



Uva Wellassa University of Sri Lanka
End Semester Examination – March 2011
SCT 232-1 Organic Chemistry



Time: One (01) hour

Total four (4) questions

Question No 01 is compulsory

Answer three (3) questions including question No 01

01. Consider the *Compound A* ($C_6H_{10}O_3$) having the following spectral data:

IR: 1720 and 1745 cm^{-1}

1H -NMR: 2.13 (s, 3H), 2.74 (t, 2H), 2.84 (t, 2H), 3.68 (s, 3H) ppm

^{13}C -NMR: 208, 172, 51, 37, 32 and 27

pm

Mass spectrum: m/z 130, 71, 59, 57 and 43

- a. Deduce the Structure of *Compound A*.
(35 marks)
- b. Account for IR signals of *Compound A* at 1720 and 1745 cm^{-1} .
(6 marks)
- c. Give the structure of the fragments responsible for mass signals at m/z 71, 57 and 43.
(9 marks)

02. a. Compare the effects of following factors on the rate of S_N1 and S_N2 reactions:

- Substrate structure
- Nucleophile
- Solvent
- Leaving groups

(16 marks)

- b. Consider (S)-3-bromo-3-methylhexane is undergoing in a nucleophilic substitution reaction through S_N1 reaction mechanism, yielding 3-methyl-3-hexanol. What is the stereochemistry expected for the product? Give explanations.

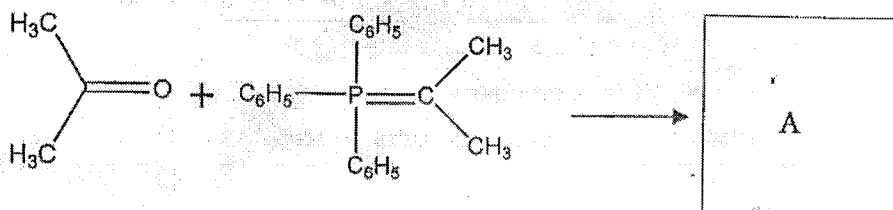
(9 marks)

03. a. Give the mechanism for Claisen condensation reaction of ethyl acetate in the presence of NaOEt.

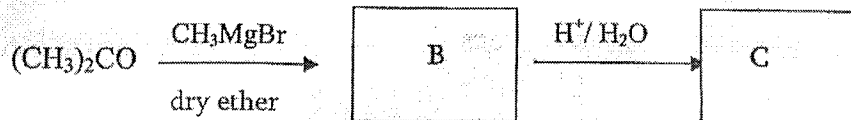
(16 marks)

- b. Draw the structures of the products A, B and C.

i.



ii.



(9 marks)

04. a. Write the mechanism for the nitration of benzene in a mixture of concentrated nitric and sulfuric acids.

(16 marks)

- b. Draw the structure of the product expected from the bromination of followings:

- i. C_6H_6
- ii. $\text{C}_6\text{H}_5\text{NH}_2$
- iii. $\text{C}_6\text{H}_5\text{NO}_2$

(9 marks)