No. of Printed Pages : **4**

21ICH1C2L

Sl. No.

M.Sc. I Semester Degree Examination, April/May - 2024

INDUSTRIAL CHEMISTRY

DSC - 2 : Theoretical Organic Chemistry

(NEP)

Time : 3 Hours Maximum Marks : 70

Note : (i) Answer **any five** questions including Q. No. 1.

(ii) Q.No. **1** is compulsory.

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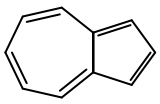
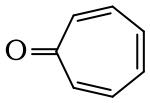
1. (a) Explain the term homoaromaticity and antiaromaticity. Discuss the aromaticity of the following compounds. **4+3+4+3=14**

(i) 

(ii) 

(b) Explain energy levels in odd and even-alternant hydrocarbons with an example.

(c) Explain aromaticity of azulene and annulenes with suitable examples.

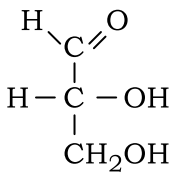
(d) State Huckel rule of aromaticity with suitable examples.

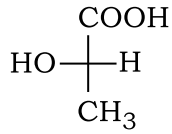
2. (a) Give a brief account of conformations and stability of 1,3-dimethylcyclohexane.

(b) Arrange the following carbocations in the order of their increasing stability with reasons.

$(CH_3)_3C^+, {}^+CH_2CH(CH_3)_2, {}^+CH_2-CH=CH_2, {}^+CH_2CH_3$

(c) Convert the following Fischer projection formulae into Sawhorse and Newman Projection. **5+4+5=14**

(i) 

(ii) 

P.T.O.

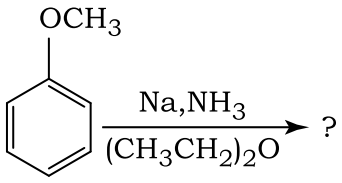
3. (a) Explain the concept of thermodynamics and kinetic control using suitable example of the reaction. **5+4+5=14**

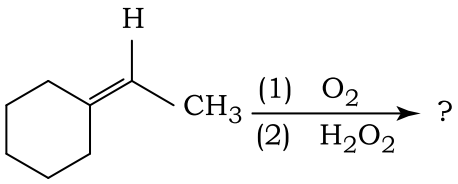
(b) Outline any two methods of generation of carbenes. Discuss their structure and stability.

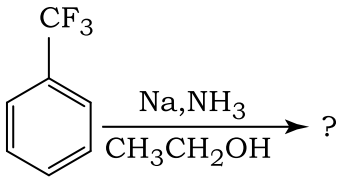
(c) Discuss the effect of substrate structure, attacking nucleophile, and leaving group on nucleophilic substitution reaction with suitable example.

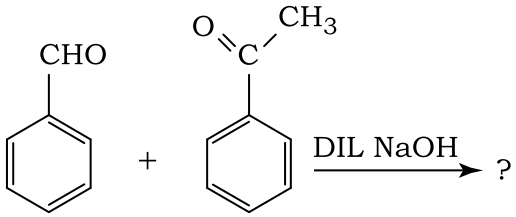
4. (a) Predict the product and sketch suitable mechanism for the following reaction.

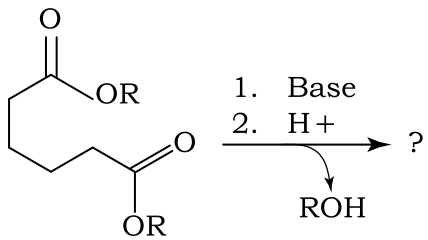
10+4=14

(i) 

(ii) 

(iii) 

(iv) 

(v) 

(b) With suitable example, discuss Wadsworth-Emmons reaction.

5. (a) Discuss the FMO of 1, 3, 5 - hexatriene with suitable example and diagram. **5+4+5=14**

(b) What are conrotatory and disrotatory motions ? Explain with suitable examples.

(c) Write short notes on :

(i) 5, 5 - sigmatropic rearrangement

(ii) Cope rearrangement

6. (a) Explain the stereochemistry of allenes and nitrogen containing compounds with suitable examples. **4+5+5=14**

(b) Write notes on :

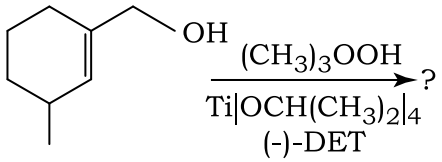
(i) Stereochemistry of ketoxime and aldoxime

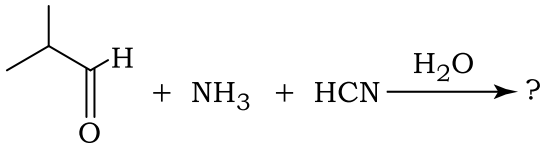
(ii) Isotopic labelling

(c) Explain, Curtin-Hammett principle. How this is useful in reaction mechanism determination.

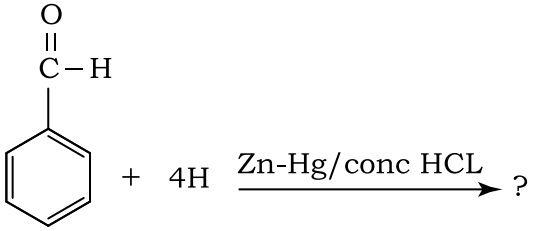
7. (a) Discuss with suitable example SET mechanisms. **4+5+5=14**

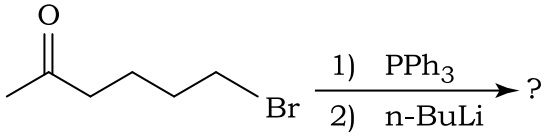
(b) Predict the product and propose suitable mechanism for the following reactions.

(i) 

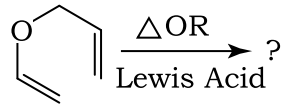
(ii) 

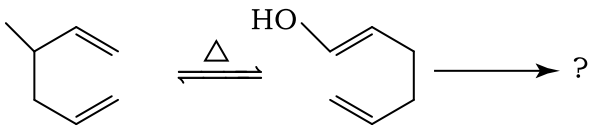
(c) Complete the following reactions :

(i) 

(ii) 

8. (a) Predict the product and propose suitable mechanism for the following reactions : **5+5+4=14**

(i) 

(ii) 

(b) What are antrafacial and suprafacial additions ? Give an example for each.

(c) What is resonance ? How this concept is useful in organic molecules properties explanation ?

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