Chemistry (P.G.)

[CBCS]

M.Sc. Second Semester End Examination-2024

(Regular & Supplementary Paper)

PAPER- CEM-202

[Organic Chemistry]

Full Marks: 40 ***Time: 02 Hrs***

The figures in the right-hand margin indicate marks.

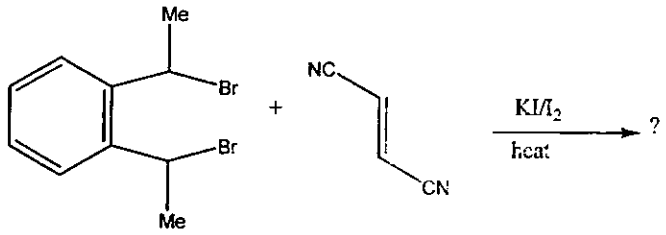
Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

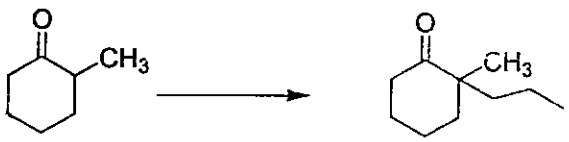
Group-A

1. Answer any four questions. **4×2=8**

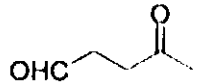
a. Predict the product of the following reaction with mechanism



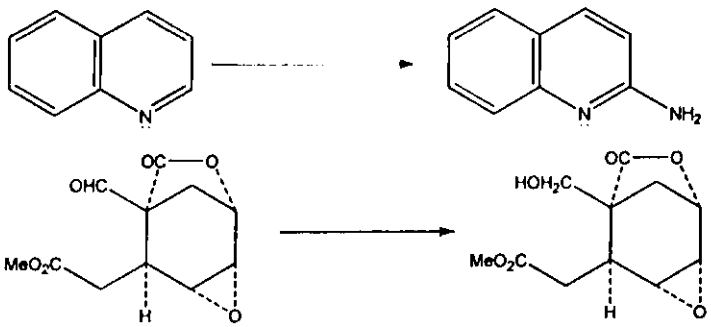
b. Carry out the following conversion with plausible mechanism



c. How would you design the synthesis of following 1,4-dicarbonyl compound?

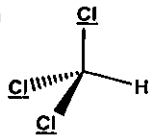


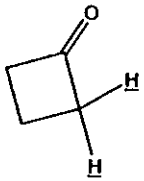
d. Give appropriate reagents for the following transformations.

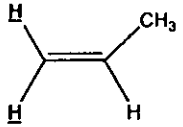


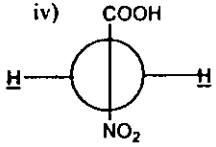
e. What are Conformational and configurational enantiomers?

f. Deduce the topic relationship of the marked homomorphic ligand with reason (any two)

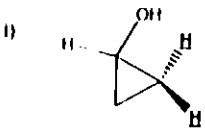
i) 

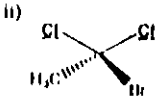
ii) 

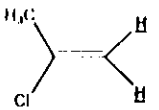
iii) 

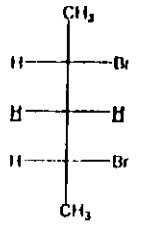
iv) 

g. Assign pro-R/pro-S; pro-r/pro-s; pro-R_a/pro-S_a or pro-E/pro-Z of the marked homomorphic ligand (any two)

i) 

ii) 

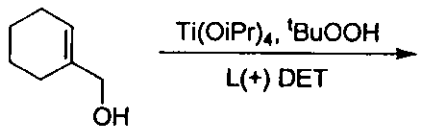
iii) 

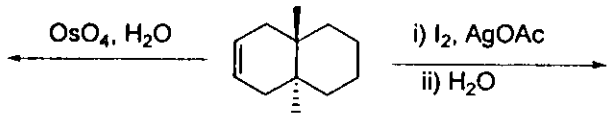
iv) 

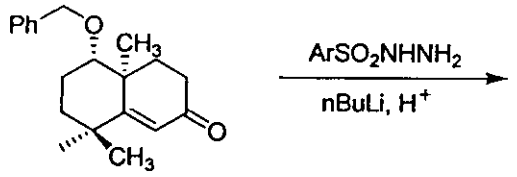
Group-B

Answer any four questions. **4×8=32**

2. Predict the product with plausible mechanism of the following

a) 

b) 

