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Total No. of Questions : 11 ]

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# CHEMSEM-102

M.Sc. (Ist Semester) Examination Dec., 2022

## CHEMISTRY

Paper - CC-2

(Organic Chemistry-I)

Time : 3 Hours ]

[ Maximum Marks : 40

### Section-A

(Marks : 1 × 10 = 10)

**Note** :- Answer all *ten* questions (Answer limit **50** words). Each question carries 1 mark.

### Section-B

(Marks : 3 × 5 = 15)

**Note** :- Answer all *five* questions. Each question has internal choice (Answer limit **200** words). Each question carries 3 marks.

### Section-C

(Marks : 5 × 3 = 15)

**Note** :- Answer any *three* questions out of five (Answer limit **500** words). Each question carries 5 marks.

### Section-A

- (i) Crown ether
- (ii) Cryptands

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**CHEMSEM-102** P.T.O.

- (iii) Cyclodextrins
- (iv) Isotopic effect
- (v) Steric effect
- (vi) Nitrene
- (vii) Taft equation
- (viii) Ortho/para ratio
- (ix) Annulenes
- (x) Regioselectivity

### **Section-B**

2. Explain the following :

- (a) Cyclopentadienyl cation is an antiaromatic compound whereas cyclopropenyl cation is an aromatic.
- (b) Allyl and benzyl halides are more reactive than alkyl halides towards nucleophilic substitution reactions.

*Or*

- (a) Ethyl acetoacetate has about 10% enol content in ethanolic solution which increases to 46% when dissolved in hexane. Explain.
- (b) What is Huckel Rule for Aromaticity ? Give its limitations ?

3. Write short notes on the following :

- (i) Hammett Postulates
- (ii) Curtin Hammett Principle

*Or*

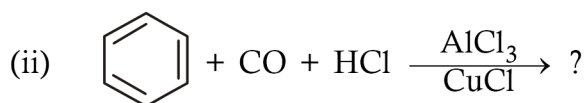
Describe any *two* methods of determining of reaction mechanism.

4. Describe SE<sup>1</sup> and SE<sup>2</sup> mechanism with suitable example.

*Or*

Discuss the IPSO attack with suitable example.

5. Predict the product and sketch a suitable mechanism for the following reactions :



*Or*

Explain the following :

(i) Hydroboration

(ii) Michael Reaction

6. Discuss the E<sub>1</sub> and E<sub>2</sub> mechanism.

*Or*

Describe the Stereochemical preference in elimination reaction.

### Section-C

7. Briefly describe the following :

(i) Aromaticity in Benzenoid and Non-benzenoid compound

(ii) Psi aromaticity

8. Explain the following :

(i) Stability and reactivity of carbene

(ii) Kinetics and thermodynamics control of reaction

9. Explain the following :
- (i) Effect of leaving group on the reactivity
  - (ii) Effect of solvent polarity on the reactivity
10. Predict the structure of alkenes expected from dehydrohalogenation of the following alkyl halides :
- (i) 2-chlorobutane
  - (ii) 2-chloro-3-methyl butane
  - (iii) 3-chloro-2-methyl butane
  - (iv) 2-chloro-3-methyl pentane
  - (v) 2-chloro-3, 3-dimethyl pentane
11. Discuss the following :
- (i) Diazonium coupling
  - (ii) Asymmetric epoxidation