Eastern University, Sri Lanka

First Year Second Semester Examination in Science-2010/2011

(April/May 2012)

CH 103 Stereochemistry and Kinetic Molecular Theory of Gases

(Proper and Repeat)

Answer all questions

Time: 01 hour

1. (a) Define the term "Chirality".

   (10 marks)

   (b) Briefly explain the different methods that can be used to separate two enantiomers in a racemic mixture.

   (20 marks)

   (c) Explain how you separate a racemic mixture of an alcohol ($\pm$ ROH) using suitable separation mechanism.
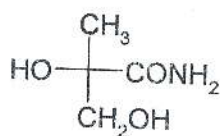
   (20 marks)

   (d) Name correctly whether following isomers are **E** or **Z** and justify your answer using E/Z nomenclature.

a.   b.
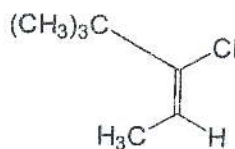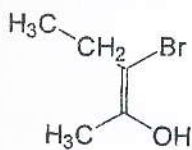
   (20 marks)

Contd...

(e) Assign the stereogenic centres as R or S in the following compound. Give re
for your answer.

$$
\begin{array}{c}
CH_3 \\
HO-\!\!\!-\!\!\!-CONH_2 \\
CH_2OH
\end{array}
$$

(30

2. (a) How does the real gas deviate from the ideal behaviour?

(20

(b)Derive the Vanderwaal's equation from ideal gas equation and explain all the terms
involved.

(30

(c) The molecular velocity of a gas molecule enclosed in a cubic box can be expressed
follows,

$$PV = \frac{1}{3} mN\overline{C^2}$$

Where,

V= Volume for the cubes, P= Pressure of the gas, m= Mass of one molecule, N= T
number of gas molecule, C= Velocity of a molecule

i. Derive the root mean square velocity for one mole of gas using above equation

(25

ii. Calculate the root mean square velocity of an Argon (Ar) Molecule at 30 °C
cm Hg pressure (Ar = 40, ; R = 8.314 J mol^{-1} K^{-1})

(25