



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES

UNIVERSITY EXAMINATION

FOR DEGREE OF BACHELOR OF SCIENCE IN:

- **BIOLOGICAL SCIENCES**
- **WATER RESOURCES**
- **CONSTRUCTION MANAGEMENT**
- **SOIL SCIENCES**
- **HORTICULTURE**

1ST YEAR 2ND SEMESTER 2018/2019 ACADEMIC YEAR

REGULAR

COURSE CODE: SCH 3121/3122

COURSE TITLE: Organic Chemistry

EXAM VENUE:

DATE:

TIME: 2.00 HOURS

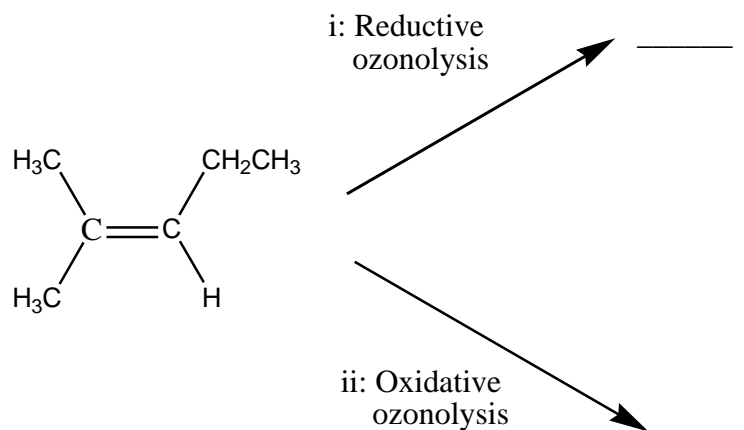
Instructions:

- 1. Answer question 1 (Compulsory) in Section A and ANY other 2 questions in Section B.**
- 2. Candidates are advised not to write on the question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

SECTION A

QUESTION ONE (Compulsory) (30 marks)

- a) Illustrate the three main steps involved in the photochlorination of methane. (6 marks)
- b) Describe briefly the rules of IUPAC system of nomenclature for saturated hydrocarbons (6 marks)
- c) Explain the difference between structural isomers and stereoisomers. Provide an example in each case (4 marks)
- d) Define the term Ozonolysis and Give the products from the two ozonolysis reactions shown below (6 marks)
- e) Briefly explain what is meant by the following terms (8 marks)
- Covalent bond
 - Carbocation
 - Nucleophile
 - Electrophile



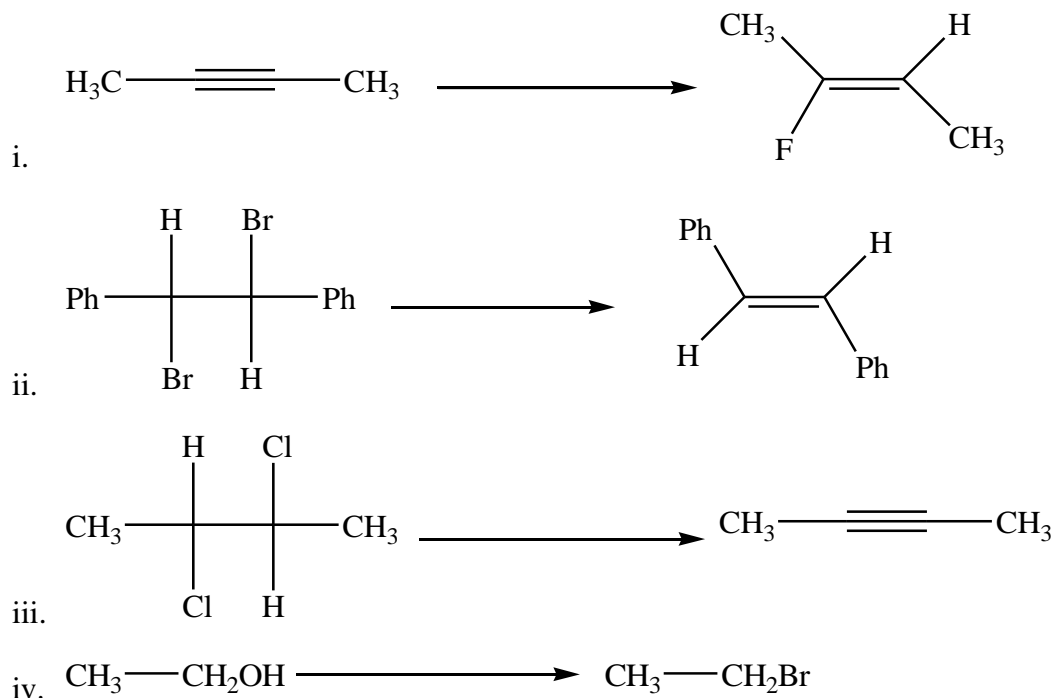
SECTION B

QUESTION TWO (20 marks)

