



ALUPE UNIVERSITY
COLLEGE

Bastion of Knowledge...

P.O.Box 845-50400 Busia(K)
principal@auc.ac.ke
Tel: +254 741 217 185
+254 736 044 469
off Busia-Malaba road

OFFICE OF THE DEPUTY PRINCIPAL
ACADEMICS, STUDENT AFFAIRS AND RESEARCH

UNIVERSITY EXAMINATIONS

2018/2019 ACADEMIC YEAR

FIRST YEAR SECOND SEMESTER REGULAR EXAMINATION

**FOR THE DEGREE OF BACHELOR OF
EDUCATION SCIENCE**

COURSE CODE: CHE 104e

COURSE TITLE: ORGANIC CHEMISTRY I

ALUPE UNIVERSITY COLLEGE
LIBRARY

DATE: 25TH APRIL, 2019

TIME: 9.00 AM – 12.00 PM

INSTRUCTION TO CANDIDATES

- SEE INSIDE

THIS PAPER CONSISTS OF 6 PRINTED PAGES

PLEASE TURN OVER

CHE 104e: ORGANIC CHEMISTRY I

STREAM: BED (Science)

DURATION: 3 Hours

INSTRUCTIONS TO CANDIDATES

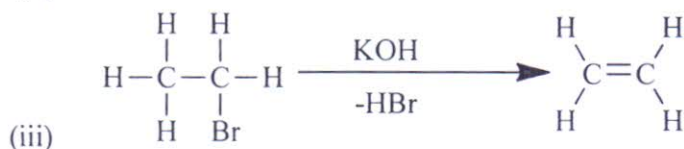
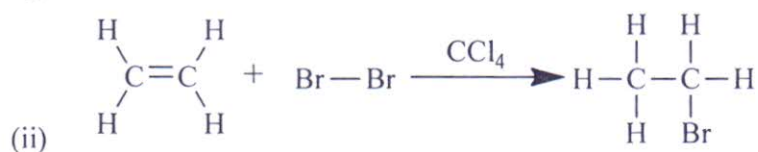
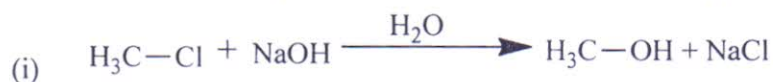
Answer ALL questions

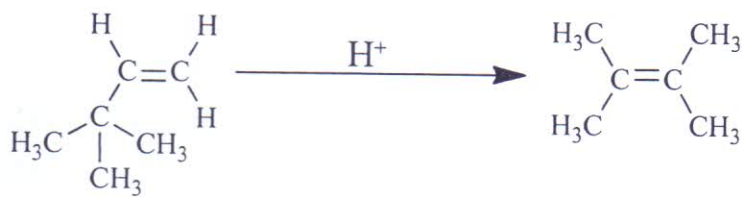
Question One

- a) Draw isomers of the following compounds (2 Marks)
- Propene
 - 1,3-butene
 - Write formulas for the three structural isomers of C_5H_{12} (3 Marks)
- b) Differentiate between hemolytic and heterolytic bond fission (1 Mark)
- c) i) Define geometrical isomerism (1 Mark)
- ii) Give the condition necessary to observe geometrical isomerism (1 Mark)
- d) Study the table below and explain the trends in boiling and melting points. (2 Marks)

Name	Bpt ($^{\circ}C$)	Mpt ($^{\circ}C$)	Density (g/ml)
Ethane	-104	-169	-
Propane	-47	-185	-
1-butene	-6	-185	0.595
Cis-2-butene	4	-139	0.621
Trans-2-butene	1	-105	0.604
2-methyl-propene	-7	-140	0.594
1-pentene	30	-138	0.641
1-hexene	63	-140	0.673
Cyclohexene	83	-104	0.810

- e) Categorize the following organic reactions in terms of the type of reaction; (4 Marks)

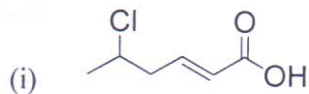




(iv)

f) Give systematic names of the following compounds.

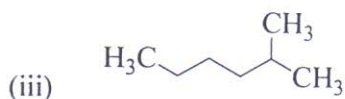
(5 Marks)



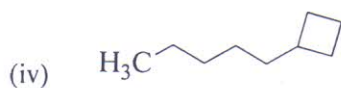
(i)



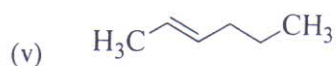
(ii)



(iii)



(iv)



(v)

g) Write the structural formulas for the following compounds

(2 Marks)

i) 4-(1-Methylethyl)heptane

ii) 1,3-cyclohexadiene

Question Two

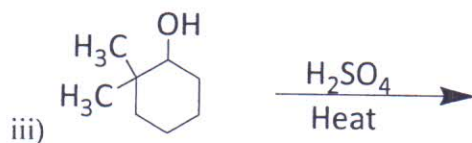
a) Predict the major products of the following chemical reactions:



