MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FIRST YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (ANALYTICAL CHEMISTRY)

SBC 103 PROTEINS AND ENZYMES

DATE: 23/7/2019 **TIME: 2.00-4.00 PM**

INSTRUCTIONS

1. Answer 1 (compulsory) and **any two** questions in Section B.
2. Use clean well labelled diagrams wherever appropriate.

SECTION A

QUESTION 1.

a) Describe with the help of a structure the features of the following amino acids

   i. Asparagine (1 mark)

   ii. Glutamine (1 mark)

   iii. Tyrosine (1 mark)

b) A polypeptide has the following sequence: Asp-Asn-Gln-His-Gly-Gly. Calculate the net charge and describe what can be done to change its PH without altering the numbers of amino acids (3 marks)

c) Describe the properties of an amino acids at a neutral PH (3 marks)

d) Using example discuss the Fischer projections of amino acids (3 marks)

e) Describe the forces tha hold proteins structures. (3 marks)

f) Identify and describes the components of the induced fit enzymatic models (3 marks)

g) Using acid – base enzymatic catalysis enumerate tautomerization (3 marks)

h) Proteins can fold and refold. Discuss (3 marks)

i) Describe the physical meaning of Vmax, Kcat and Km in Michaelis-Menten equation (3 marks)

j) Describe the following terminologies:

   i. Lyases: (1 mark)

ii. Active site: (1 mark)

iii. Ligases: (1 mark)

SECTION B

QUESTION TWO.

In accordance with Linus Pauling theory of enzymatic reaction, derive the Michael-Menten equation (20 marks)

QUESTION THREE

a) Decribe the working principles and the properties of enzymes (10 marks)

b) Discuss 5 enzyme inhibitors that you know (10 marks)

QUESTION FOUR

Some enzymes function in conjuction with Co-factors. Discuss (20 marks)

QUESTION FIVE

a) Using example discuss Zymogens (5 marks)

b) With examples describe FIVE key characteritics/features which can distinguish amino acids in proteins (15 marks)