Unit III

5. (a) Write notes on the following : **12**

(i) Hammond's postulate

(ii) Classical and non-classical carbocations with their generation and stability

(iii) Generation, stability and reactivity of free radicals.

(b) Explain the stability of cyclopropyl methylcarbocations. **4**

(c) Discuss the mechanism of : **4**

(i) Acyloin condensation

(ii) Addition of HBr to propene in presence of peroxide.

6. (a) Write short notes on following : **8**

(i) Kinetically and thermodynamically controlled product

(ii) Curtin-hammett principle.

(b) What are Carbenes ? How are they generated ? Give the structure of singlet and triplet methylene. **6**

AA-292

M. Sc. EXAMINATION, May 2017

(First Semester)

(Re-appear Only)

CH-503-B

CHEMISTRY

Organic Chemistry-I

(Structure and Mechanism in Organic Chemistry-I)

Time : 3 *Hours*] [*Maximum Marks :* 100

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. Explain the following terms with suitable example : **20**

(a) Aromaticity, Homo-aromaticity and Anti-aromaticity

(b) Alternate and non-alteranate hydrocarbons

(c) Cross-conjugation and Hyperconjugation

(d) Cryptands and inclusion compounds

(e) Catenin and rotaxanes.

2. (a) What are crown ethers ? Give methods of preparation of crown ether. Give some application of crown ethers. **8**

(b) Construct molecular orbital diagram of allyl system by the use of the perturbation molecular orbital theory. **5**

(c) Explain the aromaticity of Azulene ($C_{10}H_8$). **3**

(d) What is molecular orbital theory ? Give basic principles of molecular orbital theory. **4**

Unit II

3. (a) Discuss the conformations of Cis and trans decalins. **6**

(b) Attempt the following : **12**

(i) What is asymmetric synthesis ? Describe with example.

(ii) Discuss optical activity of allenes.

(iii) Discuss optical activity due to halicity

(iv) Discuss sharpless asymmetric epoxidation.

(c) Draw the preferred conformation of 2-bromocyclohexanone. **2**

4. (a) Discuss the effect of conformation on chemical reactivity by taking examples of cyclohexane derivatives. **8**

(b) Discuss the stereochemistry of nitrogen containing compound, strain and their consequences in small ring heterocyclic compounds. **4**

(c) Discuss annomeric effect with example. **4**

(c) Attempt the following : **6**

(i) Discuss stability of α-substituted alkyl free radicals

(ii) Discuss the rearrangement reaction of carbocations and cabanions.

Unit IV

7. (a) Discuss the basic theory, instrumentation and application of Gel Permeable Chromatography. **10**

(b) Write short notes on following : **10**

(i) Electrophoresis

(ii) Counter current distribution.

8. (a) Discuss HPLC and Reverse HPLC with schematics diagram. **10**

(b) Write short notes on the following : **10**

(i) Gas chromatography

(ii) Thin layer Chromatography.

(c) Attempt the following : **6**

(i) Discuss stability of α-substituted alkyl free radicals

(ii) Discuss the rearrangement reaction of carbocations and cabanions.

Unit IV

7. (a) Discuss the basic theory, instrumentation and application of Gel Permeable Chromatography. **10**

(b) Write short notes on following : **10**

(i) Electrophoresis

(ii) Counter current distribution.

8. (a) Discuss HPLC and Reverse HPLC with schematics diagram. **10**

(b) Write short notes on the following : **10**

(i) Gas chromatography

(ii) Thin layer Chromatography.