

M.Sc. (Part-I) (Chemistry) (NEP Pattern) Semester-I  
**NEP-12 / 01MSCCH02 - Paper-II : Organic Chemistry-I**

P. Pages : 2

Time : Three Hours



**GUG/S/25/15071**

Max. Marks : 80

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1. a) Explain the following- 8
- i) Aromaticity in benzenoid & non benzenoid compounds.
- ii) Rotaxanes.

- b) Explain phase transfer catalyst and discuss the role of crown ether as phase transfer catalyst. 8

**OR**

- c) Explain the bonding in fullerenes. 4
- d) Explain role of imines in organic synthesis. 4
- e) Discuss Graphene - as a phase transfer catalyst. 4
- f) Explain aromaticity of cyclopentadienyl anion. 4

2. a) Discuss stereochemistry of biphenyl in detail. 8
- b) Explain generation of singlet oxygen along with its reaction with organic substrate. 8

**OR**

- c) Explain the effect of conformation on reactivity of cyclohexane. 4
- d) Explain - 4
- i) Threo and erythro isomers
- ii) Prochirality
- e) Explain classical and non-classical carbocations. 4
- f) Discuss formation and reactions of carbenes. 4

3. a) Explain the following- 8
- i) Curtin-Hammett principle                      ii) Isotope effect
- b) Explain neighbouring group participation by Pi and sigma bond with example. 8

**OR**

- |           |  |          |
|-----------|--|----------|
| c)        | Discuss hard and soft acids & bases with examples.   | 4        |
| d)        | Write a note on carbocation rearrangement in neighbouring group participation.   | 4        |
| e)        | Explain Taft equation.   | 4        |
| f)        | Explain role of oxygen and nitrogen as neighbouring group in neighbouring group participation.                         | 4        |
| <b>4.</b> | a) Explain the effect of leaving group ambient substrate and ambient nucleophiles at allylic and vinylic carbon atoms. | <b>8</b> |
|           | b) Discuss the following-  | <b>8</b> |
|           | i) Sommelet- Hauser rearrangement  |          |
|           | ii) Gotterman-Koch reaction  |          |

**OR**

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|-----------|--|----------|
| c)        | Explain the mechanism of $SN^1$ reaction.                | 4        |
| d)        | Write a note on smiles rearrangement.                    | 4        |
| e)        | Explain Diazonium coupling.                              | 4        |
| f)        | Discuss mechanism of Rimer-Tiemann reaction.             | 4        |
| <b>5.</b> | a) What are annulenes.                                   | <b>2</b> |
|           | b) Explain enamines.                                     | <b>2</b> |
|           | c) Explain elements of symmetry.                         | <b>2</b> |
|           | d) What are nitrenes? Explain singlet and triplet state. | <b>2</b> |
|           | e) State Hammond postulate in short.                     | <b>2</b> |
|           | f) What is mean by migratory aptitude.                   | <b>2</b> |
|           | g) What is mean by ambient nucleophile? Give an example. | <b>2</b> |
|           | h) Write a note on ortho-para ratio.                     | <b>2</b> |

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