

## U.G. 3rd Semester Examination-2022

## CHEMISTRY

## [HONOURS]

Course Code : CHEM-H-CC-T-7

Full Marks : 40

Time : 2½ Hours

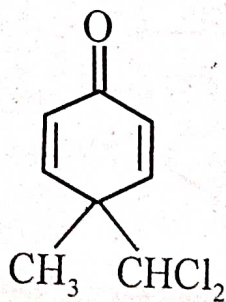
*The figures in the right-hand margin indicate marks.*

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

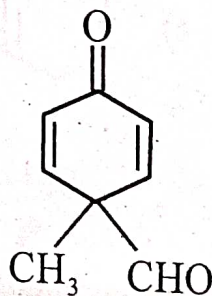
1. Answer any **five** from the following questions:

2×5=10

- a) Bromination of acetophenone in presence of (i)  $\text{AlCl}_3$  (catalytic) and (ii)  $\text{AlCl}_3$  (excess) gives different product—Explain.
- b) Hydrogenation of alkene is an exothermic process, still it requires a catalyst— explain.
- c) One of the products of Reimer-Tieman reaction of p-Cresol is 'A' but not 'B'—explain.



(A)



(B)

[Turn over]

d) Dimedone in acid medium can be used for the separation of acetaldehyde and formaldehyde from their mixture. Explain the fact.

e) Compare the stabilities of the following molecules with proper reason.

I-Butene, Cis-2-Butene and trans-2-Butene

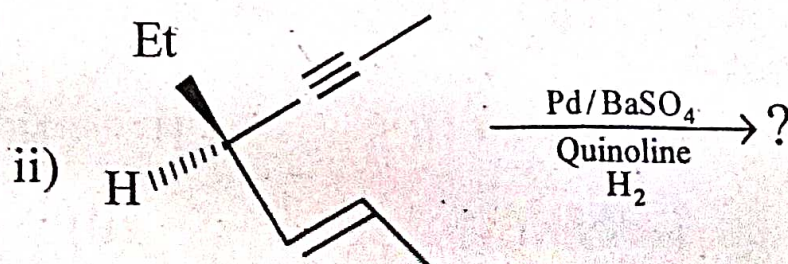
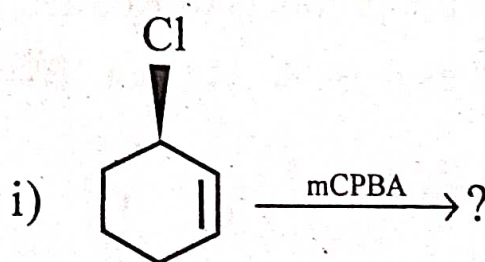
f) Explain 'umpolung' with suitable example.

g) Washing of crude m-dinitrobenzene with aqueous  $\text{Na}_2\text{SO}_3$  removes the contaminated ortho- and para- isomers. Give reason.

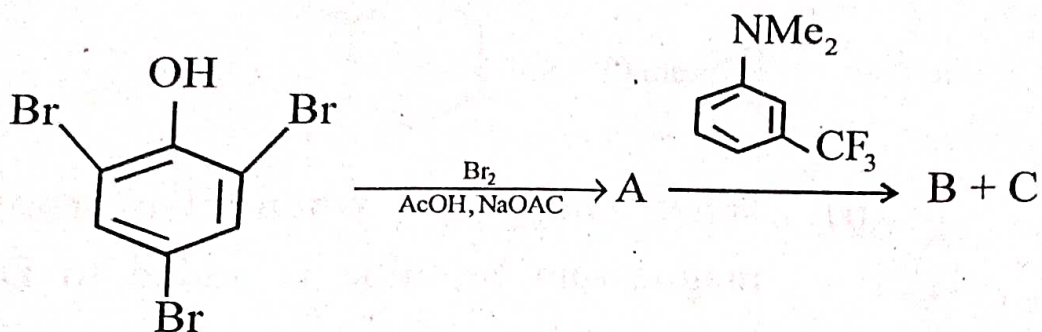
h) How will you convert benzil to diphenylacetylene via hydrazone formation?

2. Answer any two from the following:  $5 \times 2 = 10$

a) I) Predict the product(s) with proper stereochemistry.



