UNIVERSITY OF JAFFNA, SRI LANKA
BACHELOR OF PHARMACY
SECOND YEAR FIRST SEMESTER EXAMINATION – JULY 2013
PHARMACEUTICAL CHEMISTRY II - PHACH 2102

Date: 21.08.2013 **Time: 03 Hours**

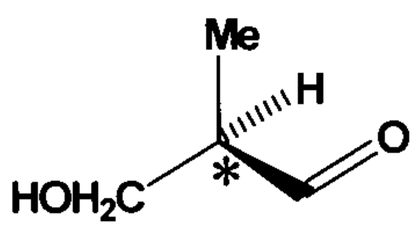
ANSWER ALL **SIX** QUESTIONS
Answer part A and part B in A separate answer book.

Part A

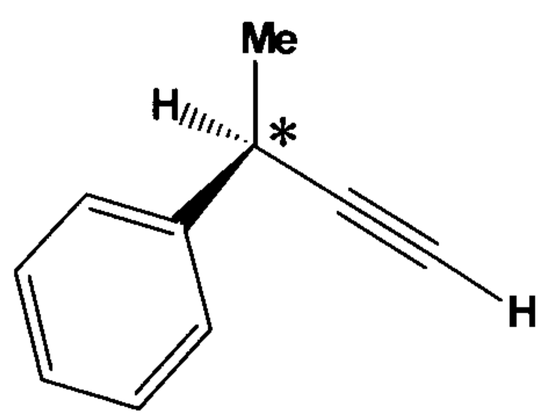
1.

1.1 Assign **R** or **S** configuration to the indicated stereogenic centres in the following molecules: (40 Marks)

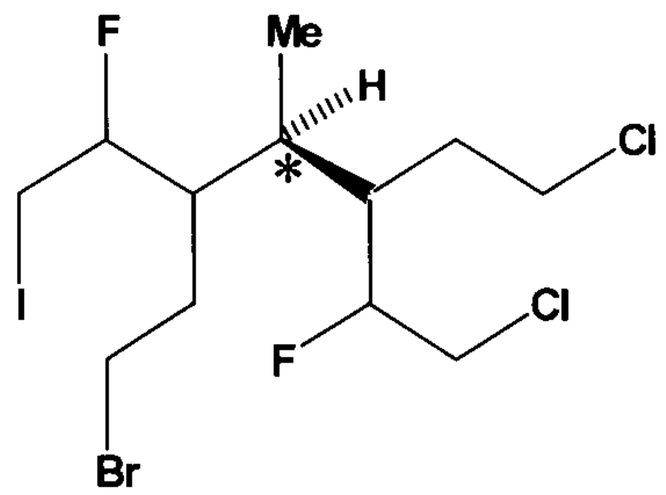
(i)



(ii)

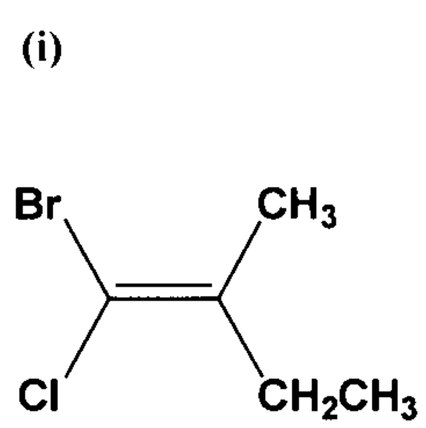


(iii)

