



2ND SEM. 2007/2008

UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMME: B. Sc. ANIMAL SCIENCE II

COURSE CODE: APH 202

TITLE OF PAPER: ANIMAL BREEDING

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER ANY 4 QUESTIONS.

**THIS PAPER MAY NOT BE OPENED UNTIL THE CHIEF
INVIGILATOR HAS GRANTED PERMISSION.**

QUESTION 1

- a) In a certain cattle population, the following data is available:
- i. Mean milk production is 800 kg per lactation.
 - ii. Mean of individuals selected to be the parents of the next generation is 1050 kg per lactation.
 - iii. Heritability of milk yield as measured in that population is 45%.

Use the data to predict response to selection for this population. (5 Marks)

- b) Derive the mathematical formula, which explains the effect of migration on allelic frequencies of a population. Highlight and discuss the two components of the formula that affect magnitude of change in allelic frequency. (10 Marks)
- c) What is the importance of the Hardy-Weinberg law in the study of animal populations? (5 Marks)
- d) What is the importance of genetic variation in animal improvement? (5 Marks)

QUESTION 2

Distinguish between the following:

- a) Positive and negative assortative mating. (5 Marks)
- b) Bottlenecks and founder effect. (5 Marks)
- c) Heritability and repeatability. (5 Marks)
- d) Inbreeding and outbreeding. (5 Marks)
- e) Progeny testing and sib selection. (5 Marks)

QUESTION 3

- a) What are the characteristics of quantitative characters or traits? (5 Marks)
- b) Albinism occurs with a frequency of 1×10^{-5} in a population of African-Americans. Assuming albinism to be due to a single autosomal recessive gene, and assuming the population to be in Hardy-Weinberg equilibrium:
- i. What is the frequency of the albinism allele? (4 Marks)

ii. What is the expected Hardy-Weinberg ratio of carriers to those affected?

(6 Marks)

c) Briefly describe the effects of the following on the genetic properties of a population:

i. Non-random mating

(5 Marks)

ii. Mutation

(5 Marks)

QUESTION 4

a) What is meant by inbreeding depression?

(5 Marks)

b) What are the genetic effects of inbreeding?

(5 Marks)

c) What are the commercial values of inbreeding?

(5 Marks)

d) Explain the following terms:

i. Quantitative trait

(4 Marks)

ii. Additive genetic variance

(2 Marks)

iii. Selection limits

(4 Marks)

QUESTION 5

Suggest breeding strategies for the improvement of beef cattle performance in Swaziland.

(25 Marks)