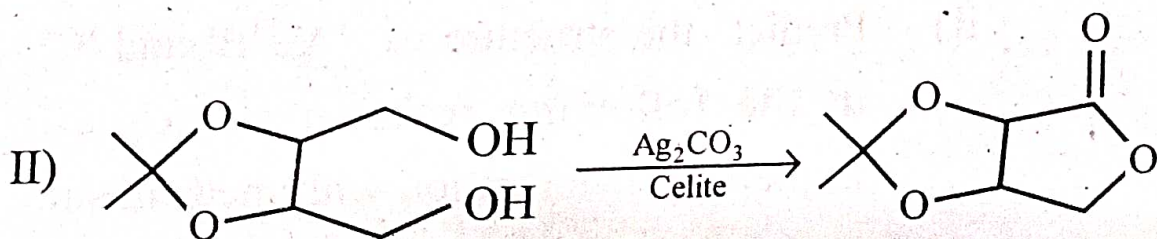
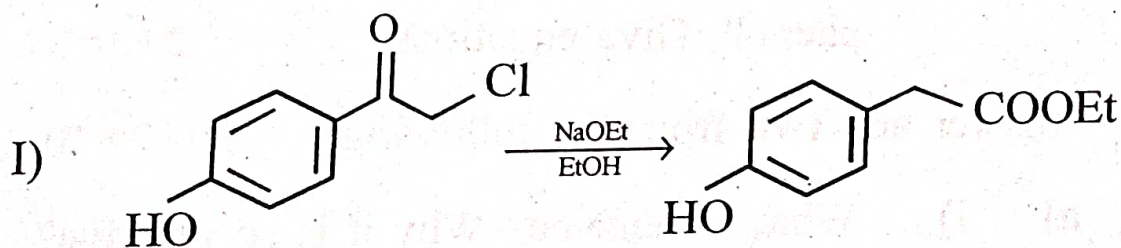
II) Indicate the structure of A, B and C in the following reaction sequences:



$$(1\frac{1}{2} + 1\frac{1}{2}) + 2 = 5$$

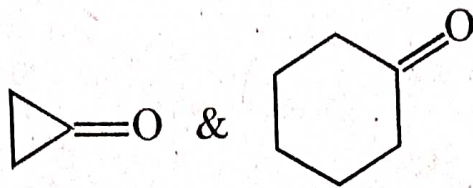
b) i) Give one evidence for the formation of  $\sigma$ -complex and  $\pi$ -complex in electrophilic substitution reaction.

ii) Write down the mechanism of the following conversions:



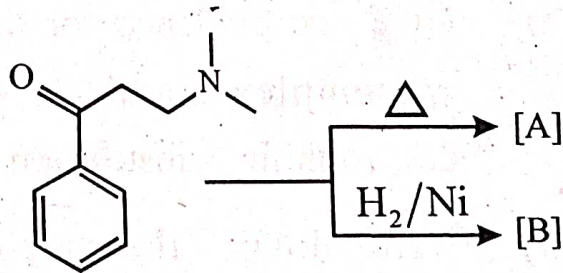
$$2 + (1\frac{1}{2} + 1\frac{1}{2}) = 5$$

- c) i) Compare the reactivity of the following pair towards HCN. 2



- ii) What happens when Iso-propyl magnesium bromide is added to Di-isopropyl ketone? Explain your answer with mechanism. 3

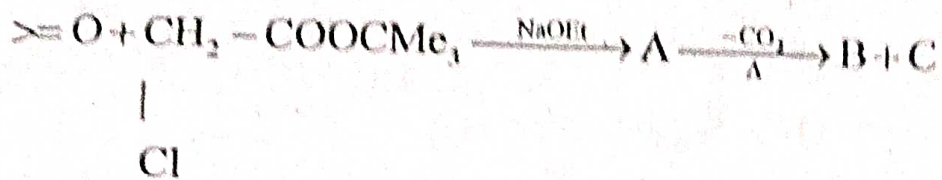
- d) i) Identify [A] and [B]



