



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

MAIN CAMPUS

UNIVERSITY SPECIAL/SUPPLEMENTARY EXAMINATIONS

2020/2021 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER EXAMINATIONS

FOR THE DEGREE

OF

**BACHELOR OF SCIENCE & BACHELOR OF EDUCATION
(SCIENCE)**

COURSE CODE: SCH 130

COURSE TITLE: ORGANIC CHEMISTRY 1

DATE: 26/07/2022

TIME: 8.00-10.00 AM

INSTRUCTIONS TO CANDIDATES

Attempt all questions

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

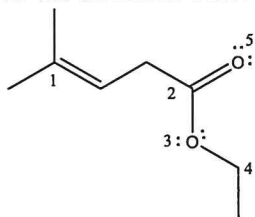
This Paper Consists of 4 Printed Pages. Please Turn Over. ▶

QUESTION ONE (18 marks)

- a) Define the following terms as used in Organic Chemistry is a field which deals with organic compounds. 4 marks
- Non-bonding electrons
 - Catenation
 - Hydrocarbons
 - Resonance structures
- b) List any three applications of organic compounds 3 marks
- c) Classify the compounds below as either organic or inorganic. Explain 5 marks
- i. CO ii. CH₃OH iii. HCl iv. C₁₂H₂₂O₁₁
- d) List any two sources of organic compounds 2 marks
- e) By help of examples, differentiate between an ionic bond and a polar covalent bond 4 marks

QUESTION TWO (22 marks)

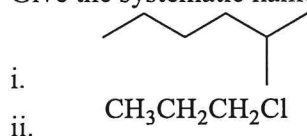
- a) Write the electronic configurations of the following atoms 4 marks
- Carbon (C, atomic no = 6) ii. Oxygen (O, atomic number = 8) iii. Hydrogen (H, atomic number = 1) iv. Chlorine (Cl, atomic number = 17)
- b) Draw and name the three dimensional shapes of the following structures 3 marks
- c) CH₄ ii. CO₂ iii. Ethyne
- d) State the hybridization around each Carbon atoms labelled 1,2,4 and Oxygen atoms 3,5 in the structure below 5 marks



- e) Methane gas (CH₄) is formed via covalent bonding of carbon (C) and hydrogen (H) atoms
- Explain what is a covalent bond 1 mark
 - Describe how the four sigma (σ) bonds in methane are formed 4 marks
 - Name one source of methane gas 1 mark
- f) Draw the Lewis structures of the following compounds 4 marks
- i. H₂O ii. CH₃CH₂Br iii. CF₄ iv. C₃H₇

QUESTION THREE (18 marks)

- a) By use of relevant examples, name four classes of organic compounds 4 marks
- b) Give the systematic names of the following structures 3 marks

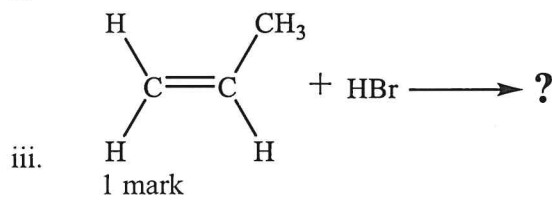
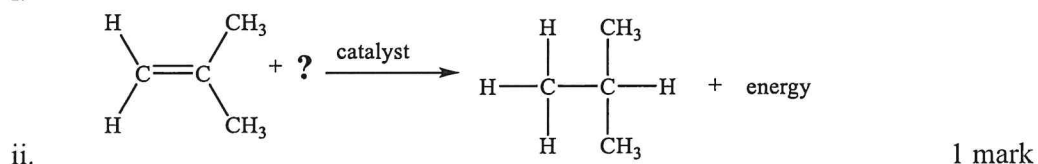




- iii.
- c) Draw the structures of the following compounds 3 marks
- i. 2,4-dimethylpent-3-ene
 - ii. Ethylcyclohexane
 - iii. 2-bromo-3,4-dimethylpentane
- d) Arrange the compounds (i-iii) below in order of decreasing solubility in water. Explain 4 marks
- $\text{CH}_3\text{CH}_2\text{Br}$ CH_3CH_3 CH_2CH_2
 i ii iii
- e) Draw and name two geometric isomers of but-2-ene 4 marks

QUESTION FOUR (12 marks)

- a) Explain the two types of cracking of alkanes 4 marks
- b) Complete the chemical equations below by providing the missing reactants or reagents or products



- c) By use of appropriate arrows, show the steps involved in formation of the products in a(i) above 4 marks