JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES

UNIVERSITY EXAMINATION FOR THEDEGREE OF BACHELOR OF EDUCATION (SCIENCE)

2ND YEAR 1ST SEMESTER 2013/2014 ACADEMIC YEAR

MAIN

COURSE CODE: SZL 204

COURSE TITLE: INTRODUCTION TO BIOCHEM AND GENETICS

EXAM VENUE: LAB 8   STREAM: (SBPS)

 DATE : 22/04/14
.   EXAM SESSION: 9.00 – 11.00 AM

TIME: 2.00 HOURS
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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: (30 MARKS)

1. Define the following terminologies

   a. Reducing sugars   (1 mark)

   b. Buffering capacity   (I mark)

   c. D and L isomerism   (1 mark)

2. Giving examples, state the different classes of amino acids on the basis of polarity of the functional groups   (3 marks)

3. Explain why water is an ideal biological solvent.   (3 marks)

4. A buffer contains 0.01M of lactic acid (pK_a=3.86) and 0.05M of sodium lactate per liter.

   a. Calculate the pH of the buffer   (1 marks)

   b. Calculate the change in pH when 5 mL of 0.5M HCl is added to 1 L of the buffer.
.   (1 marks).

   c. What pH change would you expect if you added the same quantity of HCl to 1 L of pure water?   (1 marks)

5. With the aid of an illustration, describe the structure of a nucleotide.   (3 marks)

6. Describe the Avery *et al*. experiment stating its importance to present day understanding of DNA as the genetic material.   (3 marks)

7. State the different types of RNA and their functions.   (3 marks)

8. Explain how DNA replication is achieved in the lagging strand.   (3 marks)

9. Explain the following aspects of the genetic code:

      a. Degeneracy   (1.5 marks).

      b. Universality   (1.5 marks).

10. Describe the structure of eukaryotic chromosomes.   (3 marks)

SECTION B: (40 MARKS)

11.

   a. Discuss the sources, chemistry and chemical functions of carbohydrates.   (10 marks)

   b. Enzymes are very powerful group of biological catalysts that participate in numerous biochemical reactions in living organism.

      i.   Differentiate between the "lock-and-key" model and induced fit model in enzyme catalysis   (4 marks)

      ii. Explain the importance of enzymes in clinical diagnosis of diseases?   (6 marks)

12.

    a. Describe the events that take place in the cell cycle stages   (5 marks).

    b. Discuss the process of meiosis.   (15 marks).

13. Discuss the process of mRNA translation   (20 marks)

14. Discuss lipids highlighting their classification, chemistry and physiological functions.

                                                                   (20 marks)