



Eastern University, Sri Lanka

First Year Second Semester Examination in Science

2007/2008(August /September 2009)

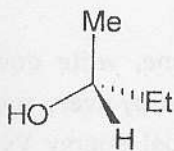
CH 103 Stereochemistry and Kinetic Molecular Theory of Gases

Proper and Repeat

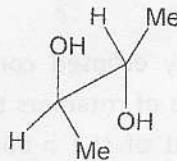
Time Allowed: **ONE HOUR**

1. (i) Draw the Fischer projection formulae of the following molecules

(a)



(b)



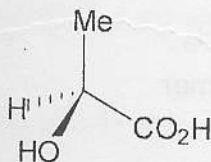
25 marks

(ii) A solution of an optically active organic compound **A** was prepared by dissolving 1g of this compound in 10ml of water. The optical rotation of this solution when measured in a tube of length 5cm using sodium D line at 25°C was found to be 7.95°. Calculate the specific rotation of the compound **A**.

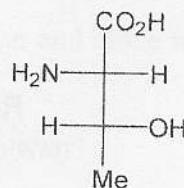
25 marks

(iii) Specify the configuration of the chiral centers in the following molecules as R or S. Give reasons for your answer.

(a)



(b)



25 marks

P.T.O

(iv) Draw the two possible chair conformations of *cis*-1-*tert*-butyl-4-chlorocyclohexane and give reasons which one is the most stable chair form.

25 marks

2. (a) (i) Write down the kinetic gas equation and ideal gas equation and explain all the terms involved in them.

15 marks

(ii) Derive an expression from the kinetic gas equation, the kinetic energy of a gas of one

mole
$$E = \frac{3}{2} RT$$

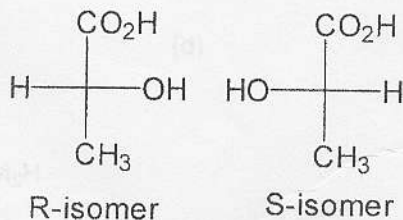
25 marks

(b) (i) Starting from fully eclipsed conformation of *n*-butane, write down all the Newman projection formula of rotamers that could be obtained by every successive 60° rotation about 2C-3C bond of the *n*-butane. Draw a potential energy Vs degree of rotation diagram to show the relative energies of the various rotamers

40 marks

(ii) Describe a method to resolve a racemic mixture containing R and S lactic acid.

Structures of R and S-lactic acid is



20 marks