

LR4_20_2

8-11



2014

REDEEMER'S UNIVERSITY

Off Gbongan-Oshogbo road, Ede, Osun State

COLLEGE OF NATURAL SCIENCES DEPARTMENT OF CHEMICAL SCIENCES B. Sc. INDUSTRIAL CHEMISTRY DEGREE

CHE 208: Organic Chemistry (III)

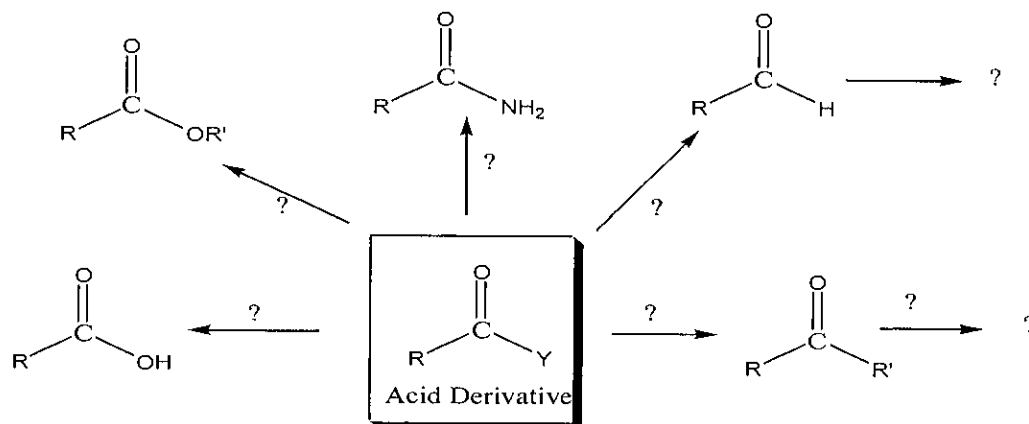
UNITS: 3

SECOND SEMESTER EXAMINATION
2016/2017 SESSION

Instruction: Answer any Four questions in all.
Time Allowed: 2 hr : 45 min

Question 1

- (a) Define Ether in terms of the bond angle of the atoms, hybridization of oxygen atom, and dipole moment **(2 marks)**
- (b) Write the mechanism for the preparation of Methyl Phenyl Ether via Williamson synthesis? **(5marks)**
- (b) Write the acid catalyzed mechanism for reaction between an alcohol and a carboxylic acid **(4marks)**
- (c) Complete the reaction scheme in the diagram below

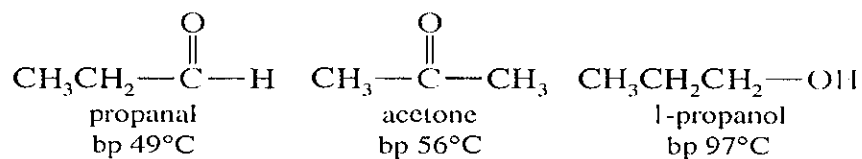
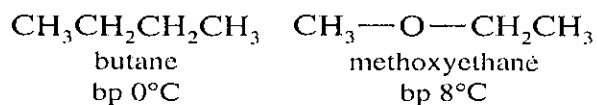


(4 marks)

Question 2

- (a) Arrange the following in the order of increasing polarity:
Ethanol, phenyl propyl ether, ethanoic acid, ethanal and propanone **(2 marks)**
- (b) Alcohols react with their -OH function in two ways. Mention them and give an example of each. **(4 marks)**

(c) What is responsible for the difference in the boiling points of the following organic compounds?

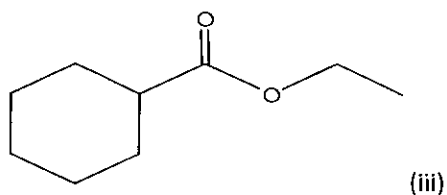
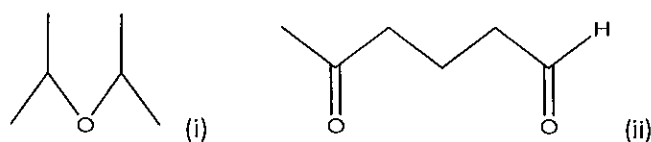


(2 marks)

(d) A symmetrical alkene can be cleaved to produce an Aldehyde and a Ketone. Write a chemical equation to show how this reaction is possible

(4 marks)

(f) Name the following compounds



(3 marks)

Question 3

(a) Give an example each of how you will prepare ketones and aldehydes from the following methods:

(i) Friedel-Crafts Acylation (ketones)

(ii) Gilman Reagent (Ketones)

(iii) Gatterman-Koch Formylation (Aldehydes)

(6 marks)

(b) How would you attempt to produce acetic anhydride from acetic acid?

(3 marks)

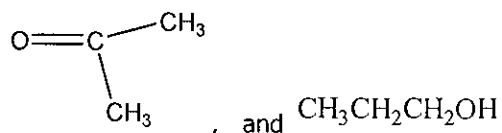
(c) Write the mechanism for the Grignard synthesis of alcohol

(6 marks)

Question 4

(a) Arrange the following in their order of **polarity** and **boiling point**.

