



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN NUTRITION AND DIATETICS

ACH 2107: INTRODUCTION TO ORGANIC CHEMISTRY

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: AUGUST 2019

TIME: 2 HOURS

DATE: Pick Date Select Month Pick Year

Instructions to Candidates

You should have the following for this examination

Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

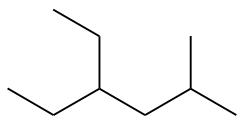
Do not write on the question paper.

QUESTION ONE (30 MARKS)

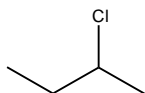
a) Define:

- (i) Biomolecules (2 marks)
- (ii) Homologous series (2 marks)
- (iii) Isomers (2 marks)

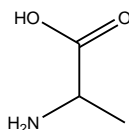
b) Give the IUPAC names of the following compounds (8 marks)



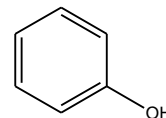
(i)



(ii)



(iii)



(iv)

- c) State whether the following organic compounds will undergo addition or elimination reactions (4 marks)
- (i) Octene
 - (ii) Butanol
 - (iii) 2-chloropropane
 - (iv) Hexyne
- d) Describe the biological function of the following elements (8 marks)
- (i) Carbon
 - (ii) Phosphorous
 - (iii) Iron
 - (iv) Zinc
- e) Write a general equation illustrating how carbohydrates are metabolized in the body (4 marks)

QUESTION TWO (15 MARKS)

- a) List the functional groups commonly present in:
- (i) Amino acids (2 marks)
 - (ii) Sugars (2 marks)
 - (iii) Lipids (2 marks)
- b) Compound A has a molecular formula of C_5H_{10} . One of its isomers decolorizes bromine water. Draw and name the possible structures of:
- (i) Compound A (3 marks)
 - (ii) The isomer of Compound A (3 marks)
- c) Describe any other chemical process you can use to distinguish compound A and its isomer listed above (3 marks)

QUESTION THREE (15 MARKS)

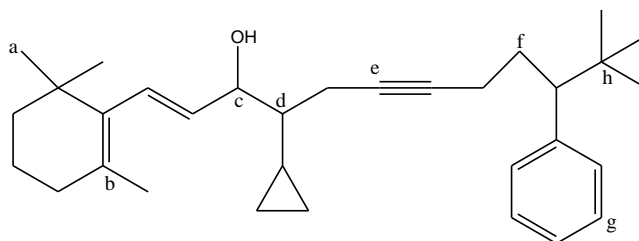
- a) Define the following terms
- (i) Enantiomers (2 marks)
 - (ii) Chiral center (2 marks)
- b) Draw the structures of the following chiral compounds
- (i) R-2-bromobutane (3 marks)
 - (ii) S-2-hydroxypropanoic acid (3 marks)
 - (iii) S-2-amino-3-methylbutanoic acid (3 marks)
- c) Distinguish between constitutional isomers and stereoisomers (2 marks)

QUESTION FOUR (15 MARKS)

- a) Distinguish between a substitution and addition reactions (4 marks)
- b) Draw and name the substitution and elimination products when 2-bromo-2-methyl propane is reacted with NaOH (5 marks)
- d) Describe simple visual test carried to distinguish between the following pair of classes of organic compounds
- (i) Alkane and alkene (3 marks)
 - (ii) Alcohols and carboxylic acids (3 marks)

QUESTION FIVE (15 MARKS)

- a) Given the following **Compound B**:



Compound B

- (i) Write the molecular formula of **Compound B** (2 marks)
- (ii) Determine the molecular mass of the compound (C = 12, H = 1, O = 16) (4 marks)

- (iii) State the type of hybridization present on the carbon labeled **a**, **b** and **e**. **(3 marks)**
- (iv) Identify and label three functional groups in **Compound B**. **(6 marks)**