

1374

- (c) Resonance Effect
(d) Diels-Alder reaction

[This question paper contains 8 printed pages]

Your Roll No. :

Sl. No. of Q. Paper : **1374** **I**

Unique Paper Code : 2172011102

Name of the Paper : DSC 2 - Basic Concepts
and Aliphatic
Hydrocarbons (Organic
Chemistry-1)

Name of the Course : **B.Sc. (Hons.)**

Semester : I

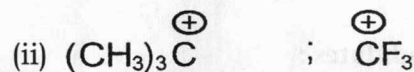
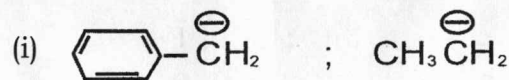
Time : 3 Hours **Maximum Marks : 90**

Instructions for Candidates :

- (a) Write your Roll No. on the top immediately on receipt of this question paper.
- (b) Attempt any **six** questions.
- (c) **All** questions carry **15** marks.
1. (a) An alcohol **A** having molecular formula C_2H_6O , when treated with conc. H_2SO_4 gives an alkene **B**. When **B** is bubbled through

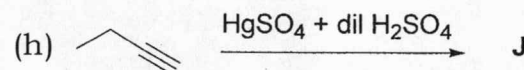
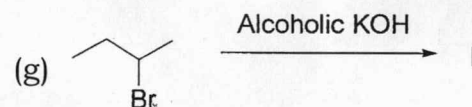
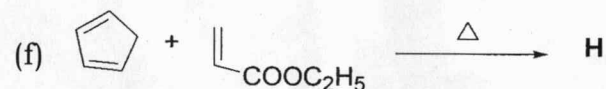
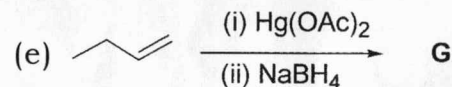
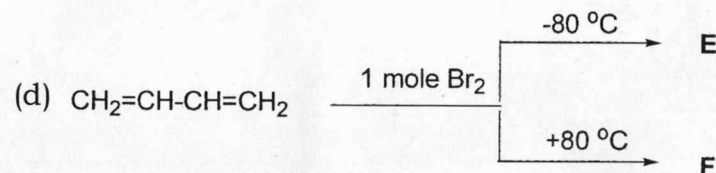
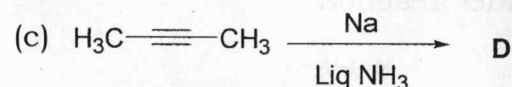
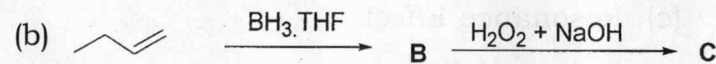
bromine water ($\text{Br}_2/\text{H}_2\text{O}$) and the product obtained is dehydrohalogenated with an excess of strong base sodamide a new compound **C** is obtained. Compound **C** is also obtained by reacting calcium carbide with water. Compound **C** gives **D** when treated with dilute H_2SO_4 in presence of HgSO_4 . Identify **A** to **D**. Write the sequence of chemical reactions involved. 5

- (b) Out of following pairs, which is more stable? Give reason. 5



- (c) Define the terms racemic mixture. Demonstrate the chemical method for resolving a racemic mixture of an acid, using an example. 5

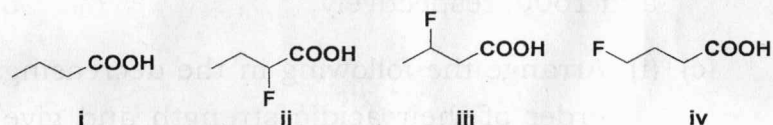
2. (a) How many stereoisomers are possible for tartaric acid? Draw their Fischer projection structures, describe the relationships between them and identify which are optically active and which are optically inactive. 5



