2022

Chemistry

B.Sc. Fifth Semester End Examination - 2022

PAPER - CC-12T

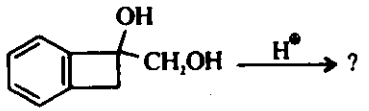
Full Marks : 40 *Time : 2 hours*

The figures in the right-hand margin indicate marks.
Candidates are required to give their answers in their own words as far as practicable.
Illustrate the answers wherever necessary.

Group-A

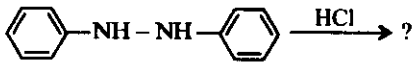
A. Answer any five of the following : **5×2=10**

1. Predict the product and give mechanism for the following reaction.



2. How IR spectroscopy can be used to distinguish between Vinyl acetate & Methyl acrylate?

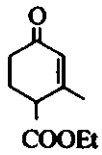
3. Predict the major product and give mechanism.



4. Aniline absorbs at 280 nm (ϵ_{max}=8600) but in acidic solution the main absorption band is seen at 203 nm (ϵ_{max}=7500) which is comparable to benzene – Explain.

5. How can you distinguish N-Methylaniline and N.N.-dimethylaniline chemically?

6. Describe the synthesis of the following compounds with proper retresynthetic analysis.



7. Write down the mechanism of Orton rearrangement.

8. Write down a scheme for the synthesis of diazoacetic ester.

Group -B

B. Answer any four from the following **4×5=20**

9. a) An organic compound of MF $C_9H_{10}O_2$ exhibits the following spectral data. 3

UV : λ_{max} at 268 nm, 264 nm, 262nm, 257 nm

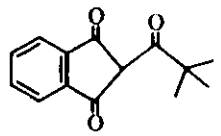
IR : 1745 cm^{-1}(s), 1225 cm^{-1} (br, s), 749 cm^{-1}(s), 697cm^{-1}(s)

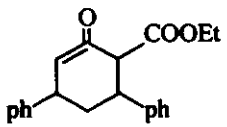
^{1}HNMR : δ1.96 (3H, Singlet); 5.00 (2H, Singlet) 7.22 (5H, Singlet)

Analyse the structure.

(b) How will you convert benzil to benzilic acid? Give mechanism. 2

10. Give retrosynthetic analysis and an efficient synthesis of the following compounds. 2½+2½

(i) 

(ii) 

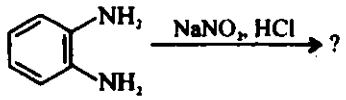
11. Write short-notes on $2\frac{1}{2}+2\frac{1}{2}$

(i) Fries rearrangement

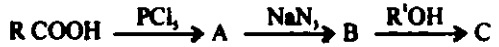
(ii) Hofmann-Martius rearrangement.

12. (a) Write down the mechanism of Arndt-Eiskrt synthesis. 3

(b) Identify the product and explain 2



13. a) Complete the following reaction with mechanism. 3



b) How will you prepare phenol from benzene via cumene? 2

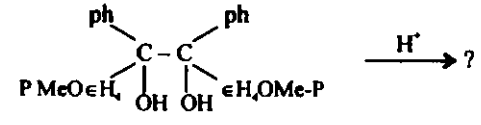
14. a) Predict the product (s) with mechanism : $2\frac{1}{2}$

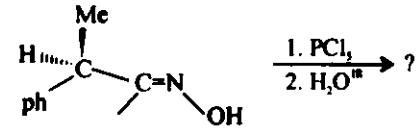
b) Why do acetylene prolons resonate at upfield region with respect to ethylenic protons though acetylinic hydrogens are more acidic than ethylenic hydrogen - Explain. $2\frac{1}{2}$

Group - C

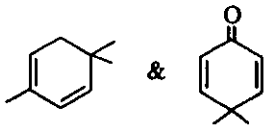
C. Answer any one from the following : 1×10=10

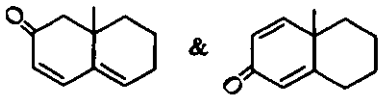
15. Predict the product of the following reation with plausible mechanism. $2\frac{1}{2}+2\frac{1}{2}$

(i) 

(ii) 

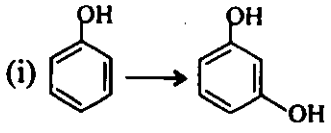
(b) How would you distinguished between the following pairs of compound by UV spectroscopy? $1\frac{1}{2}\times2$

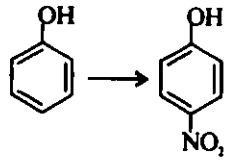
(i)  &

(ii)  &

(c) How will you prepare salicylic acid from phenol? 2

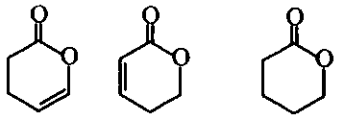
16. a) How will you carry out the following conversions. (2+1)

(i) 

(ii) 

(Continued)

b) Arrange the following compounds in order of their increasing wave number of absorption due to C=O stretching and explain with proper reason. 3



c) How will you distinguish cis and trans stilbene by NMR spectroscopy? 2

d) Predict the product of the following reactin with mechanism. 2