RAJARATA UNIVERSITY OF SRI LANKA

FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree in Applied Sciences

Second Year Semester I Examination – June / July 2018

CHE 2202 – ORGANIC CHEMISTRY II

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

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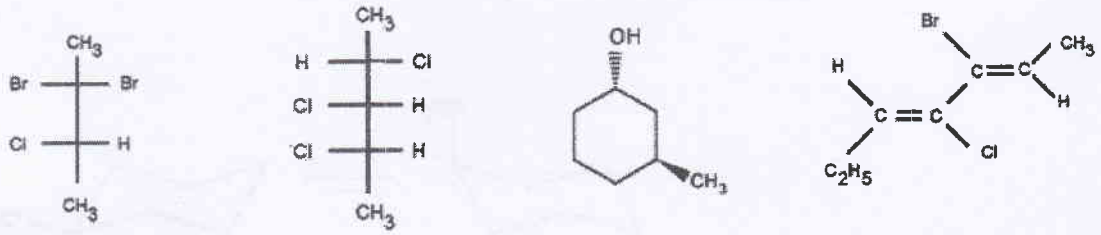
1. (a). Name the following compounds using RS or EZ nomenclature. Draw all necessary steps and write IUPAC names of the compounds.

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



(12 marks)

(b). Draw the structure of (3Z,5E)-3-bromo-1,3,5-octatriene

(03 marks)

(c). Outline the necessary steps involve in the following reaction starting from Ethyl methyl melonic acid. Determine the R /S configuration of E and F.

Ethyl methyl melonic acid

(10 marks)

2.

(a). Discribe the properties of Diastereomers (03 marks)

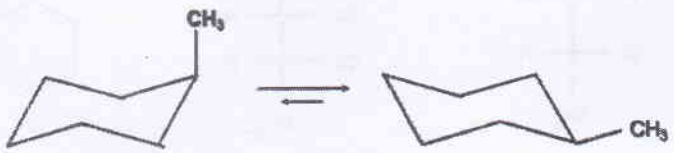
(b). Define following terms:

i. "Torsional" strain (02 marks)

ii. "Gauche" and "Anti" position (03 marks)

(c). Draw the most stable chair conformation of 1,3- dibromocyclohexane. (03 marks)

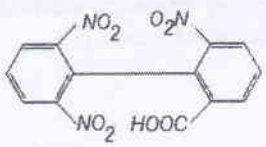
(d). "Equatorial conformation of methylcyclohexane is more stable than axial conformation". Draw Newman projections of both conformations and explain the above sentence by showing that equatorial methyl group is Anti to C_3 in the ring while axial methyl group is Gauche to C_3 in the ring.



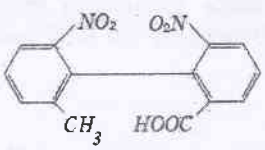
5% 95%

(08 marks)

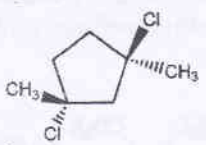
(e). State whether the following compounds are optically active or not. Explain your answer.



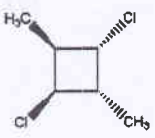
(i)



(ii)



(iii)



(iv)

(06 marks)

3.

(a). Draw the conformations of n- butane using Newman projection formulae and plot the potential energy vs angle of rotation curve for the rotation about C2 – C3 bond through 360°C. Give details of all drawings.

(07 makrs)

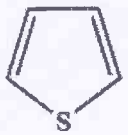
(b). The addition of H_2 to C=C normally gives off about 118 kJ/mol. Benzene has three unsaturation sites but gives off only 206 kJ/mol on reacting with 3 H_2 molecules. Discuss the statement.

(04 marks)

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

(i). Cycloheptatriene

(ii). Cyclopentadienyl anion



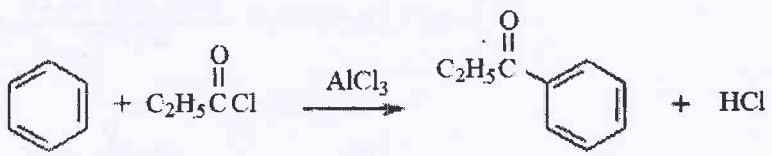
(iii). Thiophene

(06 marks)

(b). List the limitations of Friedel-Crafts alkylation reactions.

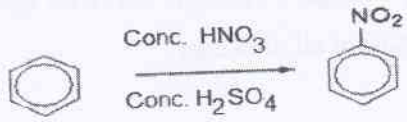
(03 marks)

(e). Friedel-Crafts acylation of benzene can be expressed as follows. Write the detailed mechanism for the reaction



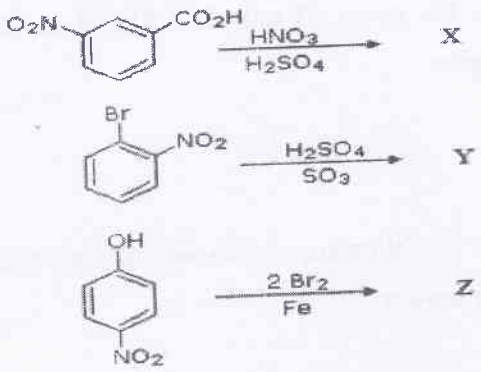
(05 marks)

4. (a). The nitration reaction of benzene takes place by the arenium ion mechanism. Dicsuss the arenium ion mechanism and give suitable evidence to prove the existence of arenium ion.



(08 marks)

(b). Identify X, Y, Z and complete following reactions



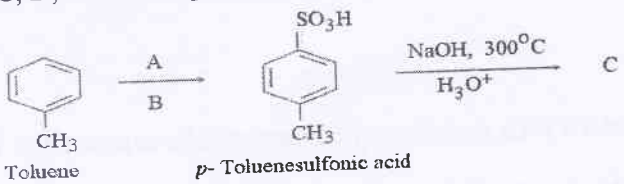
(06 marks)

(c). An electron-donating substituent such as $-CH_3$ makes phenol less acidic because it concentrates the charge. Write the mechanism relevant to resonance stabilization of the phenoxide ion and explain the above statement.

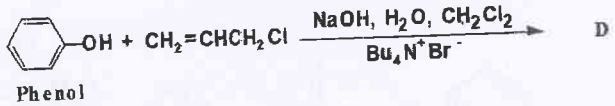
(06 marks)

(d). Identify A,B, C, D, E and complete the following reactions.

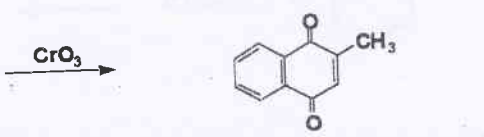
(i)



(ii).



(iii)



(05 marks)

5.

(a). Identify A, B, C, D and complete the following reactions.

(i).

Chlorobenzene

(ii).

Cyclohexene

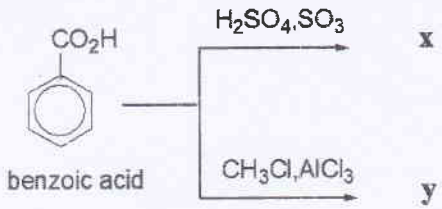
1,2-Epoxy-cyclohexane

(08 marks)

(b). Write the Grignard reaction mechanism to prepare phenyl acetic acid from toluene

(05 marks)

(c). Identify x, y, and complete the following reactions. Explain your answers.



benzoic acid

(04 marks)

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

(08 marks)

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