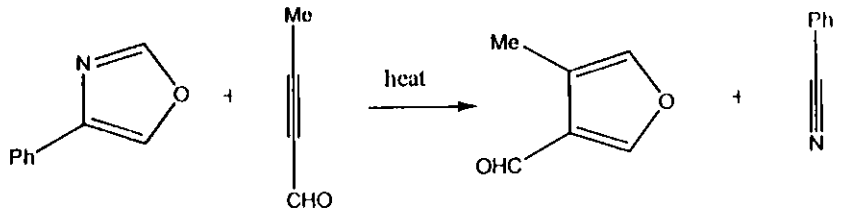
c) 

2+4+2= 8

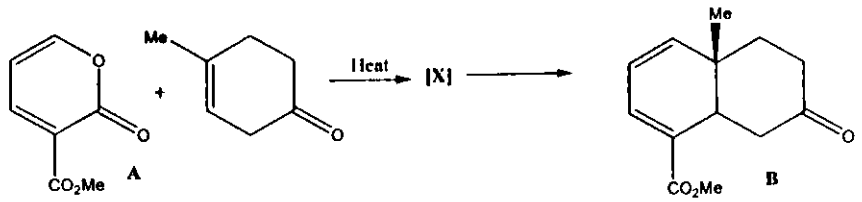
3. a). 5-methyl 1,3-cyclopentadiene, when heated with diethyl maleate, gives a mixture of three isomeric products – explain mechanistically

b) What do you mean by ortho and para selectivity in cycloaddition reaction? Explain it with the help of suitable example.

c) Identify the kind of pericyclic reaction and explain the product formation



d) Identify structure of **X** and show how **A** is transformed into **B**

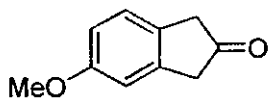


2+2+2+2=8

4. a). Explain why we find it easy to design the synthesis of 1,5-difunctionalized compound compared to 1,4- difunctionalized compound by citing a simple example.

b). Write down the importance of reconnection approach in synthesis of difunctionalized compounds.

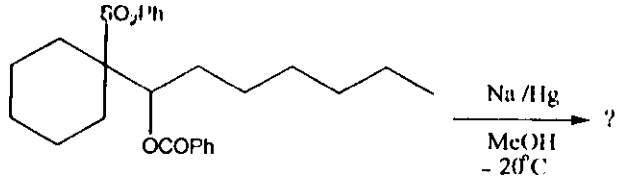
c). Following reconnection strategy how would you synthesize the target molecule given below? (Provide the retro as well as the forward synthesis)



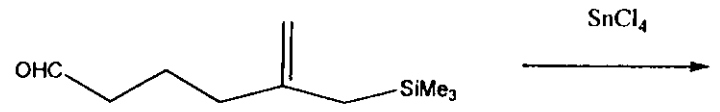
3+1+4=8

5. a). Write down the product(s) of the following reactions with mechanism (any two)

i)



ii)



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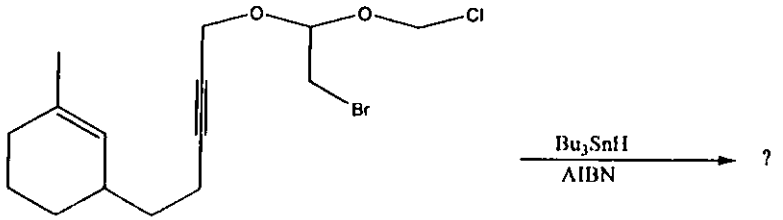

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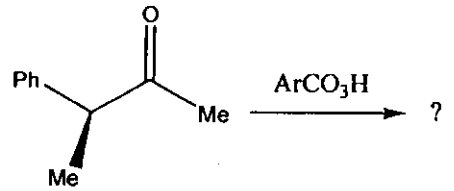
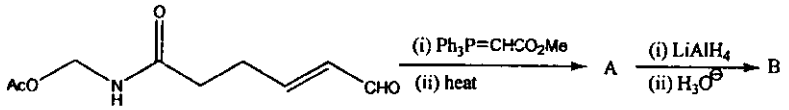


b). What are A and B in the following reaction?



