



KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2015/2016 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER
MAIN EXAMINATIONS

FOR THE DEGREE OF B.ED (SCIENCE)

COURSE CODE: SCH 230

COURSE TITLE: ORGANIC CHEMISTRY I

DURATION: 2 HOURS

DATE: 12/05/2016

TIME: 11.30 – 1.30PM

INSTRUCTIONS TO CANDIDATES

- Answer **QUESTION ONE** (Compulsory) and any other two (2) Questions.
- Indicate **answered questions** on the front cover.
- Start every question on a new page and make sure question's number is written on each page.

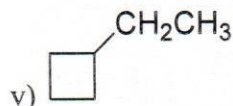
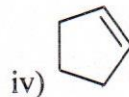
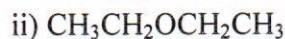
This paper consists of 6 printed pages. Please Turn Over



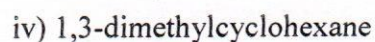
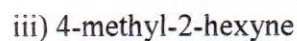
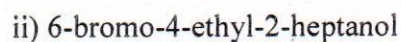
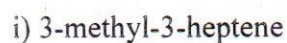
KIBU observes ZERO tolerance to examination cheating

Question 1

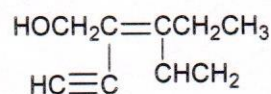
a) Give the systematic (IUPAC) names for each of the following compounds (5 marks)



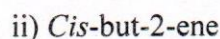
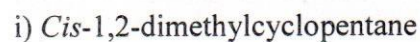
b) Draw the structures of the following compounds. (4 marks)



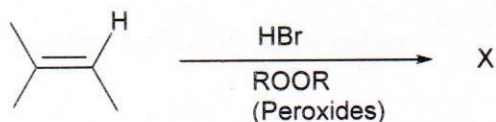
c) Draw and label the E and Z isomers of the following compounds (4 marks)



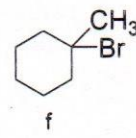
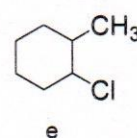
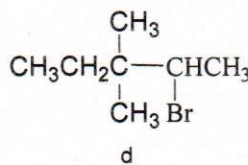
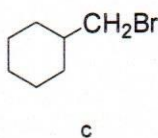
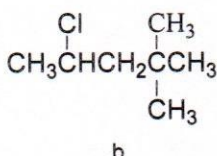
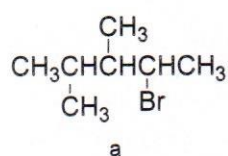
d) Draw the structures of: (2 marks)



e) Draw the structure of the product X. Give a reason. (3 marks)

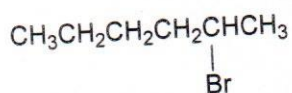


f) Which of the following alkyl halides forms a substitution product in an $\text{S}_\text{N}1$ reaction that is different from the substitution product formed in an $\text{S}_\text{N}2$ reaction? (2 marks)

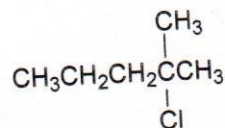


g) For each of the following alkyl halides, indicate the major product formed when the alkyl halide undergoes an E1 reaction. Show the stereochemistry of the major products. (4 marks)

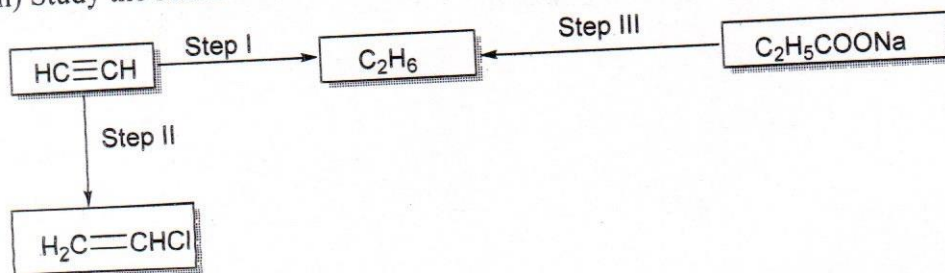
i)



ii)



h) Study the scheme below and answer the questions that follow.



(3 marks)

i) Name the reagents in:

Step I

Step II

Step III

ii) Write an equation for the complete combustion of $\text{HC}\equiv\text{CH}$

(1 mark)

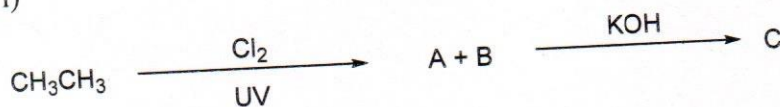
iii) Give two uses of methane

(2 marks)

Question Two

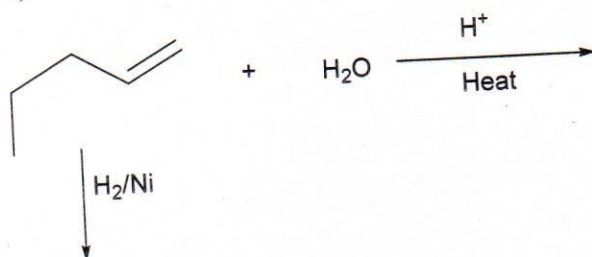
a) Complete the reactions below:

i)



(3 marks)

ii)



(2 marks)

using curly arrows

(6 marks)

c) Explain the following:

i) 1,3-pentadiene is more stable than 1,4-pentadiene

(2 marks)

ii) Ethers generally have a higher boiling points than alkanes of comparable molecular weight

(1½marks)

iii) Alkanes have lower boiling points than alcohols of comparable molecular weight

(1 ½marks)

iv) Amines have lower boiling points than alcohols of comparable molecular weight

(2 marks)

v) Primary amines are more soluble in water than secondary amines with same number of carbons

(2 marks)

Question Three

a) Write the ground-state electron configuration for the following (indicate the orbitals that are being filled)

(5 marks)

i) Ca

ii) Ar

iii) Mg^{2+}

iv) O

v) C

b) Give the hybridization of the central atom and the shape of the molecule in each of the following species

(5 marks)

i) BH_3

ii) CO_2

iii) CH_4

iv) H_2O

v) NH_3

c) Using curved arrows, show how an equally stable resonance structure can be generated for each of these anions

(5 marks)

i) NO_3^-

ii) CO_3H^-

iii) BO_3^-

iv) $[CH_2NH_2]^+$

d) i) Define isomerism

(1 mark)

b) Label and show the steps of the monohalogenation reaction leading to products A and B above