বিদ্যাসাগর বিশ্ববিদ্যালয়

VIDYASAGAR UNIVERSITY

Question Paper

B.Sc. Honours Examinations 2022

(Under CBCS Pattern)

Semester - IV

Subject: CHEMISTRY

Paper : C 10-T

Organic Chemistry - IV

Full Marks : 40

Time : 2 Hours

Candiates are required to give their answer in their own words as far as practicable.
The figures in the margin indicate full marks.

Group - A

Answer any ***four*** questions from the following : 5×4=20

1. (a) Distinguish Methyl benzoate and Phenyl acetate by IR spectroscopy. 2

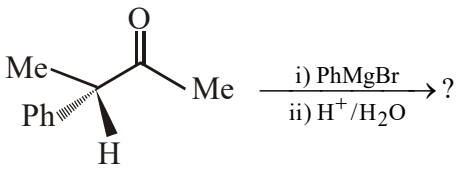
   (b) Define synthetic equivalent with an example. 1

   (c) How many kinds of non equivalent proton are there $C_2H_5CH = CH_2$, label them. 2

2. (a) Why do acetylenic proton resonate at upfield region with respect to ethylenic proton, though acetylenic hydrogen are more acidic than ethylenic hydrogen ? 3

   (b) How can you convert $ArNH_2$ to ArNHMe exclusively without any Ar NMe_2 ? 2

3. (a) Predict the major product of the following reaction with proper explanation.



3

(b) How high dilution technique can be utilized for large ring synthesis ? 2

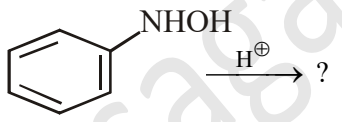
4. What do you mean by diastreoselective aldol reaction ? Illustrate with proper example and with the help of Zimmermann-Traxler model. 5

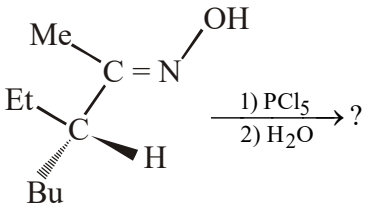
5. (a) IR absorption due to C = O stretching occurs at higher frequency and higher intensity than the c = c stretching — explain. 2

(b) Explain why a polar solvent usually shifts the $\pi - \pi$ transition to longer wavelengths? 2

(c) What is auxochrome ? Give an example. 1

6. (a) Predict the product of the following reaction and give mechanism.

(i) 

(ii) 

2+2

(b) Diazoacetic ester is more stable than diazomethane — Explain. 1

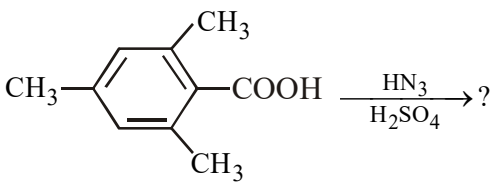
Group - B

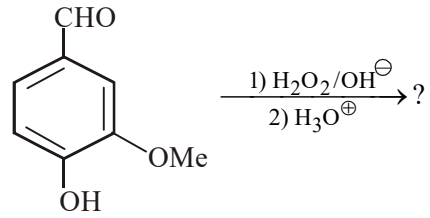
Answer any ***two*** of the following questions : 10×2=20

7. (a) How can you separate a mixture of primary, secondary and tertiary aliphatic amines by Hinsberg method ? 3

(b) Explain what happen when cyclopentanone is treated with diazomethane ? 2

(c) Find out the product(s) of the following reactions with plausible mechanism.

(i) 

(ii) 

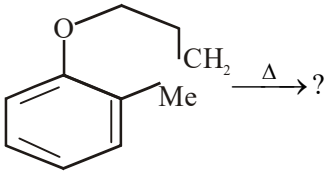
2+2

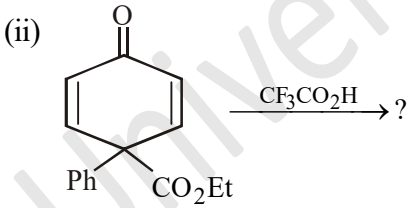
(d) Define FAI with example. 1

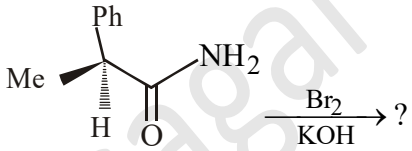
8. (a) What is stereo selective reaction ? Give example. 2

(b) Why TMS is used as reference compound in scanning ^1H NMR spectrum of a compound ? 2

(c) Predict the product(s) of the following reactions with plausible mechanism.

(i) 

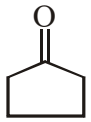
(ii) 

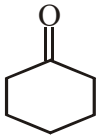
(iii) 

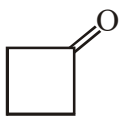
2+2+2

9. (a) Predict the expected UV spectral change on addition of 1 drop of 5% NaOH to a solution of p-Cresol in spectral ethanol with justification. 2

(b) How IR spectroscopy can be used to distinguish between the following compounds? Explain briefly

(i) 

(ii) 

(iii) 

3

(c) Discuss the effect of dilution by CCl_4 on IR absorption position of 'O—H' stretching of ethanol. 2

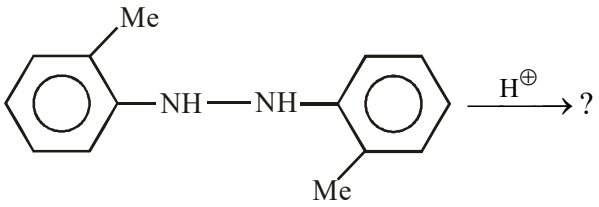
(d) A compound of molecular formula $C_6H_{12}O$ shows a strong IR band at 1705 cm^{-1} and two singlet signals at $\delta 2.1$. and 1.2 in its 'H NMR spectrum. Determine its structure. 3

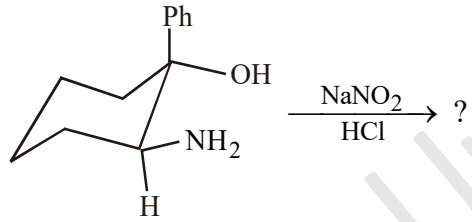
10. (a) How can you distinguish between the following pairs ?

$CH_3-CH_2-C\equiv CH$ and $CH_3-C\equiv C-CH_3$ by ^1H NMR spectroscopy. 2

(b) What do you mean by shielding and deshielding of proton in ^1H NMR spectroscopy ? Discuss with example. 3

(c) Predict the product(s) with plausible mechanism of the following reactions.

(i) 

(ii) 

2½ + 2½