$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$, $\text{CH}_3\text{CH}_2\text{CHO}$, $\text{CH}_3\text{-O-CH}_2\text{CH}_3$,



(4 marks)

(b) Give reason(s) for your preference of order of arrangement in each case

(2 marks)

(c) Draw the chemical structure of the following organic compounds

Propyl acetate, Ethyl propanoate

(2 marks)

(d) Write the mechanism for the dehydration of alcohols

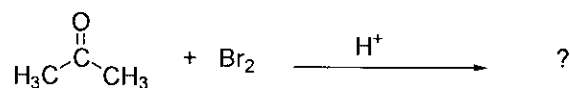
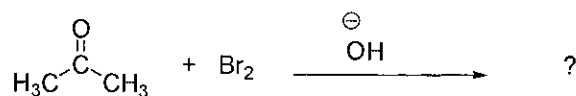
(5 marks)

(e) Why are Epoxides very reactive?

(2 marks)

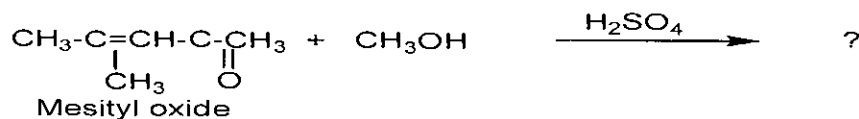
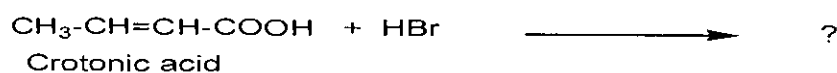
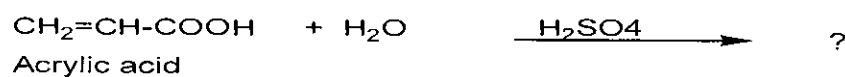
Question 5

(a) Show the mechanism for the acid and base promoted alpha-bromination of acetone



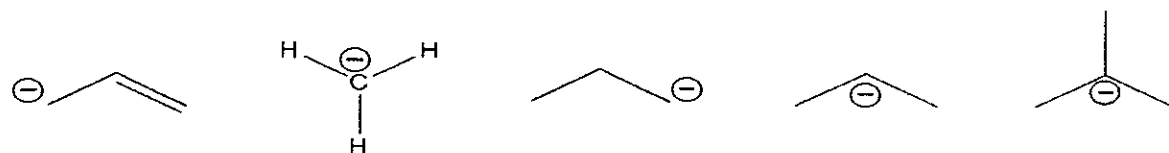
(5 marks)

(b) Complete the following electrophilic addition reactions



(5 marks)

(c) Arrange the following carbanions in their order of stability



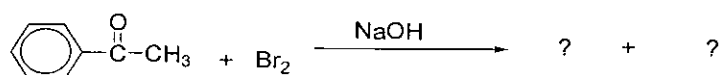
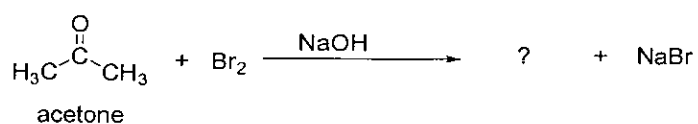
(3 marks)

(d) List the different types of carbanions

(2 marks)

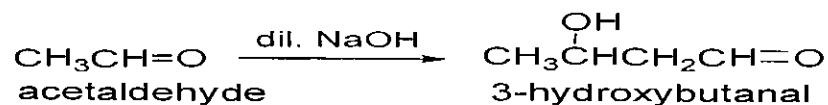
Question 6

(a) Complete the following alpha halogenation reaction



(3 marks)

(b) Describe the mechanism of this Aldol condensation reaction



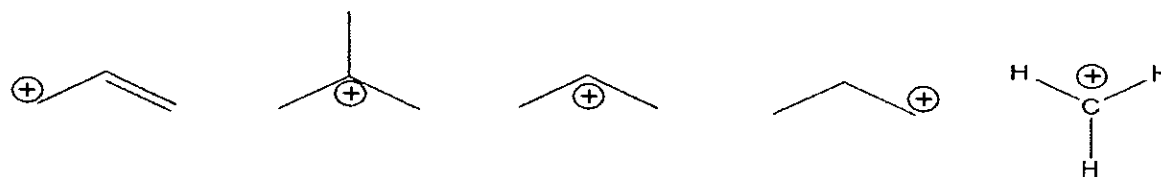
(3 marks)

(c) A carbocation is a molecule in which a carbon atom bears three bonds and a positive charge.

(i) What are the factors that stabilize a carbocation

(3 marks)

(ii) Arrange the following in the order of their stability



(3 marks)

(iii) List the different types of carbocation giving examples as appropriate

(3 marks)