



FACULTY OF NATURAL RESOURCES MANAGEMENT AND AGRICULTURE  
DEPARTMENT OF ANIMAL PRODUCTION AND HEALTH

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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**

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