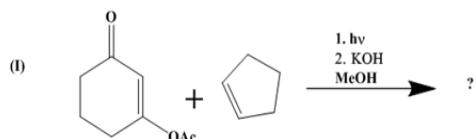
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(8)

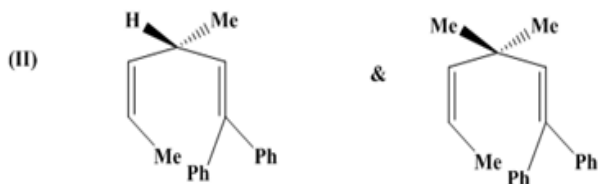
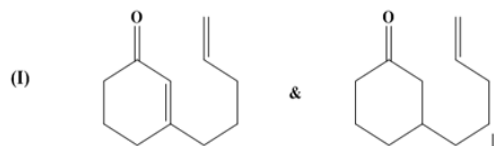
- (c) Provide mechanism to afford the given product for the assigned photochemical reaction. 3



8. (a) With the aid of reaction mechanism, predict the major products formed in the following reactions. 3x2=6



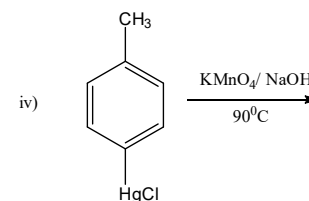
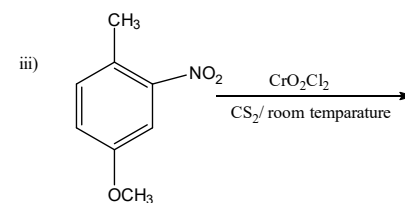
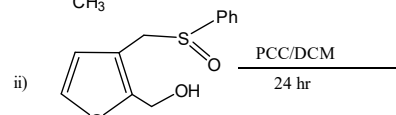
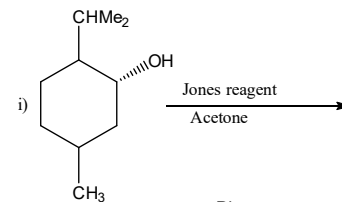
- (b) How can the contrast between the proposed pairs of photochemical reactions be illustrated? Present the mechanism for each photochemical reaction to identify the products. 3+3=6



(3)

UNIT - II

3. (a) Predict the major product of the following reaction and suggest appropriate mechanism. 2^{1/2}x4=10



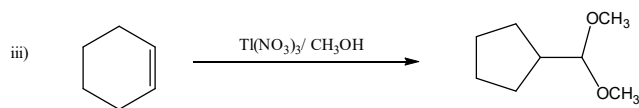
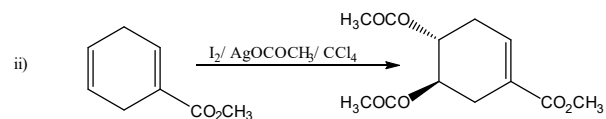
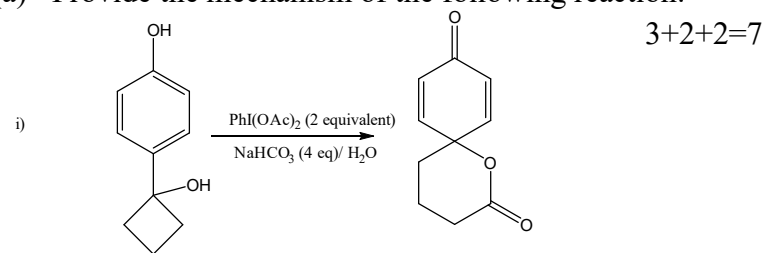
- (b) The direct oxidative conversion of primary halides and sulfonates to aldehyde can be carried out by reaction with DMSO under alkaline condition. Formulate a mechanism for this reaction. 2

- (c) The oxidative conversion of primary alcohol can be carried out by reaction with hypervalent iodine containing reagent. Suggest the name of such a reagent and formulate the mechanism of the oxidation reaction. 2

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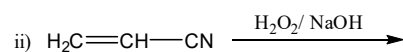
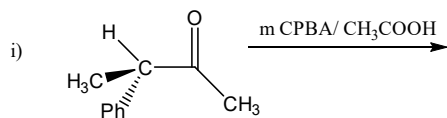
(4)

4. (a) Provide the mechanism of the following reaction:



(b) Oxidation of alcohol to the corresponding carbonyl compound can be carried out by using DMSO, Oxalyl chloride and an amine base. Which name reaction is this? Explain the detail reaction condition and mechanism of this reaction with an example also explain the role of each reagent. 3

