



ALUPE UNIVERSITY
COLLEGE

... Bastion of Knowledge ...

P. O. Box 845-50400 Busia(K)

principal@auc.ac.ke

Tel: +254 741 217 185

+254 736 044 469

off Busia-Malaba road

**OFFICE OF THE DEPUTY PRINCIPAL
ACADEMICS, STUDENT AFFAIRS AND RESEARCH**

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

FIRST YEAR SECOND SEMESTER MAIN EXAMINATION

**FOR THE DEGREE OF BACHELOR OF EDUCATION
(SCIENCE)**

COURSE CODE: CHE 104E

COURSE TITLE: BASIC ORGANIC CHEMISTRY 1

DATE: 9TH JUNE, 2022

TIME: 1400 – 1700 HRS

INSTRUCTION TO CANDIDATES

- **SEE INSIDE**

THIS PAPER CONSISTS OF FOUR PRINTED PAGES PLEASE TURN OVER

REGULAR – MAIN EXAM

CHE 104e: BASIC ORGANIC CHEMISTRY 1

STREAM: BED(Sci)

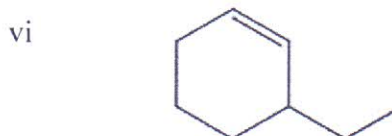
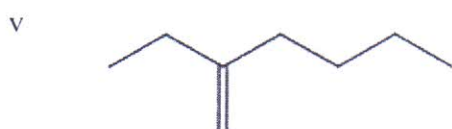
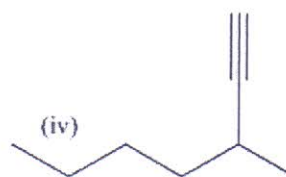
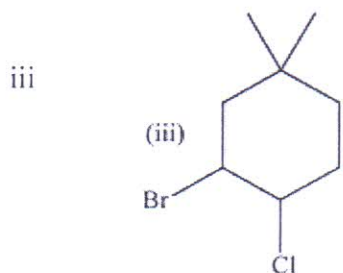
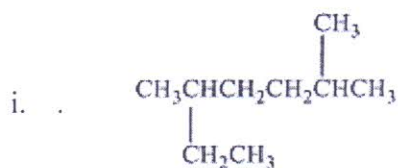
DURATION: 3 Hours

INSTRUCTIONS TO CANDIDATES

i. Answer all questions

Question One

a) Write the IUPAC name of each of the following organic compound (6 Marks)



b) Discuss the physical properties of alkenes (5 marks)

c) Explain the following observations (3 marks)

- (i) The boiling points of unbranched alkanes increase with increase in molecular weight
- (ii) The melting points of isomeric alkanes increase on branching
- (iii) Alkanes are virtually insoluble in water

Question Two

a) (i) Define the Zaitsev's rule (1 mark)

(ii) When 2-chlorobutane is treated with alcoholic potassium hydroxide two products are produced. Write the equation for the reaction and identify the major and minor products.

Apply the Zaitsev's rule to account for the major product. (3 marks)

b) Predict the more stable alkene of each pair. Justify your answers. (6 marks)

i. 2-methylpent-2-ene or 2,3-dimethylbut-2-ene

ii. Cis-3-hexene or trans-3-hexene

iii. 1-hexene or cis-3-hexene.

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

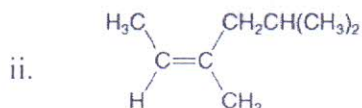
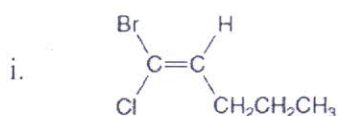
(i) Ethene and hydrogen (2 marks)

(ii) Combustion of butane. (2 marks)

Question Three

a) Write the structural formulae for all the constitutional isomers with the molecular formula C_5H_{12} and name them by IUPAC system (3 Marks)

b) Give the IUPAC names for each of the following using E/Z designation (2 Marks)



c) Give the mechanism of reaction when methane reacts with chlorine in presence of light showing initiation, propagation and termination steps. (6 marks)

d) Briefly explain the test used to differentiate ketones from aldehydes (3 marks)

Question Four

- a) Define the following terms:
- i.) Polymerization (2 Marks)
 - ii.) Homologous series (2 Marks)
- b) Describe a chemical test used to distinguish between propane and propene (2 Marks)
- c) Alcohols have higher boiling points than alkanes with equal number of carbon atoms. Explain (4 Marks)
- d) State three uses of alkanes. (2 Marks)
- e) Draw the structure of 4-isopropylheptane. (2 Marks)

Question Five

- a) Outline two unique properties of carbon. (2 Marks)
- b) State two sources of alkanes (2 Marks)
- c) For each of the following pairs of compounds, predict the one with a higher boiling point. Justify your answers. (4 Marks)
- (i) Cis-1,2-dichloroethene or cis-1,2-dibromoethene
 - (ii) Cis or trans-2,3-dichlorobut-2-ene
- d) State Markovnikov's rule. (2 Marks)
- e) Write the structures of the major organic product(s) of the following reactions. [4 marks]

