RAJARATA UNIVERSITY OF SRI LANKA

FACULTY OF APPLIED SCIENCES

B.Sc. (General Degree)

Second Year Semester I Examination – October / November 2014

CHE 2202 – ORGANIC CHEMISTRY II

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

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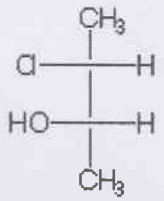
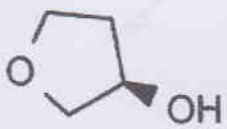
1. (a). Name the following compounds using RS nomenclature. Draw necessary steps and write IUPAC names of the compounds.

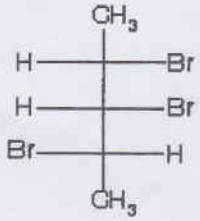
i).



ii).



iii).



(12 marks)

b). Draw the Fischer projection of (2R,4R)-2,4-dibromopentane

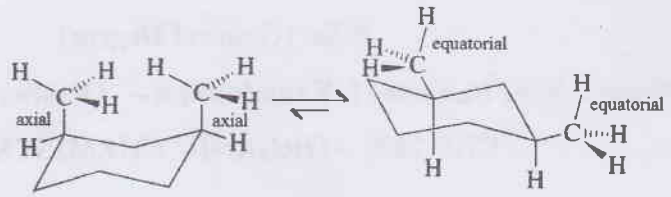
(04 marks)

(c). Draw the conformations of Butane using Newman projection formulae and plot the potential energy vs angle of rotation curve for the rotation of C2 – C3 bond through 360°C

(09 makrs)

2.

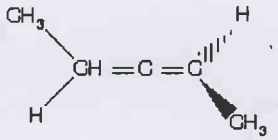
(a). Chrair conformations of *cis* 1,3-Dimethylcyclohexane show two different energy levels, while *trans* 1,3-Dimethylcyclohexane show same engery levels. Draw necessary diagrams and discuss this observation.

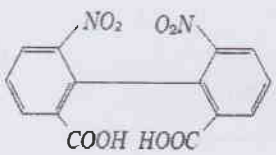


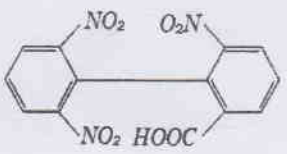
cis 1,3-Dimethylcyclohexane

(06 marks)

(b). Discuss the optical activity of the following compounds

i). 

ii). 

iii). 

(06 marks)

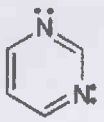
(c). Explain the aromaticity of the following complonds using Huckels rule

i). 

Cyclopentadienyl anion

ii). 

Cyclopentadienyl radical

iii). 

pyrimidine

(06 marks)

(d). i. List out the limitations of Friedel-Craft alkylation reactions (03 marks)

ii. Outline the reactions of systhesis of Benzoic acid from Benzene via *n* - propyl benzene

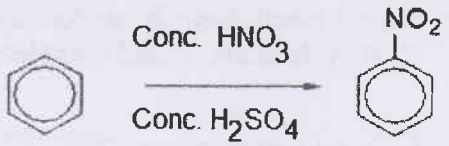
(04 marks)

3.

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

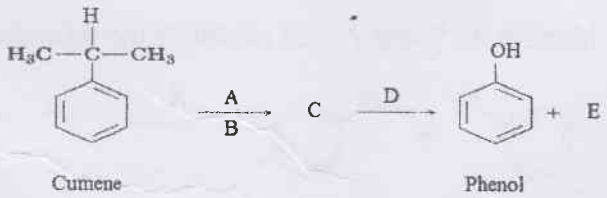
(07 marks)

(b). 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.



(09 marks)

(c). Synthesis of Phenol using Cumene is given below. Identify A, B, C and D, and complete the following reactions.

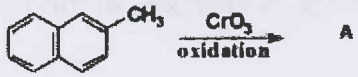


(04 marks)

(d). Elaborate a method to synthesis of p-methyl phenol in the laboratory. (05 marks)

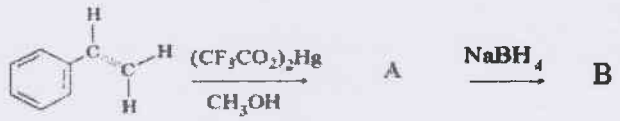
4.

(a). i). Identify A and complete the following reactions



2-Methylnaphthalene

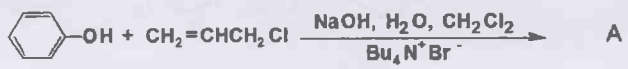
ii). When Styrene treated with methanolic Mercuric trifluoroacetate followed by Sodium borohydrate, a phenolic methyl esters produces. Identify A and B and complete the following reaction



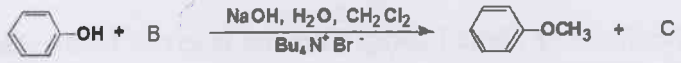
Styrene

(08 marks)

(b). When Phenol reacts with 3-Chloropropane under given conditions, 'A' produced. However when Phenol reacts with 'B' under same conditions, Methyl phenylether and 'C' produced. Identify A, B and C and complete the following reactions

i. 

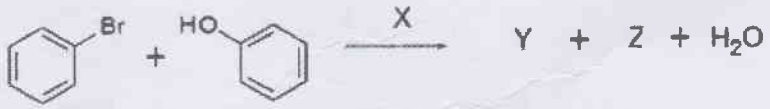
Phenol 3-Chloropropene

ii. 

Phenol Methyl phenyl ether

(06 marks)

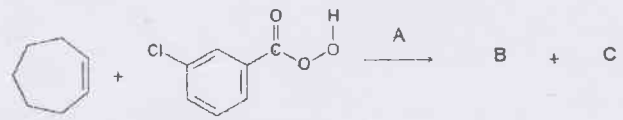
(c). i. Identify X, Y and Z, and complete the following reactions



ii. The Y of the above (i) is an extremely weak base. Explain this by using resonance hybrids

(06 marks)

(d). Synthesis of epoxides can be achived by treatment of an alkene with a peroxyacid. Identify A,B and C and complete the following reaction.



Cycloheptene *meta*-Chloroperoxy-benzoic acid

(05 marks)

05.

(a). Write the mechanisms for the synthesis of phenylacetic acid from toluene

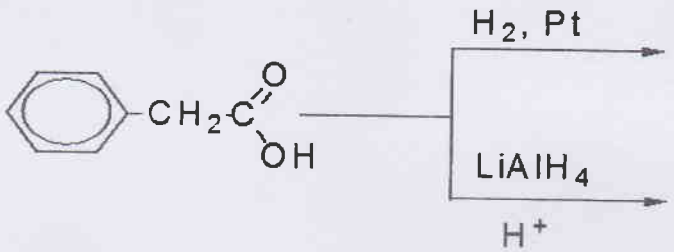
i). via hydrolysis of a nitrile.

ii). by carbonation of Grignard reagent

toluene phenylacetic acid

(10 marks)

(b). Reduction of phenyl acetic acid using two different conditions are given below. Identify the products and complete the following reactions



(05 marks)

(c).

i). Listout the type of dyes used in the industry.

ii). Write a short account on "direct dyes" used to color fabricks

(10 marks)

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