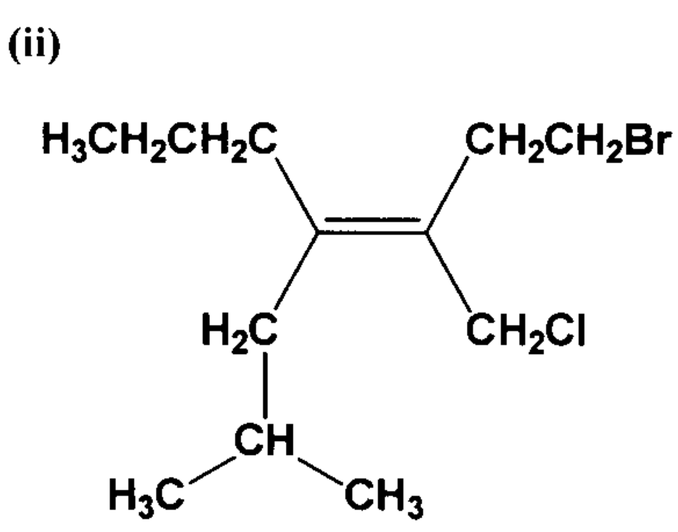


1.2 Specify the configuration as **E** or **Z** for the following molecules: (30 Marks)

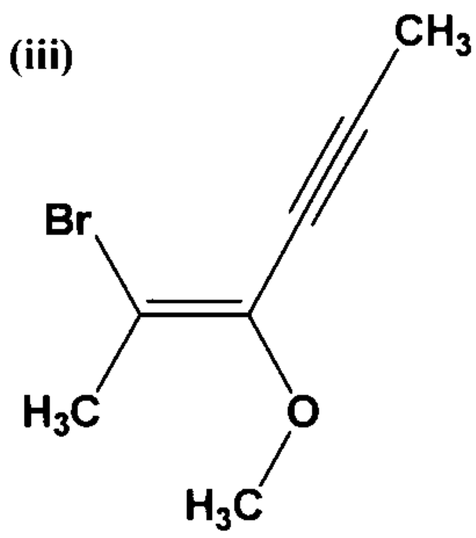
(i)



(ii)

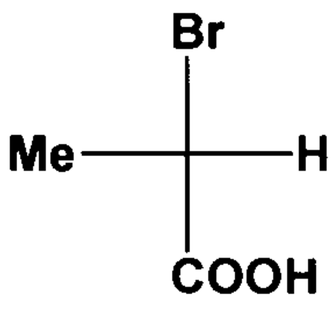


(iii)



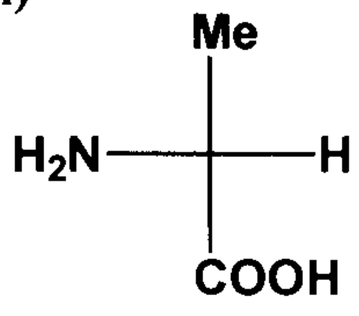
1.3 Specify the configuration as **D** or **L** for the following compounds: (30 Marks)

(i)



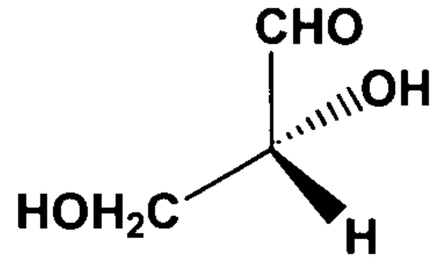
Fischer Projection

(ii)



Fischer Projection

(iii)

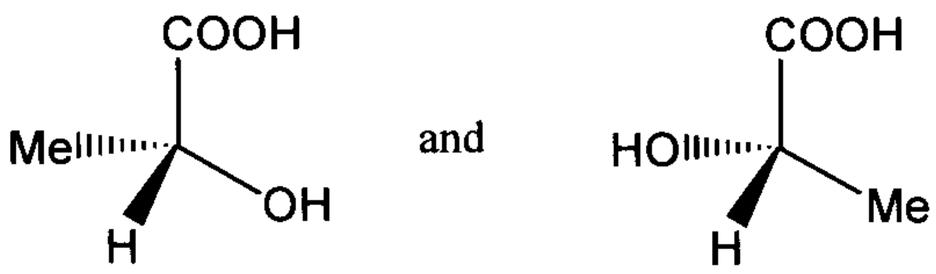


2.

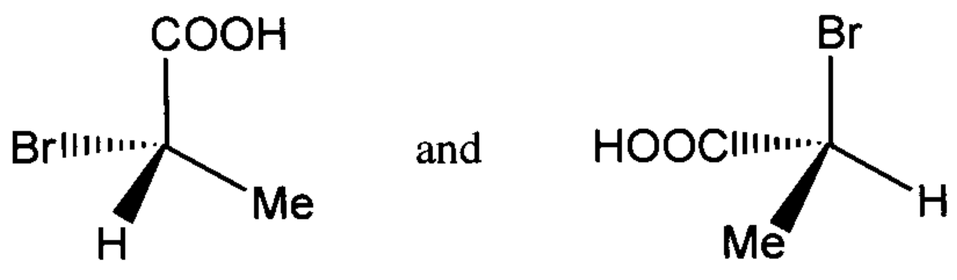
2.1 The concentration of cholesterol dissolved in chloroform was found to be 6.15 g/100 mL. A portion of this solution in a polarimeter tube of 5 cm length caused an observed rotation of -1.2°. Calculate the specific rotation of cholesterol. (30 marks)

