

Total Pages – 8

B.Sc. RNLK-/Chemistry/CC-12T/21

2021

Chemistry

[Fifth Semester]

Paper - CC-12T

Full Marks : 40

Time : 2 hours

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

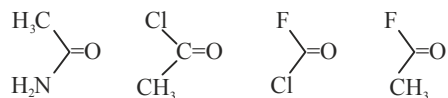
*Candidates are required to give their answers in their own words as far as practicable.*

*Illustrate the answers wherever necessary.*

Group - A

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

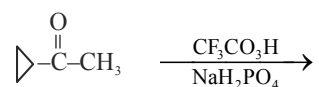
1. Arrange the following carbonyl compound in order of increasing Carbonyl stretching frequency.



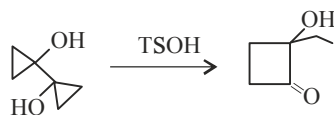
(Turn Over)

( 2 )

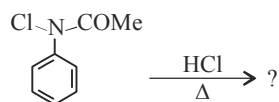
2. Predict the product & give mechanism.



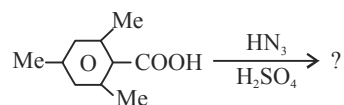
3. A conjugate diene in hexane solution shows  $\lambda_{\text{max}}$  at 219nm. What will happen if the solvent is changed to ethanol?
4. Suggest a mechanism of the following reaction.



5. Give the structure of principal organic product of the following reaction and propose a mechanism.



6. Identify the product and write a possible mechanism for the following reaction.



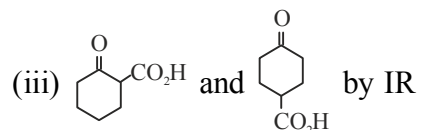
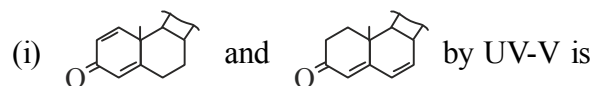
( 3 )

7. Tertiary anime of the type  $R^1R^2NCH_3$  can be prepared using formaldehyde and formic acid as the reagent. Explain.
8. Define FGA with suitable example.

**Group - B**

**B. Answer any four from the following :  $4 \times 5 = 20$**

9. (a) How can you distinguish between the following as indicated (any two)

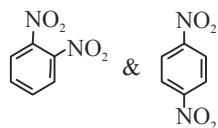


- (b) A compound of MF  $C_4H_6O_2$  shows very strong IR band at  $1720\text{ cm}^{-1}$  and only one singlet signal in its  $^1H-NMR$  spectrum. Analyse the structure.

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

( 4 )

10. (i) How can you separate a mixture of primary, secondary and tertiary aliphatic amine by Hinsberg method?
- (ii) How will you distinguish the following pair of compound by  $^1\text{H-NMR}$  spectroscopy?



3+2=5

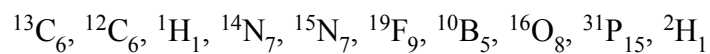
11. Write short notes of the following (any two)  $2\frac{1}{2}\times 2=5$
- a) Wagner-Meerwein rearrangement
  - b) Dakin rearrangement.
  - c) FischerHepp rearrangement.
12. (a) What do you mean by Synthone(SN) and Synthetic equivalent (SE). Give example.
- (b) Using retrosynthetic analysis, synthesize the following molecule.



- (c) Why TMS is used as an internal standard in NMR spectroscopy.  $2+2+1=5$

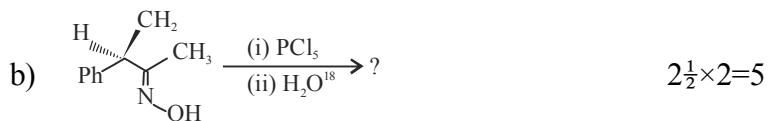
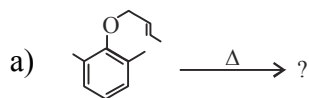
( 5 )

13. (a) Define auxochrome and bathochromic shift.  
(b) Which of the following nuclei are NMR active and why?



$$3+2=5$$

14. Give the product with mechanism.



### Group - C

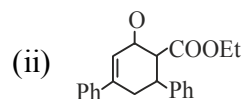
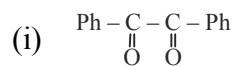
C. Answer any one from the following :  $1 \times 10 = 10$

15. (a) An organic compound A,  $\text{C}_6\text{H}_{12}\text{O}_2$  on heating with Na/Xylene produces another compound B,  $\text{C}_6\text{H}_{12}\text{O}_2$  along with an alcohol  $\text{C}_3\text{H}_8\text{O}$  which does not give iodoform test. Oxidation of compound B with  $\text{HNO}_3$ /

( 6 )

$\text{CH}_3\text{COOH}$  generates a compound C,  $\text{C}_6\text{H}_{10}\text{O}_2$  which shows one quartet and one triplet signal in  $^1\text{H-NMR}$  spectrum and a characteristic IR band at  $1730\text{cm}^{-1}$ . Treatment of compound C with excess  $\text{C}_2\text{H}_5\text{MgBr}/\text{H}_2\text{O}/\text{H}^+$  gives a compound D,  $\text{C}_{10}\text{H}_{22}\text{O}_2$  which shows one quartet (8H), one triplet (12H) and a broad peak (2H) in  $^1\text{H-NMR}$  spectrum and a broad IR band at  $3350\text{cm}^{-1}$ . Heating compound D, with dil  $\text{H}_2\text{SO}_4$  affords E,  $\text{C}_{10}\text{H}_{20}\text{O}$  showing IR band at  $1710\text{cm}^{-1}$ . Identify the compound A to E and Explain reactions.

- (b) Distinguish ortho and meta nylon by  $^1\text{H-NMR}$  spectroscopy. 2
- (c) Give the retrosynthetic pathway and its forward path for synthesis of the following. (any one)

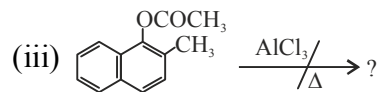
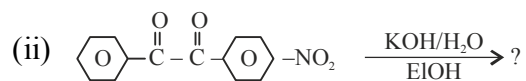
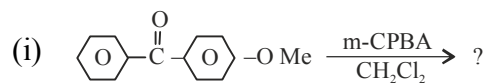


6+2+2=10

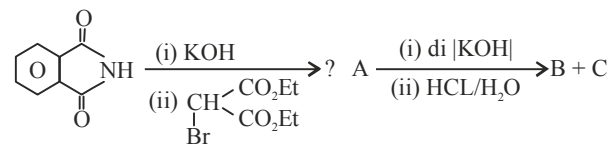
( 7 )

16. (a) Why excess diosmethane is used in Arndt-Eistert reaction?

(b) Write down the product with mechanism (any two)



(c) Identify the mission products.



(d) Define finger print region in IR spectrum.

$$2+(2\times 2)+3+1=10$$