FACULTY OF NATURAL RESOURCES MANAGEMENT AND AGRICULTURE

DEPARTMENT OF ANIMAL SCIENCE

BACHELOR OF SCIENCE HONOURS DEGREE IN ANIMAL SCIENCE

Animal Breeding (LAS 2204)

SEMESTER 2 EXAMINATION

June 2023

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

a. Describe, using breed examples, the following crossbreeding systems:

    i.   Grading-up   **[3 marks]**

    ii.   Backcross   **[4 marks]**

    iii.   Three-breed rotational.   **[5 marks]**

b. Outline the four main reasons for crossbreeding animals.   **[8 marks]**

Question 2

The average weight of rams and ewes in a flock is 73 kg and 65 kg respectively. A ram with a weight of 85 kg and a ewe with a weight of 70 kg were selected for mating from the flock. Given that the narrow sense heritability for body weight in the flock is 0.25:

a. Calculate the estimated breeding values (EBVs) of:

    i.   the ram   **[3 marks]**

    ii.   the ewe.   **[3 marks]**

b. Calculate the estimated breeding value for the unborn offspring.   **[5 marks]**

c. Calculate the accuracy of the EBVs.   **[3 marks]**

d. Determine the expected mature weight if the offspring is:

    i.   A male   **[3 marks]**

    ii.   A female.   **[3 marks]**

Question 3

a.

    i.   Define the term selection limit.   **[2 marks]**

    ii.   What are the three reasons for the occurrence of a selection limit?   **[6 marks]**

b. Explain why genomic selection is becoming more popular with animal breeders compared to selection using phenotypes.

    [6 marks]

c. Explain the three main factors that influence the size of selection differential in a breeding program

[6 marks]

SECTION B. ANSWER ANY <u>TWO</u> QUESTIONS IN THIS SECTION

Question 4

Explain the importance of each examination carried out during the breeding soundness examination of:

    i.   Dairy heifers   **[10 marks]**

    ii.   Rams.   **[10 marks]**

Question 5

a. Differentiate between open-nucleus and closed-nucleus breeding programs.   **[10 marks]**

b. Describe the structure of a typical commercial poultry breeding program.   **[10 marks]**

Question 6

Using different examples of farm animals, discuss the benefits and negative effects of selective animal breeding.   **[20 marks]**

END OF QUESTION PAPER

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