(*University of Choice*)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS 2018/2019 ACADEMIC YEAR

THIRD YEAR SECOND SEMESTER EXAMINATIONS

FOR THE DEGREE OF BACHELOR OF SCIENCE BIOTECHNOLOGY

COURSE CODE: **BMB 325**

COURSE TITLE: **ENZYMOLOGY AND ENZYME TECHNOLOGY**
(MAIN EXAMINATION)

DATE: **27TH MAY 2019** **TIME:** **3.00 -5.00 PM**

INSTRUCTIONS TO CANDIDATES

This paper is divided into three sections, **A B** and **C,** carrying respectively: Multiple Choice Questions (**MCQs**), Short Answer Questions (**SAQs**) and Long Answer Questions (**LAQs**).

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

SECTION A: MULTIPLE CHOICE QUESTIONS (20 MKS)

Instructions to the candidate

- The section has twenty (20) multiple choice questions (MCQs)
- Each question has a stem and four (4) completion options, of which only one is correct
- Write your answers on the provided university examination booklet.

1. Which one is true about protein primary structure conformations:
    A. Linear structures are of secondary conformation
    B. Linear structures are stabilised by hydrophobic bonds, and a majority covalent bonds.
    C. Linear structure only consists of ionic bonds, and hydrogen bonds.
    D. Linear structures include insulin protein and a number of enzymes as examples.
2. Concerning secondary structure conformation of proteins, which is false:
    A. Consist of beta sheets and alpha helix
    B. Stability is enhanced by Ionic, covalent ,hydrogen and peptide bonds
    C. Only need peptide bonds for their stability.
    D. None of the above
3. Biologically active protein conformation structure is:
    A. Tertiary structure
    B. Primary structure
    C. Secondary structure
    D. All of the above.
4. Which of the following does not include free cytosolic protein:
    A. Mitochondrial
    B. Lysossomal
    C. Nuclear
    D. None of the above.
5. Bound proteins include the following except:
    A. Peroxismal
    B. Lysossomal ezyme
    C. ER protein
    D. Secretory protein.
6. Nuclear protein include the following except:
    A. B and C
    B. DNA polymerase
    C. RNA polymerase
    D. All of the above
7. The following entail catalytic protein except:
    A. Insuline
    B. Complement proteins

C. Glutathione reductase
D. B and C

8. Which of the following is not a polar amino acid?
   A. Isoleucine
   B. Valine
   C. Methionine
   D. Alamine

9. True about a zwitterion
   A. Is a dipolar ion
   B. Is positively charged amino acid
   C. Is a negatively chaged ion
   D. None of the above.
10. Which of the following statements does negate the optical properties of amino acids
   A. They rotate plane polarised light
   B. Left rotation are L. forms
   C. Right rotation are D.forms
   D. Glycine is the most optically active of all the amino acids.
11. Light absorbing amino acids include the following, except:
   A. Phenylalamine
   B. Tryptophan
   C. Tyrosine
   D. None of the above.
12. Which of the following does not describe post translational modification:
   A. Phosphorilation
   B. Methylation
   C. polyadenylation
   D. Ubiquitination
13. Which of the following, best describes the mechanism of action of enzymes:
   A. Lowers the activation energy of the reactions
   B. Raises the activation energy of the reaction
   C. Participates in the chemical reaction
   D. Can increase the rate of biochemical reactions
14. Regarding characteristics of enzymes, which one is false:
   A. They are specific
   B. Denature at extreme temperatures
   C. Denaturation is reversible
   D. Denaturation is irreversible
15. Regarding serine proteases,which is true?
   A. They contain serine residues

B. They degrade other proteins,hence activating them
C. A and B
D. Only A

16. Oxido-reductases;
    A. Are enzymes that cause reduction reactions only
    B. Are enzymes that catalyse reduction and oxidation reactions
    C. Are enzymes that cause reduction and oxidation reactions
    D. Are enzymes that catalyse reduction reactions only
17. Kinase enzymes:
    A. Catalyse hydrolysis of phosphate groups
    B. Catalyse addition of phosphate groups
    C. Are not common in living systems
    D. All of the above are true.
18. The following entail regulation mechanisms of enzyme catalysed reactions, except:
    A. Allosteric regulation
    B. Mechanical regulation
    C. Covalent modification
    D. Compartmentalization
19. Regarding factors that influence enzyme activity, which is not:
    A. Size of the enzyme.
    B. Substrate concentration
    C. P.H
    D. Temperature
20. Enzyme purification by affinity chromatography is based on binding of target enzyme to the:
    A. Acrylamide gel matrix
    B. Bis- acrylamide gel matrix
    C. Enzyme substrate
    D. None of the above.

SECTION B: SHORT ANSWER QUESTIONS (40 MKS)

Instructions

- This section has a total of **FIVE** short answer questions (SAQs), totalling a maximum of forty (40) marks.
- Answer all questions.
- Write your answers on the provided university examination booklet.

1) Describe the models of studying protein folding (8 marks)
2) Discuss the techniques used in investigating protein trafficking and sorting (8 marks)

3) Describe four mechanisms of elucidating regulation of enzyme catalysed reactions.(8 marks)
4) Discuss the principle of irreversible enzyme inhibition. Give at least two examples of irreversible inhibitors and their application in medicine.(8 marks)
5) What are enzyme cofactors? Identify at least four inorganic ions that serve as enzyme cofactors and state the enzymes involved in each cases.(8 marks)

SECTION C: LONG ANSWER QUESTIONS (40 MKS)

Instructions

- This section has **TWO** long answer questions (LAQs), totalling a maximum of forty (40) marks.
- Answer all questions.
- Write your answers on the provided university examination booklet.

1. By giving the types of reactions they catalyse, highlight the various classes of enzymes (20 marks)

2. By illustrations using enzyme kinetics graphs, distinguish between competitive enzyme inhibition and non -competitive enzyme inhibition. State the effects of reversible inhibitors on the apparent V_{max} and apparent $K_{m.}$