RAJARATA UNIVERSITY OF SRI LANKA

FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree

Second Year Semester I Examination– April / May 2016

CHE 2202 – ORGANIC CHEMISTRY II

Answer any four questions. **Time: 02 hours**

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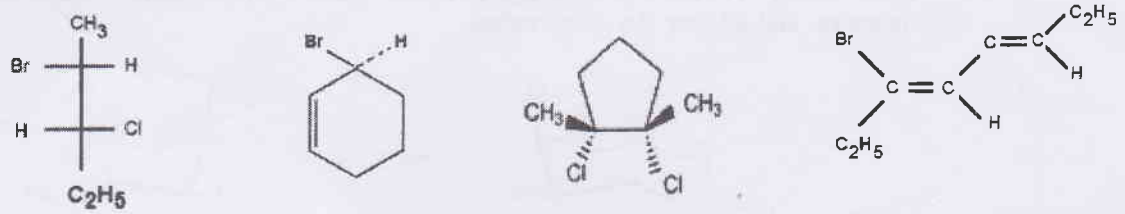
1. (a). Name the following compounds using RS or EZ nomenclature. Draw the necessary steps and write IUPAC names of the compounds.

i). ii). iii). iv).



(10 marks)

(b) Outline the necessary steps involve in the asymmetric synthesis of optically active (-) Valaric acid from optically inactive Ethyl methyl melonic acid.

Ethyl methyl melonic acid (-) active Valeric acid

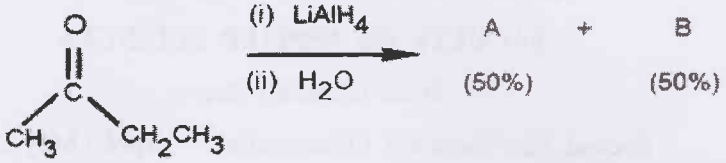
(07 marks)

(c). Draw the conformations of n- propane using Newman projection formulae and plot the potential energy vs angle of rotation curve for the rotation of C1 – C2 bond through 360°C

(08 makrs)

2. (a). When 2- butanone reacts with $LiAlH_4$ / H_2O, a racemic mixture of (A) and (B) was produced.

(i). Write the mechanism of the reaction and identify (A) and (B).



(05 marks)

(ii). Write a detailed account on how to separate (A) and (B). (06 marks)

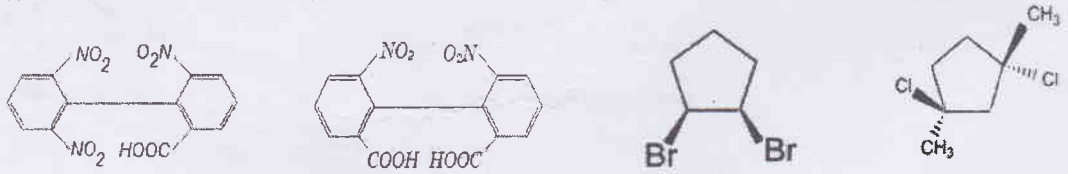
(b). Chrair conformations of *cis* 1-Chloro-4-t-butylcyclohexane show two different energy levels, while *trans* 1-Chloro-4-t-butylcyclohexane show same engery levels. Draw necessary diagrams and discuss this observation.

(06 marks)

cis 1-Chloro-4-*t*-butylcyclohexane

(c). State whether the following compounds are optically active or not. Explain your answer

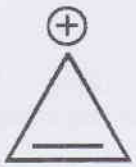
(i) (ii) (iii) (iv).



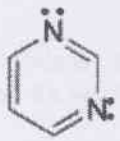
(08 marks)

3. (a). Determine whether the following compounds show aromaticity accordance with Huckels rule. Explain your answer

(i) (ii) (iii) (iv)

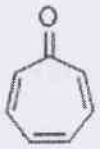


cyclopropenyl cation



pyrimidine

cycloheptatriene



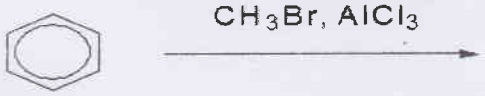
cycloheptatrienone

(08 marks)

(b). Benzenesulfonic acid is prepared from the sulfonation of Benzene using concentrated Sulfuric acid. Write the mechanism of this reaction.

