UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

SECOND SEMESTER EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

SCH 102: ORGANIC CHEMISTRY I

DATE: APRIL 3, 2018 **TIME: 2:00-4:00PM**

INSTRUCTIONS:

Answer Question ONE and ANY Other TWO Questions

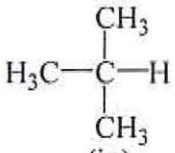
QUESTION ONE (30 MARKS)

a) Explain why alkanes are considered to be saturated hydrocarbons (3 marks)

b) Explain the concept of geometric isomerism alkenes (3 marks)

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

(i) $CH_3CH_2CH_2CH_2Br$ (ii) $CH_3CH_2CH_2CH_2OH$ (iii) $CH_3CH_2CH_2OH$



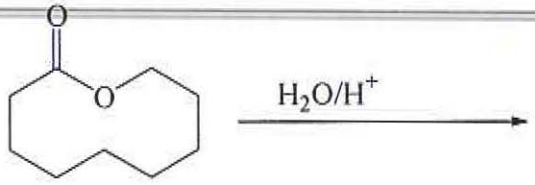
(iv)

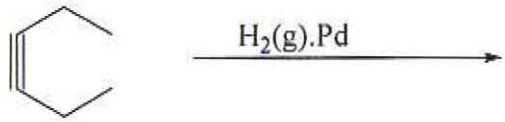
d) Explain the role of UV light in halogenations of alkanes (4 marks)

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

f) With a specific example illustrate hydrolysis of a Grignard reagent to form an alkane (4 marks)

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

i) 

ii) 

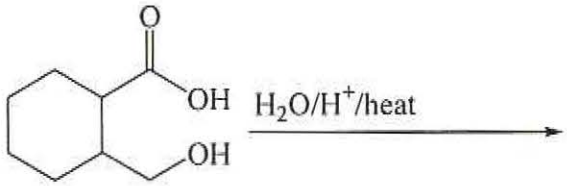
(h) Using methanol as an example, explain the concept of hydrogen bonding (4 marks)

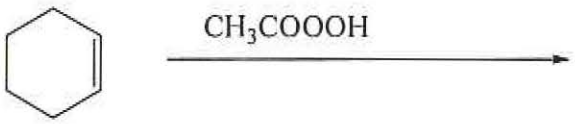
QUESTION TWO (20 MARKS)

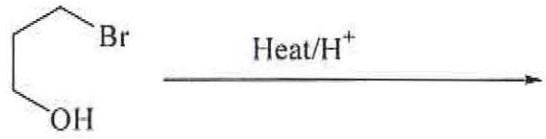
a) Describe allylic halogenation in alkenes (4 marks)

b) Show how you would synthesize bromo-cyclohexane from cyclohexanol (6 marks)

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

i) 

ii) 

(iii) 

d) Explain two applications of alkanes in industry (4 marks)

QUESTION THREE (20 MARKS)

a) Explain the low boiling point of branched 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 are less polar than alcohols (6 marks)

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

QUESTION FOUR (20 MARKS)

a) Alkynes are slightly acidic compared to alkenes. Explain (3 marks)

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

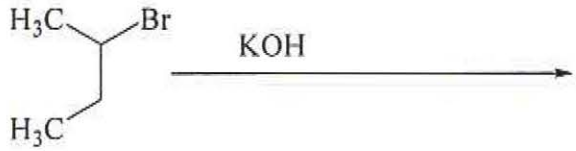
i) Diisobutylether

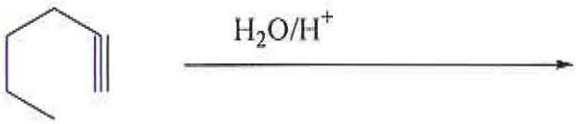
ii) α,β dihydroxylethylpentanoate

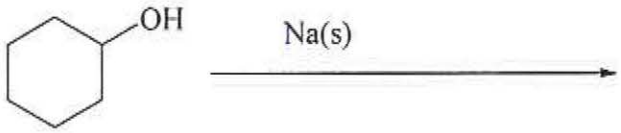
iii) Lithium cyclohexanoate

iv) Cyclopropylcyclohexane

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

i) 

ii) 

iii) 

d) Describe an analytical test for alcohols (3 marks)

QUESTION FIVE (20 MARKS)

a) Explain an analytical test for alkynes in the lab (5 marks)

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

c) Additions of electrophilic reagents to alkenes follows Markovnikov's rule. Explain. (5 marks)

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

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