

EMBU UNIVERSITY COLLEGE
(A CONSTITUENT COLLEGE OF THE UNIVERSITY OF NAIROBI)

SECOND SEMESTER EXAMINATIONS 2013/2014

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE, BACHELOR OF SCIENCE IN BIOLOGY, BACHELOR OF SCIENCE IN
MICROBIOLOGY AND BIOTECHNOLOGY AND BACHELOR OF SCIENCE IN
ENVIRONMENTAL CONSERVATION & NATURAL RESOURCE MANAGEMENT

SCH 102: ORGANIC CHEMISTRY

DATE: APRIL 3, 2014

TIME: 2.00 - 4.00PM

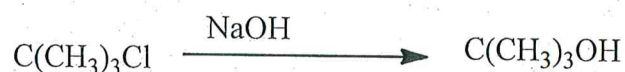
INSTRUCTIONS:

ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

QUESTION ONE

- a) Draw the functional group in each of the following groups of compounds (4 marks)
- i.) Carboxylic acids
 - ii.) Alcohols
 - iii.) Alkynes
 - iv.) Esters
- b) State three sources of hydrocarbons. (3 marks)
- c) Explain why hexane is a liquid at room temperature while ethane is a gas at the same temperature. (3 marks)

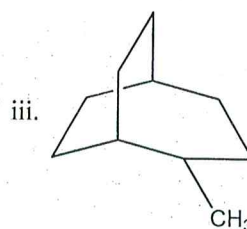
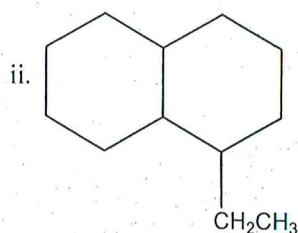
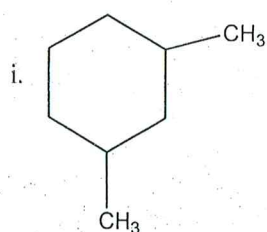
- d) Define the following terms. (4 marks)
- isomerism
 - pyrolysis
- e) Using an appropriate example show how hydrogen bonding is formed in alkanols and in alkanolic acids. (2 marks)
- f) Write a mechanism to show how the reaction below takes place through S_N2 process. (4 marks)



- g) Using acidified KMnO_4 and sodium hydrogen carbonate, explain how one can distinguish between hexane, hexanol and hexanoic acid. (5 marks)
- h) Explain why the melting points of hydrocarbons increase with increase in molecular masses (3 marks)
- i) Methanol is soluble in water but methane is not, explain (2marks)

QUESTION TWO

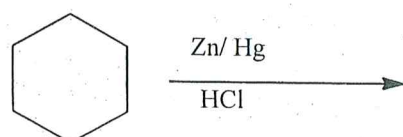
- a. Using appropriate examples name three types of isomers formed by alkanes (6 marks)
- b) Name the following alkanes. (6 marks)



- c) i.) Explain the term aromatization and using an appropriate alkyl halide show how benzene is formed. (4 marks)

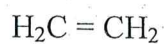
ii. Draw and name the structures of products of the chemicals reactions below.

(4 marks)



QUESTION THREE

a) i.) Write the hybridization and name the geometrical shape of the carbon atoms in the molecules below. (6 marks)

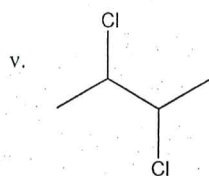
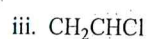
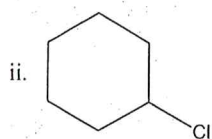


ii.) Using an example for each, explain the meaning of the following terms. (6 marks)

- Catenation
- Enantiomers
- Halogenation

b) Name the following compounds. (5 marks)

i) CH_3I



c. State three importance of learning organic chemistry.

(3marks)

QUESTION FOUR

j) Write a mechanism to show how the conversion below is carried out indicating all the possible termination steps. (8mks)



c. Write a mechanism for the reaction between ethanol and 2-bromo-2-methylpropane through the E_1 process. (6 marks)

d. Given that the molecular formular below is of an alkane, draw and name all isomers of the molecule. (6 marks)



QUESTION FIVE

a) Define the following terms:

i.) Polymerization

(4marks)

ii.) Homologous series

b) Describe a chemical test used to distinguish between; propane and propene (2marks)

c) Alcohols have higher boiling points than alkanes with equal number of carbon. (4marks)

d) State three uses of alkanes

(2marks)

e) Write the chemical equation for the reaction below and indicate the required conditions for each.

(i) Ethene and hydrogen

(2 marks)

(ii) Combustion of butane.

(2 marks)

(iii) Pyrolysis of propane.

(2marks)

f) Draw the structure of 4-isopropylheptane.

(2marks)

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