KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

SPECIAL/SUPPLEMENTARY EXAMINATIONS
FIRST YEAR EXAMINATION FOR THE AWARD OF THE DEGREE OF BACHELOR OF EDUCATION
FIRST SEMESTER, 2022/2023
(NOVEMBER/DECEMBER, 2022)

CHEM 130: INORGANIC CHEMISTRY I

STREAM: Y1 S1 **TIME: 2 HOURS**

DAY: **DATE: 00/12/2022**

INSTRUCTIONS

1. ***Do not write anything on this question paper.***
2. ***Answer ALL the questions in section A and any TWO questions in section B.***

SECTION A (30 MARKS)

1. (a) Define the term *structural isomerism*. (2marks)

(b) Draw structural formulae for the structural isomers of C_4H_{10}.

(c) A hydrocarbon, **W,** contains 92.3% carbon by mass. The relative molecular mass of **W** is 78.0

(i) Calculate the empirical formula of **W**.

(ii) Calculate the molecular formula of **W**. (4 marks)

(d) Give the name and draw the graphical formula of an alkene that is an isomer of but-1-ene **and** that has a different carbon skeleton. (2 marks)

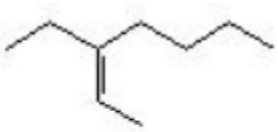
Name

Graphical formula

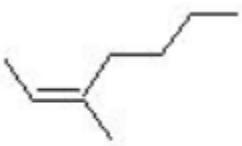
(e)There are four structural isomers of molecular formula C_4H_9Br. Name and draw structural formulae of these isomers . (4 marks)

(f) What are the hybridizations of carbons 1 and 2 respectively in the following structure? (2 marks)

(g) Determine the double bond stereochemistry (E or Z) for the following molecules. (4 marks)



A



B

(h)Why are alkene boiling points slightly less than the corresponding alkane? (3 marks)

(i)From structure and bonding, indicate the direction of dipole moment (If any) for each of the following compounds (3 marks)

i. HBr
ii. CH_2Cl_2
iii. I_2

j. Draw the structural formulae of the following compounds (3 marks)

i. 2-Bromo,2- methyl propene
ii. *Cis*-2 methyl-3-heptene
iii. (E)-2-Chloro-2 butene

k. Draw and name the structures of alkenes that yield a pair of following compounds when they undergo Ozonolysis (6 marks)

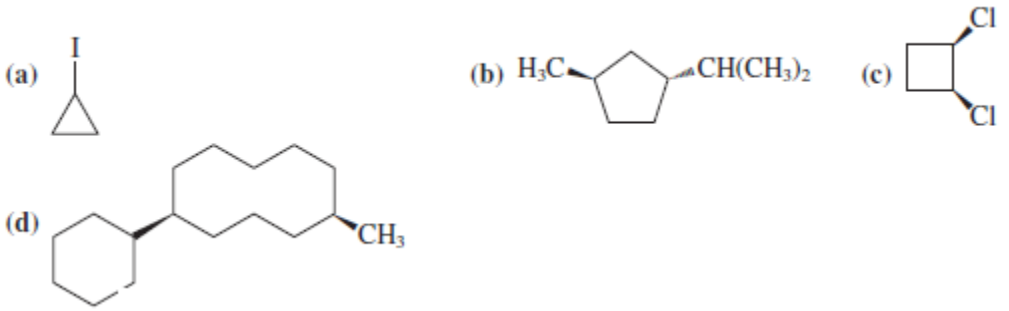
i. $CH_3CH_2CH_2CHO$ and HCHO
ii. Only CH_3COCH_3
iii. CH_3CHO and $OHCCH_2CHO$

(l)Draw and write the names of the structures obtained from the reaction between water and butyne. (4 marks)

(m) State any two industrial uses of ethane (2 marks)

SECTION B (15Marks): Attempt only two questions of your choice in this section

2. Describe isomerism in alkenes. Give illustrations of three examples (15 marks)
3. Outline any five methods methods of preparing hexane in the laboratory (15 marks)
4. a. Name the following molecules according to the IUPAC nomenclature system. (7marks)



b. Formulate the product(s) that you would expect from each of the following reactions. Show
Stereochemistry clearly. (8 marks)