

Total Pages – 8

B.Sc. RNLK-/Chemistry/HCC-7T/21

2021

Chemistry

[Third Semester]

Paper - HCC-7T

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

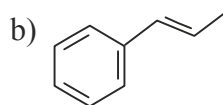
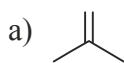
A. Answer any five from the following questions. 5×2=10

1. What do you mean by atropisomerism? Give Example.
2. What do you mean by stereoconvergent reaction? Give Example.
3. Define valence tautomerism with an example.

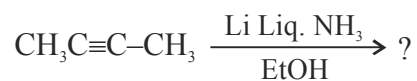
(Turn Over)

(2)

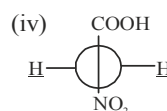
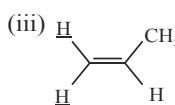
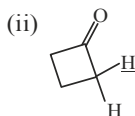
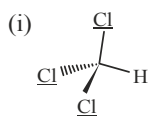
4. Predict the orientation in HCl addition to these alkenes.



5. Predict the product of the following reaction with plausible mechanism.

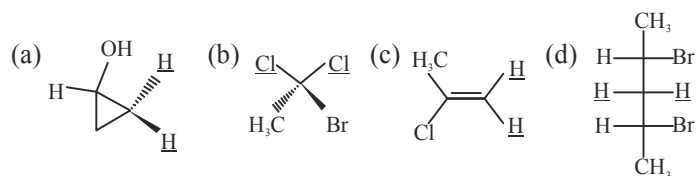


6. Write down the stereochemistry of the major product obtained when *Z*-2-butene is subjected to dihydroxylation with OsO_4 . Give the mechanism.
7. Deduce the topic relationship of the marked homomorphous ligand with reason (any two)



(3)

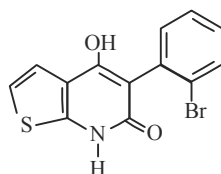
8. Assign pro-R or pro-S or pro-E/pro-Z of the marked homomorphous ligand (any two)



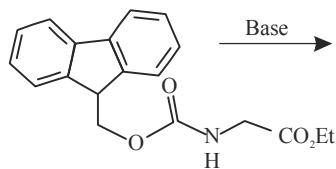
Group - B

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

9. (a) Draw the structural formula of the R_a -configured atropisomer of the compound represented by the formula below.

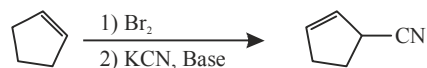


- (b) Write the product with mechanism and name of the following reaction.



(4)

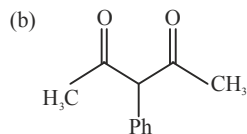
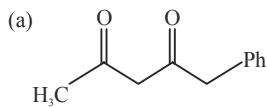
(c) Explain this result with mechanism.



10. (a) Account for the increase in the ratio of 1-alkene to 2-alkene product as the base is changed from MeO^- to Me_3CO^- to Et_3CO^- in the dyhydrobromination of 2-bromo-2, 3-dimethylbutane. 1+2+2=5

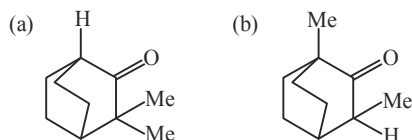
(b) PhCH_2NO_2 is a liquid that dissolve in NaOH . On acidification with HCl , initially a solid tautomer is precipitated. However, this slowly reverted to the initial liquid. Explain this with a suitable energy profile diagram. 2+3=5

11. (a) Of the following two compound, which one has the greater enol content in gas phase any why?



Or

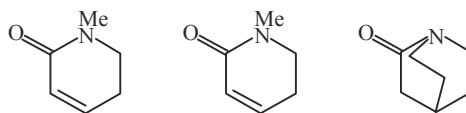
(5)



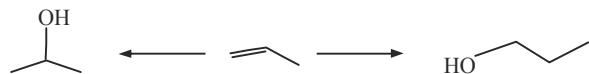
(b) *Thero* and *enythro* isomer of butan-2,2-di-ol can be distinguish from their dipolemoment value. Explain.

(c) Define pseudoasymmetric centre. 2+2+1=5

12. (a) Arrange the following compound in increasing order of basicity. Explain your answer.



(b) Transfer the following with suitable reagent and show the mechanism.

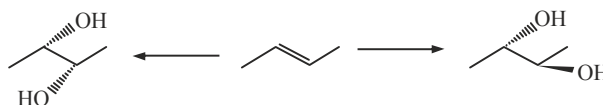


2+3=5

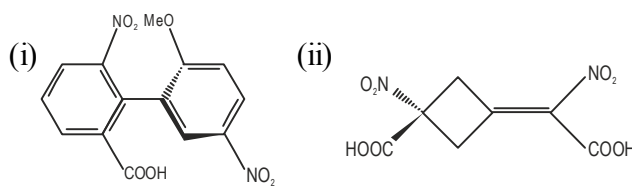
13. (a) Draw the (-)sc and (+)ap conformation of active butane-2,3-di-ol.

(6)

- (b) Transfer the following with suitable reagent with mechanism. 2+3=5



14. (a) Assign R/S naming of the following :



- (b) Draw the energy profile diagram of three step exothermic reaction in which the second step is r.d.s. and the first unstable intermediate is more stable than the second. 3+2=5

Group-C

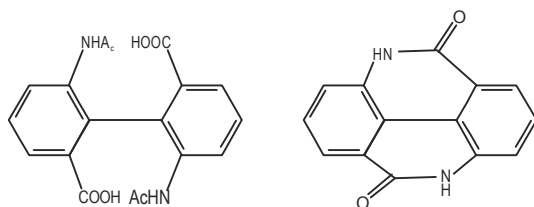
- C. Answer any one of the following question : 1×10=10

15. (a) Draw the more stable conformation of the following compounds.

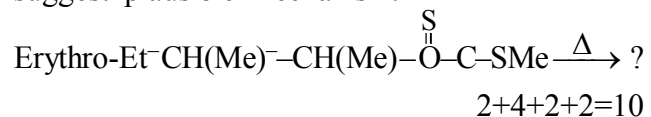
- (i) 2-amino ethanol (ii) 1,2-dichloroethane

(7)

- (b) Draw the torsion angle energy profile diagram of 2-methylbutane along C2-C3 bond and identify the fully eclipsed, partially eclipsed, gauche form and also conformer.
- (c) Which of the following compound is resolvable at room temperature and why?



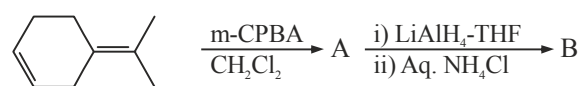
- (d) Write the stereochemistry of the product and suggest plausible mechanism.



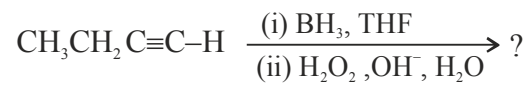
16. (a) Write short notes on
- (i) Oxymercuration and Demercuration reaction.
 - (ii) Ozonolysis reaction.

(8)

- (b) Identify the products in the following reactions and briefly explain how these could be formed.



- (c) Predict the product of the following reaction with plausible mechanism. 2



$$(2\frac{1}{2} \times 2) + 3 + 2 = 10$$