



Technical University of Mombasa

Faculty of Applied and Health Sciences

DEPARTMENT OF **PURE AND APPLIED SCIENCES**

DIPLOMA IN ANALYTICAL CHEMISTRY

(DAC 12S)

ACH 2205: ORGANIC CHEMISTRY II

SPECIAL/SUPPLEMENTARY: EXAMINATIONS

SERIES: MARCH 2014

TIME: 2 HOURS

INSTRUCTIONS:

You should have the following for this paper

- *Answer booklet*

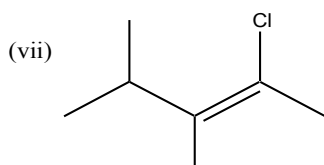
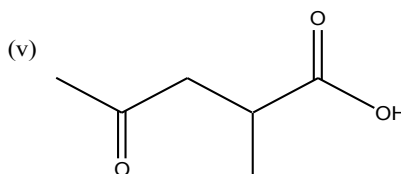
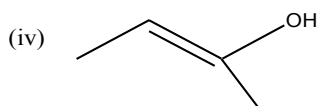
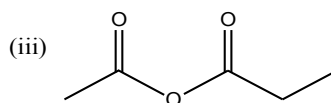
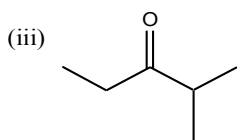
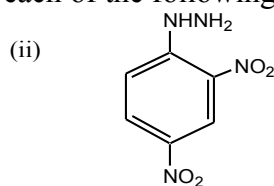
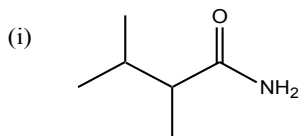
This paper consists of **FIVE** questions.

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

This paper consists of 5 PRINTED pages

Question ONE

a) Give a systematic (IUPAC) name for each of the following compounds

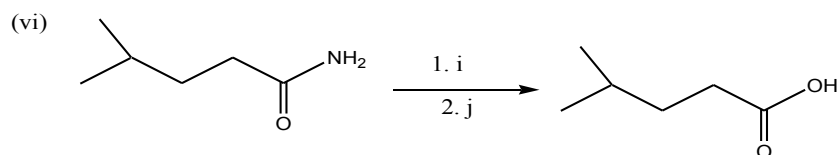
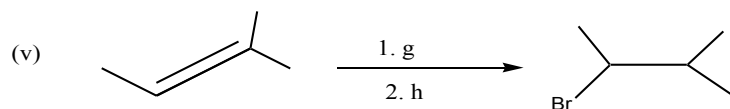
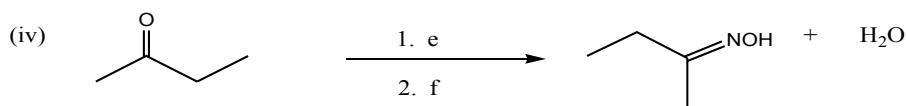
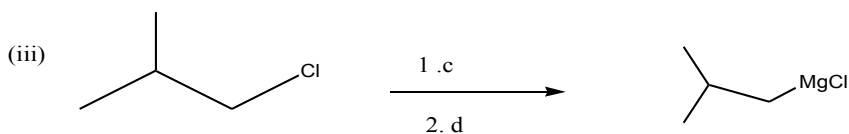
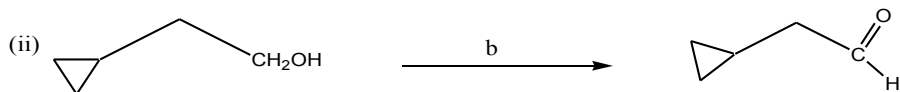
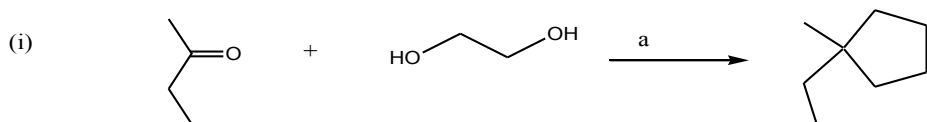


b) Draw the line bond angle structures of the following organic compounds indicating the stereochemistry where applicable

- (i) 2-methylcyclohexyl magnesium chloride
- (ii) 2-Bromo-3-methyl butanoyl chloride
- (iii) 3-(methylethyl) hex -2E-enol
- (iv) Propanoic ethanoic anhydride
- (v) 3,4-Dimethyl-2-oxo-hexanoic acid
- (vi) N,N-Dimethylaminopentane

