JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BIOLOGICAL, PHYSICAL, MATHEMATICS AND ACTUARIAL SCIENCES

UNIVERSITY EXAMINATIONS: 2023/2024 ACADEMIC YEAR

BACHELOR OF:

- ✓ **EDUCATION SCIENCE WITH IT**
- ✓ **SCIENCE IN RENEWABLE ENERGY TECHNOLOGY AND MANAGEMENT**
- ✓ **SCIENCE IN CONSTRUCTION MANEGEMENT**
- ✓ **SCIENCE IN BIOLOGICAL SCIENCES**
- ✓ **SCIENCE IN AGRICULTURAL EDUCATION EXTENSION**

FIRST YEAR SECOND SEMESTER EXAMINATIONS

SPB 9103: ORGANIC CHEMISTRY/BASIC ORGANIC CHEMISTRY EXAMINATIONS

COURSE CODE: SPB 9103

COURSE TITLE: BASIC ORGANIC CHEMISTRY/ ORGANIC CHEMISTRY

EXAM VENUE: **STREAM: (BED SCI)**

DATE: **EXAM SESSION:**

TIME: 2:00HRS

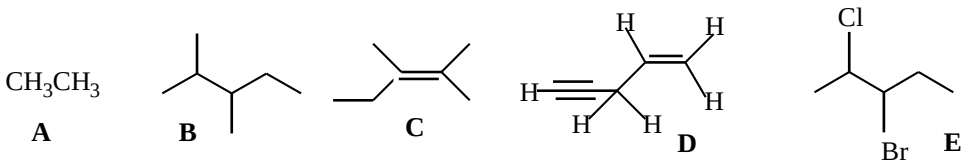
Instructions:

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: ANSWER ALL QUESTIONS

QUESTION 1

a. Give the IUPAC names of the following compounds (**A-E**); [10 marks]



b. Explain each of the following observations: [10 marks]

i. Branched alkanes produce gasoline of high octane rating .

ii. The study of Organic Chemistry is the cornerstone in the understanding of living systems.

iii. All the C-H bonds in methane are equal in length

iv. Alkenes are more reactive than alkanes of the same carbon skeleton.

v. Alcohols are amphoteric.

c. Complete the following reactions, giving conditions in each case; [10 marks]

i. $CH_4 + Br_2 \rightarrow$

ii. $C_2H_6 + I_2 \rightarrow$

iii. $C_4H_{10} + CO_2 \rightarrow$

iv. $CH_4 + Br_2 \rightarrow$

v. $CH_3\text{-}CH_2\text{-}OH + Cl_2 \rightarrow$

SECTION B (40 MARKS): ANSWER ANY TWO QUESTIONS FROM THIS SECTION:

EACH QUESTION CARRIES 20 MARKS

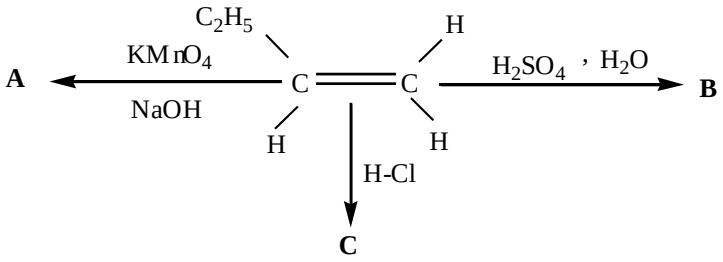
QUESTION 2

a. Draw All the structural isomers of the compound given below; [3 marks]

C_5H_9Cl

b. Carbon is said to be a unique element. Discuss this fact giving **FOUR** counts. [4 marks]

c. Give the structures and names of products (**A-C**) to complete the following scheme; [9 marks]



d. Distinguish between *homolytic* and *heterolytic* bond cleavage. [4 marks]

QUESTION 3

a. Explain briefly each of the following observations: [10 marks]

i. The melting point of alkanes increase down the homologous series.
ii. Alcohols of lower molecular weight are soluble in water.
iii. Alkenes change potassium permanganate from purple to brown.
iv. Boiling point of branched alkylhalides are generally lower compared to the corresponding straight chain derivatives.
v. Organic Chemistry is all around us.

b. Give the products of the following reactions; [8 marks]

(i) $C_{11}H_{24} \xrightarrow{\text{Heat}}$

(ii) $CH_4 + Cl_2 \xrightarrow{hv}$

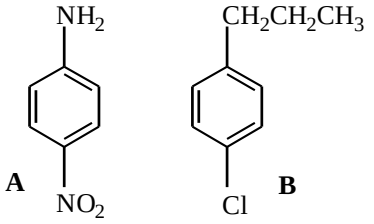
(iii) $CH_3\text{-}CH_2\text{-}CH_2\text{-}CH_2\text{-}Cl \xrightarrow{\text{Alcoholic KOH}}$

(iv) $H\text{-}C\equiv C\text{-}Li^{+} + CH_3\text{-}CH_2\text{-}Cl \longrightarrow$

c. Give any **FOUR** uses of halogenoalkanes. [2 marks]

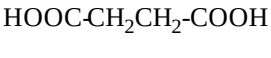
QUESTION 4

a. Give the IUPAC names of compounds (**A-D**); [8 marks]

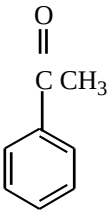


A

B



C



D

b. Complete the following reactions; [8 marks]

(i) $CH_3\text{-}Br + Na\text{-}OH \longrightarrow$

(ii) $CH_3CH{=}CH_2 + O_3 \xrightarrow{Zn,\ H_2O}$

(iii) $CH_3\text{—}\underset{\displaystyle H}{\overset{\displaystyle |}{C}}{=}O \xrightarrow{OH^{-}/H_2O}$

(iv) $CH_3 - C \equiv C - H + H_2\ddot{O}: \longrightarrow$

c. Discuss the nature of hybridization in methane. [4 marks]

QUESTION 5

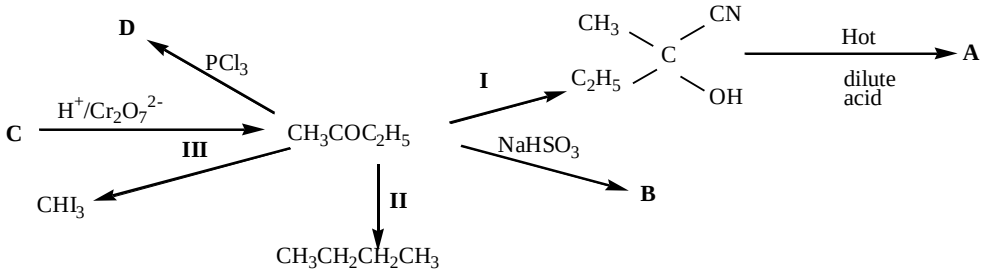
a. Desrcibe TWO chemical tests that can be used to distinguish between propanal and propanone. [4 marks]

b. Give the IUPAC names and the structural formulae of organic products formed when ethene reacts with;

i. Chlorine [3 marks]

ii. Water [3 marks]

c. The following is an illustration of some of the major reactions of butanone.



i. Give the structures of the compounds A, B, C and D. [4 marks]

ii. Give the reagents for the reaction I, II, III. [3 marks]

d. Give three (3) uses of haloalkanes [3 marks]

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