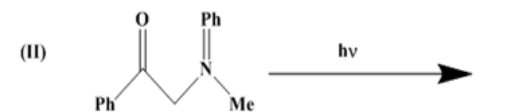
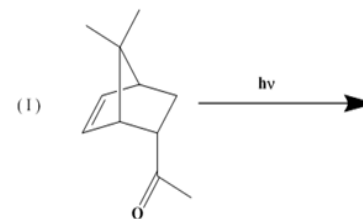
(c) Predict the product of the following reaction and suggest mechanism 2x2=4



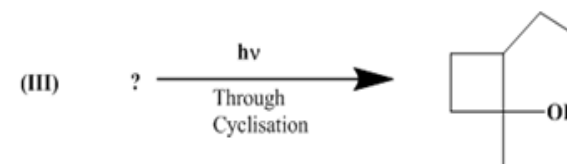
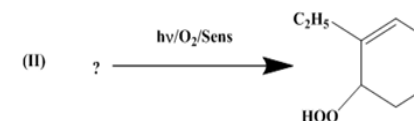
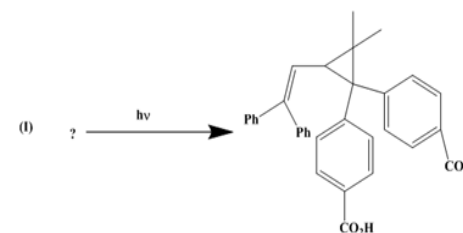
(7)

UNIT - IV

7. (a) Delineate the photochemical outcomes for the following reactions with the support of mechanisms. 2.5x2=5

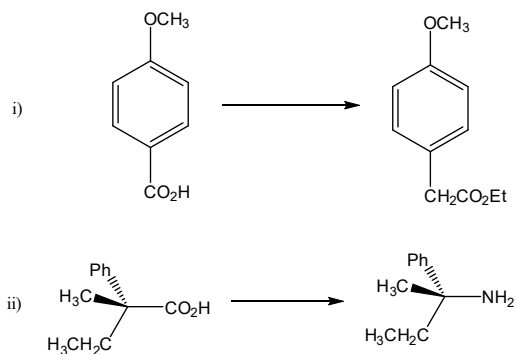


(b) Assign starting material for the following photochemical processes. 2x3=6

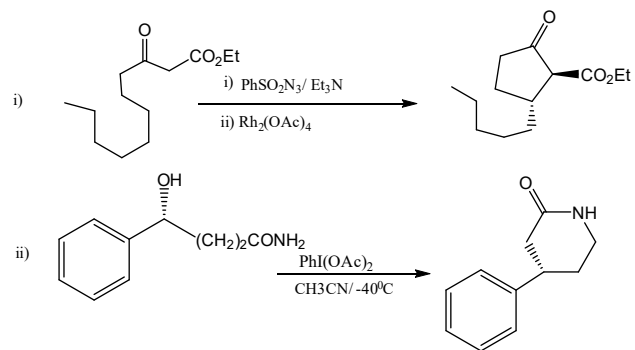


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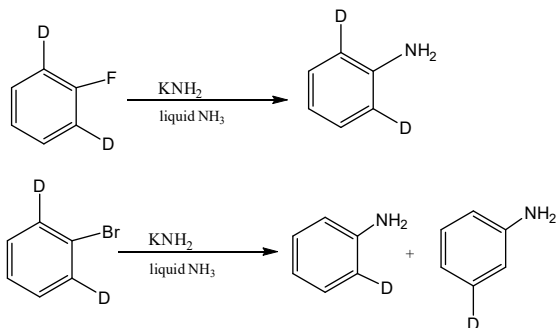
(6)



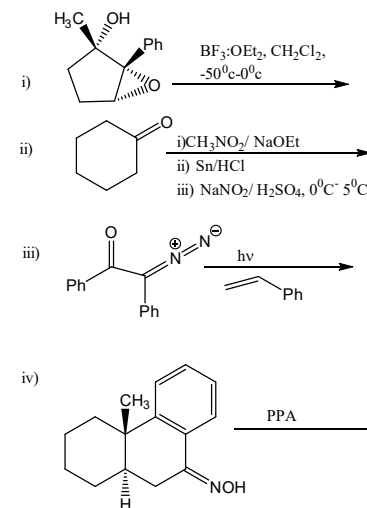
(b) Provide the mechanism of the following reaction.

 $2^{1/2} \times 2 = 5$ 

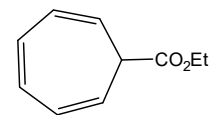
(c) Explain with mechanism the formation of the products in the following transformation. 3



(5)

UNIT - III5. (a) Predict the product of the following reaction (s) and give plausible mechanism in each case. $2^{1/2} \times 4 = 10$ (b) What happens when p-methylphenyl acetate is heated with anhydrous AlCl_3 ? Give mechanism of the reaction. 2

(c) Show how the following compound could be synthesized in one step from benzene. Give mechanism of the reaction. 2

6. (a) Carry out the following conversions and provide mechanism of the reaction involved. $2 \times 3 = 6$

(Turn Over)