

**UNIVERSITY OF SWAZILAND**

**1<sup>st</sup> SEM. 2013/2014**

**FINAL EXAMINATION PAPER**

**PROGRAMMES: B.Sc. ANIMAL SCIENCE III**

**B.Sc. ANIMAL SCIENCE (DAIRY OPTION) III**

**COURSE CODE: AS 301**

**TITLE OF PAPER: ANIMAL BREEDING**

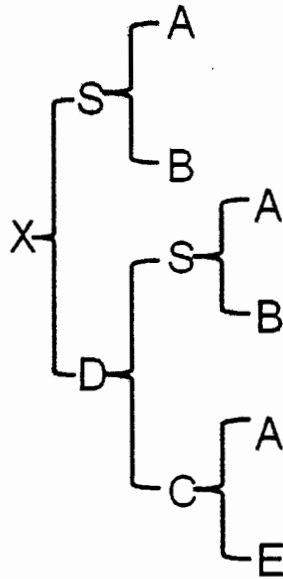
**TIME ALLOWED: TWO (2) HOURS**

**INSTRUCTIONS: ANSWER ANY FOUR QUESTIONS**

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INVIGILATOR**

**Question 1**

Study the pedigree diagram below and answer the questions below it.



- i. Convert this pedigree diagram into an arrow diagram. **(6 points)**
- ii. What is the relationship covariance between S and D? **(14 points)**
- iii. Calculate the inbreeding coefficient of all the inbred animals in the pedigree. **(5 points)**

**Question 2**

- i. Show the relationship between gene and genotypic frequency in a population that is in Hardy Weinberg equilibrium. **(10 points)**
- ii. In Waldo pigs coat colour is under the control of a single locus with two codominantly inherited alleles. Animals which are homozygous (bb) are black, those which are heterozygous are gray while those of genotype “BB” are white. A representative sample from a naturally breeding population of these pigs yielded the following numbers: 145 black, 150 gray and 189 white. Is this population in Hardy Weinberg equilibrium? Set alpha error ( $\alpha$ ) level at 0.01. **(15 points)**

### Question 3

- i). Name the two basic approaches used by animal breeders to improve the genetic makeup of animals? **(4 points)**
- ii). Migration will always cause a change in the gene frequency of the native population. Briefly discuss this statement. **(6 points)**
- iii). Draw and fully label a diagram showing the relationship between mean of unselected population, mean of selected parents, mean of progeny from selected parents, selection differential and selection response **(15 points)**

### Question 4

- i). Define the following terms:
  - a) Inbred animal **(2 points)**
  - b) Half sibs **(2 points)**
  - c) Codominance **(2 points)**
  - d) Natural selection **(2 points)**
  - e) Selection intensity **(2 points)**
- ii). Mr. Johnston is a pig producer. He selects replacement boars from his own herd. Currently he is trying to increase the litter size through selection. Can he select for litter size in boars? Briefly explain. **(5 points)**
- iii). Briefly compare and contrast inbreeding and positive assortative mating. **(5 points)**
- iv). List five quantitative traits of importance in a dairy herd. **(5 points)**

### Question 5

- a) Write an equation showing the factors which determine the phenotype of an animal. Explain each of the terms in the equation. **(15 points)**
- b) Discuss the effect of negative assortative mating on gene and genotypic frequencies in a population? **(10 points)**