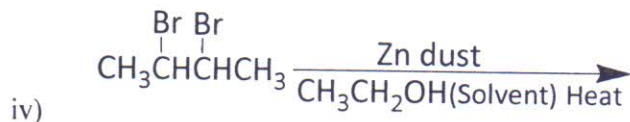
(1 Mark)



(1 Mark)

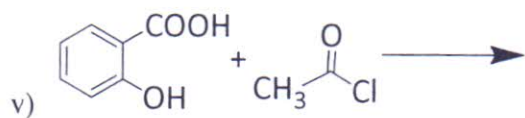


(1 Mark)

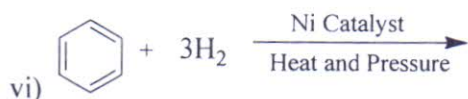


(1 Mark)





(1 Mark)



(1 Mark)

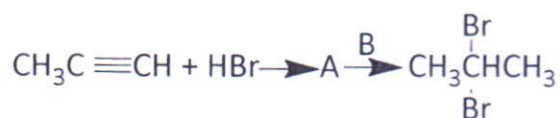
b) The behaviour of carbon is very unique and that is why it has attracted a lot of attention. Discuss two properties of carbon that make it unique.

(2 Marks)

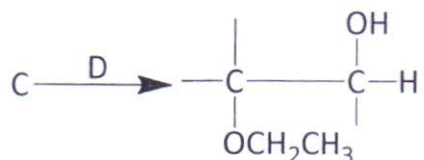
c) Provide the missing reactants and reagents for the following transformations.

(4 Marks)

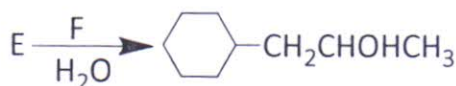
i)



ii)



iii)



d) What is the importance of resonance structures in any molecule

(1 Mark)

e) List four uses of alkyl halides

(2 Marks)

f) Give the detailed mechanism for dehydration of alcohols

(2 Marks)

g) Define the Markovnikov's rule and give an example of a reaction in which it applies

(3 Marks)

Question Three

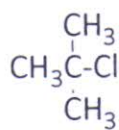
a) Explain the following observations:-

i) Alcohols have corresponding higher boiling points than alkanes and alkyl halides.

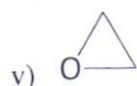
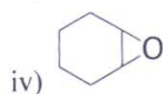
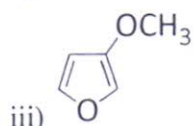
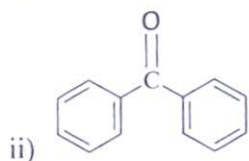
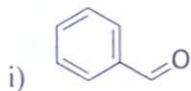
(2 Marks)

ii) Carboxylic acids are soluble in water

(1 Mark)



- iii) $\text{CH}_3\text{CH}_2\text{Cl}$ has a higher boiling point than (1.5 Marks)
- b) Give IUPAC names for the following compounds: (2.5 Marks)



- c) Illustrate with suitable examples the following reactions:

- i) Hydration of alkenes (2 Marks)
- ii) Polymerization of alkenes (2 Marks)
- iii) Sulfonation of benzene (2 Marks)
- iv) Oxidation of alcohols (2 Marks)

Question Four

- a) Distinguish between the following chemical reactions:

- i) $\text{S}_{\text{N}}1$ and $\text{S}_{\text{N}}2$ (2 Marks)
- ii) $\text{E}1$ and $\text{E}2$ (2 Marks)

- b) Using IUPAC system, name the following compounds: (2 Marks)

- i) $\text{CH}_3(\text{CH}_2)_5\text{CHO}$
- ii) $\text{CH}_3\text{CH}_2\text{COCH}_2\text{CH}_2\text{CH}_3$
- iii) $\text{C}_6\text{H}_5\text{COC}_6\text{H}_5$
- iv) $\text{CH}_2\text{ClCH}_2\text{CH}(\text{CH}_3)\text{COOH}$

- c) Using IUPAC system, draw the structure of the following compounds: (5 Marks)

- i) Pentanal
- ii) 2,4,4-trimethylhexane
- iii) 1-ethyl-2-methylcyclohexane



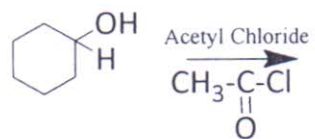
iv) 2-methylpentan-3-ol

v) 1,3,5-hexatriene

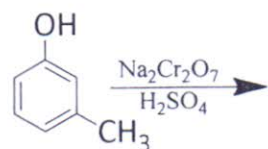
d) Suggest products for the following reactions:

(4 Marks)

i)



ii)



iii)

