CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF CERTIFICATE IN ANIMAL HEALTH AND PRODUCTION

ANSC 00141: BASIC GENETICS AND ANIMAL BREEDING

STREAMS: CERT (ANHE) **TIME: 2 HOURS**

DAY/DATE: MONDAY 10/12/2018 **2.30 PM – 4.30 PM**

INSTRUCTIONS:

- **This examination has two sections: A and B**
- **Attempt ALL Questions in Section A and any Two Questions in Section B**
- **Mobile phones are NOT ALLOWED in the examination room**

SECTION A: ATTEMPT ALL QUESTIONS: 40 MARKS

1. The basic building blocks of nuclei acids are nucleotides. Answer the following questions.

   (a) Label the carbons on the pentose sugar below [1 mark]

   (b) Lis three differences between DNA and RNA [3 marks]

   (c) Name one differences between purines and pyrimidines. [1 mark]

2. Define the following terms [5 marks]

   (a) Cytokinesis
   (b) Recombination
   (c) Gene
   (d) Chromosome
   (e) Mutation

3. Discuss the process of growth in livestock [5 marks]

4. Giving examples explain the following concepts [8 marks]

   (a) Incomplete (partial) dominance
   (b) Co-dominance
   (c) Complete dominance
   (d) Multiple alleles

5. Fill the blanks in the table below [4 marks]

Parents	Males	Females	
Parental genotypes	-? -	aa	
Gametes	All A	-?-	
Offspring genotypes	-?-	Aa	-?-

6. Briefly discuss the factors that disrupt the Hardy-Weinberg equilibrium in a population. [10 marks]

7. Discuss two factors that influence the phenotype of an individual. [3 marks]

SECTION B: ATTEMPT ANY TWO QUESTIONS- 30 MARKS

8. Selection is the process that determines which animals become parents of the next generation.

   (a) Differentiate between mating and inbreeding. [4 marks]
   (b) Discuss two consequences of inbreeding [4 marks]
   (c) Discuss two advantages of cross-breeding [4 marks]
   (d) Distinguish between natural and artificial selection [3 marks]

9. Use the information provided below to answer the questions that follow

$\sigma_A^2 = 3{,}600\, g^2 ; \sigma_P^2 = 1{,}200\, g^2 ; \mu = 200\, g$

(a) Differentiated between heritability in broad sense and heritability in narrow sense. [3 marks]

(b) Estimate the breeding value for animal whose weight for the trait is 250g. [3 marks]

(c) What is the accuracy of the breeding value estimate in 3b above [3 marks]

(d) If the above animal was mated to a group of randomly selected mates, what would be the expected breeding value of the progeny? [3 marks]

(e) If the animal is mated to a mate with a breeding v value equal to 10 g, what would be the expected breeding value of the progeny? [3 marks]

10. In a pig breeding program, the selection intensity for males is 1.804 and for females is 0.798. The generation interval for males and females if 0.5 years. Males and females are selected based on their own-performance for the trait weaning weight. Heritability for the trait is 0.20 with a phenotypic standard deviation of 3 kg. Determine the response to selection per annum for this trait. [15 marks]
