

CHUKA



UNIVERSITY

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

BIOC 204: BIOCHEMISTRY OF AMINO ACIDS AND PROTEINS

STREAMS: BSC BIOCHEMISTRY

TIME: 2 HOURS

**DAY/DATE: TUESDAY 16/04/2019
4.30 P.M.**

2.30 P.M. -

INSTRUCTIONS:

- **Answer question ONE and any other TWO questions**
- **Do not write on the question paper**

QUESTION ONE (30 MARKS)

- (a) Using structural illustration, describe formation of a peptide bond between threonine and tyrosine.
(4 marks)

(b) Amino acids are ampholytes, using alanine as an example, illustrate its net charge in acidic, neutral and alkaline solutions. (4 marks)

(c) Describe the secondary structure of proteins. (5 marks)

(d) Explain the various ways through which protein denaturation can occur. (5 marks)

(e) Provide a structural description of how serotonin is formed from tryptophan. (6 marks)

(f) Explain how hemoglobin releases oxygen in actively metabolizing tissues. (6 marks)

QUESTION TWO (20 MARKS)

(a) Using illustrative diagrams, describe the structure and function of myoglobin. (10 marks)

(b) Describe the structure and function of α -keratin. (10 marks)

QUESTION THREE (20 MARKS)

(a) Describe dialysis as a procedure for separation of protein from solvents. (10 marks)

- (b) Using structural illustrations, describe the ionization of histidine and calculate its pH value given that carboxyl group pKa is 1.82, imidazole side chain pKa is 6.0 and ammonium ion side chain pKa is 9.17.
(10 marks)

QUESTION FOUR (20 MARKS)

- (a) Describe how the contractile force of muscle is generated by myosin and actin. (10 marks)

- (b) Describe the general process of protein biosynthesis after the formation of mRNA.

(10 marks)
