Class Test-1, 2024-2025

Semester-4, DSCC-5, Organic Chemistry

FM: 20, Time: 48 minutes

Date of Examination: 18. 07. 25

Topic: Stereochemistry

Attempt any Four questions: 4 x 5

1. (a) Draw the potential energy diagram of *n*-butane for rotation around C2-C3 bond showing the conformers. Explain the relative stabilities of the conformer. 3

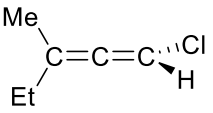
   (b) Draw the most stable conformations of 1,2-dibromoethane and ethylene glycol and justify your answer. 2

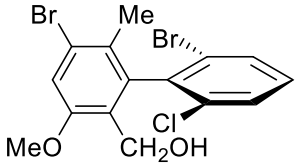
2. (a) Draw the conformers of 1-chlorobutane for rotation about C1-C2 bond. Comment on the relative stabilities of the conformers. 3

   (b) The rotational energy barriers in CH_3CH_2X (X = F, Cl, Br, I) are remarkably similar in magnitude despite considerable differences in the size of halogens. How do you explain for the fact. 2

3. (a) Explain the nature of stereoisomerism exhibited by the compounds of the formula $XYC=(C=)_nXY$ where n = 1 and 2. 3

   (b) For each of the following molecule, designate the *R/S* configuration after determining the priority order. 2

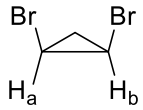
(a) 

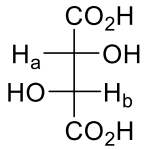
(bi) 

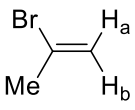
4. (a) Explain the stereoisomerism of 6,6'-dinitrodiphenic acid and draw the energy profile diagram for racemization of its enantiomers on heating. Label each maximum and minimum with appropriate rotamers. 3

   (b) Define atropisomerism with suitable examples. 2

5. (a) Find out the topicity relationship between the marked ligands in each of the following: 3

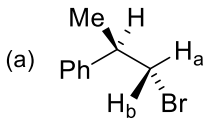
(a) 

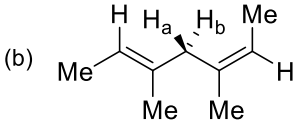
(b) 

(c) 

   (b) All stereogenic centres are not chiral. Justify with suitable examples 2

6. (a) Identify, with explanation, among the marked hydrogens the *pro-R* and *pro-S* ones in each case. 3

(a) 

(b) 

   (b) Determine the configuration of the final product resulting from attack of MeMgBr onto the *Re*-face of *R*-2-hydroxypropanal and subsequent hydrolysis. 2

End