



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**SCHOOL ENGINEERING SCIENCES, HEALTH SCIENCES, SPATIAL**  
**PLANNING, BIOLOGICAL SCIENCES, HORTLICULTURAL STUDIES**  
**FIRST YEAR SECOND SEMESTER EXAMINATIONS FOR THE DEGREE OF**  
**BACHELOR OF SCIENCE EDUCATION WITH IT**  
**SCH 3112/SPB 9103: BASIC ORGANIC CHEMISTRY**  
**UNIVERSITY EXAMINATIONS: 2021/2022 ACADEMIC YEAR**

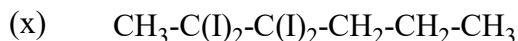
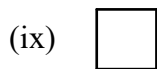
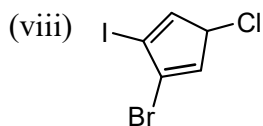
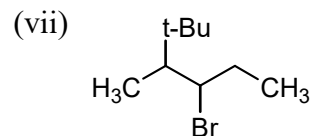
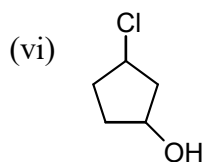
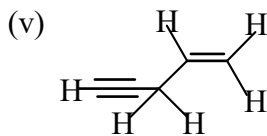
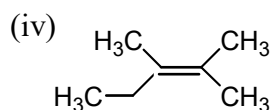
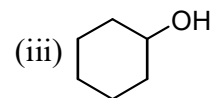
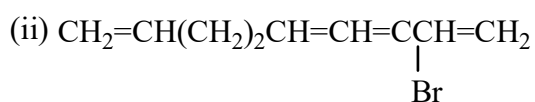
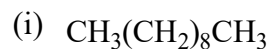
**ANSWER ALL QUESTIONS IN SECTION A AND ANY TWO QUESTIONS FROM SECTION B**

**SECTION A: ANSWER ALL QUESTIONS**

**QUESTION 1**

a) Give the IUPAC names of the following compounds;

(10 marks)



b) Draw the structures of the following compounds;

(10 marks)

- Prop-2-enol
- 3,4-dibromo-3,4-dichlorohept-1-yne
- Nonane
- Octanol
- Cyclohexane

- c) Using TWO examples, give the classification of alkylhalides. (6 marks)
- d) Esterification is a reaction typical of alkanols and alkanolic acids. Illustrate this reaction using ethanol and propanoic acid. (4 marks)

**SECTION B (40 MARKS):**

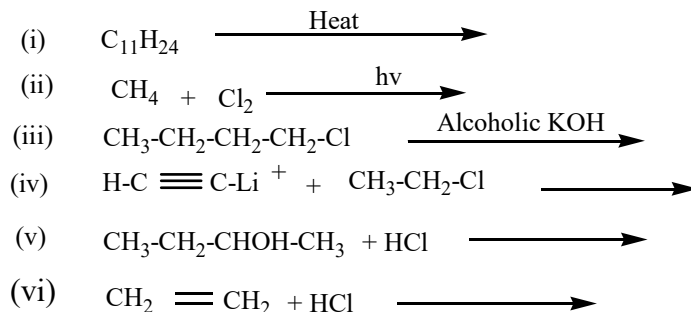
**ANSWER ANY TWO QUESTIONS FROM THIS SECTION-  
EACH QUESTION CARRIES 20 MARKS**

**QUESTION 2**

- a) Give a brief explanation to the following observations: (15 marks)
- Boiling points of alkanes increase down along the homologous series.
  - Branched alkylhalides have lower boiling points compared to the corresponding straight-line derivatives.
  - Lower alcohols are miscible with water.
  - C-H-C bond angle is  $109.5^\circ$  in alkanes
  - Alkenes decolourise bromine water.
- b) Define the following terms; (5 marks)
- Catenation
  - Homologous series
  - Functional group
  - Cracking
  - Zwitter ion

**QUESTION 3**

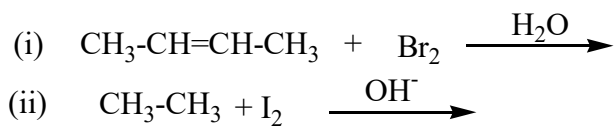
- a) Give the products of the following reactions; (12 marks)



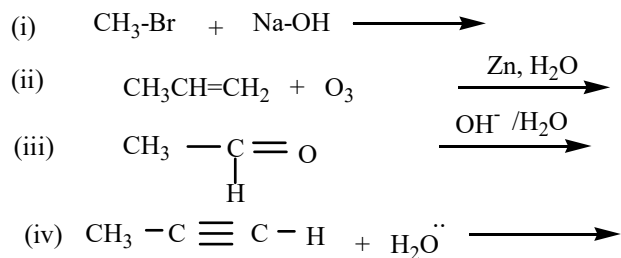
- b) Carbon is said to be a very unique element. Discuss this statement. (8 marks)

**QUESTION 4**

- a) Discuss the structure and bonding in methane (6 marks)
- b) Give the mechanism for the following reactions and name the major products; (6 marks)

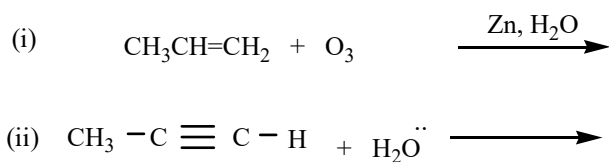


(c) Complete the following reactions; (8 marks)



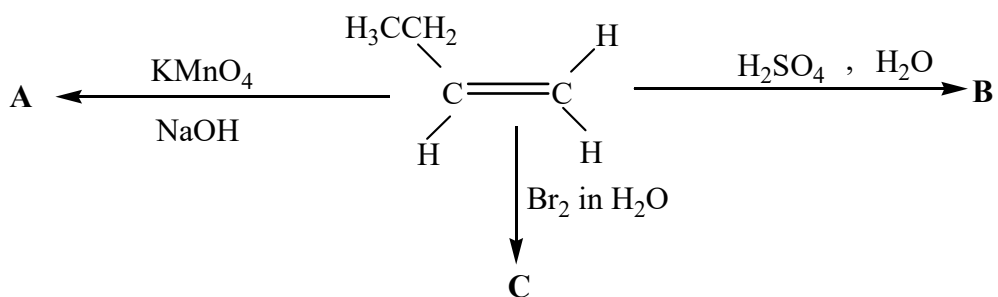
### QUESTION 5

a) Give the mechanism for the reactions below; (10 marks)



b) Briefly discuss the significance of studying Organic Chemistry. (5 marks)

c) Give products (A-C) to complete the following scheme: (3 marks)



d) Explain any **FOUR** uses of alkylhalides. (2 marks)

***E\*\*\*\*\*N\*\*\*\*\*D***