2x3+2=8

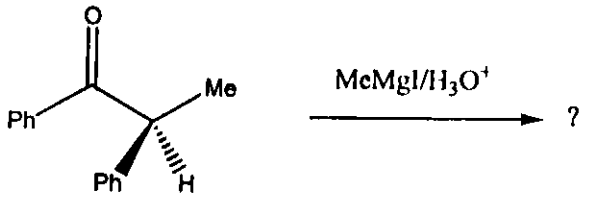
6. a). Draw all conformation of 1,2 -dimethyl cyclohexane and 1,3- dimethyl cyclohexane. Assigned the preferred conformations.

b). The chromic acid oxidation of cis -4-tert butyl cyclohexanol occurred more rapidly than trans isomer. Explain

c). In reaction with sodium thiophenoxide (PhS^-Na^+) in aqueous ethanol, cis-4-tert butyl cyclohexyl bromide reacts about sixty(60) times faster than trans isomer. Explain

3+2+3 = 8

7. a) Write down the major product using Cram's Rule and Re/Si name of the following carbonyl in the reactant.



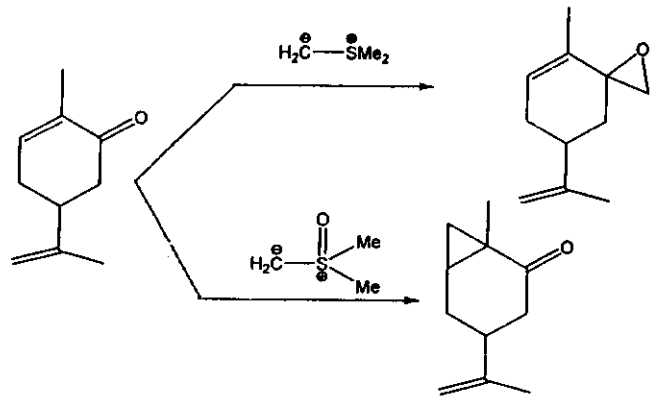
b) Predict the product of the following reaction

cis-1,2-dimethyl-1,2-cyclohexanediol $\xrightarrow{H_3O^+}$?

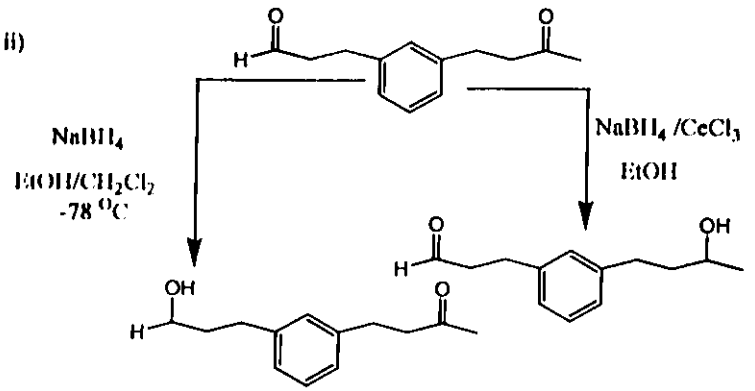
c) Write all the isomers of $CH_3(CHBr)_3CH_3$ with Fischer projection formula. Designate C-3 center as stereogenic/non-stereogenic and chirotopic/achirotopic in each isomer. Also label this center by R/S notation as appropriate. 3+2+3 = 8

8. a). Explain the product formation (any one)

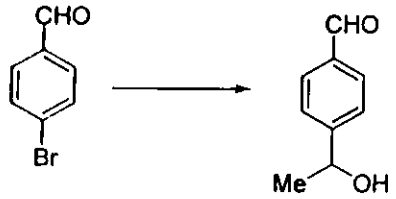
i)



ii)

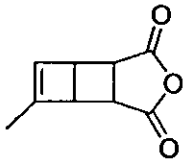


b). How would you bring about the following conversion?

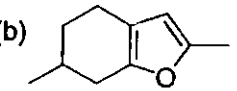


c). Outline the synthesis of the following target molecule with proper retrosynthetic analysis (any one).

(a)



(b)



4+2+2 = 8

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