2.2 2Classify each of the following pairs of organic compounds as enantiomers, diastereoisomers, geometrical isomers or identical compounds: (40 marks)

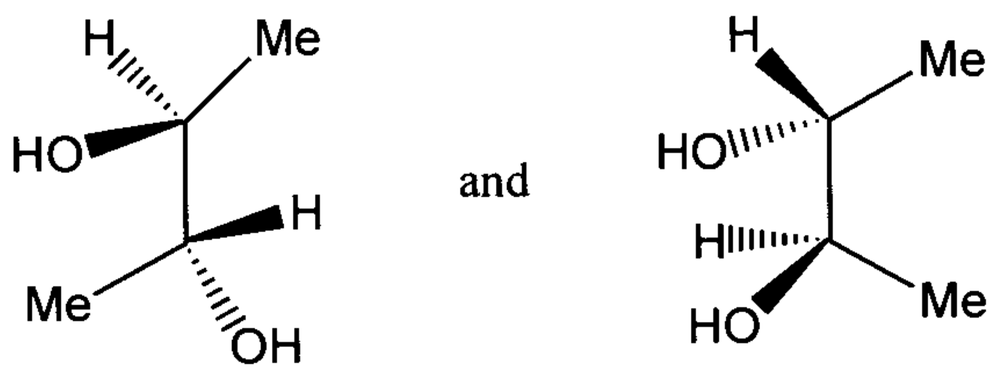
2.2.1



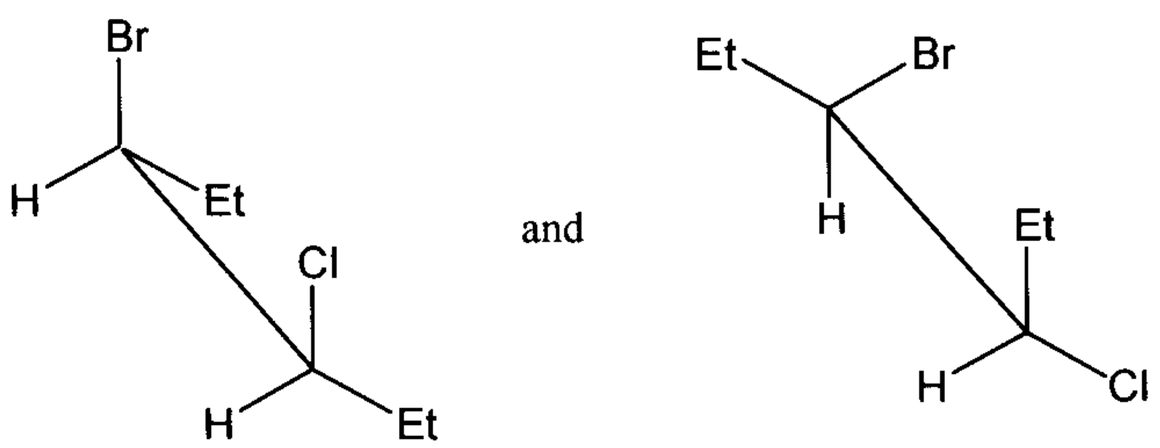
2.2.2



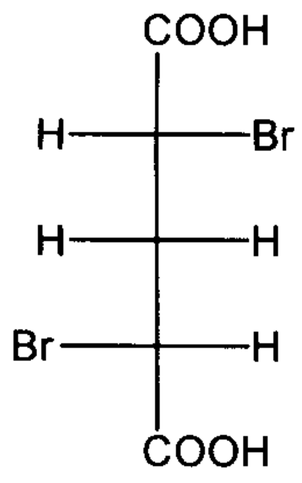
2.2.3



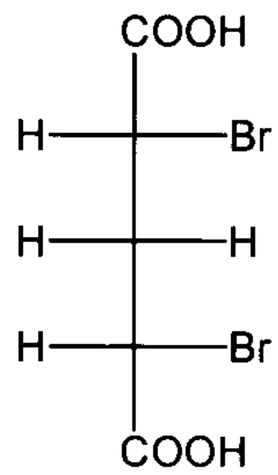
2.2.4



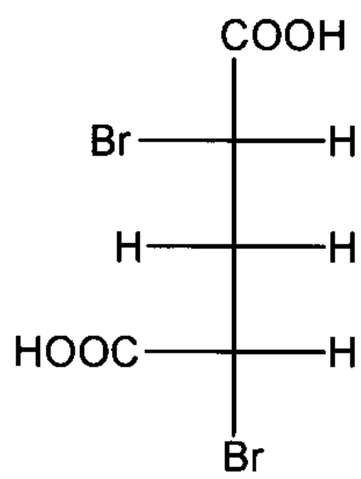
2.3 Consider the following molecules **J**, **K** and **L** to answer the questions given below (30 Marks)



