

U.G. 4th Semester Examination - 2022

CHEMISTRY

[HONOURS]

Course Code : CHEM-H-CC-T-10

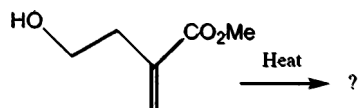
(Organic)

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.*

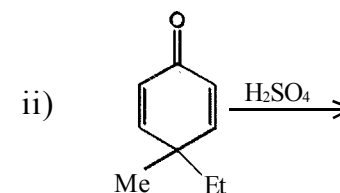
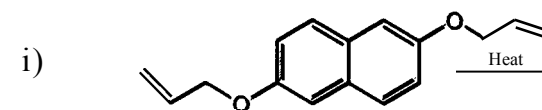
1. Answer any **five** questions: $2 \times 5 = 10$
- What do you mean by Hyperchromic effect in UV spectroscopy?
 - The carbonyl stretching frequency in cycloprop-2-enone is exceptionally low. Justify.
 - Indicate the major product of the following reaction:



- An organic compound of the molecular formula C_3H_3N has the following characteristic IR bands: $2000-2390\text{cm}^{-1}$ (s), $1620-1630\text{cm}^{-1}$, $3010-3100\text{cm}^{-1}$. Draw the structure of the compound.
- How would you distinguish between p-cresol and anisole by UV spectroscopy?
- Define illogical electrophile and nucleophile.
- Give definition of diastereoselectivity and enantioselectivity.

2. Answer any **two** questions: $5 \times 2 = 10$

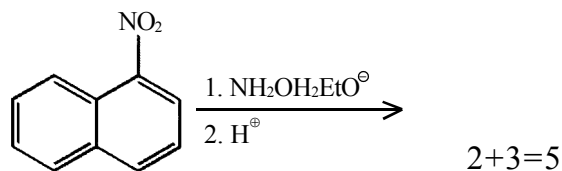
- a) Predict the product with mechanism.

 $2\frac{1}{2} \times 2 = 5$

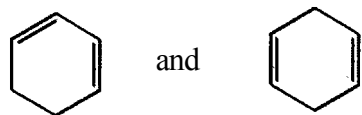
- "Hoffmann rearrangement and Lossen rearrangement are mechanistically similar"—Justify.

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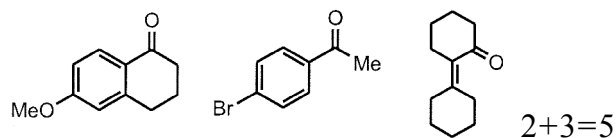
- ii) Predict the product with a suitable mechanism.



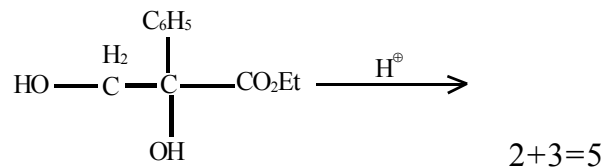
- c) i) How would you distinguish the following pair from UV-spectroscopy?



- ii) Using Woodward's rules, calculate values of λ_{max} of the following compounds:

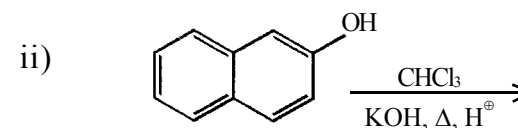
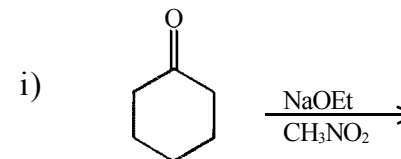


- d) i) How will you establish that Schmidt Rearrangement is intramolecular?
ii) Write down the product of the following reaction with probable mechanism.



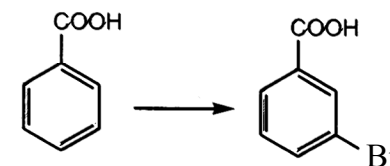
3. Answer any **two** questions: $10 \times 2 = 20$

- A. a) Write down the major product with suitable mechanism.



$2 \frac{1}{2} \times 2 = 5$

- b) How would you carry out the following transformation using Hoffmann Rearrangement?



- c) How is the O-H absorption peak in IR-spectrum shifted by replacing H by D? Give reason.
- 3+2=5

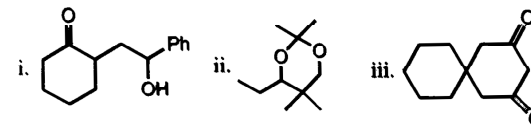
- B. a) What is synthon? Give example.
 b) Distinguish between acetone and propanal using $^1\text{H-NMR}$.
 c) A compound having molecular formula $\text{C}_8\text{H}_7\text{OCl}$, shows a strong band at 1693 cm^{-1} in its IR spectrum and $^1\text{H-NMR}$ peaks at $\delta\ 7.4\text{-}7.9$ (5H, m), $\delta\ 4.75$ (2H, s). Assign the structure.
 d) Explain stereoselective and stereospecific reactions with suitable examples.

$$2+2+4+2=10$$

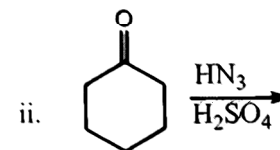
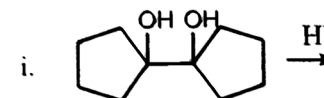
- C. a) Describe degenerate Cope rearrangement with an example.
 b) Discuss the solvent effects on the $n\rightarrow\pi^*$ and $\pi\rightarrow\pi^*$ transitions of carbonyl compounds in UV spectrum.
 c) Discuss functional group interconversion with an example.
 d) How can you show that the three methyl protons in ethanol are equivalent?
 e) What are azo dye compounds?

$$2+3+2+2+1=10$$

- D. a) Give retrosynthetic analysis of any two of the following compounds and outline the corresponding synthetic route.



- b) Write down the product of the following reactions with proper mechanism.



$$(3\times 2)+(2\times 2)=10$$
