

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS
EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF
SCIENCE IN CHEMISTRY, BACHELOR OF SCIENCE IN AGRICULTURAL
EDUCATION AND EXTENSION, BSC AGRICULTURE, BSC FOOD SCIENCE,
BSC ENVIRONMENTAL SCIENCE AND WILDLIFE, BSC AGRICULTURAL
ECONOMICS, BSC ANIMAL SCIENCE AND BSC IN HORTICULTURE

CHEM 103: GENERAL ORGANIC CHEMISTRY

STREAMS: BSc. Chem, BSc. Aged, BSc Ensc, BSc. Agri, BSc Fost, BSc Ansc, Bsc Hort
TIME: 2 HOURS

DAY/DATE: TUESDAY 18/4/2023

8.30 A.M. – 10.30 A.M.

Answer all questions in section A and any two in section B

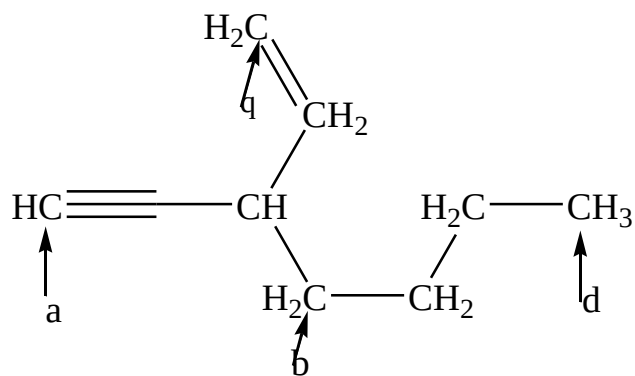
SECTION A

QUESTION 1:30 MARKS

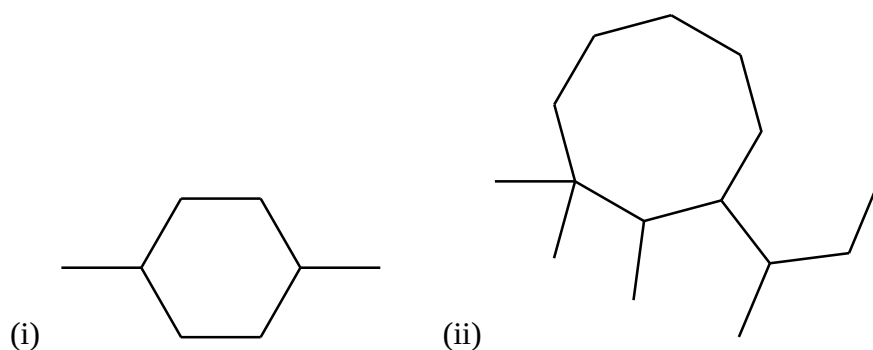
(a) Using the formula C_4H_9Br outline a description of primary, secondary and tertiary halides giving the correct names and structures (6 marks)

(b) Explain the difference between a geminal dihalide and a vicinal dihalide using appropriate examples (2marks)

(c) Give hybridization of the carbon atoms labeled a, b, c and d. (4marks)



(d) Name the following structures using the correct IUPAC names (2marks)



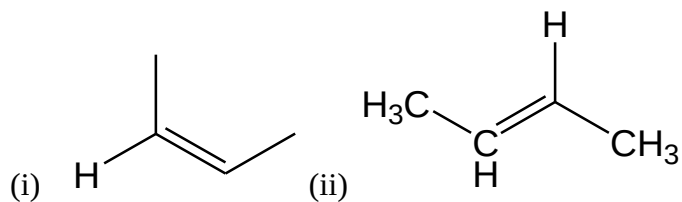
(e) Discuss

i) The difference in the boiling points of branched and n-alkanes (4 marks)

(f) Draw and name the constitutional isomers of pentane (6 marks)

(g) Identify the IUPAC nomenclature of the structures below considering E-Z isomerism

(2 marks)



