**FACULTY OF NATURAL RESOURCES MANAGEMENT AND AGRICULTURE**

**DEPARTMENT OF ANIMAL PRODUCTION AND HEALTH**

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**MOLECULAR BIOLOGY (NAP 1103/LAS 1107)**

**SEMESTER 1 EXAMINATION**

**JUNE 2026**

| | |
|---|---|
| **Time Allowed:** | **3 hours** |
| **Total Marks:** | **100** |
| **Special Requirements:** | **None** |
| **Examiner's Name:** | **Ms M. I. Tshuma** |

***Instructions to Candidates:***

1. *The 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**

| **QUESTION** | **MARKS** |
|---|---|
| SECTION A | **60** |
| SECTION B | **40** |
| **TOTAL ATTAINABLE MARKS** | **100** |

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## SECTION A

### Question 1

a) With the aid of a diagram where possible, describe the structure of the following:

i. DNA [5]

ii. RNA [5]

iii. Genetic code [3]

iv. Start codon [3]

v. Operon [4]

### Question 2

a. Explain the importance of gene mutations in agriculture. [6]

b. Describe the following types of point mutation:

i. Missense mutation [2]

ii. Nonsense mutation [2]

iii. Silent mutation [2]

c. Using diagrams, describe the following types of gene mutation:

i. Translocation [3]

ii. Deletion [3]

iii. Substitution [3]

iv. Insertion [3]

### Question 3

Express your understanding on the following methods:

i) Reverse Transcription Polymerase Chain Reaction (RT-PCR) [5]

ii) Gene silencing [5]

iii) DNA sequencing [5]

iv) Sodium Dodecyl Sulphate Polyacrylamide Gel Electrophoresis (SDS-PAGE) [5]

**Section B**

**Question 4**

Discuss the use of enzymes in the central dogma of DNA. [20]

**Question 5**

Describe the process of gene expression in eukaryotes under the following headings:

i. Transcription [8]

ii. Post-transcriptional modification [4]

iii. Translation [8]

**Question 6**

Give an account on the mechanism of protein synthesis. [20]

END OF QUESTION PAPER