SP-1096

M.Sc. (Previous) Examination, 2019

CHEMISTRY

Second Paper
CH-402
(Organic Chemistry)

Time allowed : Three hours
Maximum Marks : 75

SECTION – A **(Marks 2 × 10 = 20)**

Answer all **ten** questions (Answer limit **50** words). Each question carries **2** marks.

SECTION – B **(Marks 5 × 5 = 25)**

Answer all **five** questions. Each question has internal choice (Answer limit **200** words). Each question carries **5** marks.

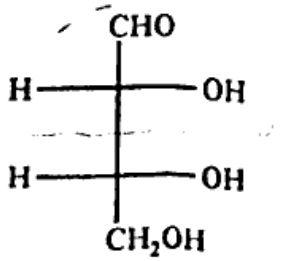
SECTION – C **(Marks 10 × 3 = 30)**

Answer any **three** questions out of **five (Answer limit 500** words). Each question carries **10** marks.

SECTION – A

1. (i) Define and explain with a suitable example the term cross-conjugation. **2**

(ii) Assign R or S configuration to Chiral centres in the given structure : **2**



(iii) Explain in brief phase transfer catalysis.

(iv) Explain in brief SET mechanism with a suitable example. **2**

(v) What happens when benzene is treated with n-propyl bromide in presence of anhydrous $AlCl_3$? Explain the reason for the formation of the product(s). **2**

(vi) What happens when E and Z-2-butenes are treated with perbenzoic acid separately ? Explain in brief the product formation in the two cases. **2**

(vii) What are Meisenheimer salts ? Explain the mechanism of the reaction wherein they are formed. 2

(viii) How will you convert but-2-en-zone into 2-hydroxy-2-methyl but-2-ene ? 2

(ix) Explain in brief the E1CB mechanism. Give one example. 2

(x) What is cope-rearrangement ? Give one example of this rearrangement to explain it in brief. 2

SECTION – B

2. What are helicines ? Explain in brief why do they show optical activity. 5

OR

Explain briefly the conformational analysis of 1,3- and 1,4- dimethyl cyclo-hexanes. Which one of them does'nt have any chiral-center and why is it so ?

3. What do you understand by kinetically controlled and thermodynamically controlled reactions ? Explain with the help of energy profile diagram and a suitable example of the two terms. 5

OR

What is neighbouring group participation ? Explain the participation of *C-C single* bond (σ-bond) in such reaction.

4. Explain electrophilic substitution accompanied by shift of double bond. Give one example in support of the explanation. 5

OR

What is SNAr reaction ? Explain its mechanism with the help of a suitable example.

5. Explain with suitable example the terms chemo-selectivity and Pregio-selectivity. 5

OR

Define hydroboration. Give the mechanism and applications of this reaction in synthetic organic chemistry.

6. Compare E1, E2 and E1cb reactions. 5

OR

Explain in brief the stereochemistry of electrocyclic reactions. Give example in support of your answer.

SECTION – C

7. What are cyclodextrins ? How are they classified ? Discuss their structure and applications. 10

8. What do you understand by Hammond's principle ? Derive the expression for product ratio in case of Curtin-Hammet Principle and explain the significance of this principle. 10

9. Discuss the mechanism of the following reactions :

   (i) Benzyne mechanism. 2½

   (ii) Allylic bromination with NBS. (N-Bromosuccinimide) 2½

   (iii) Sandmeyer reaction. 2½

   (iv) SE mixed reaction. 2½

10. Explain the mechanism of the following reactions with suitable examples :

   (i) Mannich reaction 2½

   (ii) Stobbe reaction 2½

   (iii) Wittig reaction 2½

   (iv) Hydrolysis of esters 2½

11. (i) What are electrocylic reactions ? Explain 4n π & (4n + 2)π electrocyclic reactions with the help of the concept of conrotatory and disrotatory motion. Give suitable example in support of your answer. 5

   (ii) What are sigmatropic rearrangements ? Explain these rearrangements with suitable example. 5