FACULTY OF NATURAL RESOURCES MANAGEMENT AND AGRICULTURE

DEPARTMENT OF ANIMAL PRODUCTION AND HEALTH

BACHELOR OF SCIENCE HONOURS DEGREE IN ANIMAL PRODUCTION AND HEALTH

Animal Breeding (NAP 2203)

SEMESTER 2 EXAMINATION

September 2024

Time Allowed:	**3 hours**
Total Marks:	**100**
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

Discuss how the following impact genetic progress in breeding:

i. Selection intensity, **[4 marks]**

ii. Genetic variance, **[4 marks]**

iii. Accuracy of genetic evaluation, and **[4 marks]**

iv. Generation interval. **[4 marks]**

Question 2

a. State four benefits of implementing community-based breeding programs (CBBPs) in developing countries. **[4 marks]**

b. Despite their benefits, why are CBBPs not being widely implemented in developing countries? **[10 marks]**

Question 3

a. Outline the main reasons for crossbreeding. **[8 marks]**

b. Explain the differences between rotational and terminal crossbreeding systems. **[4 marks]**

Question 4

a. Define the term "inbreeding depression." **[2 marks]**

b. Explain the causes of inbreeding depression. **[4 marks]**

c. Explain the effects of inbreeding depression on animal populations. **[6 marks]**

d. Describe three measures breeders can take to manage or prevent inbreeding depression in a closed breeding population. **[6 marks]**

SECTION B. ANSWER ANY TWO QUESTIONS IN THIS SECTION

Question 5

a. Evaluate the role of the following biotechnologies in advancing genetic gains in livestock breeding:
   i. artificial insemination, **[4 marks]**
   ii. multiple ovulation and embryo transfer, and **[4 marks]**
   iii. heat synchronization. **[4 marks]**

b. Compare the economic and practical implications of these biotechnologies for small-scale versus large-scale producers. **[8 marks]**

Question 6

Define the following genetic parameters and explain their significance in animal breeding:

i. Heritability, **[4 Marks]**
ii. Repeatability, **[4 marks]**
iii. Genetic Correlation, **[4 Marks]**
iv. Genetic Variance, and **[4 Marks]**
v. Phenotypic Variance. **[4 Marks]**

Question 7

a. State three advantages and three disadvantages of using molecular markers in selection. **[6 marks]**

b. Outline the structure and key components of a breeding program. **[14 marks]**

END OF QUESTION PAPER