

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

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

BIOC 204: INTRODUCTION TO AMINO ACIDS AND PROTEINS

STREAMS: BSC (BIOC)

TIME: 2 HOURS

DAY/DATE: TUESDAY 14/04/2020

11.30 AM – 1.30 PM

INSTRUCTIONS:

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

QUESTION ONE (30 MARKS)

- (a) Briefly describe the differences between the α -helix and β -pleated sheets form of protein secondary structure. [4 marks]
- (b) Outline physical properties of amino acids. [6 marks]
- (c) Describe the amino acids reaction with ninhydrin and explain its relevance in amino acid determination. [8 marks]
- (d) List and describe the agents that cause protein denaturation. [5 marks]
- (e) Describe the major functions of conjugated proteins in the body. [5 marks]
- (f) Differentiate between semi-essential and non-essential amino acids. [2 marks]

QUESTION TWO (20 MARKS)

- (a) Outline differences between protein synthesis in eukaryotic and prokaryotic cells. [7 marks]
- (b) Reconcile the fact that “Genetic code is degenerate but unambiguous”. [7 marks]

- (c) Illustrate structurally the formation of aminoacyl-tRNA that initiates translation. [6 marks]

QUESTION THREE (20 MARKS)

- (a) Using illustrative diagram, discuss the structure of β_2 -adrenergic receptor in relation to signal transduction. [10 marks]
- (b) Describe Edman's reaction for determination of amino acid sequence in proteins. [10 marks]

QUESTION FOUR (20 MARKS)

- (a) Arginine has the following pKa values: pK1=2.17, pK2=9.04, pK3=12.48. What is the structure and net charge of arginine at the following pH values? 2, 4, 10 and 12. [8 marks]
- (b) With use of a suitable diagram, describe the structure, properties and functions of aromatic amino acids found in proteins. [12 marks]
-