UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMME: BSc. ANIMAL SCIENCE III

COURSE CODE: AS 301

TITLE OF PAPER: ANIMAL BREEDING

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER QUESTION NUMBER 1 AND ANY OTHER 3 QUESTIONS

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

1. **(THIS IS A COMPULSORY QUESTION! You must answer this question and any other THREE questions of your choice)**
   i). List two basic tools that can be used in genetic improvement of livestock? (4)
   ii). Define the following terms: (10)
      a) Inbreeding
      b) Linebreeding
      c) Migration
      d) Common ancestor
      e) Selection differential
   iii). Compare and contrast qualitative and quantitative traits. (6)
   iv). Briefly discuss tandem selection. (5)

2.
   i). Choose and name a livestock species of interest to you. List and then discuss three traits you would select for in this species. (6)
   ii). What is grading up? What are the advantages of grading up? Describe the process of grading up and show the associated genetic changes for the first three generations. (12)
   iii). Briefly discuss selection response. (3)
   iv). Define the term genetic engineering (4)

3.

Sire identity	Dam identity	Calf identity	Sex of the calf	Date of birth date/month/year	Birth weight (kg)
Xerox	F1	F2	Female	3/8/2001	24
Xerox	F1	F3	Female	18/12/2001	22
Hero	F2	F44	Female	11/4/2006	20
Hero	F3	DX5	Male	30/6/2006	25
DX5	F44	ARROW	Male	5/4/2008	27

   i. Use information from this record to draw an arrow diagram. (8)
   ii. What is the relationship covariance between Hero and F1? (1)
   iii. What is the relationship covariance between F3 and Xerox? (1)
   iv. List ALL pairs of animal which are not related in this pedigree. (3)
   v. What is the relationship covariance between F44 and DX5? (8)
   vi. Comment on the mating of F44 and DX5 to produce Arrow. (4)

4.

    i). Briefly discuss the following:

       a) Selection index (6)

       b) B.V. (4)

       c) Assortative mating (4)

       d) What does L.O.C stand for? When selecting for what classification/type of traits would one encounter L.O.C. values? If a bull is said to have an L.O.C of 0.969 for mule foot (a genetic disease caused by a recessive) what does this mean in simple language. (8)

       e) List three concerns related to genetic engineering of animals. (3)

5.

    i). What are the TWO factors which determine change in gene frequency caused by a single migration? (4)

    ii). What are half sibs and full sibs? In your opinion which of these two are the most common in the livestock production business. (4)

    iii). Explain why the phenotypic mean of the progeny produced by parents selected for the same trait is lower than that of their parents. (4)

    iv). List four possible applications of genetic engineering in animals (4)

    v). Mr. Joe Knowitall says: "Boars do not produce piglets so there is no need to consider boars when trying to increase herd litter size, moreover, it is practically impossible to select boars for litter size since they do not give birth to piglets!" Briefly comment on this statement by Mr. Knowitall. (4)

    vi). In livestock, what is a pedigree? (2)

    vii). Briefly discuss random mating. (3)