

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATIONS
RESIT/SPECIAL EXAMINATION**

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

BIOC 204/206: BIOCHEMISTRY OF AMINO ACIDS AND PROTEIN

STREAMS: BSC. BIOCHEMISTRY Y2S2

TIME: 2 HOURS

DAY/DATE: TUESDAY 02/02/2021

8.30 A.M – 10.30 A.M.

INSTRUCTIONS

- Answer Question One and any other Two Questions.
- Do not write on the question paper.

Question One (30 marks)

- Using structural illustration, describe formation of a peptide bond between threonine and tyrosine. (4 marks)
- Amino acids are ampholytes, using alanine as an example, illustrate its net charge in acidic, neutral and alkaline solutions. (4 marks)
- Describe the secondary structure of proteins. (5 marks)
- Explain the various ways through which protein denaturation can occur (5 marks)
- Provide a structural description of how serotonin is formed from tryptophan (6 marks)
- Explain how hemoglobin releases oxygen in actively metabolizing tissues (6 marks)

Question Two (20 marks)

- Using illustrative diagrams, describe the structure and function of myoglobin (10 marks)
- Describe the structure and function of α -keratin. (10 marks)

Question Three (20 marks)

- a. Describe dialysis as a procedure for separation of proteins from solvents. (10 marks)
- b. Using structural illustrations, describe the ionization of histidine and calculate its pI 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. (10marks)
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