

B.Sc. (CBCS Pattern) Sem-V  
**USCCHT09 - Chemistry Paper-I : Organic Chemistry**

P. Pages : 2

Time : Three Hours



**GUG/W/22/13089**

Max. Marks : 50

Notes : 1. All questions are compulsory and carry equal marks.

1. a) Discuss principle of NMR spectroscopy. How many peaks would you expect in 5  
i) Ethyl acetate  
ii) Toluene
- b) Write a short note on: 5  
i) Chemical shift  
ii) Spin-spin coupling

**OR**

- c) Define and explain coupling constant J.? 2½
- d) Why TMS is used as reference compound in NMR. 2½
- e) Discuss Nuclear shielding and de-shielding? 2½
- f) The molecular formula of compound is C<sub>7</sub>H<sub>8</sub>O with NMR data as shown- 2½  
i) Singlet at 3.7 δ (1H)  
ii) Singlet at 4.4 δ (2H)  
iii) Singlet at 7.2 δ (5H)  
Assign the structure

2. a) Explain Claisen condensation with mechanism for preparation of acetoacetic ester? 5
- b) How will you prepare barbituric acid and glycine from Diethyl malonate? 5

**OR**

- c) Give the preparation of 4-methyl uracil? 2½
- d) How will you synthesize cinnamic acid from dimethyl malonate as starting material? 2½
- e) Explain Keto-enol tautomerism with example? 2½
- f) Give the preparation of succinic acid from acetoacetic ester? 2½
3. a) Discuss natural and synthetic polymer. How will you prepare Buna-S. 5
- b) What are polymers and classify on the basis of composition and origin of polymer. 5

**OR**

- |           |  |          |
|-----------|--|----------|
| c)        | What are biodegradable polymers?                           | 2½       |
| d)        | Explain vulcanization of rubber?                           | 2½       |
| e)        | Give the application of thermo softening polymer?          | 2½       |
| f)        | Explain addition reaction of polymer with example?         | 2½       |
| <b>4.</b> | a) Explain twelve principles of green chemistry?           | <b>5</b> |
|           | b) Discuss the green chemistry in Sustainable development? | <b>5</b> |

**OR**

- |           |   |    |
|-----------|---|----|
| c)        | Why is it better to prevent pollution and hazardous materials than to produce and clean them? | 2½ |
| d)        | Explain catalysis in green chemistry.   | 2½ |
| e)        | Discuss the term cardle to cardle in Green chemistry.   | 2½ |
| f)        | Discuss about alternative feedstock in green chemistry?                                       | 2½ |
| <b>5.</b> | <b>Attempt any ten.</b>   |    |
| a)        | What is the relation between T and $\delta$ values?   | 1  |
| b)        | How many signals are obtained in 1, 2-dichloro ethane?  | 1  |
| c)        | Name two solvents used in NMR spectroscopy.   | 1  |
| d)        | Define active methylene compound with example.  | 1  |
| e)        | What are enolates?  | 1  |
| f)        | What is ketonic hydrolysis?   | 1  |
| g)        | What is PVC?  | 1  |
| h)        | Write structure of phenol-formaldehyde resin.   | 1  |
| i)        | Define cross linked polymer with example.   | 1  |
| j)        | What is atom economy?   | 1  |
| k)        | Give any two examples of green solvents?  | 1  |
| l)        | Who is the father of green chemistry?   | 1  |

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