J



K



L

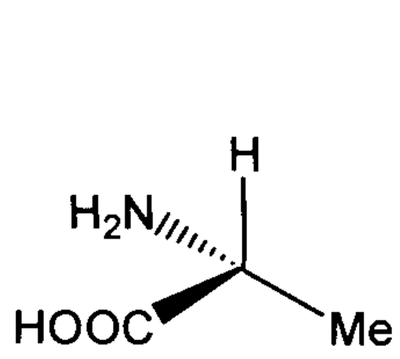
What is the stereochemical relationship between **J** and **L**?

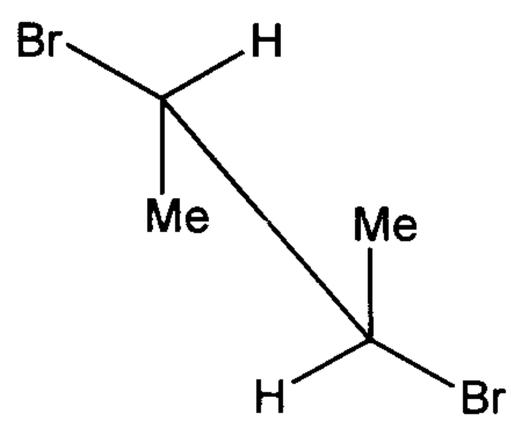
Which one of the three compounds is achiral?

How would the specific rotations of **J**, **K** and **L** differ?

3.

3.1 Draw the Fischer projection formula for the following molecules: (30 Marks)





3.2 Answer the following by considering 1,4-dimethylcyclohexane: (40 Marks)

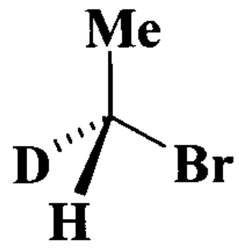
3.2.1 Draw the planar structures and the corresponding chair conformations of *syn*- and *anti*-1,4-dimethylcyclohexanes.

3.2.2 Indicate the most stable and the least stable chair conformations of this compound.

3.3 Define the term "***enantiomeric excess***". (30 Marks)
The enantiomeric excess of an organic sample was found to be 95. Calculate the percentage of each enantiomer found in the organic sample.

4.

4.1 The compound **A** reacts with sodium ethoxide and gives the compound **B** (C_4H_9DO) as the product. The rate of this reaction depends on the concentrations of the compound **A** as well as sodium ethoxide present in the reaction mixture. (50 Marks)



A

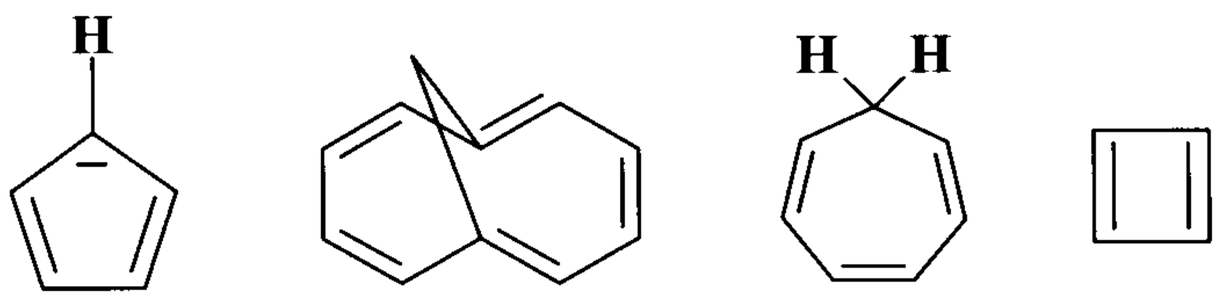
4.1.1 Give the structure, including the stereochemistry, of the product **B**

4.1.2 Suggest a plausible mechanism for the above reaction

4.1.3 Draw and completely label the free energy *vs* reaction coordinate diagram for the above reaction based on the mechanism you have proposed. In the diagram, clearly indicate the positions of reactants, transition states, intermediates (if any) and products. Assume the compound **B** is more stable than the compound **A**.

