No. of Printed Pages : **2**

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M.Sc. I Semester Degree Examination, April/May - 2023

CHEMISTRY

Theoretical Organic Chemistry

Time : 3 Hours | Maximum Marks : 70

Note : *Answer* ***any five*** *of the following questions with Question No.* ***1 Compulsory.*** *Each question carries* ***equal*** *marks.*

1. (a) Give an account of hybridization, geometry and shapes of simple organic molecules. **5**

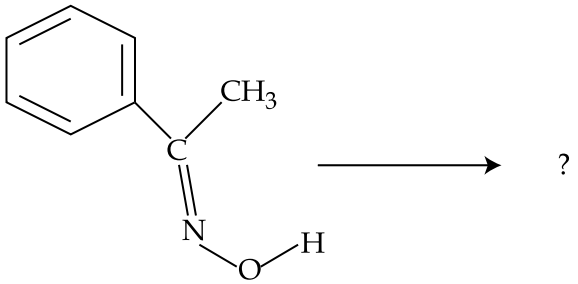
(b) What is Hückel's rule ? Write briefly on the aromaticity, antiaromaticity and homoaromaticity of an organic compounds. **5**

(c) What are crown ethers ? Discuss their applications in organic synthesis ? **4**

2. (a) Discuss the relationships between element of symmetry and optical activity. **5**

(b) What is *Cahn-Ingold-Prelog* rule ? Explain how these rules are used to find the RS configuration of optically active molecules. **5**

(c) Predict the product and name the following reactions. Explain its applications in determinations for configuration of ketoximes. **4**



3. (a) What are nucleophiles ? Explain SN1 mechanism with suitable examples. **5**

(b) Explain the factors affecting reactivity of the aliphatic nucleophilic substitution reactions. **5**

(c) Discuss the neighbouring group mechanism with example. **4**

4. (a) Discuss the SNAr and SRN1 mechanism with suitable examples. **5**

(b) Explain the Smiles rearrangement mechanism with suitable examples. **5**

(c) Write a note on quantitative treatment of reactivity in substrate and electrophiles. **4**

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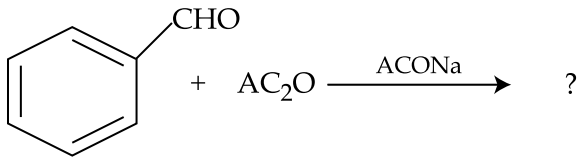
5. (a) What are carbanions ? Explain the methods of generation and its various types of reactions. **5**

(b) Complete the following reactions and suggest possible mechanism for these reactions : **5**

(i) 

(ii) $2\,CH_3COH \xrightarrow{Dil.NaOH}$?

(c) Point out the similarities and differences between Hoffmann and Curtis rearrangement with suitable examples. **4**

6. (a) Explain the optical activity exhibited by biphenyls. **5**

(b) Discuss the conformational analysis of mono and disubstituted cyclohexanes. **5**

(c) Write a note on SE2 and SE1 mechanism with suitable examples. **4**

7. (a) Explain the Arrhenium ion mechanism and discuss about its orientation and reactivity. **5**

(b) Describe Gattermann-Koch reaction with mechanism. **5**

(c) How can mechanism of a reaction be determined by isotopic labelling ? Discuss with two examples. **4**

8. (a) Explain the nature bonding in Catananes and Rotaxanes with suitable examples. **5**

(b) Write a note on ambient nucleophiles and regioselectivity with suitable examples. **5**

(c) Discuss in brief : **4**

(i) Ortho/para ratio

(ii) Reimer Tiemanna reaction

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