

SET B

[This question paper contains 3 printed pages]

Sr. No. of Question paper :

Roll No.....

Unique Paper Code : 32171201_OC

Name of the Paper : Organic Chemistry-I: Basics and Hydrocarbons

Name of the Course : B.Sc. (H) Chemistry

Semester : II

Duration : 3 Hours

Maximum Marks : 75

Instructions for the students:

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **four** questions in all.
3. All questions carry equal marks.

1. (a) Giving the mechanism involved, write the structure of the alcohols formed from Cyclohexyl-ethene, $C_6H_{11}CH=CH_2$, under the following conditions: (9)

- (i) Hydroboration-oxidation
- (ii) Oxymercuration-demercuration
- (iii) Acid catalyzed hydration

(b) How can a racemic mixture of Lactic acid be resolved using the method of diastereoisomeric salt formation? (4.75)

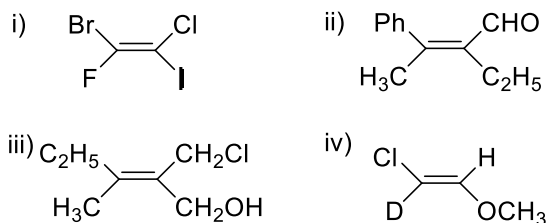
(c) Giving reasons, arrange the following in increasing order of boiling points: (5)

- (i) 2-methylhexane (ii) 2,2-dimethylpropane (iii) 2-methylbutane (iv) heptane (v) octane and (vi) hexane

2. (a) Carry out the following conversions (any **four**) : (8)

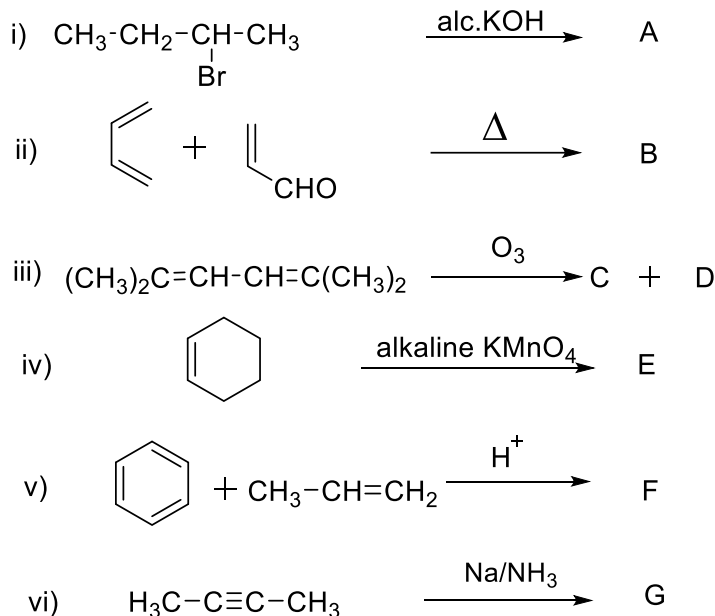
- (i) Chloroprene from acetylene
- (ii) cis-But-2-ene from propyne
- (iii) Pent-2-yne from pent-2-ene
- (iv) 2,3-Dimethylbutane from propane
- (v) p-Bromobenzoic acid from benzene

(b) Assign priorities and give E/Z notations to the following compounds: (6)



(c) Write down all the staggered conformations for 1,2-dichloroethane? Why does dipole moment of this compound increase with increase in temperature? (4.75)

3. (a) Complete the following reactions : (7)



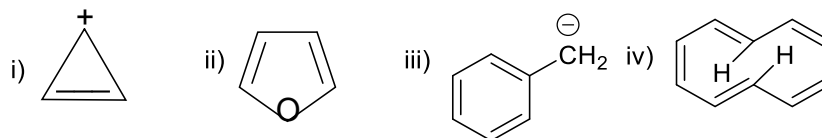
(b) Why does nitration of toluene take place more easily as compared to benzene? (3)

(c) Calculate the percentage of isomers formed on monochlorination of isobutane. Relative rates of hydrogens 3°: 2°: 1° towards chlorination at room temperature are 5.0 : 3.8 : 1. (4.75)

(d) A hydrocarbon C_4H_{10} (A) on monochlorination gives a compound $\text{C}_4\text{H}_9\text{Cl}$ (B). Compound (B) on treatment with sodium metal gives 2,2,3,3-tetramethylbutane. What are the structural formulas for A and B. Write down all the reactions involved? (4)

4. (a) Draw the Fischer projections for all possible stereoisomers of 3-Bromobutan-2-ol. Show how they are related to each other and assign R/S configuration to each of them. (8)

(b) Classify the following compounds as aromatic, anti-aromatic and non-aromatic with suitable explanation: (6)



(c) Addition of hydrogen chloride to 3,3-dimethyl but-1-ene yields a mixture of 2-chloro-3,3-dimethylbutane and 2-chloro-2,3-dimethylbutane. Explain. (4.75)

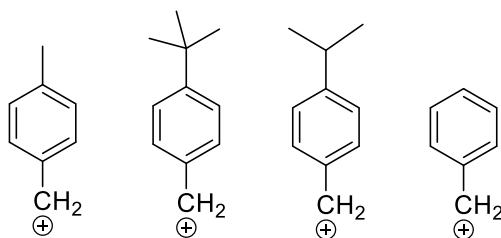
5. (a) How would you distinguish the following chemically? Give reactions. (6)

- (i) But-1-yne from but-2-yne
- (ii) Propene and propyne

(b) Draw the energy diagram for all the conformations of Cyclohexane. Write down the stability order of its various conformations with explanation. (5)

(c) Explain with mechanism that when Isobutyl chloride reacts with benzene using anhydrous AlCl_3 the product obtained is not Isobutyl benzene but t-butyl benzene. (4.75)

(d) Arrange the following carbocations in decreasing order of stability with suitable explanation. (3)



6. (a) Write a short note on any **three** : (9.75)

- (i) Relative and Absolute Configuration
- (ii) Inductive vs Electromeric effect
- (iii) Corey House synthesis
- (iv) Baeyer's Strain theory

(b) Convert the following flying-wedge structures to Fischer projection, assign priority order and designate R/S configuration. (9)