4.2 Hückel's rule for aromaticity. (50 Marks)

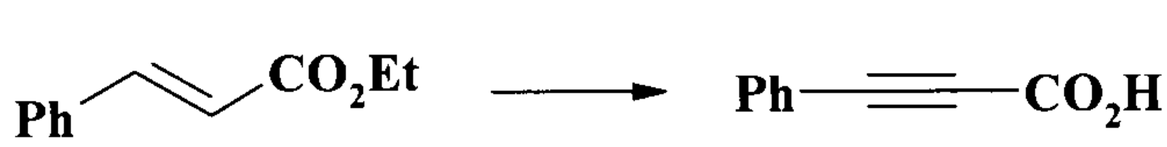
Giving reasons, classify the following chemical species as aromatic, anti-aromatic or non-aromatic



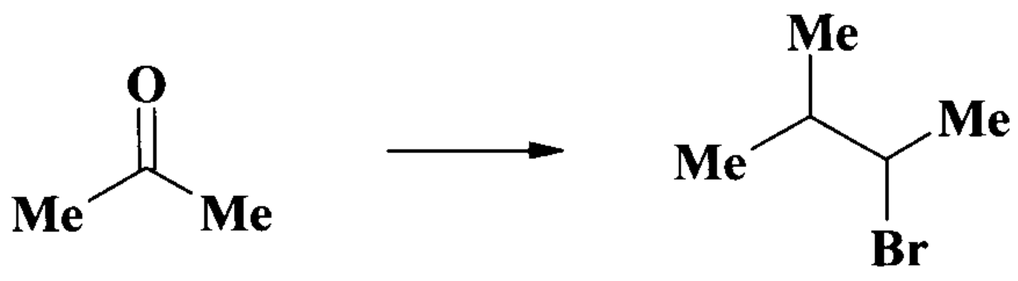
5.

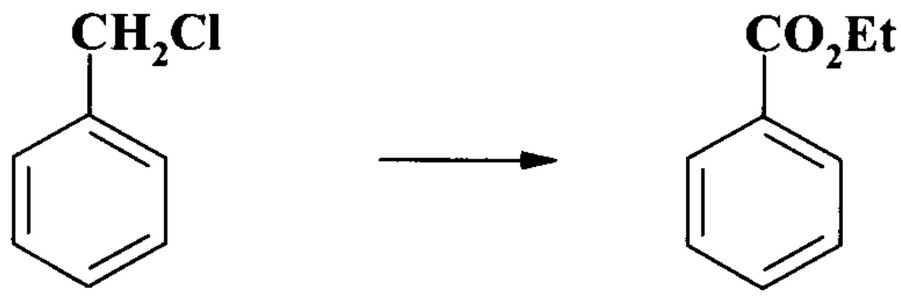
5.1 By means of reaction schemes, show how the following conversions may be effected. Give essential experimental conditions. (More than one step may be involved in each case.) (60 Marks)

(i)



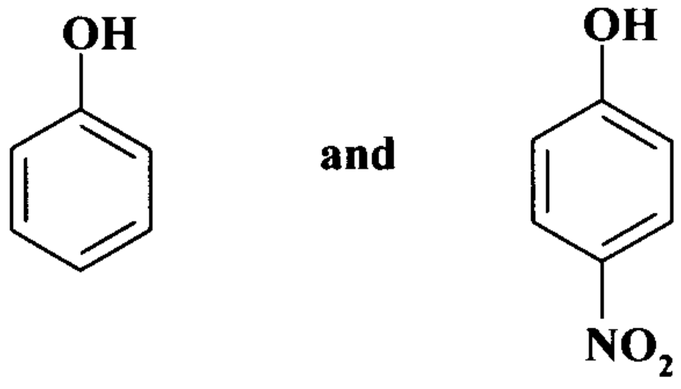
(ii)



(iii) 

5.2 Acidity of a substance is measured by its pK_a value. Write expressions for K_a and pK_a. Giving reasons, indicate the compound that has higher pK_a value in each of the following pairs: (40 Marks)

(i) $HC{\equiv}CH$ and $H_2C{=}CH_2$

(ii) 

Part B

6.

6.1 Write an account on Acetyl salicylic acid (40 Marks)

6.2 Draw the diagram for Synthesis of following medicinal drugs:

6.2.1 phenecetin B.P (20 Marks)

6.2.2 dicophaneB.P (20 Marks)

6.2.3 chlorobutol B.P (20 Marks)