



Technical University of Mombasa

Faculty of Applied and Health Sciences

DEPARTMENT OF MEDICAL SCIENCES

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF MEDICAL
LABORATORY SCIENCES

BMLS13M (Y1 S1)

ACH 4105: ORGANIC CHEMISTRY

SPECIAL/SUPPLEMENTARY EXAMINATION

OCTOBER 2013 SERIES

2 HOURS

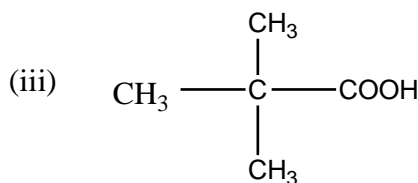
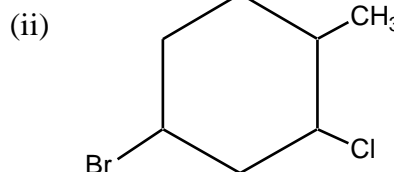
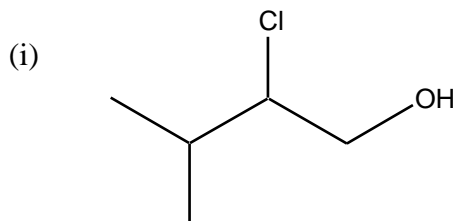
Instructions to candidates:

This paper consist of **FIVE** questions

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

Question ONE

a) Give IUPAC name to each of the following compounds:



(4marks)

b) Draw the structure for each of the following compounds:

(i) 2,2,4-Trimethyl pentane

(ii) 2,3-Dichloro-3, 4-dimethyl-1-hexene

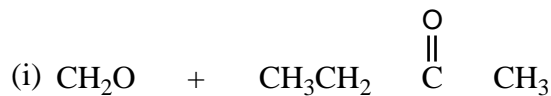
- (iii) 1-methyl cyclobutanol
 (iv) Methyl ethanoate

(4marks)

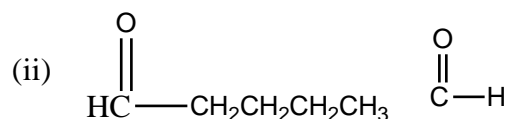
c) An organic compound contains 48.7% carbon, 8.1% hydrogen and the rest oxygen. Determine its empirical formula. (C = 12, H = 1, O = 16)

(3marks)

d) Give the structures of the compounds that give the following products upon reaction with ozone :

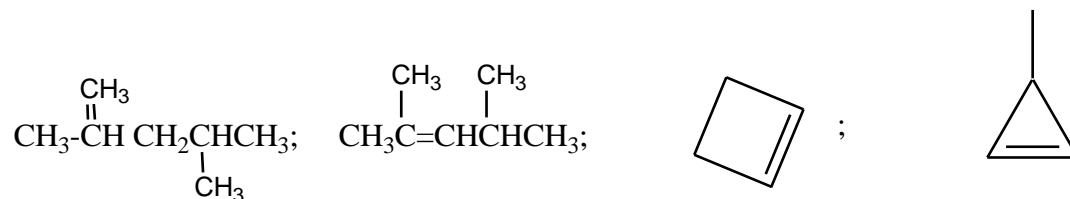


(2 marks)



(2 marks)

e) State which one among the follow has the highest octane rating and give reasons for your choice.

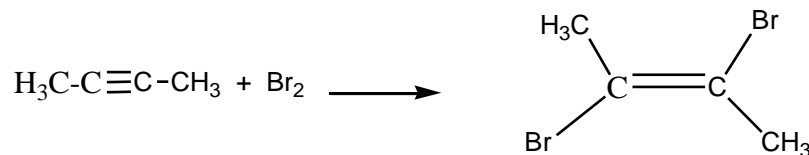


f) Give the dash formula and Bond line formulas for the following molecules

- (i) $\text{CH}_3\text{CH}(\text{Cl})\text{CH}(\text{CH}_3)\text{CH}_3$
 (ii) $\text{CH}_3\text{OCH}_2\text{CH}_3$

