



MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FIRST YEAR SECOND SEMESTER EXAMINATION FOR
BACHELOR OF SCIENCE IN ANALYTICAL CHEMISTRY

SBC 103: PROTEINS AND ENZYMES

DATE: 6/5/2019

TIME: 2.00-4.00 PM

INSTRUCTIONS

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

SECTION A

QUESTION ONE.

- 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) Discuss using example the Fischer projections of amino acids (3 marks)
- e) Describe the forces tha hold proteins structures. (3 marks)
- f) Describes the components of the induced fit enzymatic models (3 marks)
- g) Explain tautomerization in acid – base enzymatic catalysis (3 marks)
- h) Explain how proteins folds and refolds (3 marks)
- i) Describe the physical meaning of V_{max} , K_{cat} and K_m 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 (20 MARKS)

Derive the Michael-Menten equation in accordance to Linus Pauling theory of enzymatic reaction

QUESTION THREE (20 MARKS)

- a) Describe the working principles and the properties of enzymes (10 marks)
- b) Discuss 5 enzyme inhibitors that you know (10 marks)

QUESTION FOUR (20 MARKS)

Some enzymes function in conjunction with Co-factors. Discuss

QUESTION FIVE (20 MARKS)

- a) Describe Zymogens using example (5 marks)
- b) Describe using example FIVE key characteristics/features which can distinguish amino acids in proteins (15 marks)