



MACHAKOS UNIVERSITY

University Examinations for 2020/2021

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (ANALYTICAL CHEMISTRY)

SBC 103 PROTEINS AND ENZYMES

DATE: 17/6/2021

TIME: 8:30 – 10:30 AM

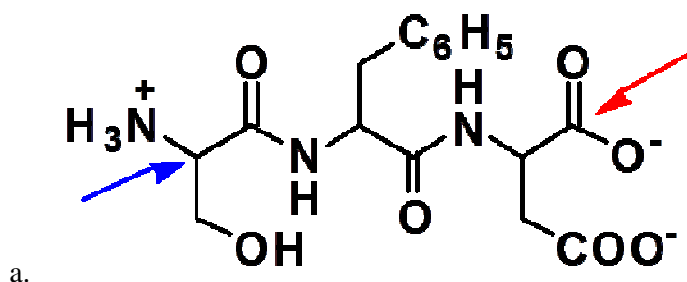
INSTRUCTIONS

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

SECTION A (COMPULSORY)

QUESTION ONE (30 MARKS)

- a) Account for the bonding between C-G and T-A in DNA base pairing. (3 marks)
- b) Describe the pKa of aspartate. (3 marks)
- c) Account for the function of glycine and hydroxyproline on the bends of polypeptides (3 marks)
- d) Describe any two amino acids found on the active sites of metalloprotease (3 marks)
- e) Describe the naming of the following amino acid (3 marks)



- f) Describe the chemical reaction catalysed by alanine aminotransferase (3 marks)
- g) Describe the role of a catalyst on free energy (3 marks)
- h) Illustrate the chemical catalytic mechanisms used by enzymes (3 marks)
- i) Describe the reaction coordinates of a reactant with two transition states (3 marks)
- j) Describe the significance of the unique properties of enzyme catalysts (3 marks)

SECTION B: (ANSWER ANY OTHER TWO QUESTIONS)

QUESTION TWO (20 MARKS)

Discuss the unique properties of water as a biomolecule

QUESTION THREE (20 MARKS)

- a) Discuss non-competitive inhibition (10 marks)
- b) Discuss five enzyme inhibitors (10 marks)

QUESTION FOUR (20 MARKS)

Discuss the regulation of haemoglobin functions.

QUESTION FIVE (20 MARKS)

Discuss the importance of weak interactions in protein chemistry