



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**SCHOOL OF BIOLOGICAL, PHYSICAL, MATHEMATICS AND ACTUARIAL SCIENCES**

**UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE**

**(COMMUNITY HEALTH)**

**1<sup>ST</sup> YEAR 1<sup>ST</sup> SEMESTER 2024**

**KISUMU CAMPUS**

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**COURSE CODE: HCB 3213**

**COURSE TITLE: BASIC BIOCHEMISTRY**

**EXAM VENUE:**

**STREAM: (BSc Community Health)**

**DATE:**

**EXAM SESSION:**

**TIME: 2:00 HRS**

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**Instructions:**

- 1. Answer question 1 (Compulsory) in Section A and ANY other 3 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) Biomolecule
  - (ii) Hormones
  - (iii) Alkanes
  - (iv) Vitamins
  - (v) Hydrocarbons [10 marks]
- (b) State any **THREE** examples of essential amino acids [3 marks]
- (c) Draw the linear and cyclic structures of a typical glucose. [4 marks]
- (d) Describe the **THREE** types of ribonucleic acids. [3 marks]
- (e) Draw the structure of the following organic compounds; [6 marks]
- i. 2,2-dichlorohexene
  - ii. 2,4-dimethylheptanoic acid
  - iii. Ethyl ethanoate
- (f) State any **FOUR** functions of carbohydrates as biomolecule. [4 marks]

**QUESTION TWO (20 marks)**

- (a) Explain briefly why alcohols have much higher boiling points than alkanes of similar molecular mass. [2 marks]
- (b) State **FIVE** functions of proteins to a living organism. [5 marks]
- (c) State the uniqueness of carbon in organic chemistry. [4 marks]
- (d) Draw the structures of different chain isomers of alkanes corresponding to the molecular formula  $C_5H_{12}$ . [6 marks]
- (e) State the main structural difference between RNA and DNA. [3 marks]

### QUESTION THREE (20 marks)

- (a) Distinguish between fibrous and globular proteins with examples. [4 marks]
- (b) What is the effect of protein denaturation to the living organisms? [2 marks]
- (c) Explain any **FOUR** functions of lipids in the body. [4 marks]
- (d) Briefly describe the **THREE** classifications of lipids. [6 marks]
- (e) State any **FOUR** properties of alkanes. [4 marks]

### QUESTION FOUR (20 marks)

- (a) Define the terms;
- i. 'Organic chemistry'. [2 marks]
  - ii. Homologous series [2 marks]
  - iii. Saturated hydrocarbons [2 marks]
- (b) Differentiate between
- i) a polysaccharide and a monosaccharide. [2 marks]
  - ii) An alkane and alkyne [2 marks]
- (c) Briefly comment on the difference between aromatic and aliphatic hydrocarbons. [4 marks]
- (d) Write short notes on any **THREE** functions of nucleic acids in living things. [6 marks]

### QUESTION FIVE (20 marks)

- (a) Briefly state the **FOUR** classes of amino acids with examples. [8 marks]
- (b) Define protein denaturation and explain the **TWO** main conditions that enhances it. [6 marks]
- (c) Distinguish between fats and oils as applied in organic chemistry. [2 marks]
- (d) Explain any **FOUR** functions of the carbohydrates in a living organism. [4 marks]