



Technical University of Mombasa

Faculty of Applied and Health Sciences

DEPARTMENT OF PURE AND APPLIED SCIENCES
UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE IN
COMMUNITY HEALTH (BCM 12S)

ACH 4118 : ORGANIC CHEMISTRY

SUPPLEMENTARY/SPECIAL EXAMINATION

JULY 2013 SERIES

2 HOURS

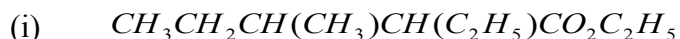
Instructions to candidates:

This paper consist of **FIVE** questions

Answer question **ONE** (compulsory) and any other **TWO** questions

Question ONE

(a) Convert the following condensed formulars to bond line structure and name the functional group of each compound:

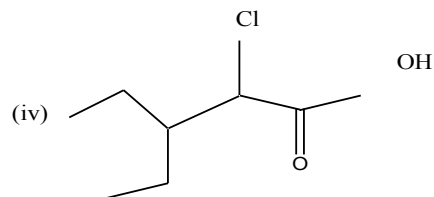
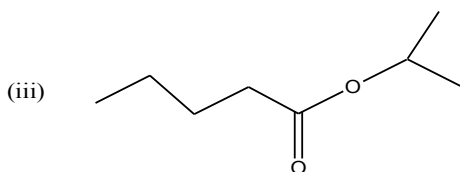
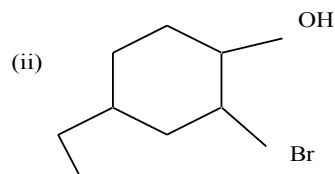
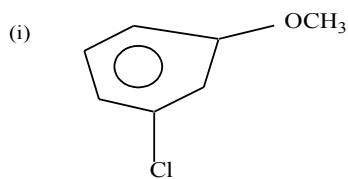


(4 marks)

(b) Draw and name any **THREE** isomers of Heptan-2-one.

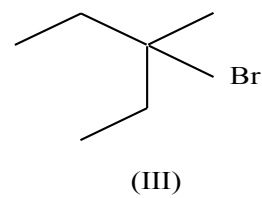
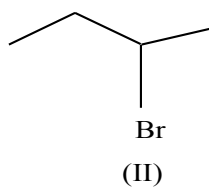
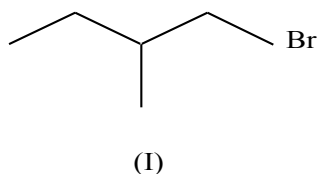
(6 marks)

(c) Provide the IUPAC names of the following molecules:



(d) Arrange with reason(s), the following compound in order of increasing boiling points. Hexanoic acid, Hexane, Hexanol, Hexanal. **(4 marks)**

(e) Consider the following alkylhalides below:

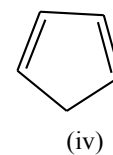
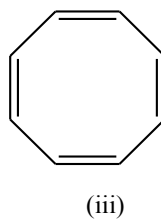
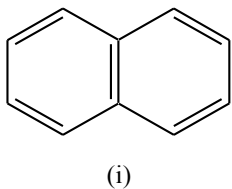


(i) Classify the alkylhalides above. **(3 marks)**

(ii) Give the structure of the product between I and $\text{CH}_3\text{CH}_2\text{O}^-\text{Na}^+$ in acetone and name the reaction. **(3 marks)**

(iii) State with a reason which alkylhalide will be more reactive towards $\text{S}_{\text{N}}1$ type of reaction. **(2 marks)**

(f) Classify the following structures as either anomatic, Anti-aromatic or non-aromatic:



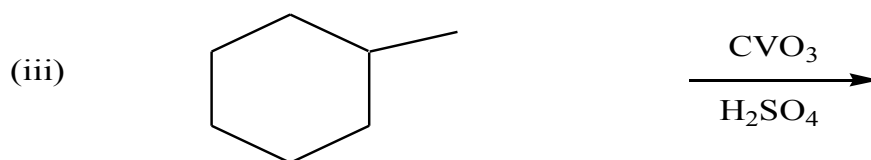
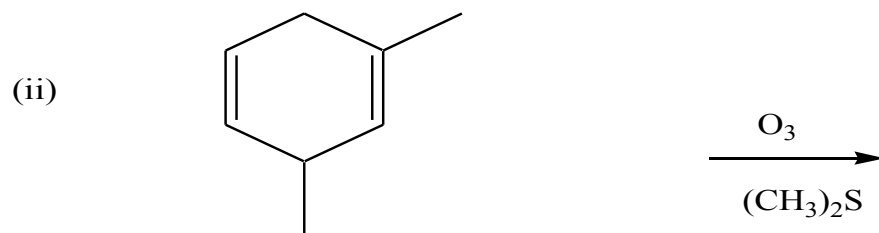
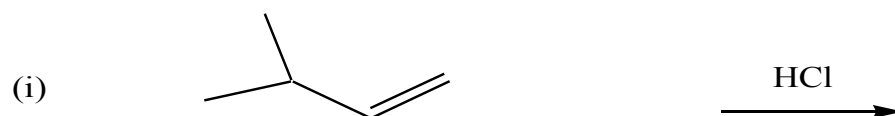
Question TWO