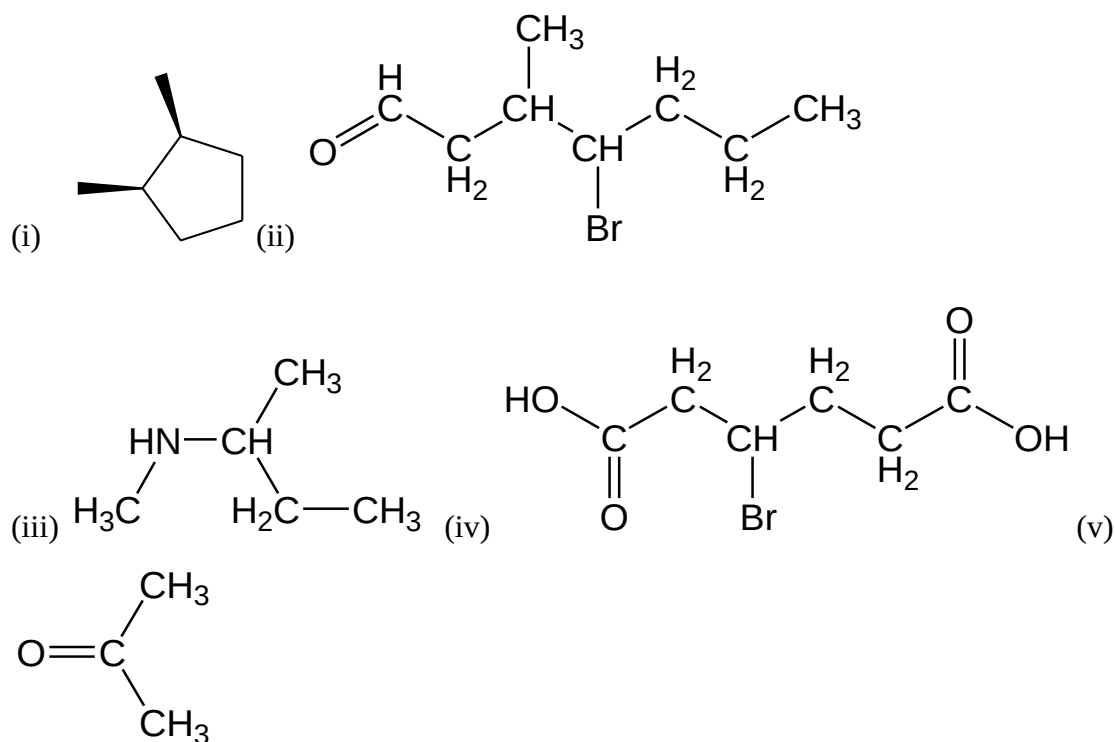
(h). Give 2 uses of alkanes and 2 uses of alkynes (4 marks)

SECTION B (Questions 2, 3 and 4)

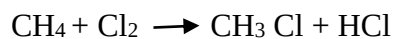
QUESTION 2: 20 marks

(a) Name the following organic compounds

(5 marks)



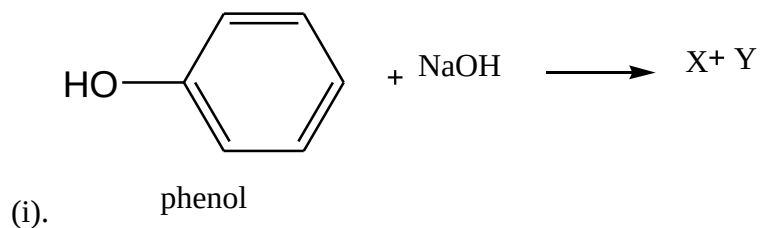
(b) Using appropriate equations show the reaction mechanism in the reaction below.



(5 marks)

(c) Complete the following equations

(4 marks)



(d) Describe how to differentiate an alkanal and a ketone

(2marks)

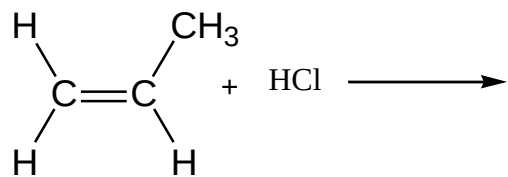
(e).What are the physical properties of alkanols (3 marks)

(f) .Give 2 uses of alkyl halides (1 mark)

QUESTION 3:20 MARKS

(a) State Markonikov,s law (1mark)

(b) Complete the reaction below (1mark)



c) Draw the structure for the following compounds (5 marks)

(i) Ethanal

(ii) 2,2-dimethylheptanal

(iii) Ethylamine

(iv) 2-methyl-1-propanamine

(v) Diethyl ether

d) Describe alkylation of acetylide ions in formation of alkynes (4 marks)

(e) .Explain the meaning of the following terms (2marks)

(i) Catenation

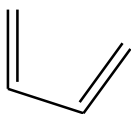
(ii) Conformation

(f) Describe a method for preparing ethene and 2 methods for preparing ethanol using appropriate equations (7 marks)

QUESTION 4: 20 MARKS

(a) (i) Explain the meaning of the phrase “elements of unsaturation” (1 mark)

(ii) Calculate the elements of unsaturation in the structure given below (3 marks)



buta-1,3-diene

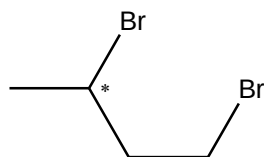
(b) (i) Using an arrow show the allylic Hydrogen on an open structural formula of propene

(2 marks)

(ii) With the aid of appropriate equations show the mechanism with all steps in the allylic bromination of propene (6 marks)

(c) (i) Briefly explain the meaning of the terms, achiral, chiral, enantiomers and asymmetric carbon (4 marks)

(ii) Draw the enantiomers of 1,3-dibromobutane and label them as (R) or (S) (4 marks)



1,3-dibromobutane

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