- a) Draw the chemical structure of the following: (6 marks)
- 1-Ethyl-3-methylcyclohexane
 - 1-chloro-2-ethyl-4-methylcyclohexane
 - trans*-5,5-dimethylhex-2-ene

iv. *But-3-yn-1-ol*

b) Classify each of the following reactions as an Elimination, Addition or Substitution. (4 marks)



c) Explain what is meant by geometric isomerism and by using but-2-ene show how these may occur and the differences in their melting and boiling points. (6 marks)

d) Explain two methods by which alkenes may be prepared using examples. (4 marks)

QUESTION THREE (20 marks)

a) 1. Define the following terms used in organic chemical reactions (4 marks)

- i. Heterolysis,
- ii. Halogenation,
- iii. Hydrohalogenation
- iv. Ozonolysis

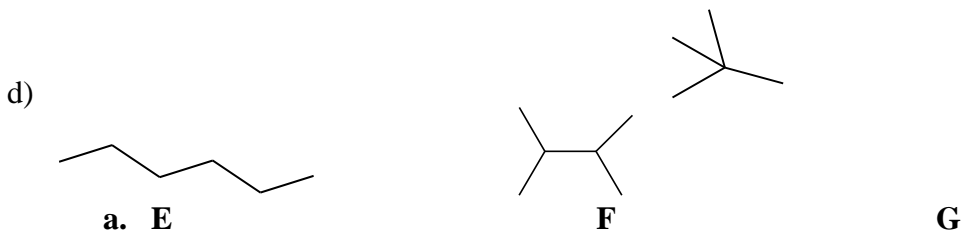
b) Explain and differentiate using curly arrows between homolytic and heterolytic bond cleavage in organic chemical reactions. (6 marks)

c) Name two polymers and show how ethyne can be used to make them (4 marks)

d) What is cracking and how is it useful in the petroleum industry (6 marks)

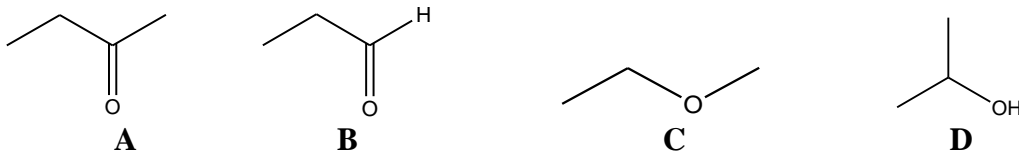
QUESTION FOUR (20 marks)

- a) Write a structure corresponding to the following names (4 marks)
- i. 4-Nonene
 - ii. Cis-2-pentene
- b) Explain the meaning of a functional group. Name them. Draw SIX containing an oxygen atom. (10 marks)
- c) Consider the following organic compounds, name them and arrange them in order of increasing boiling point. Explain your reasoning. (6 marks)

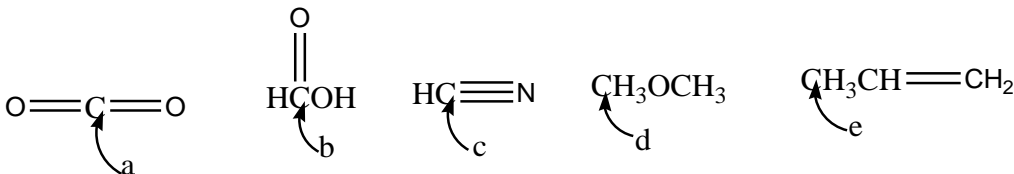


QUESTION FIVE (20 marks)

- a) Name five organic compounds used in the construction industry. Also five organic compounds used in the agricultural industries. (5 marks)
- b) Referring to the compounds below, answer the questions that follow.



- i. Write the systematic (IUPAC) names for the compounds **A** and **B** (4marks)
 - ii. Briefly explain the relationship between molecules **C** and **D** above? (4 marks)
- c) For each of the following compounds, state the hybridization at each of the carbon atoms indicated a- e. (5 marks)



- d) Explain the difference between structural isomers and stereoisomers. Provide an example in each case (2 marks)