

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE AND
BACHELOR OF EDUCATION (SCIENCE)**

CHEM 130 : ORGANIC CHEMISTRY 1

STREAMS: BSC & BSC (EDUCATION)

TIME: 2 HOURS

DAY/DATE: TUESDAY 02/11/2021

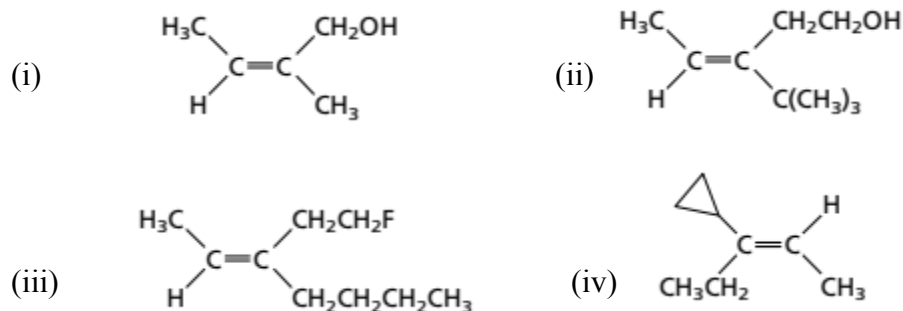
11.30 A.M. – 1.30 P.M.

INSTRUCTIONS

- **Answer all questions**

QUESTION ONE (30 MARKS)

- a) Draw the structures of the following compounds (9 marks)
- 2,3-dimethylbutane
 - 6-Isopropyl-2,3-dimethylnonane
 - 3-Ethyl-1,1-dimethylcyclohexane
 - 3,4-dibromobut-1-ene
 - 3-Methylbut-1-ene
 - 6,6-Dimethylhept-3-yne
 - 4-Bromo-2-methylheptanal
 - Pent-4-en-2-ol
 - 2-Bromobutanoic acid
- b) Write the structural formula for all the constitutional isomers with the molecular formula C_6H_{14} and name them by IUPAC system (5 marks)
- c) Explain three physical properties of alkenes (6 marks)
- d) Determine the configuration of each of the following alkenes as Z or E as appropriate: (4 marks)



e) For each of the following pair of compounds, predict the one with a higher boiling point. Justify your answers. (6 marks)

(i) Cis-1,2-dichloroethene or cis-1,2-dibromoethene

(ii) Cis or trans-2,3-dichlorobut-2-ene

(iii) Cyclohexene or 1,2-dichlorocyclohexene

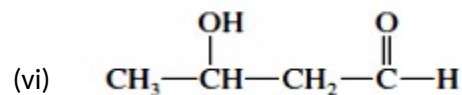
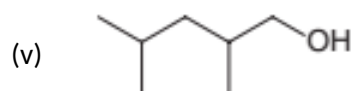
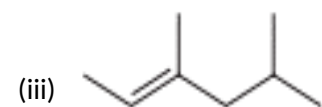
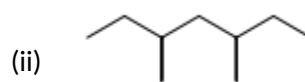
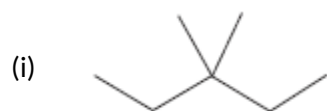
QUESTION TWO (20 MARKS)

a) Write the structures of all the alkenes that can be formed by dehydrohalogenation of each of the following alkyl halides. (4 marks)

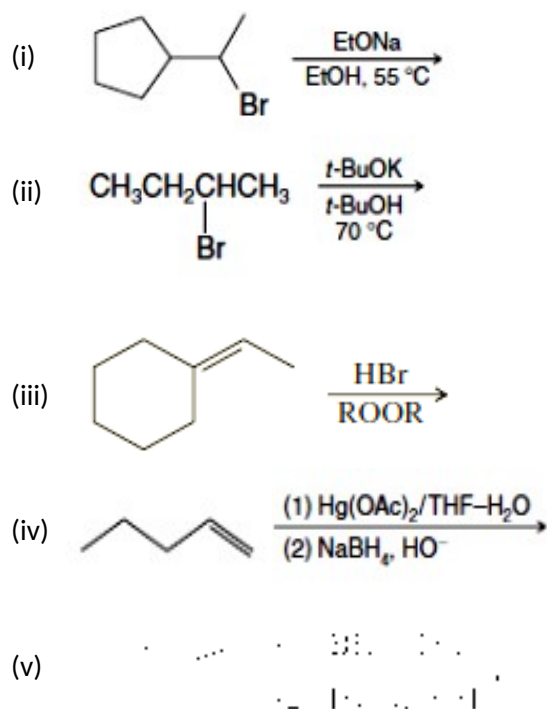
(i) 2-Bromo-2,3-dimethylbutane

(ii) tert-Butyl chloride

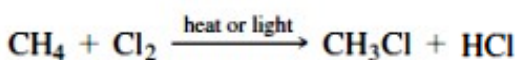
b) Write the IUPAC name of each of the following organic compound (6 marks)



b) Draw the structure of the major products for each of the following reactions. (10 marks)

**QUESTION THREE (20 MARKS)**

- a) State 2 commercial uses of alkanes (2 marks)
- b) Halogenation reactions of alkanes take place by a radical mechanism. Write the step-wise mechanism for the following reaction: (6 marks)



- c) Describe with the aid of suitable examples, the synthesis of alkanes from alkenes, stating the required conditions. (8 marks)
- a) Complete the following reaction and provide a detailed, step-by-step mechanism for the process (4 marks)

