



1ST SEM. 2018/2019

UNIVERSITY OF ESWATINI
RE-SIT FINAL EXAMINATION PAPER

PROGRAMME: BSc ANIMAL SCIENCE
BSc ANIMAL SCIENCE (DAIRY OPTION)

COURSE CODE: ASC405/AS405

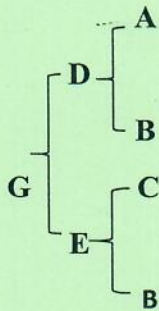
TITLE OF PAPER: ANIMAL BREEDING

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER ANY FOUR QUESTIONS

DO NOT OPEN THIS PAPER UNTIL PERMISSION HAS BEEN GRANTED BY THE
CHIEF INVIGILATOR

Question 1



- Organize this pedigree into an arrow diagram so that it can be used to determine relationships between animals. (4 Marks)
- List **any 5 pairs** of unrelated animals in the pedigree. (5 Marks)
- What are full sibs? List one pair of full sibs from the pedigree. (4 Marks)
- Calculate the relationship covariance between D and E. (4 Marks)
- What is the inbreeding co-efficient of G? (3 Marks)
- Why is it not advisable to breed closely related animals? (3 Marks)
- What is random mating. (2 Marks)

Question 2

- A study carried out in one SADC country reported that on average 6 out of 160 (six out of one hundred and sixty) goats suffer from clubfoot, a genetic disease caused by a recessive allele (f) and affected goats have some difficulty in walking.
 - Calculate the frequency of the recessive allele and the dominant allele in the goat population in that country. (4 Marks)
 - What percentage of the goat population would be expected to be phenotypically normal but carry the clubfoot allele. (2 Marks)
 - Would you expect the population to be in Hardy-Weinberg equilibrium at the locus responsible for clubfoot? Briefly justify your answer. (4 Marks)
- State the Hardy-Weinberg law and list its 5 assumptions. (7 Marks)
- Explicitly define migration as used in modern animal breeding. (4 Marks)
- State the **two key** requirements for a migration event to have any genetic impact on a population. (4 Marks)

Question 3

(a) Differentiate between:

- (i) Natural selection and artificial selection. **(4 Marks)**
- (ii) Adaptive value and estimated breeding value. **(4 Marks)**
- (iii) Genotype and phenotype. **(4 Marks)**
- (iv) Codominance and overdominance. **(4 Marks)**
- (v) Backcross and a crossbred. **(4 Marks)**
- (vi) Positive assortative mating and negative assortative mating. **(4 Marks)**
- (vii) Define an inbred. **(1 Mark)**

Question 4

- (a) Despite that each sperm cell and each oocyte from parents contribute 50% to all their offsprings, full sibs still show differences in traits, clearly explain the cause. **(2 Marks)**
- (b) List **10** vital factors for knowing an effective breeding objective(s). **(10 Marks)**
- (c) State the breeder's equation. **(1 Mark)**
- (d) Explain in detail each of the components of the breeder's equation in (c) above. **(9 Marks)**
- (e) Define a common ancestor. **(3 Marks)**

Question 5

- (a) Selection against a recessive gene that is present in a population at a low frequency is very difficult. Explain the reasons behind this difficulty. **(4 Marks)**
- (b) Progeny testing for recessive genes is one way to eliminate recessive genes in a herd. Discuss in detail **Progeny testing for recessive genes**. Ensure to also explicitly categorize and describe the **three types of progeny testing** involved, with their advantages, limitations, level of confidence in each test and give examples. **(21 Marks)**