8. Write short note on the following (attempt any **three**): 5×3=15

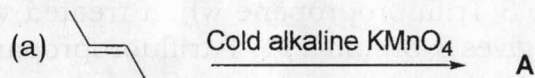
- (a) Wurtz-Fittig reaction
(b) Elcb reaction

- (b) *trans*-2-Butene upon bromination gives meso-dibromo product, while *cis*-2-butene gives racemic mixture ? 5
- (c) Bromination is more selective than chlorination of alkanes ? 5
6. (a) What do you mean by inductive effect ? Arrange the following carboxylic acids in the **increasing order** of their acidity strength. 5

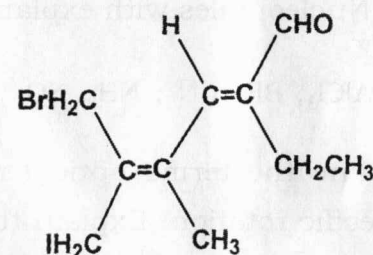


- (b) 2, 3-Dimethylbut-2-ene is more stable than 2-methylbut-1-ene. Explain. 5
- (c) Draw and name various Conformations of Cyclohexane and arrange them in increasing order of their Stability. Draw their potential Energy diagram. 5

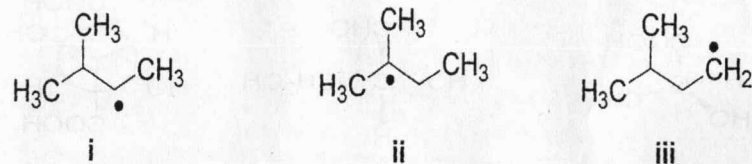
7. Write the structure of product(s) A to J: $10 \times 1.5 = 15$



- (b) (i) A 90° in the plane rotation is not allowed in a Fischer projection, while a 180° rotation is permitted. Justify this statement with a suitable example. 2.5
- (ii) Assign E/Z configuration at all the stereogenic centre(s) present in the following molecule : 2.5



- (c) Define the term hyperconjugation effect and arrange the following free radicals in the increasing order of their stability, giving a suitable reason. 5



3. (a) Draw all conformations of *n*-butane resulting from rotation about the C2-C3 bond and arrange them in order of increasing stability, providing reasons for the stability order. Also, illustrate the potential energy diagram.

5

- (b) (i) Classify the following into Electrophiles or Nucleophiles with explanation.

2.5

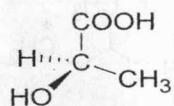


- (ii) Define the terms optical rotation and specific rotation. Explain the factors on which they depend.

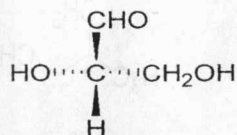
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- (c) Assign the R/S nomenclature at all the chiral centre(s) present in the following molecules : (Do any **two**).

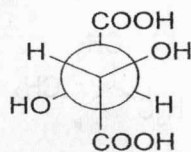
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i



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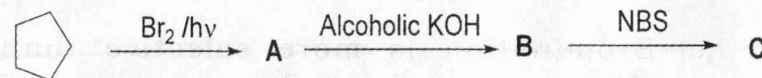


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4. (a) Complete the following set of chemical reactions :

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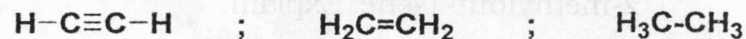


- (b) 2-Methylpropane is brominated at 125°C in the presence of light. What % of product will be 2-bromo-2-methylpropane. The relative reactivity for 1°, 2°, 3° hydrogens are 1, 82 and 1600, respectively.

5

- (c) (i) Arrange the following in the decreasing order of their acidic strength and give suitable explanation.

2.5



- (ii) How will you distinguish between 1-butyne and 2-butyne ? Provide the chemical reaction.

2.5

5. Give suitable explanations with mechanism (if involved).

- (a) 3, 3, 3-Trifluoropropene when treated with HBr gives 3-bromo-1, 1, 1-trifluoropropane ?

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P.T.O.