

B.Sc.- III (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.  
2. All questions carry equal marks.

1. a) What is NMR spectroscopy? Explain principle of NMR spectroscopy. **5**
- b) i) Explain the role TMS in NMR spectroscopy. **5**  
ii) A compound with molecular formula  $C_2H_6O$  gives the following NMR data.  
a) Triplet,  $1.8 \delta$  (3H)  
b) Quadrate,  $3.6 \delta$  (2H)  
c) Singlet,  $4.80 \delta$  (1H)  
deduce the structure of compound.

**OR**

- c) What is the equivalent and nonequivalent protons with example. **2½**
- d) Discuss Spin-Spin coupling in NMR spectroscopy. **2½**
- e) How many number of NMR peak observed in **2½**  
i) 1, 2, 2 tribromo ethane  
ii) Ethyl bromide
- f) Write note on Shielding and deshielding in NMR. **2½**
2. a) How will you convert diethyl malonate into following. **5**  
i) Cinnamic acid. ii) Glycine
- b) Discuss the mechanism of Claisen condensation. **5**

**OR**

- c) Write a note on Keto-enol tautomerism in Acetoacetic ester. **2½**
- d) How will you prepare diketone from Acetoacetic ester. **2½**
- e) How will you convert malonic ester into dimethyl succinic acid. **2½**
- f) Explain, why  $\alpha$ -hydrogen atoms are acidic in nature in reactive methylene compound. **2½**
3. a) Discuss natural and synthetic polymers. How will you prepare chloroprene? **5**
- b) Write a note on: **5**  
i) Phenol-formaldehyde polymer ii) Polythene polymer

**OR**

- c) Explain vulcanization of rubbers. 2½
- d) What is addition polymerization reaction. 2½
- e) Give classification of polymers including di-block, tri-block and amphiphilic polymers. 2½
- f) Explain cure reaction. 2½
4. a) Explain twelve principles of green chemistry. 5
- b) Write a uses of alternative basic chemical as feedstocks in chemical industry and research green chemistry. 5

**OR**

- c) Write about alternative solvents in green chemistry. 2½
- d) Write about sustainable developments designing products under the holistic approach "Cradle to cradle". 2½
- e) Give preparation of Acetanilide by using green synthesis approach. 2½
- f) What are the alternative techniques in organic synthesis? 2½
5. Attempt **any ten** **10**
- 1) What is PMR spectroscopy?
  - 2) Write splitting of "a" and "b" protons in following compound  

$$\overset{a}{CH_3}-\overset{b}{CH_2}-OH$$
  - 3) What is chemical shift?
  - 4) What is reactive methylene group?
  - 5) Draw the enol form of Malonic ester.
  - 6) How acetic acid is obtained from malonic ester. (Reaction only)
  - 7) What is PVC.
  - 8) What is Biodegradable polymer.
  - 9) Give some uses of rubber.
  - 10) Give application of green chemistry.
  - 11) What is toxicity of solvent.
  - 12) Write some catalyst used in green chemistry.

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