(i) Printed Pages : 7] Roll No. ....

(ii) Questions : 9] **Sub. Code : 0 0 5 0**

Exam. Code : 0 0 0 1

B.A./B.Sc. (General) 1st Semester Examination

1127

CHEMISTRY

(Organic Chemistry–A)

(Same for B.Sc. Microbial and Food Tech.)

Paper : II

Time : 3 Hours] **[Max. Marks : 22**

Note :– Attempt *five* questions in all selecting *one* question from each Unit. Question No. **9** is compulsory. All quesetions carry equal marks.

Unit–I

1. (a) With the help of suitable examples, describe the effect of lone pairs of electrons on the central atom of a molecule on the bond angle of that compound.

(b) Define resonance effect. Account for the low reactivity of vinyl and aryl halides towards nucleophilic substitution reactions as compared to alkyl halides.

(c) Define Hydrogen bonding. Explain why 2-hydroxybenzoic acid is 17 times stronger an acid compared to benzoic aicd ?

2. (a) What are free radicals ? Arrange the following radicals in order of increasing stability and explain the reason for your choice :

$$(CH_3)_2\dot{C}H,\ (CH_3)_3\dot{C},\ \ \dot{C}H_3,\ \ CH_3\dot{C}H_2$$

(b) What are rearrangement reactions ? Discuss the role of [1, 2]-hydride and [1, 2]-methyl shifts in the rearrangement of carbocations ?

(c) Draw and explain the energy profile diagram of a non-concerted reaction with an isolable intermediate.

Unit–II

3. (a) Give the mechanistic details of Corey-House reaction for preparation of *n*-peptane.

   (b) Write a note on sulphonation of alkanes.

   (c) As the Kolbe's electrolysis reaction proceeds, the pH of solution gradually increases. Explain.

4. (a) Give details of the relative reactivity and orientation in halogenations of alkanes.

   (b) Write a note on Dieckmann condensation reaction for the preparation of cycloalkanes.

   (c) Describe the salient features of Baeyer's strain theory. Calculate the angle strain in a simple cyclopentane ring.

Unit–III

5. (a) With the help of suitable examples, explain the following :

   (i) Ring-chain isomerism

   (ii) Optical activity

   (iii) Meso compounds

(b) Write notes on the following :

(i) Relative and absolute configurations

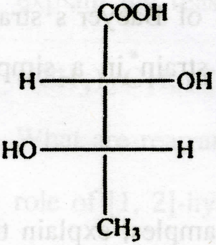
(ii) Alternating axis of symmetry

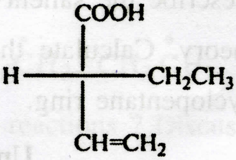
6. (a) Differentiate between the following, giving suitable examples :

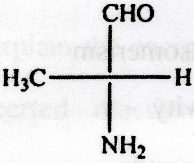
(i) Internal and external compensation

(ii) Enantiomers and diastereomers

(b) Assign R or S configuration to the chiral centres in the following compounds :

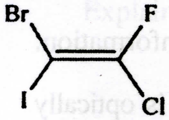


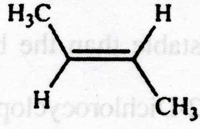


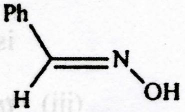


Unit–IV

7. (a) Differentiate between *cis/trans* and E/Z nomenclature for geometrical isomers. Assign E or Z nomenclature to the following compounds :







(b) Draw the Newman projection formulae for the different conformations of *n*-butane along with the energy profile diagram. Account for the difference in energy of these conformations.

(c) What is the necessary and sufficient condition for geometrical isomerism ?

8. (a) Write a detail note on the determination of configuration of geometrical isomers, citing suitable examples.

(b) Explain the following observations :

   (i) Substitution at equatorial position of cyclohexane is more stable that at axial position.

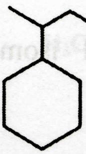
   (ii) Twist boat conformation of cyclcohexane is more stable than the boat conformation.

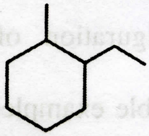
   (iii) *trans*-1, 2-Dichlorocyclopropane is optically active while *cis*-1, 2-dichlorocyclopropane is optically inactive.

(Compulsory Question)

9. (a) The electronic configuration of carbon predicts it to be divalent, however it is tetravalent. Explain.

   (b) Give the IUPAC nomenclature for the following compounds :





(c) Draw the Fischer projection of the compound :

$CHO(CHOH)_2CH_2OH$

(d) All chiral centres are stereogenic centres, however all stereogenic centres are not chiral. Explain.