

**UNIVERSITY OF FORT HARE**

**ANIMAL BREEDING  
AGA 322**

**DEGREE EXAMINATIONS**

**NOVEMBER**

**2018**

.....

**Time: 3 HOURS**

**Subject: AGA 322**

**Marks: 100**

**This paper consists of 4 pages including the cover page**

**Internal Examiners**  
**Mr. M. Mpayipheli**  
**Prof. V. Muchenje**

**External Examiners**

**INSTRUCTIONS**

*Answer all questions*

*It is in your best interest to write clearly and legibly*



### Question 1 (20 marks)

1. What is the contribution of the following scholars to the field of animal breeding and genetics? Choose the correct option from the answers given.
  - 1.1. R.A. Fisher, S. Wright and J.B.S. Haldane (1)
    - a. Developed BLUP methodology
    - b. Founders of theoretical population genetics
    - c. Developed the approach of genomic selection
    - d. Invented the Selection Index theory
  - 1.2. Lanoy Nelson Hazel (1)
    - a. Developed BLUP methodology
    - b. Founders of theoretical population genetics
    - c. Developed the approach of genomic selection
    - d. Invented the Selection Index theory
  - 1.3. Charles R. Henderson (1)
    - a. Developed BLUP methodology
    - b. Founders of theoretical population genetics
    - c. Developed the approach of genomic selection
    - d. Invented the Selection Index theory
2. What is gene mutation? (2)
3. Distinguish between gene sex-influenced traits and sex-limited traits. (4)
4. Describe any FIVE (5) principles of Hardy-Weinberg Equilibrium. (10)



### Question 2 (20 marks)

1. Grey colour in horses is caused by a dominant gene, G, and other colours by its recessive allele, g. A survey of 10000 Arabian foals showed 84% grey. Assume random mating for colour among the parents.
  - a. What are the estimated frequency of the red gene? (3)
  - b. What percent of the grey foals are expected to be heterozygous? (3)
  - c. What is the probability that a randomly chosen stallion is homozygous GG? (2)
2. Briefly explain “gene action” and in your explanation include its importance. (6)
3. Briefly discuss the importance of heritability. (6)

### Question 3 (20 marks)

1. Consider a cattle selection programme with a phenotypic standard deviation of 20, response per year of 1.99, selection intensity of 1.99 and generation interval of 2. Compute the following:
  - a. Response per generation (4)
  - b. Selection differential (3)
  - c. Heritability (3)
2. What animal breeding problems are faced in communal areas of South Africa? (10)



**Question 4 (20 marks)**

Discuss any FOUR (4) reproductive technologies used to improve livestock hers in South Africa. (20)

**Question 5 (20 marks)**

Discuss traits of economic importance in dairy cattle. (20)

**END OF PAPER....GOODLUCK!**

---

