

Unique Paper Code : 42171103
Name of the Paper : Atomic Structure Bonding, General Organic Chemistry
and Aliphatic Hydrocarbons
Name of the Course : **B.Sc. (Programme)**
Semester : I

Duration : 3 hours

Maximum marks: 75

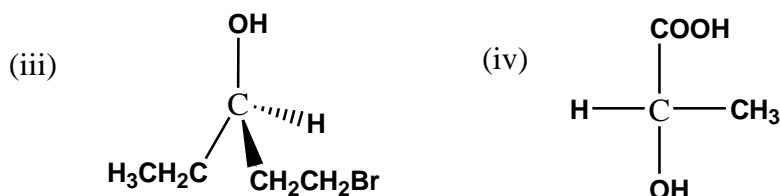
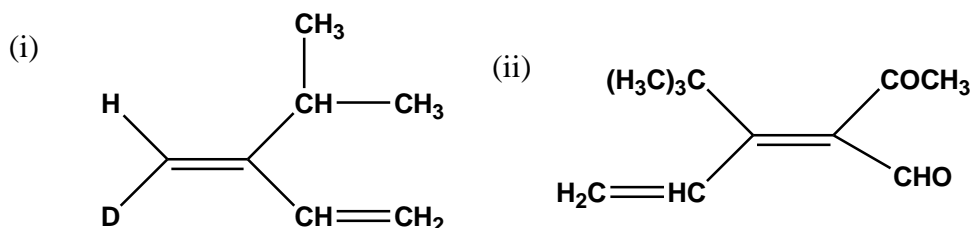
(Write your Roll No. on the top immediately on receipt of this question paper)

Attempt SECTION A and SECTION B on different answer sheets

Questions 1 & 4 carry 19 marks each and questions 2, 3, 5 and 6 carry 18.5 marks each.

SECTION B
ORGANIC CHEMISTRY
Attempt ANY TWO questions

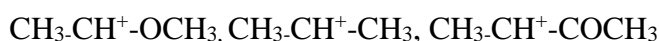
4. (a) Give reasons for the following (Any four)
- Alkyl groups act as electron donors when attached to π system.
 - Pyridine is basic while pyrrole is not.
 - Glucose and Fructose are covalent compounds yet they are soluble in water.
 - Isopropyl free radical is more stable than n-propyl free radical
 - Vinyl chloride is less reactive than alkyl chloride
- (b) Assign E/Z or R/S configuration of the following



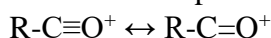
- (c) Explain the following reactions
- Kolbe's reaction
 - Wurtz reaction
 - Birch reduction
- (d) Comment on this statement:

- (i) To be optically active molecule should be chiral.
- (ii) Tartaric acid has two chiral carbons yet one of its form is optically inactive. (5,5,5,4)

5. (a) Give the mechanism of the reaction involved in the formation of chloromethane from methane by treatment with chlorine in presence of light.
- (b) Draw all the conformations of cyclohexane. Which of them is most stable and why?
- (c) Write short notes on the following:
- (i) Hyperconjugation (ii) Tautomerism (iii) Resonance effect.
 - (d) (i) Arrange the following carbocations in decreasing order of stability. giving the reasons.



- (i) Which of the canonical forms would contribute more towards resonance? Explain which form is more stable.



- (ii) Arrange the following in increasing order of stability
 $\text{HC}\equiv\text{C}^-$, $\text{H}_2\text{C}=\text{CH}^-$, CH_3CH_2^- , $(\text{CH}_3)_2\text{CH}^-$, $\text{C}_6\text{H}_5\text{CH}_2^-$, CH_3^-
- (iii) Arrange the following in decreasing order of acidity



(5,5,5,3.5)

6. (a) Which of the following compounds are aromatic and why?
- (i) Annulene [6] (ii) Pyrrole (iii) Annulene [4] (iv) Anthracene
- (b) Give the mechanism of-
- (i) Addition of Br_2 in CCl_4 to cis but-2-ene
 - (ii) Give the reaction involved when HBr is added to 3-methylbut-1-ene, also comment on regioselectivity of the reaction.
- (c) Explain the terms with examples.
- (i) Mesomers (ii) Enantiomers (iii) Diastereoisomers

- (d) Identify (x), (y) and (z) in the following synthetic scheme write their structures. Is compound (z) optically active. justify your answer.

