Uva Wellassa University, Sri Lanka
Btech. Science and Technology/ Mineral Resources and Technology
End Semester Examination- Semester 1
December –2008

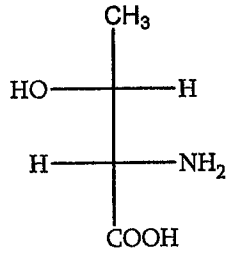
SCT 132-1 Organic Chemistry

Answer four (04) questions only — Time: One (01) hour

1. a. Draw the structure of (Z)-2-bromo-2-butene.

(3 marks)

b. Consider the Fisher projection given below.



i. Draw corresponding Newman projection and Sawhorse projection.
ii. Using R or S designations specify the configuration at each chiral center.

(12 marks)

c. Draw the Newman projections for the most and the least stable conformations of 1,2-dichloroethane ($ClCH_2CH_2Cl$).

(6 marks)

d. Which is the most stable configurational isomer, *cis*- or *trans*-1,4-dimethylcyclohexane? Why?

(4 marks)

2. a. Arrange the following in order of increasing neucleophilicity:

RO^-, H_2O, ROH , HO^-

(4 marks)

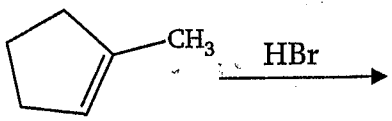
b. Compare the effects of following factors on the rate of S_N1 and S_N2 reactions: substrate structure, nucleophile, solvent and leaving groups.

(12 marks)

c. Consider the S_N1 reaction of (R)-3-bromo-3-methylhexane with methanol to yield 3-methoxy-3-methylhexane. What is the stereochemistry expected for the product? Give Explanations.

(9 marks)

3. a. What is the major product of the following reaction?



(4 marks)

b. Give the mechanism for the above reaction.

(10 marks)

c. Draw a fully labeled reaction energy diagram for the above reaction.

(8 marks)

d. How dose the rate of the reaction vary if HI is used instead of HBr.

(3 marks)

4. a. "Benzene favors elecrophilic substitution reaction but not electrophilic addition reactions" Explain.

(8 marks)

b. Give the mechanism for the Friddle-Craft alkylation reaction of benzene using $(CH_3)_2CHCl$ /$AlCl_3$

(8 marks)

c.. Give the structures of the product obtain from the reaction of following compounds with CH_3Cl /$AlCl_3$?

i. C_6H_6
ii. $C_6H_5NH_2$
iii. $C_6H_5NO_2$

(9 marks)

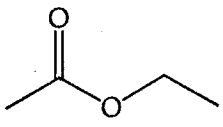
5. a. i. Name the two types of mechanisms involve in nucleophilic aromatic substitution reactions.

(2 marks)

ii. Simple aryl halides do not undergo S_N2 mechanism of nucleophilic substitution. Why?

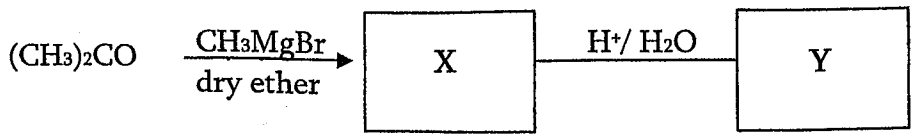
(5 marks)

b. Give the mechanism for Claisan Condenzation reaction of the following compound in the presence of NaOEt.



(10 marks)

c.. Give the structures of compounds X and Y



(8 marks)