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 (AGED)

1ST YEAR 1ST SEMESTER

COURSE CODE: SCH 3112

COURSE TITLE: ORGANIC CHEMISTRY

EXAM VENUE: **STREAM: (BED SCI)**

DATE: **EXAM SESSION:**

TIME: 2:00 HRS

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) Biomolecule
   (ii) Peptide bond
   (iii) Alkanes
   (iv) Dipolar ions
   (v) Hydrocarbons
   [10 marks]

   (b) State examples of **THREE** essential amino acids [3 marks]

   (c) Given that the R-groups of two amino acids are;
   A: R= CH_3CH_2 B: R = CH_3
   Draw the **TWO** structures of the amino acids. [4 marks]

   (d) Describe the **THREE** types of Ribonucleic acid. [3 marks]

   (e) Briefly describe the **THREE** classifications of lipids. [6 marks]

   (f) Provide **FOUR** functions of carbohydrates as biomolecule. [4 marks]

QUESTION TWO (20 marks)

2. (a) Briefly state the **FOUR** classes of amino acids. [4 marks]

   (b) Define protein denaturation and explain the **TWO** main conditions that enhances it. [6 marks]

   (c) Define and give an example of geometrical isomers. [4 marks]

   (d) Distinguish between fats and oils as applied in organic chemistry. [2 marks]

   (e) Explain any **FOUR** functions of the carbohydrates in a living organism. [4 marks]

QUESTION THREE (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_6H_{14}. [6 marks]

(e) State the main difference between RNA and DNA. [3 marks]

QUESTION FOUR (20 marks)

(a) Briefly state any **FOUR** laboratory methods of amino acids synthesis. [7 marks]

(b) Distinguish between fibrous and globular proteins. [3 marks]

(c) What is the effect of protein denaturation to the living organisms? [2 marks]

(d) Amino acids 'Zwitterion' are amphoteric''. Explain this statement. [4 marks]

(e) Explain any **FOUR** functions of lipids in the body. [4 marks]

QUESTION FIVE (20 marks)

(a) Define the term 'Organic Chemistry'. [2 marks]

(b) Differentiate between
i) a polysaccharide and a monosaccharide.
ii) An alkane and alkyne [4 marks]

(c) Briefly comment on the difference between aromatic and aliphatic hydrocarbons. [4 marks]

(d) Briefly describe how the test for starch is carried out. [4 marks]

(e) Write short notes on any **THREE** functions of nucleic acids in living things. [6 marks]