



**FACULTY OF NATURAL RESOURCES MANAGEMENT AND
AGRICULTURE**

DEPARTMENT OF ANIMAL PRODUCTION AND HEALTH

NAP1101 INTRODUCTION TO BIOCHEMISTRY

NHC1105 PRINCIPLES OF BIOCHEMISTRY

Semester I, Segment 2

November 2024

Time Allowed : 3 hours
Special requirement : None
Examiner : Mr. B Mpala

Instructions to Candidates:

1. This paper consists of six questions, answer **ALL** questions in **Section A** and **ANY TWO** in **Section B**.
2. Marks for each question are shown in brackets. Where a question has subdivisions, the marks for each subdivision are given.
3. Illustrate your answer, where applicable, with large clearly labelled diagrams.

MARK ALLOCATION PER SECTION	MARKS
SECTION A	60
SECTION B	40
TOTAL ATTAINABLE MARKS	100

This paper consists of three printed pages including this one.

SECTION A: ANSWER ALL QUESTIONS

QUESTION 1

- a) Explain why the following are biologically important:
- i. Steroids. [2]
 - ii. Phospholipids. [2]
 - iii. Polysaccharides. [2]
 - iv. Nucleic acids. [2]
 - v. Amino acids. [2]
- b) Compare and contrast the three different types of isomers found in biomolecules. [10]

QUESTION 2

- a) State the functions of the following cell organelles:
- i. Nucleus. [1]
 - ii. Ribosomes. [1]
 - iii. Mitochondria. [1]
 - iv. Smooth endoplasmic reticulum. [1]
- b) Compare and contrast an animal cell and a plant cell. [12]
- c) Balance the following biochemical reactions.
- i. $\text{CO}_2 + \text{H}_2\text{O} + \text{light energy} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$. [2]
 - ii. $\text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 + \text{H}_2\text{O} \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{energy}$. [2]

QUESTION 3

- a) What do you understand by the term enzyme activation energy in enzyme reactions? [2]
- b) Describe three factors that influence enzyme activity. [6]
- c) Highlighting the enzymes involved, describe the process of DNA replication. [8]
- d) Explain why coupled reactions are biologically important. [4]

SECTION B: ANSWER ANY TWO QUESTIONS IN THIS SECTION

QUESTION 4

Briefly describe the reactions of the following biological pathways:

- a) Calvin cycle. [10]
- b) Krebs cycle. [10]

QUESTION 5

- a) Distinguish between macro and micro minerals. [4]
- b) Copy and complete the following table. [4]

Maltose	=	Glucose	+	
	=	Glucose	+	Galactose
Sucrose	=		+	

- c) Explain the functions of three essential amino acids in animals. [6]
- d) State the functions of three essential fatty acids in monogastric livestock. [6]

QUESTION 6

Discuss the relevance of biochemistry in animal and crop agriculture. [20]