- ii) How Catechol can be synthesized from phenol? Give equations. 2+3=5

3. Answer any two from the following: 10×2=20

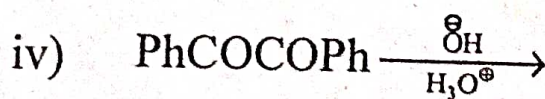
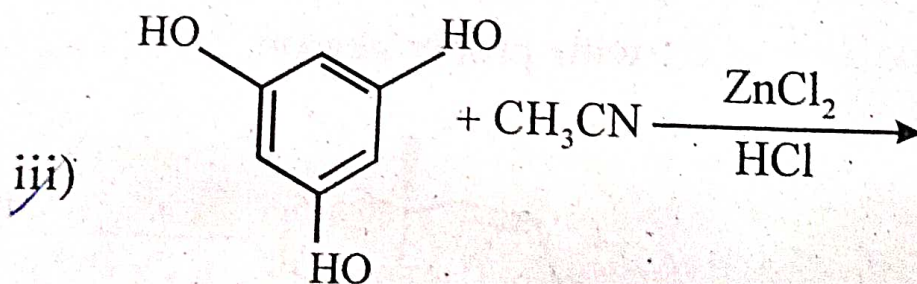
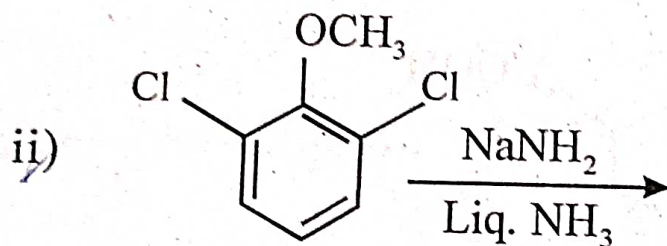
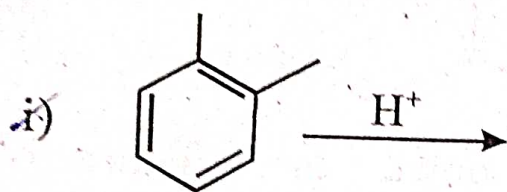
- a) i) What is benzyne? Why it is so reactive?  
ii) Predict the structure of 'A', 'B' and 'C' in the following reaction sequences. Explain their formation with mechanism.

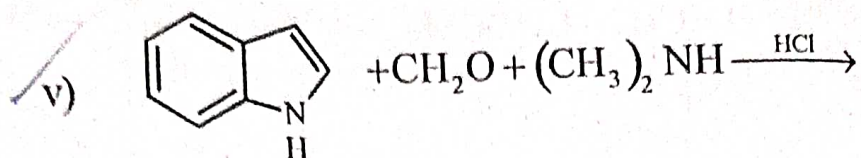


iii) DBU/Mel can be used for methylation of RCOOH in stead of  $\text{CH}_2\text{N}_2$ . Justify.

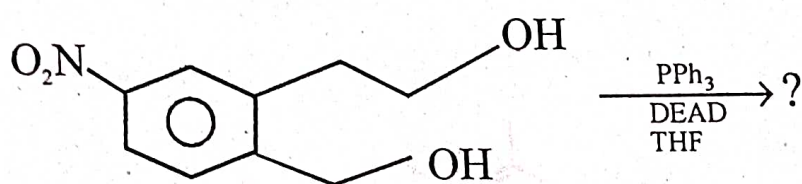
iv) What is Girard reagent-T? Give its one use. 3+3+2+2

b) Give the products with plausible mechanism: 2×5=10

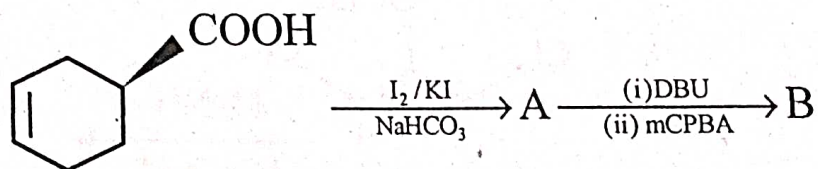




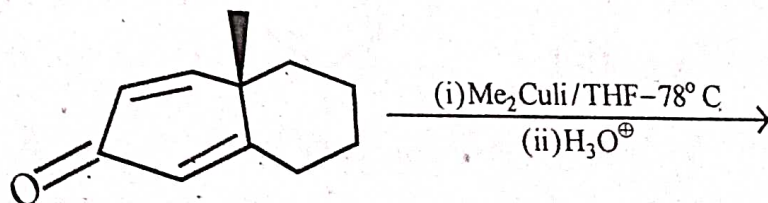
- c) i) Sulphonation of benzene shows primary kinetic isotope effect —explain.  
 ii) How will you convert erythro-1, 2-diphenyl-1,2-ethenediol to z-stilbene?  
 iii) Predict the product with mechanism :



