



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY  
SCHOOL OF AGRICULTURAL AND FOOD SCIENCES**

**FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF  
SCIENCE IN ANIMAL SCIENCE**

**2017/2018 ACADEMIC YEAR**

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**COURSE CODE: AAS 3215:**

**COURSE TITLE: PRINCIPLES OF ANIMAL GENETICS**

**EXAM VENUE: LR 4**

**STREAMS: BSc. AGED, Bsc. and , Bsc. Animal  
Science**

**DATE: 20/12/17**

**EXAM SESSION: 9.00 – 11.00 AM**

**TIME: 2 HOURS**

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**Instructions:**

- 1. Answer ALL questions in section A and ANY other 2 Questions in section B.**
- 2. Candidates are advised not to write on question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

**SECTION A [30 MARKS]**

**Answer ALL questions in this Section.**

Q1. Define the following terminologies

- (a) Pseudo gene **(2marks)**
- (b) Trait **(2marks)**
- (c) Molecular marker **(2marks)**
- (d) Mutation **(2marks)**
- (e) Inbreeding depression **(2marks)**

Q2 (a) How does animal breeding utilizes trait variation **(3marks)**

(b) State various levels where genetic variation can be observed in animals **(4 marks)**

(c) Using formulae and variances explain what constitutes the phenotypic value of an individual **(3 marks)**

Q3 (a) Using formulae differentiate between broad and narrow sense heritability **(4 marks)**

(b) Using a diagram explain how self fertilization affects heterozygosity and homozygosity over time **(3 marks)**

(c) If heterozygosity (H) was initially 0.5, what would be the expected level of heterozygosity after 5 generations? **(3 marks)**

**SECTION B [40 MARKS]**

**Answer any TWO QUESTIONS in this Section.**

Q4. Tongue-rolling and red-green colour blindness are two genetically controlled conditions which occur in humans. Tongue-rolling is controlled by the dominant allele, T, while non-rolling is controlled by the recessive allele, t.

Red-green colour blindness, is controlled by a sex-linked gene on the X chromosome. Normal colour vision is controlled by the dominant allele, B, while red-green colour blindness is controlled by the recessive allele, b.

a) Complete the genetic diagram to show the possible genotypes and phenotypes which could be produced from the following parents. **(13 marks)**

**Female**

**Male**

Colour blind and heterozygous for tongue-rolling.

Normal colour vision and non-roller.

**Parental genotypes**

**Genotypes of gametes**

**Genotypes of children**

**Sex and phenotypes of children**

b) Explain why a higher percentage of males than females in a population is red-green colour blind. **(4 marks)**

c) Sex-linked genes on the y chromosome have been found in humans and other animal species. Suggest and explain one piece of evidence which would support the presence of such a gene.

**(3 marks)**

Q5. The different animal breeding schemes may be grouped into pure breeding and crossbreeding. Discuss **(20 marks)**

Q6. Hardy-Weinberg equilibrium is very important in population genetics. State it, the equation involved and its important assumptions **(20 marks)**