FACULTY OF NATURAL RESOURCES MANAGEMENT AND AGRICULTURE

DEPARTMENT OF ANIMAL PRODUCTION AND HEALTH

BACHELOR OF SCIENCE HONOURS DEGREE IN ANIMAL PRODUCTION AND HEALTH

Introduction to Genetics (NAP 1201)

Principles of Genetics (NHC 1204)

SEMESTER 2 EXAMINATION

June 2025

Time Allowed:	**3 hours**
Special Requirements:	**None**
Examiner's Name:	**K. Mafunga**

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**

This paper consists of three printed pages including this one.

SECTION A: ANSWER ALL QUESTIONS IN THIS SECTION

Question 1

Define the following:

i. Incomplete Penetrance **[2 marks]**

ii. Codominance **[2 marks]**

iii. Incomplete dominance **[2 marks]**

iv. Polygenic inheritance **[2 marks]**

v. Recessive lethal alleles **[2 marks]**

vi. Epigenetics. **[2 marks]**

Question 2

a. What is agricultural genomics? **[1 mark]**

b. Highlight the importance of agricultural genomics in modern farming practices. **[8 marks]**

c. Discuss four major challenges limiting the application of genomics in agriculture within developing countries. **[12 marks]**

d. Suggest possible strategies to overcome these challenges identified under 2c above. **[8 marks]**

Question 3

a. State Mendel's principles of inheritance. **[3 marks]**

b. Explain how the following causes deviations from Mendel's principles:

i. Pleiotropy **[4 marks]**

ii. Epistasis. **[4 marks]**

Question 4

a. How does telophase differ between plant and animal mitosis? **[2 marks]**

c. Describe the role of meiosis in the life cycle of a vascular plant. **[6 marks]**

SECTION B: ANSWER ANY TWO QUESTIONS IN THIS SECTION

Question 5

a. State four features of the garden pea that made it a good choice as an experimental organism in Mendel's work. **[4 marks]**

b. In peas, round seeds are dominant over wrinkled seeds, and yellow cotyledons are dominant over green cotyledons. If you were given a plant that has round seeds and yellow cotyledons, how would you determine its genotype? **[16 marks]**

Question 6

a. Define genetic biodiversity. **[2 marks]**

b. Explain the significance of genetic biodiversity in agriculture. **[4 marks]**

c. Discuss threats to genetic diversity in modern agriculture. **[8 marks]**

d. Evaluate three methods used to conserve genetic resources in plants and animals. [**6 marks]**

Question 7

a. Compare and contrast the processes of mitosis and meiosis. **[10 marks]**

b. Compare and contrast qualitative and quantitative characters. **[10 marks]**

END OF QUESTION PAPER