(7marks)

c) Give the reagents (a-j) responsible for the following transformations



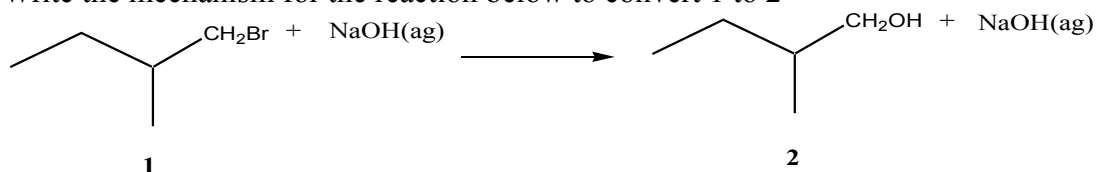
d) Show using a mechanism that the OH group of ethanoic acid forms water in etherification with methanol in presence of an acid catalyst. **(6marks)**

Question TWO

a) (i) Explain the term electrophile **(2marks)**

(ii) Write S_N2 in full **(1mark)**

b) Write the mechanism for the reaction below to convert 1 to 2



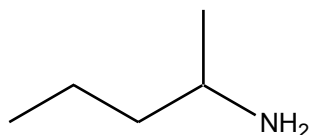
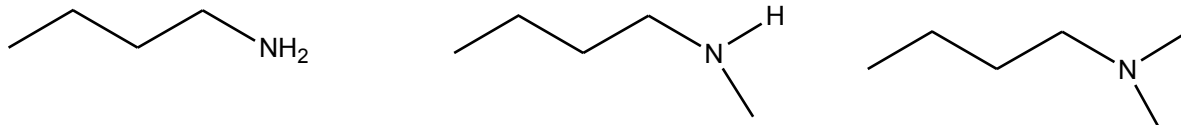
(4marks)

c) Molecular mass determination of lower carboxylic acids by osmotic pressure method give double the expected mass. Explain with the help of ethanoic acid. **(3marks)**

- d) Using Lucas tests explain how one can differentiate between primary, secondary and tertiary alcohols. **(5marks)**

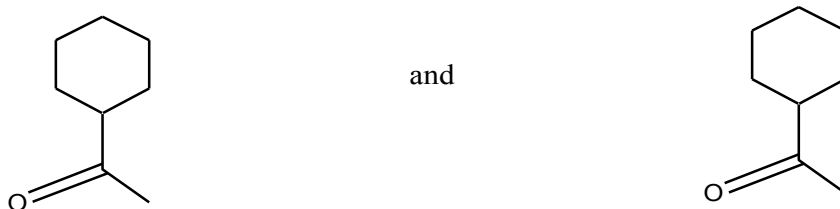
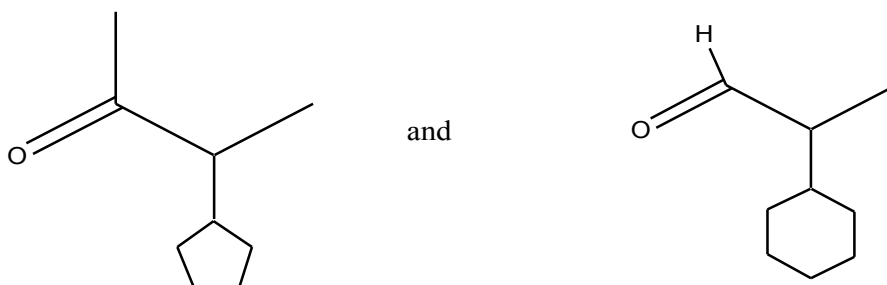
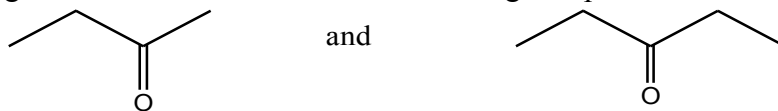
Question THREE

- a) (i) Arrange the following amines in increasing order of basic properties **(2marks)**



- (ii) Explain the order in a(i) above **(2marks)**

- b) Using observable tests how are the following compounds differentiated



- c) (i) give the structures of the following compounds
- I. 3,3 – dichloro-2-pentanone
 - II. 3,4 – dichloro-2-methylbutanal
- (ii) Assign the prefixes gem- or vic- to the compounds name in c(i) above and give reason. **(3marks)**

Question FOUR

- a) (i) Ethanedioic acid has a higher boiling point than ethanoic acid. Explain **(3marks)**
(ii) Arrange the following compounds in increasing order of acidity. Explain propanoic acid; propanol ; 2-chloropropanoic acid and 3-chloropropanoic acid. **(4marks)**
- b) Using curly arrows write reaction mechanism of the acid hydrolysis of propanenitrile **(8marks)**

Question FIVE

- a) (i) Give the general structures of Acetals and ketals **(2marks)**
(ii) Complete and show the mechanism of the following reaction



(5marks)

- b) The reaction of ethanoic acid and phosphorous trichloride give compound Q. Compound Q reacts with ammonia to give compound K. When compound R is reacted with bromine in sodium hydroxide solution, compounds is formed. Compound R reacts with lithium aluminium chloride to give compound T. Identify the compounds Q,R, S and T and explain your answer using equations **(8marks)**