FACULTY OF LIFE SCIENCES

DEPARTMENT OF ANIMAL SCIENCE

BACHELOR OF SCIENCE HONOURS DEGREE IN ANIMAL SCIENCE

Animal Breeding and Genetics 2 (LAS 4101)

SEMESTER 1 EXAMINATION

February 2022

Time Allowed: 3 hours

Special Requirements: Calculator

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 <u>ALL</u> 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

a) Explain how correlations can be used as a tool for selection.   **[4 marks]**

b) Recommend, giving reasons, two ways of preserving animal genetic diversity in Zimbabwe.   **[4 marks]**

c) Outline three benefits of adopting genomic selection to animal breeders. **[6 marks]**

d) The response to selection can be improved by increasing the selection differential. Explain how the selection differential can be improved in a breeding program.   **[6 marks]**

Question 3

a) Give three benefits and three hazards of continuously mating related animals. **[6 marks]**

b) Explain why genotype x environment can pose a serious risk to animal breeders.

                                                                    [4 marks]

c) Using diagrams, describe the different reaction norms of genotype x environment interaction.   **[10 marks]**

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

Question 4

a) Differentiate, giving examples, an open nucleus breeding program from a closed nucleus breeding program.   **[6 marks]**

b) Discuss the seven factors that should be considered when setting up a breeding program.

                                                                    [14 marks]

Question 5

a) The average weight of ewes in a flock is 65 kg. A ram with weight of 85 kg and a ewe with 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, find the estimated breeding value for the unborn offspring. **[10 marks]**

b) Highlight the importance of estimated breeding values in animal breeding. **[10 marks]**

Question 6

a) Explain the four main factors affecting animal genetic gain. **[8 marks]**

b) Describe the forces that influence genetic diversity. **[12 marks]**

END OF QUESTION PAPER

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