



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF SCIENCE AND TECHNOLOGY EDUCATION

DEPARTMENT OF SCIENCE, MATHEMATICS AND TECHNOLOGY EDUCATION

CELL BIOLOGY PST 1135

Main Examination Paper

NOVEMBER 2024

This Examination Paper consists of 5 pages

Time Allowed: 3 hours

Total Marks: 100

Internal Examiner: MRS. S. NCUBE

External Examiner: DR. P. MANYANGA

**INSTRUCTIONS**

- 1 **QUESTION ONE** is compulsory. Choose **ANY** other **FOUR** questions
2. Each question carries 20 **marks**.
3. Begin each question on a new page.

**MARK ALLOCATION**

QUESTION	MARKS
1.	20
2.	20
3.	20
4.	20
5	20
6	20
TOTAL	100

## QUESTION 1

1(a) State the functions of the following cell organelles:

- i. Centrioles
- ii. Vacuole
- iii. Mitochondria
- iv. Lysosomes
- v. Nucleolus

(5 Marks)

(b) Tabulate the differences between eukaryotes and prokaryotes.

(5 Marks)

(c) Relate the following properties of water to its functions in living organisms:

- i. Specific heat capacity
- ii. Cohesion and surface tension
- iii. Adhesion
- iv. Density and freezing
- v. As a solvent

(10 Marks)

## QUESTION 2

2(a) Illustrate how a polysaccharide of five glucose monomers is formed.

(10 Marks)

(b) State the differences between a triglyceride and a phospholipid.

(5 Marks)

(c) Outline the functions of proteins.

(5 Marks)

## QUESTION 3

3(a) Distinguish between inhibition and regulation.

(5 Marks)

(b) Describe the lock and key and the induced fit modes of action in enzymes.

(5 Marks)

(c) Explain the following processes of enzyme inhibition:

- i. Competitive inhibition
- ii. Non-competitive reversible inhibition

iii. Non- competitive irreversible inhibition (6 Marks)

(d) State and explain factors that affect enzyme activity. (4 Marks)

#### QUESTION 4

4. Describe cellular communication in cells. (20 Marks)

#### QUESTION 5

5. Describe the structures of the three types of cytoskeleton components. (20 Marks)

#### QUESTION 6

6.(a) Explain the following terms:

(i) Protein synthesis

(ii) Protein trafficking

(iii) Protein targeting

(iv) Vesicular transport

(v) Glycosylation

(10 Marks)

(b) Outline the process of oxidative phosphorylation in relation to ATP production.

(10 Marks)

**END OF QUESTION PAPER**