[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 7014 **K**

Unique Paper Code : 2172511101

Name of the Paper : DSC – Basic Concepts of Organic Chemistry

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

Semester : I

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

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

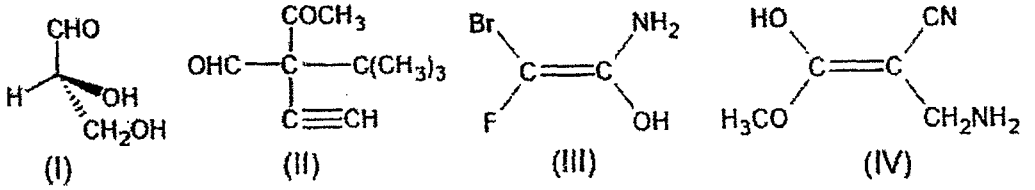
1. Write the product(s) with complete chemical reaction for any five of the following. Name the reaction and the intermediate involved.
   (a) Benzene is treated with acetyl chloride in presence of $AlCl_3$.
   (b) Phenol is treated with chloroform in presence of sodium hydroxide,
   (c) Cyclohexanone oxime is treated with concentrated sulphuric acid,
   (d) Two moles of acetaldehyde are made to react in presence of NaOH.
   (e) Prop-2-enal is treated with diethyl malonate in presence of hydroxide ion.
   (f) 2,3-Dimethylbutane-2,3-diol is treated with dilute sulphuric acid.
   (g) Propene is reacted with BH_3 followed by oxidation with H_2O_2 in presence of NaOH. (3×5)

2. Give reasons for the following : **(Any five)**
   (a) Benzyl carbocation is more stable than allyl carbocation,
   (b) Acetaldehyde reacts faster than acetone towards nucleophilic addition reaction.
   (c) pk_a of nitroacetic acid is 1.68 while pk_a of acetic acid is 4.76.
   (d) Aniline is less basic than ethylamine.
   (e) 2,3-Dimethylbut-2-ene is more stable than but-2-ene,

P.T.O.

(f) Aryl halides have very low reactivity towards nucleophilic substitution reaction as compared to alkyl halides. (3×5)

3. (a) Assign E/Z or R/S to the following :



(I) (II) (III) (IV)

(b) Draw the various conformations of n-butane and arrange them in increasing order of their stability. Give reasons for the stability order.

(c) Why S_N^1 reactions are accompanied by racemization? (2×4,4,3)

4. (a) Distinguish between :
   (i) E_1 and E_2 reaction
   (ii) Racemic mixture and meso-Compound

(b) Write the product(s) and mechanism involved when prop-1-ene reacts with HBr in i) presence and ii) absence of peroxide.

(c) Write products of the following reactions and state the type of the reaction involved :
   (i) Propyne is treated with dilute sulphuric acid in presence of mercuric sulphate.
   (ii) 2-Chlorobutane is treated with aqueous sodium hydroxide. (5×3)

5. (a) Explain why halogens in haloarenes are weakly deactivating and ortho/para directing.

(b) Explain the formation of different products formed when ethyl bromide is treated with NaCN and AgCN.

(c) What happens when chlorobenzene is treated with $NaNH_2$ in liquid NH_3? Give the mechanism involved. (5×3)

6. Write short notes (with mechanistic details) of any **three** of the following :
   (a) Perkin Reaction
   (b) Wagner – Meerwein rearrangement
   (c) Claisen-Schimdt reaction
   (d) Benzoin Condensation (5×3)

(1000)