(a) Analysis of an organic compound gave 54.5% carbon 9.1% Hydrogen and 36.4% Oxygen by mass (C=12, H= 1, O = 16, RFM = 44). Work out the:

(i) Empirical and molecular formula of the compound. **(6 marks)**

(ii) Double bond equivalent for the compound. **(2 marks)**

(b) Provide the structure(s) of the main organic product(s) formed from each of the following reactions:

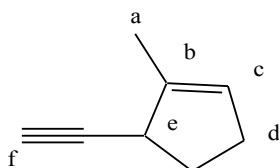


(c) Provide a probable reaction mechanism leading to the formation of the major product in b(i) above. **(4 marks)**

Question THREE

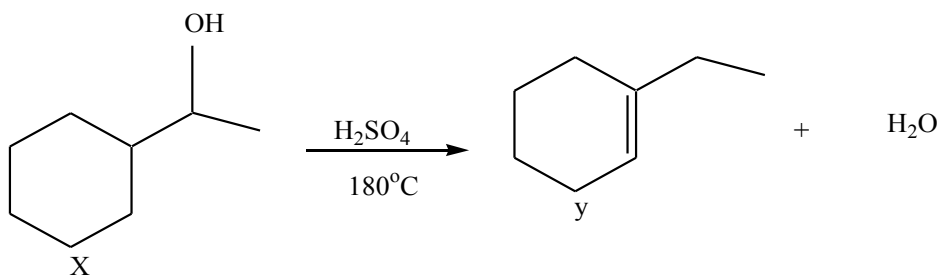
(a) For the compound below:

(i) Give the hybridization of all the labelled carbons. **(3 marks)**



(ii) What is the degree of unsaturation of the above molecule? **(2 marks)**

(b) Consider the reaction below:

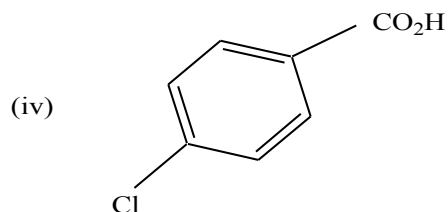
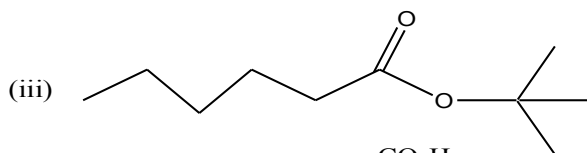
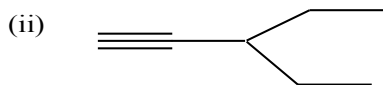
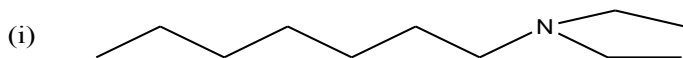


(i) Using curly arrows show the reaction mechanism for the formation of y.

(6 marks)

(ii) Provide the structure of the alkene that would be formed alongside alkane (y) in the reaction above. **(2 marks)**

(c) Give the IUPAC names of the following compounds:

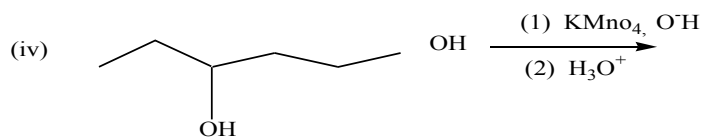
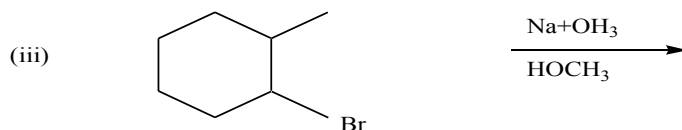


(4 marks)

(d) Define the term nucleophile and give one example of a nucleophile. **(3 marks)**