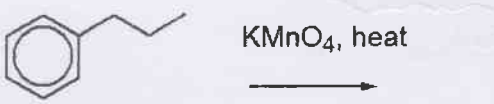
(07 marks)

(c). Identify the products of the following reaction and describe the **polyalkylation** of Friedel-Crafts reaction.



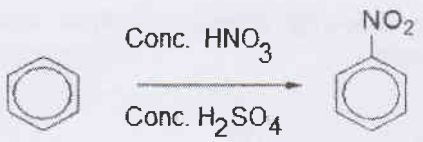
(04 marks)

(d). Complete the following reactions



(06 marks)

4. (a). The nitration reaction of Benzene can be expressed as follows. Write the detailed mechanism of the reaction and discuss the energy diagram of the reaction.

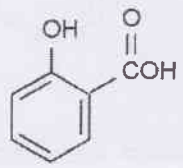


(07 marks)

(b). Phenols (pK_a ~10) are much more acidic than alcohols (pK_a ~ 16) due to resonance stabilization of the phenoxide ion. Draw all necessary steps and explain the statement.

(06marks)

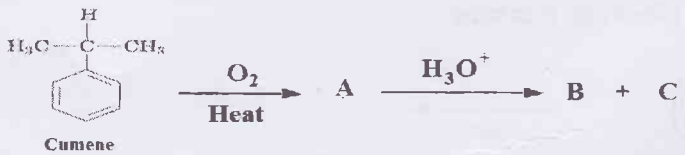
(c). Write the mechanism of synthesis of Salicylic acid using phenol by Kolbe carboxylation

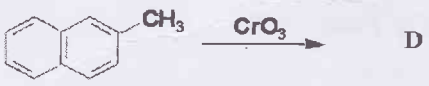


Salicylic acid

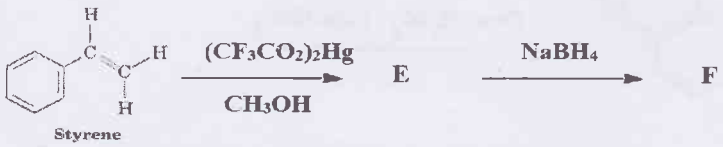
(06 marks)

(d). Complete following reactions





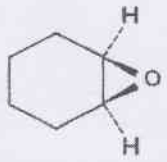
2-Methylnapthalene



Styrene

(06marks)

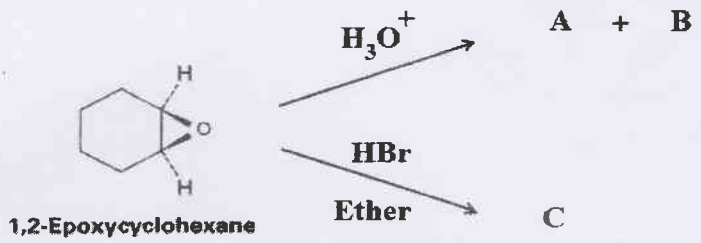
5. (a). Describe the synthesis of 1,2 epoxy cyclohexane from cyclohexene



1,2-Epoxycyclohexane

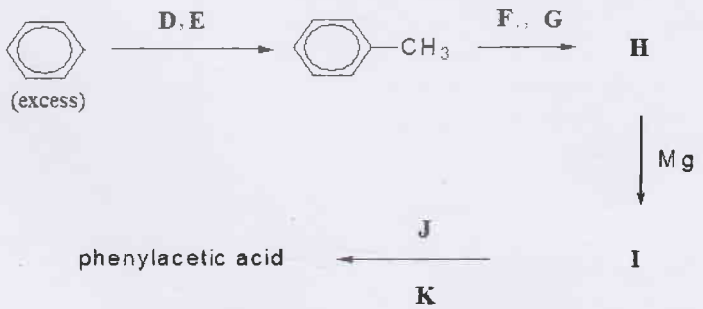
(06 marks)

(b). Complete the following reactions



(05 marks)

(c). Synthesis of Phenylacetic acid from Benzene is given below. Identify the reactants/product from D to K.



(08 marks)

(d). Write a short account on "basic dyes" used to color fabricks

(06 marks)

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