



UNIVERSITY OF EMBU

2016/2017 ACADEMIC YEAR

FIRST SEMESTER EXAMINATION

FIRST YEAR EXAMINATION FOR THE DEGREE OF MASTER OF SCIENCE IN PLANT BREEDING AND BIOTECHNOLOGY

ACB 603: BIOMETRICAL GENETICS

DATE: DECEMBER 1, 2016

TIME: 2:00-5:00PM

INSTRUCTIONS:

Answer Any 4 Questions.

QUESTION ONE (25 MARKS)

- a) Inheritance of traits can be in three main ways. Discuss. (15 marks)
- b) Plant breeders were studying seed shape in *Dolichos lablab* and made three different crosses. They got F₂ 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 ratios. (10 marks)

	Cross I		Cross II		Cross III	
	Round	Wrinkled	Round	Wrinkled	Round	Wrinkled
Observed	107	33	523	177	676	224

QUESTION TWO (25 MARKS)

Write an essay on heritability and its application in nature.

QUESTION THREE (25 MARKS)

Discuss heterosis and its genetic, physiological and biochemical basis.

QUESTION FOUR (25 MARKS)

a) Outline the development of the Hardy-Weinberg equilibrium and its application in population genetics. (15 marks)

b) Analysis of performance of 10 wheat plants on two parameters were as shown on the table below: (10 marks)

Parameter	Plant									
	i	ii	iii	iv	v	vi	vii	viii	ix	x
No. of grains on the main spike	33	31	32	34	36	37	41	37	34	36
Weight of 1000 seeds, g	1.7	1.8	1.6	1.9	1.7	2.0	2.2	1.9	1.7	1.9

For each parameter find:

i) Variation, σ^2

ii) The standard deviation, σ

QUESTION FIVE (25 MARKS)

Describe the role played by Nilson Ehle in explaining inheritance of continuous traits.

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