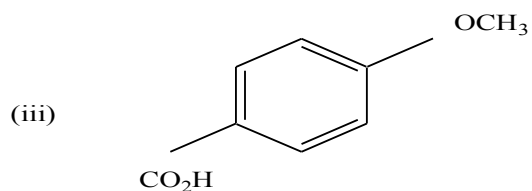
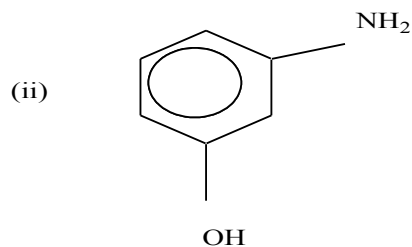
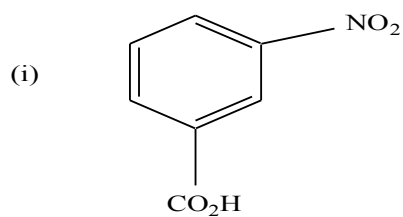
Question FOUR

(a) Provide the structure of the products in the following reactions.



(10 marks)

(b) Indicate with an arrow where an electrophile would add to the following compounds in electrophilic substitution reaction.



(3

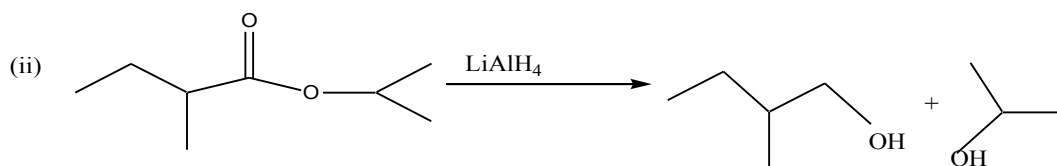
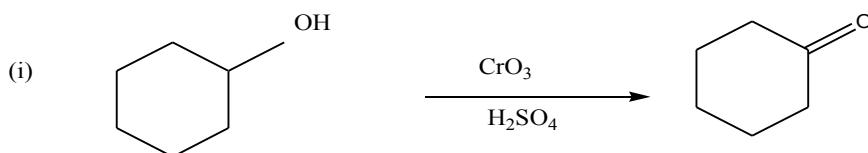
marks)

- (c) Arrange with reasons, the following compounds in order of decreasing boiling points:
Butanoic acid, butane, butanol. (3

marks)

- (d) Indicate the type of reaction and name the product(s) in each of the following reactions. (4

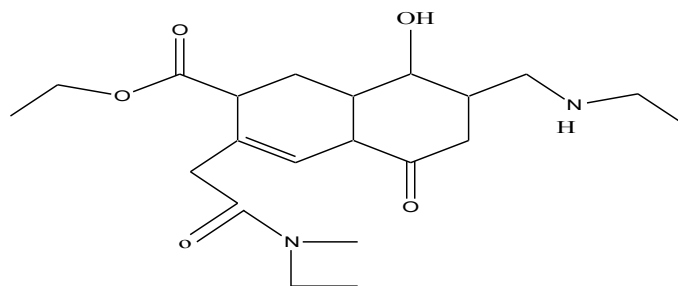
marks)



Question FIVE

- (a) Describe the sequential bromination of methane in U.V light. (4 marks)

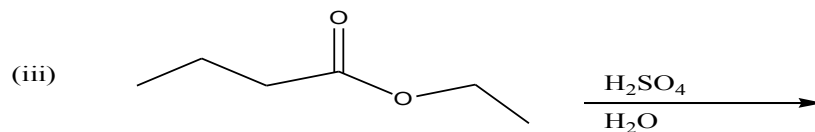
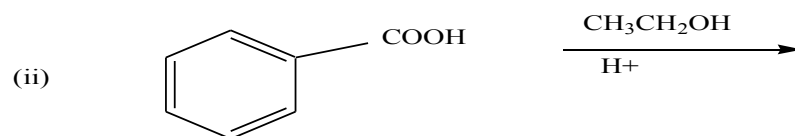
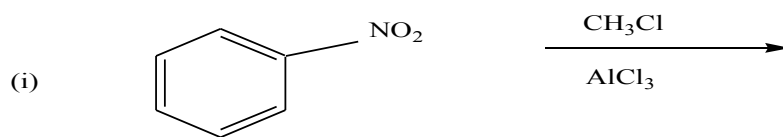
- (b) Consider the compound below:



Identify all the functional groups in the structure.

(6 marks)

(c) Complete the following reactions and name the products.



(d) Name the reaction in c(i) above.

(2 marks)