UNIVERSITY OF EMBU

2016/2017 ACADEMIC YEAR

SECOND SEMESTER EXAMINATION

THIRD YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE (AGRICULTURE -ANIMAL PRODUCTION OPTION AND RANGE MANAGEMENT

AAS 303: POPULATION AND QUANTITATIVE GENETICS

DATE: APRIL 4, 2017 **TIME: 2:00-4:00PM**

INSTRUCTIONS:

Answer Question ONE and ANY other TWO Questions

QUESTION ONE

a) Find the gene frequencies of genotype AA, Aa and aa in percentage if the recessive homozygotes form 1% of that population (2 Marks)

b) Discuss the main features of oligogenic inheritance (4 Marks)

c) Using a graph, illustrate a population in Hardy-Weinberg equilibrium (3 Marks)

d) A population has 196 out of 400 individuals with gene frequency MM. What percentage of this population are heterozygotes if it is in Hardy- Weinberg equilibrium? (3 Marks)

e) Differentiate between founder effects and population bottleneck (4 Marks)

f) Discuss three causes of heterosis in nature (3 Marks)

g) Citing appropriate examples, explain threshold characters (2 Marks)

h) Black bean seeds were crossed and produced 107 black seed and 33 white seeds in F_2. Use B and b to determine the genotypes of the parents. Did the observed segregation differ significantly from the expected? (Use the attached X^2 table in your working). (3 Marks)

i) Some members in a population were found to be highly resistant to HIV infection despite repeated exposure. Explain the possible reasons (3 Marks)

j) Describe the heritability and its biological significance (3 Marks)

QUESTION TWO

a) A student studying a mutating population was expected to make classifications. Discuss various ways that he used to go about this task. (12 Marks)

b) Describe the four main patterns of speciation (8 Marks)

QUESTION THREE

a) Giving appropriate example, discuss adaptation with beneficial genetic mutation (10 Marks)

b) Discuss outbreeding and its biological significance (10 Marks)

QUESTION FOUR

a) There are several manifestations of genetic polymorphism in nature. Discuss (10 Marks)

b) Explain factors that influence genetic equilibrium in a population (10 Marks)

QUESTION FIVE

a) Genetics students were studying seed colour in beans and made 3 different crosses. They got F_2 hybrids in the ratios as shown in the table below. Find out if the observed differences in the three crosses were significantly different from the expected ratio or not. (10 Marks)

	Cross 1		Cross 2		Cross 3	
	Black	White	Black	White	Black	White
Observed	70	30	745	255	700	300

b) Discuss heterosis and its biological significance (10 Marks)

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