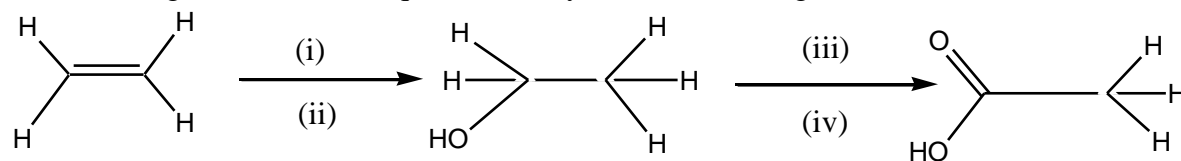
(4marks)

g) Using curly arrows, show the reaction mechanism for the reaction below:



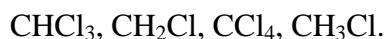
(3 marks)

h) Give the reagents (i) to (iii) required to carry out the following transformations:



(3 marks)

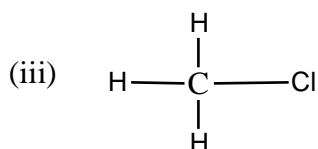
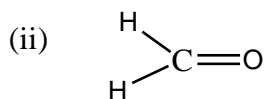
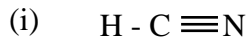
i) Arrange the following molecules in order of increasing boiling point.



(1mark)

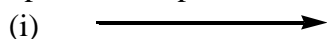
Question TWO

- a) Explain the term hybridization (2marks)
b) State the THREE types of hybridization adopted carbon (3marks)
c) Show diagrammatically how electrons are hybridized in methane, CH₄ (3marks)
d) Indicate the type of hybridization present on the carbon atom in each of the following molecule:



(5marks)

- e) Explain the importance of each of the following arrows as used in organic chemistry:



(5marks)

- f) Identify products A-D in the reactions below:



Question THREE

- a) Differentiate between:

- (i) Pyrolysis and combustion reaction
(ii) Nucleophile and electrophile

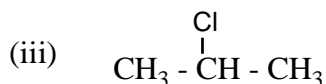
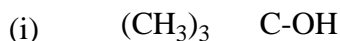
(4marks)

- b) Give all products obtained when propane, CH₃CH₂CH₃, undergoes

- (i) Pyrolysis (4 products)
(ii) Combustion (2 products)

(6marks)

c) Show the polarity of the bonds by using δ^+ and δ^- in the following molecules:



d) Combustion of a 3.0mg of H_2O .

e) (i) Calculate the % composition of the compound. (4marks)

(ii) Determine the empirical formula of the compound. (3marks)

Question FOUR

a) Give THREE visual chemical tests you would perform to distinguish between n-hexane and 2,6-octadiene. (3marks)

b) The reaction of 60ml(1mol) ethanoic acid and 46ml (0.5mol) butan-1-ol yields 40g of butyl ethanoate.

(i) Write the chemical equation for the reaction. (1mark)

(ii) Name the process above (1mark)

(iii) Indicate the catalyst that must be used (1mark)

(iv) State the limiting reagent (1mark)

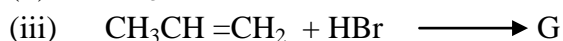
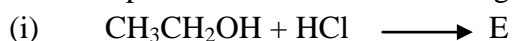
(v) Find the number of moles to be produced (3marks)

(vi) Determine the % yield (3marks)

(vii) Explain why its not practicable to get 100% yield. (3marks)

c) Write a chemical equation for the reaction between ethanol and sodium metal. (1mark)

d) Give the products E-G in the following reactions:



(3marks)

Question FIVE

a) Write down the initiation, chain propagation and chain termination steps for the free radical bromination of propane in presence of organic peroxide. (6marks)

b) For the following transformation



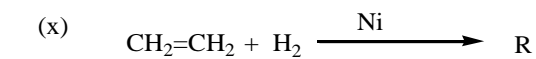
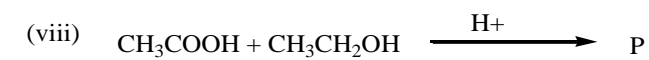
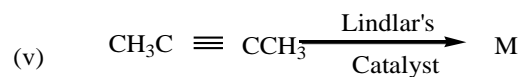
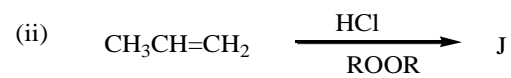
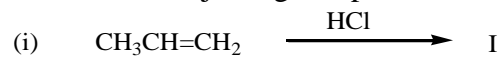
(i) Give the product H

(1mark)

(ii) Write the reaction mechanism using curly arrows

(3marks)

c) Provide the major organic products I-R for the reactions below:



(10marks)