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CHE 104e

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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**

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)

(i) Propene

(ii) 1,3-butene

(iii) 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)

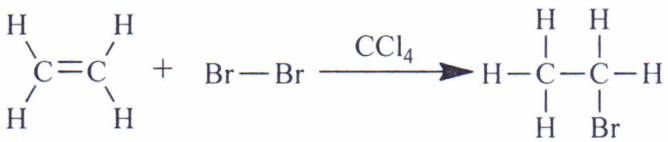
ii) Give the condition necessary to observe geometrical isomerism (1 Mark)

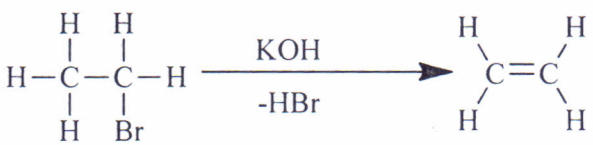
d) Study the table below and explain the trends in boiling and melting points. (2 Marks)

Name	Bpt (°C)	Mpt (°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)

(i) $H_3C-Cl + NaOH \xrightarrow{H_2O} H_3C-OH + NaCl$

(ii) 

(iii) 

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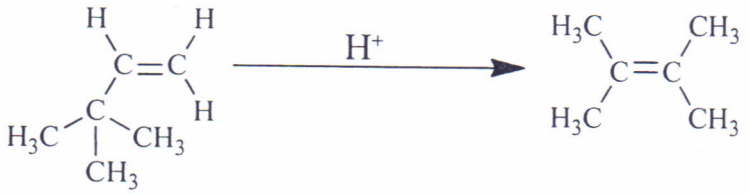
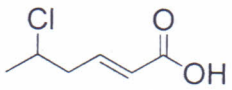


f) Give systematic names of the following compounds. (5 Marks)

(i)



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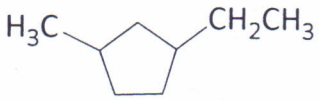

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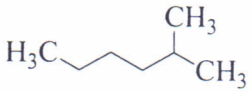

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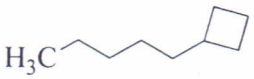
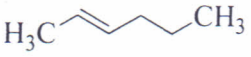


(v)



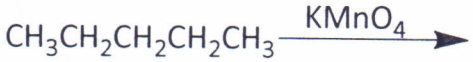
g) Write the structural formulas for the following compounds (2 Marks)

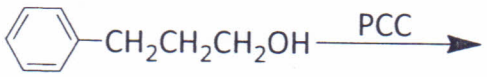
i) 4-(1-Methylethyl)heptane

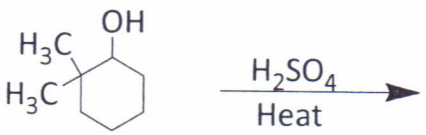
ii) 1,3-cyclohexadiene

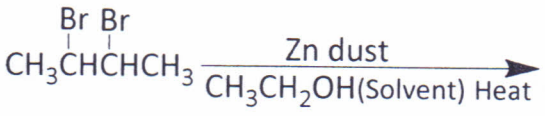
Question Two

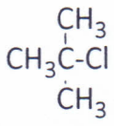
a) Predict the major products of the following chemical reactions:

i)  (1 Mark)

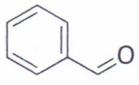
ii)  (1 Mark)

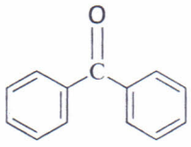
iii)  (1 Mark)

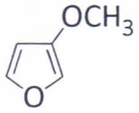
iv)  (1 Mark)

iii) CH_3CH_2Cl has a higher boiling point than  (1.5 Marks)

b) Give IUPAC names for the following compounds: (2.5 Marks)

i) 

ii) 

iii) 

iv) 

v) 

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) S_N1 and S_N2 (2 Marks)

ii) E1 and E2 (2 Marks)

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

i) $CH_3(CH_2)_5CHO$

ii) $CH_3CH_2COCH_2CH_2CH_3$

iii) $C_6H_5COC_6H_5$

iv) $CH_2ClCH_2CH(CH_3)COOH$

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

i) Pentanal

ii) 2,4,4-trimethylhexane

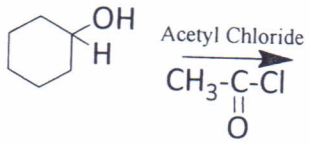
iii) 1-ethyl-2-methylcyclohexane

iv) 2-methylpentan-3-ol

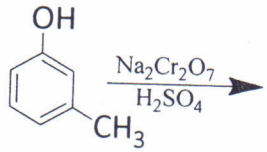
v) 1,3,5-hexatriene

d) Suggest products for the following reactions: (4 Marks)

i)



ii)



iii) $CH_3COOH \xrightarrow{SOCl_2}$

$CH_3CH_2COOH \xrightarrow[2.\ H_2O]{1.\ LiAlH_4}$

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