



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES**  
**UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF EDUCATION**  
**(SCIENCE)**  
**1<sup>ST</sup> YEAR 2<sup>ND</sup> SEMESTER 2017/18**  
**MAIN REGULAR**

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**COURSE CODE: SCH 103**

**COURSE TITLE: Basic Organic Chemistry**

**EXAM VENUE:**

**STREAM: (BED SCI)**

**DATE:**

**EXAM SESSION:**

**TIME: 2:00HRS**

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**Instructions:**

- 1. Answer question 1 (Compulsory) in Section A and ANY other 2 questions in Section B.**
- 2. Candidates are advised not to write on the question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**

**INSTRUCTIONS: Answer Question 1 and any other TWO questions**

**QUESTION ONE (Compulsory) (30 marks)**

1. (a) Define the following terms:

(i) Isomers

(ii) Aromatic hydrocarbon

(iii) Homologous series

(iv) Functional group

(v) Markovnikovs rule

[10 marks]

b) Draw structural formulas corresponding to the following names:

(i) 5-bromo-3-ethylhexanoic acid

(ii) 3-methyl-2-hexen-4-yne

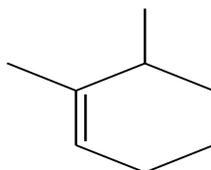
(iii) 2,3,4-trimethyl-4-propylheptane

(iv) 2,5-dimethyl-1,5-hexadiene

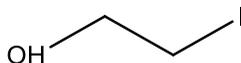
[8 marks]

(c) Give the name of each of the following organic compound:

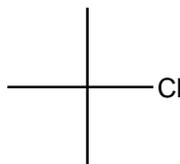
(i)



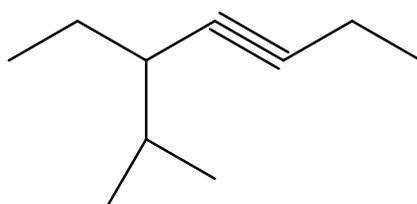
(ii)



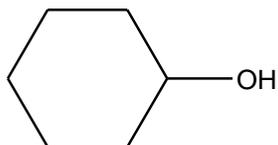
(iii)



(iv)



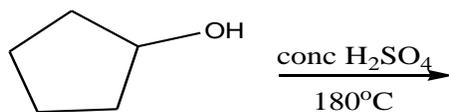
(v)



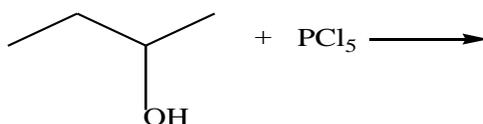
[10 marks]

(d) Complete the following reactions by giving the main organic product formed:

(i)



(ii)



[4 marks]

### QUESTION TWO (20 marks)

2. (a) Give the type of hybridization present in the following aliphatic hydrocarbons:

(i) Pent-2-ene

(ii) Ethane

(iii) Propyne

[3 marks]

(b) Differentiate between Tollen's and Benedict's test for aldehydes. [6 marks]

(c) Using examples, discuss any **FOUR** reactions involving alkenes. [8 marks]

(d) Propose structures for the following;

i) A two carbon ester

ii) A three carbon amide

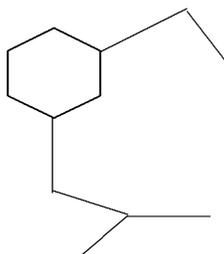
iii) A four carbon ether.

[3 marks]

### QUESTION THREE (20 marks)

3. (a) State any **TWO** physical properties of alkanes. [2 marks]

(b) Consider the following structure



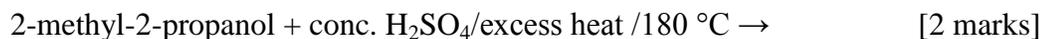
- i) How many primary carbon atoms does it have? [1 mark]
- ii) How many secondary carbon atoms does it have? [1 mark]
- iii) How many tertiary carbon atoms does it have? [1 mark]
- iv) Write down the molecular formula. [2 marks]
- v) Convert the skeletal structure into condensed structure [2 marks]

(c) State the uniqueness of carbon in organic chemistry. [4 marks]

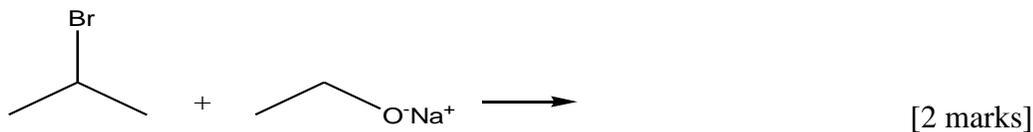
(e) Draw the structure of butyl benzoate. [1 marks]

(f) Complete the following reactions by giving the main organic product formed:

(i)



(ii)



(iii) 2-chloropropanoic acid +  $\text{CaCO}_3 \rightarrow$  [2 marks]

### QUESTION FOUR (20 marks)

4. (a) State **TWO** uses of each of the following organic compounds;

- (i) Carboxylic acids
- (ii) Alcohols
- (iii) Esters
- (iv) Alkenes [8 marks]

(b) Write down the products formed when 2-methylpropanol reacts with;

- (i) Excess Conc.  $\text{H}_2\text{SO}_4$  / heat /  $180\text{ }^\circ\text{C}$
- (ii)  $\text{K}_2\text{Cr}_2\text{O}_7$  /  $\text{H}^+$  /  $\Delta$
- (iii)  $\text{SOCl}_2$
- (iv) Na [8 marks]

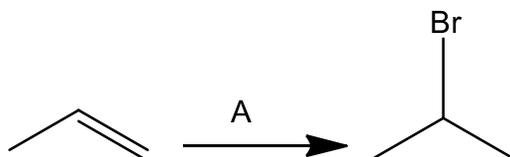
(c) Give the product of the reaction of ethanal with;

- (i)  $\text{LiAlH}_4$
- (ii) Fehling's reagent [4 marks]

### QUESTION FIVE (20 marks)

5. (a) The following name is incorrect. Draw the molecule and give its correct name. [4 marks]  
1-methyl-2-cyclopentene

(b) Fill in the missing reagent needed for the following reactions to take place and name the product



[3 marks]

(c) Complete the following organic reactions by giving the main organic product(s):

- (i) 3-methylpentene +  $\text{HBr} \rightarrow$  [2 marks]
- (ii) 3-bromobenzoic acid + 2-propanol  $\rightarrow$  [2 marks]

(d) Briefly discuss the reactions of alkyl halides.

[6 marks]

(e) State any **THREE** features of a homologous series

[3 marks]