UNIVERSITY OF EMBU

2018/2019 ACADEMIC YEAR

SECOND SEMESTER EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

SCH 102: ORGANIC CHEMISTRY I

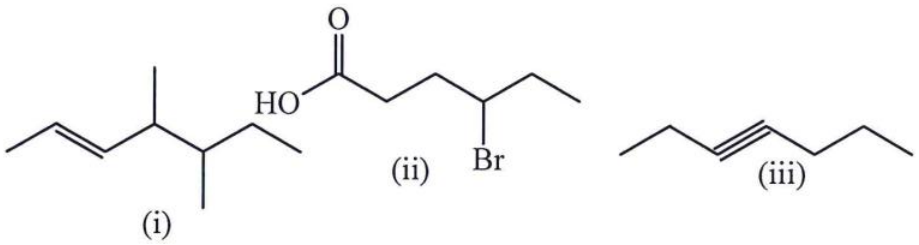
DATE: APRIL 9, 2019 **TIME: 8:30 AM – 10:30 AM**

INSTRUCTIONS:

Answer Question ONE and ANY Other TWO Questions

QUESTION ONE (30 Marks)

a) Give IUPAC name of the following compounds (3 marks)



(i) (ii) (iii)

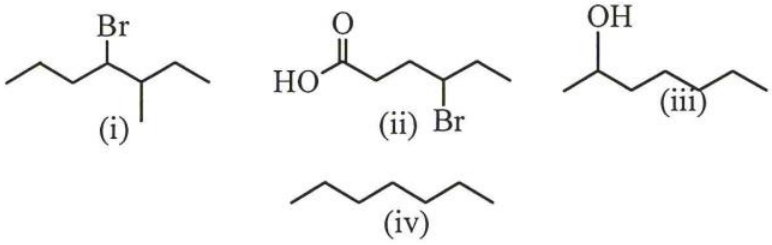
b) Give the structures of the following compounds (3 marks)

i) 2,4-dimethylheptene

ii) 2,4-dichlorocyclohexanoic acid

iii) Cyclohexylpropanoate

c) Arrange the following compounds in order of the increasing boiling points (4 marks)

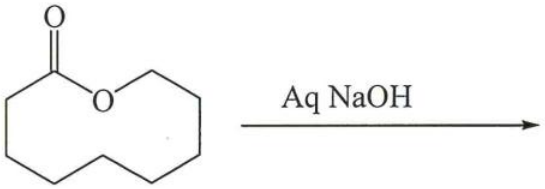


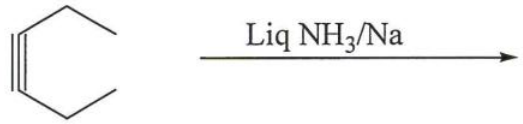
d) Explain the effect of light on free radical halogenations of alkanes (4 marks)

e) Ketones and enols are major products in hydration of alkynes. Explain. (4 marks)

f) With a specific example illustrate preparation an alkane by coupling of alkyhalides (4 marks)

g) Predict the products in the following reactions (4 marks)

i) 

ii) 

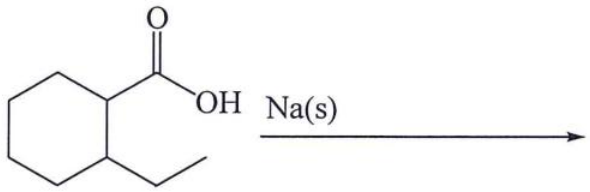
h) Using cyclohexanol as an example, explain the concept of hydrogen bonding (4 marks)

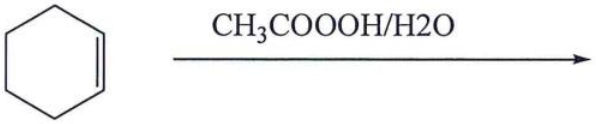
QUESTION TWO (20 MARKS)

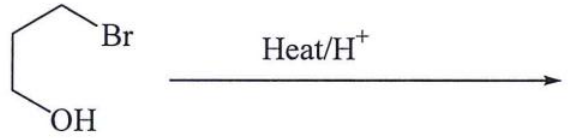
a) Describe Markovnikov's addition in alkenes (4 marks)

b) Show how you would synthesize methyl cyclohexane from methane (6 marks)

c) Predict major products in the following reactions (6 marks)

i) 

ii) 

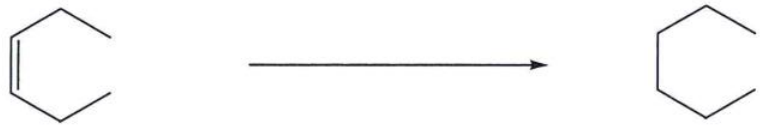
(iii) 

d) Describe combustion of alkanes and explain its application in industry (4 marks)

QUESTION THREE (20 MARKS)

a) Explain the low boiling point of short chain alkanes (4 marks)

b) Show how you would perform the following syntheses in the lab (9 marks)

i) 

ii) 

iii) 

c) Explain why alkyl halides higher boiling points than alkanes (6 marks)

d) Describe an analytical laboratory test for ketones (4 marks)

QUESTION FOUR (20 MARKS)

a) Alkenes are slightly basic compared to alkanes. Explain (3 marks)

b) Give the structures of the following organic compounds (8 marks)

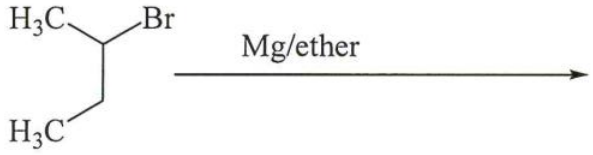
i) Di-sec-butylether

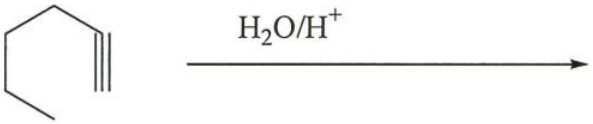
ii) α,β dimethylpentanoic acid

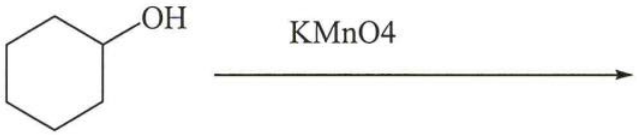
iii) 1,4 diisopropyl cyclohexene

iv) Potassium butanoate

c) Predict major products in the following reactions (6 marks)

i) 

ii) 

iii) 

d) Explain why tertiary alcohols cannot be oxidized (3 marks)

QUESTION FIVE (20 MARKS)

a) Explain why alkanes are the most unreactive class of organic compounds (5 marks)

b) During free radical undesirable side products are common. Explain. (5 marks)

c) Additions of electrophilic reagents to alkenes in presence of free radicals reverses Markovnikov's rule. Explain. (5 marks)

d) The dipole moment in alkanes is lower than alkylhalides. Explain (5 marks)

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