

**CHUKA**



**UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

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

**BIOC 204: INTRODUCTION TO AMINO ACIDS AND PROTEINS**

**STREAMS:**

**TIME:2 HOURS**

**DAY/DATE: THURSDAY 13/04/2023**

**8.30 A.M. –10.30 A.M.**

**INSTRUCTIONS**

**Answer question one and any other 2 questions**

**QUESTION ONE (30 MARKS)**

- a) Explain why, when wool sweaters or socks are washed in hot water or heated in a dryer, they shrink while silk, on the other hand, does not shrink under the same conditions. (3 marks)
- b) Illustrate the formation of a peptide bond between lysine and tyrosine. (4 marks)
- c) List the function of any 5 non-protein amino acids. (5 marks)
- d) Distinguish between simple and compound proteins. (2 marks)
- e) In reference to immunoglobulins, describe multiple myeloma and Bence-Jones proteins disorders. (8 marks)
- f) Briefly describe the different levels of proteins structure. (8 marks)

**QUESTION TWO (20 MARKS)**

- a) Discuss the different ways in which protein denaturation takes place. (10 marks)
- b) Describe the Edman degradation method for protein sequence determination. (10 marks)

**QUESTION THREE (20 MARKS)**

- a) Describe with the aid of illustration, and highlight its importance. (8 marks)
- b) List peptides of physiological importance. (6 marks)

- c) Describe any three reactions due to the carboxylic groups of amino acids. (6 marks)

**QUESTION FOUR (20 MARKS)**

- a) A 100 mL solution of 0.1 M glycine at pH 1.72 was titrated with 2M NaOH solution. The pH was monitored and results were plotted. Justifying your answer, plot the titration curve of glycine clearly showing the following points on the curve where: (10 marks)
- i. The pH is equal to the  $pK_a$  of the carboxyl group.
  - ii. The pH is equal to the  $pK_a$  of the protonated amino group.
  - iii. Glycine has its maximum buffering capacity.
  - iv. The *average* net charge of glycine is zero.
- b) Describe the structure- function relationship between myoglobin and hemoglobin. (10 marks)
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