

EASTERN UNIVERSITY SRI LANKA
 FIRST EXAMINATION IN SCIENCE (2003/2004) - Repeat -
 EXTERNAL DEGREE

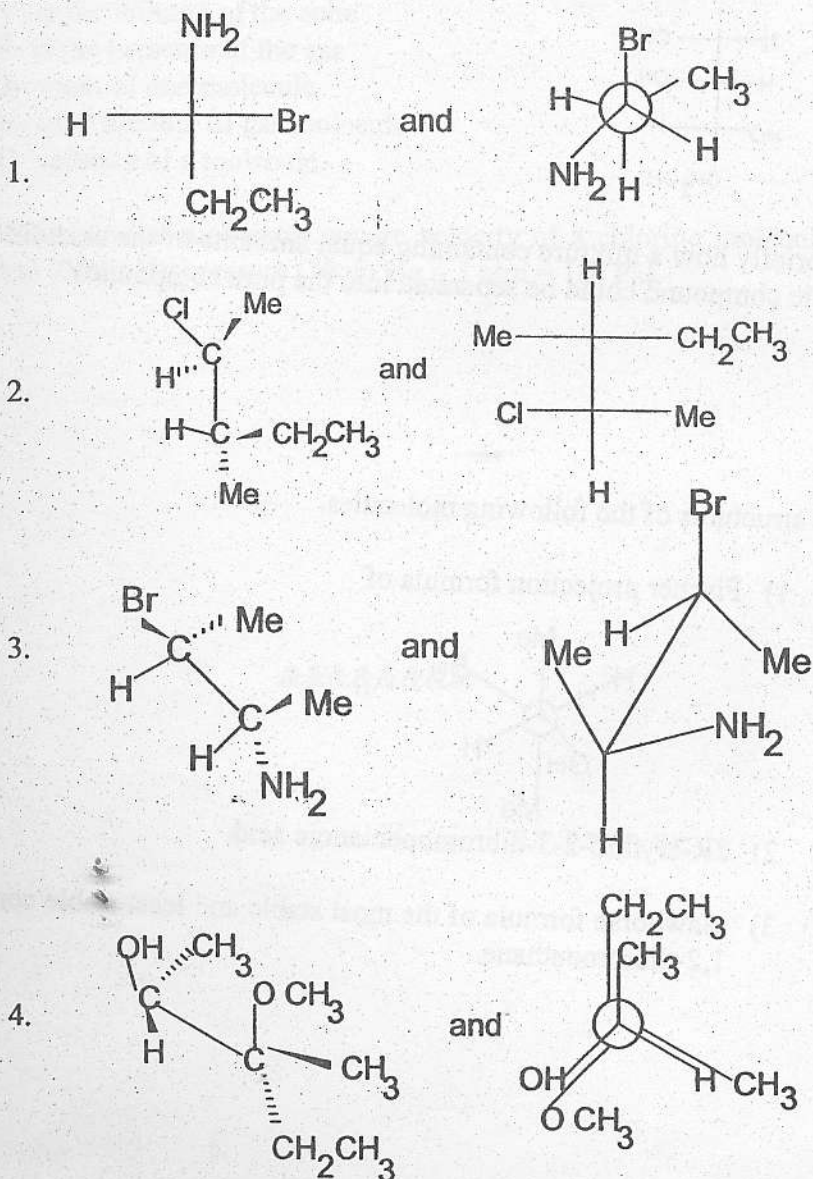
SECOND SEMESTER (Oct./Nov. 2007)

EXTCH 103- STEREOCHEMISTRY AND KINETIC MOLECULAR THEORY

ANSWER ALL QUESTIONS

TIME - ONE HOUR

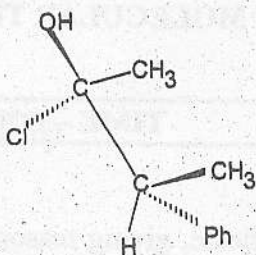
1. a) For each of the following pairs of compounds, indicate, giving reasons, whether they are enantiomers, diastereoisomers, geometrical isomers or identical compounds.



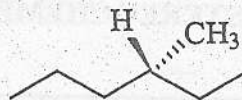
Turn over

b) Giving reasons, specify the configuration of the following molecules as R or S.

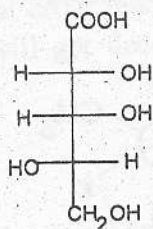
i)



ii)



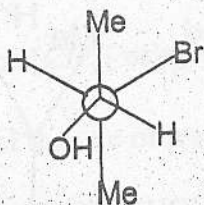
iii)



c) Explain briefly how a mixture containing equal amounts of the enantiomeric pair of a carboxylic compound could be separated into the pure compounds.

2. a) Give the structures of the following molecules.

1) Fischer projection formula of



2) 2R-erythro-2,3-dibromopentanoic acid.

3) Sawhorse formula of the most stable and least stable conformations of 1,2-dibromoethane.

b) Considering a certain mass of a gas enclosed in a cubic box of length l at a fixed temperature. Derive expressions for,

- ii) The total change of momentum per second on one face of the box due to one molecule only.
- iii) The total change of momentum due to impacts of all the molecules on all faces of the box.
- iv) Show that

$$PV = \frac{1}{3} mNC^2$$

Where,

V- is the volume of the cube

P- is the pressure of the gas

m- mass of one molecule

N- total number of gas molecule

C- velocity of a molecule.

- v) Calculate the root mean square velocity of a chlorine molecule at 27°C and 78 cm Hg pressure (76cm Hg = 1 atm = 10^5 Pa).

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