Roll No. .....

(12/19-II)

5170

B. Sc. EXAMINATION

(First Semester)

CHEMISTRY

Third Paper (CH-103)

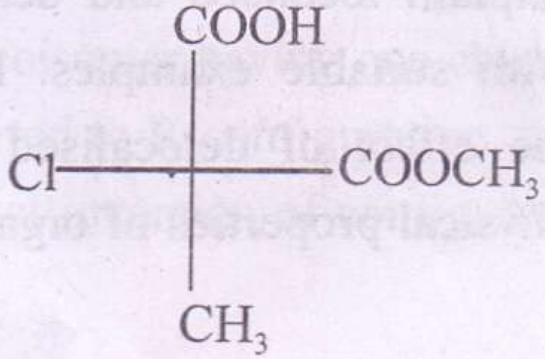
Organic Chemistry

Time : Three Hours *Maximum Marks : 27*

Note : Q. No. **1** is compulsory. Attempt *five* questions in all, selecting *two* questions from each Section.

1. (a) What is Hyperconjugation ? Why is it called no bond resonance ?

(b) Assign 'R' and 'S' configuration to the following with reasoning :



(c) What is the difference between enantiomers and diastereomers ?

(d) Differentiate between intermediate and transition state is organic reactions.

(e) How many hyperconjugated structures will be formed in $(CH_3)_3C^+$?

(f) Cyclopropanes have greatest ring strain yet they are readily prepared. Why ?

(g) Which of the following compounds has highest boiling point ? 1×7=7

(i) Pentane

(ii) 2-Methylbutane

(iii) Cyclopentane.

Section A

2. (a) Explain 'Electromeric' effect with suitable examples. 2

(b) Explain localised and delocalised bonds with suitable examples. Discuss briefly the effect of delocalised bonds on the physical properties of organic molecules. 3

3. (a) What are + R and – R effects ? Explain with *one* example in each case. 2

(b) Draw Potential energy diagram for various conformations of cyclohexane and explain their relative stability. 3

4. State whether the following statements are true or false. Justify your answer with proper reasoning : 5

(a) A molecule with R-configuration is always dextrorotatory.

(b) An achiral compound can have chiral centres.

(c) An optically inactive substance must be achiral.

(d) When an achiral molecule reacts to give a chiral molecule, the product is always racemic.

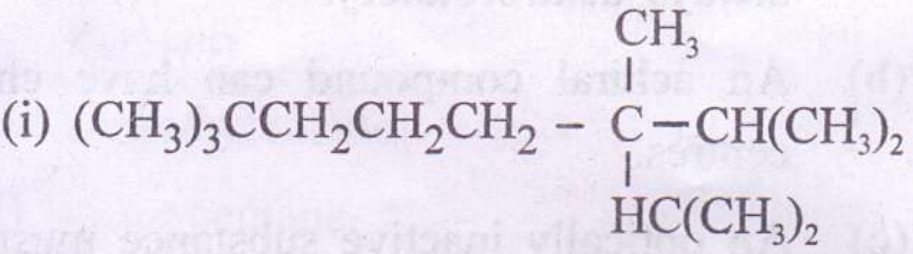
(e) In chemical reactions, if S-configuration of a stereoisomer having one chiral centre is converted to R-configuration, it always means that inversion of configuration has occurred.

Section B

5. (a) Draw E-level diagram for catalysed and uncatalysed reactions. 3

(b) Define and illustrate the term 'Isotope Effect'. In what way it is useful in determining the mechanism of organic reaction ? 2

6. (a) Give IUPAC name of the following :

(i) 

(ii) $CH_3CH\ (CH_2CH_2CH_3)_2$ 1

(b) Electrolysis of an aqueous solution of sodium propanoate gives butane, ethane, ethylene and ethyl propanoate. Suggest suitable mechanism for these products. 2

(c) Neopentyl chloride is generally prepared by free radical chlorination of neopentane. Explain. 2

7. (a) Discuss briefly Sachse-Mchr theory of strainless rings. How does it account for the stability of cycloalkanes containing six or more carbon atoms. 3

(b) Complete the following : 2

(i) $ClCH_2CH_2CH_2Cl \xrightarrow{Mg} ?$

(ii) $ClCH_2CH_2CH_2CH_2Cl \xrightarrow{Mg} ?$