Exam. Code : 107401
Subject Code : 2174

B.Sc. (Biotechnology) Semester—I

BT–4 : ORGANIC CHEMISTRY–A

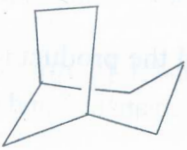
Time Allowed—3 Hours] [Maximum Marks—40

SECTION—A

Note :— Attempt **ALL** questions. Each question carries 1 mark.

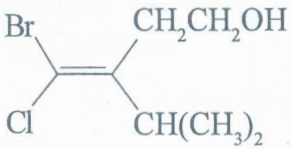
1. Why alcohol (lower members) have high boiling point ?

2. Give the IUPAC nomenclature of following :



3. What is Epoxidation ?

4. Assign E or Z notation to following :



5. Discuss two properties for Enantiomer and Diastereomer.

6. Discuss one example of molecule having chirality center other than carbon.

7. Define the term Nucleophilicity.

8. What do you mean by solvolysis reaction ?

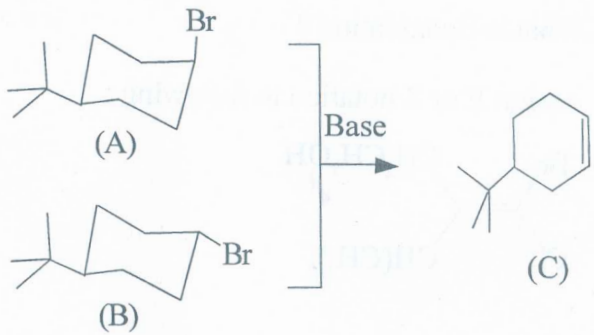
SECTION—B

Note :— Attempt any **FIVE** questions. Each question carries 4 marks.

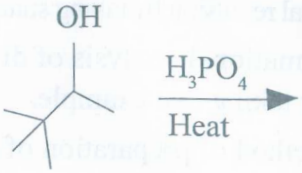
9. Discuss conformational analysis of butane (as Newman projections) with the help of potential energy diagram.

10. Discuss the structure, stability and bonding in free radicals.

11. Which reactant (A or B) yield the product (C) faster ? Discuss in detail with suitable explanation and mechanism to support your answer.



12. Identify the product(s) obtained in the following reaction. Discuss the mechanism and reasoning for the formation of each product.



13. Differentiate between prochirality center and prochiral face by taking suitable examples. Also discuss the meaning of *pro*-S and *pro*-R by citing one example in each case.

14. (a) Identify the chiral center, if any in the following compounds :

    (i) 2-cyclopentenol

    (ii) 1,1,3-trimethylcyclobutane

    (iii) 2-bromo-2-methylbutane

    (iv) 1,2-epoxypropane.

    (b) Discuss kinetic resolution method for the resolution of Enantiomers.

15. Discuss the stereochemistry as observed in the case of S_N2 reaction.

16. (a) How carbocation will rearrange in the hydrolysis reaction of 2-bromo-3-methylbutane ?

    (b) Discuss S_N1–S_N2 mechanistic continuum.

SECTION—C

Note :— Attempt any **TWO** questions. Each question carries 6 marks.

17. (a) Explain 1,3-diaxial repulsion by taking suitable example.

    (b) Discuss conformational analysis of di-substituted cyclohexane by taking one example.

    (c) Discuss one method of preparation of alkyl halide from alcohol with mechanism. 2,2,2

18. (a) What do you mean by hydrogenation of alkene ? Discuss reagents and mechanism for this reaction along with stereochemical aspect of the reaction.

    (b) It is true that 3° alcohol and 1° alkyl halides react by E_1 and E_2 mechanism respectively. Based on these observations, predict through which mechanism 1° alcohol and 3° alkyl halide should react. Write plausible mechanism and explanation in each case. 3,3

19. (a) Discuss with examples the reactions which can yield a chiral (may or may not be racemic) product from :

    (i) achiral starting material

    (ii) chiral but optically inactive reactants.

    (b) Differentiate between the absolute and relative configuration of the molecule. 4,2

20. (a) "Partial but not complete loss of optical activity was observed in SN^1 reaction." Comment on statement with suitable example and explanation.

    (b) What are the effects of the solvents on the rate of nucleophilic substitution reaction ? 3,3