JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES

UNIVERSITY EXAMINATION FOR THEDEGREE OF BACHELOR OF BIOLOGICAL (SCIENCES B)

2ND YEAR 1ST SEMESTER 2013/2014 ACADEMIC YEAR

MAIN

COURSE CODE: SBI 3216

COURSE TITLE: BIOCHEMISTRY I

EXAM VENUE: CR **STREAM: (Biological Sciences)**

DATE: 23/04/14 **EXAM SESSION: 9.00 – 11.00 AM**

TIME: 2.00 HOURS

Instructions:

1. **Answer ALL Questions 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.**

SECTION A

1. List three characteristics of biological macromolecules. (3 marks)

2. List down three structural differences between Deoxyribonucleic Acid (DNA) and Ribonucleic acid (RNA). (3 marks)

3. Write short notes on phospholipids. (3 marks)

4. Outline the characteristics of basic amino acids. (3 marks)

5. Explain the three ionization states of amino acids. (3 marks)

6. Illustrate the structure of sucrose indicating clearly the bond linking the two Monosaccharide units. (3 marks)

7. List down three biological functions of Lipids. (3 marks)

8. Explain why biochemical reactions are carried out in carefully buffered solutions. (3 marks)

9. Briefly explain the meaning of the following terms in reference to carbohydrates:
   a. Enantiomers
   b. Epimers
   c. Tautomers (3 marks)

10. a. Name the pyrimidine bases found in RNA.
    b. List the components of a nucleotide. (3 marks)

SECTION B (40 Marks)

11 a) Discuss the various ways in which enzymatic activity is regulated in living systems.

(12 marks)

b) Explain how the induced fit and key and lock models accounts for enzyme action?

(8 marks)

12**.**

a. Briefly describe β-oxidation of fatty acid.

(16 marks)

b. How does the oxidation of fatty acids with an odd number of carbons in their chain differ from that of those with even number of carbons.

(4 marks)

13. a) Describe in details the four levels of protein organization. (16 marks)

b) Briefly explain how the substitution of a nucleotide in the DNA of an organism a can
. lead to malfunctioning of an enzyme. (4 marks)

14. The breakdown of glucose to pyruvate is a crucial metabolic pathway. Describe this pathway detailing the enzymes catalyzing the various steps. (20 marks)