- iv) Write down the structure of B with proper stereochemistry:

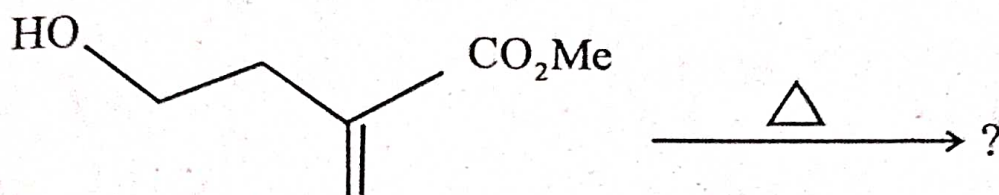


- v) Give the stereostructure of the product with proper reason:

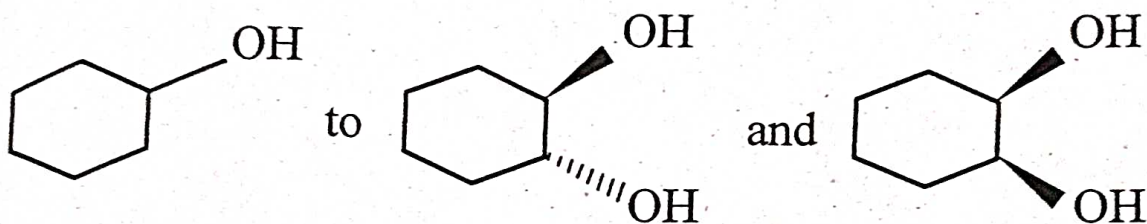


$$2+2+2+2+2=10$$

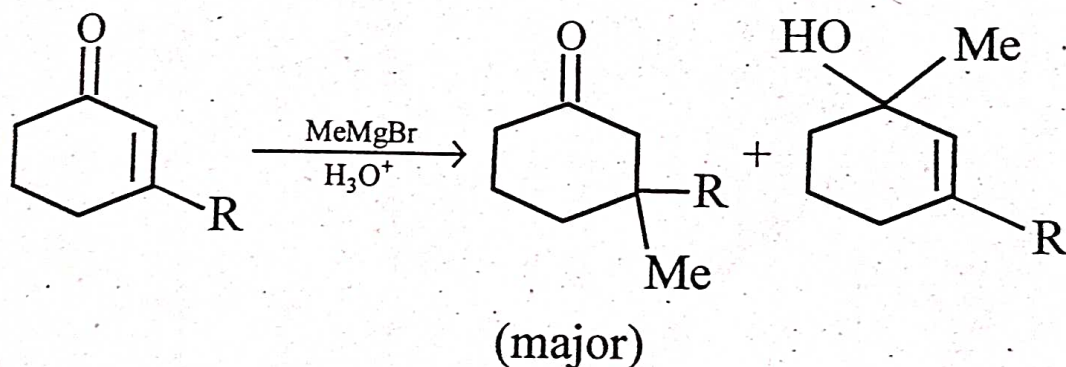
- d) i) Indicate the major product of the following reaction:



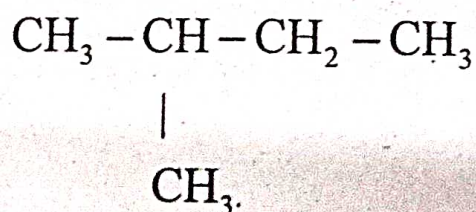
- ii) Convert:



- iii) Give explanation of the following observation:



- iv) Suggest two sets of reactants to prepare the following alkane using Corey-House strategy and choose the better set with proper reason.



$$2+3+2+3=10$$