MACHAKOS UNIVERSITY

University Examinations for 2017/2018 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

2017/2018 Year SEPTEMBER - DECEMBER Semester Examination for Degree in Bachelor of AGRICULTURAL EDUCATION

CODE: SCB 120 UNIT NAME: INTRODUCTION TO GENETICS

Date---------- Time ----------

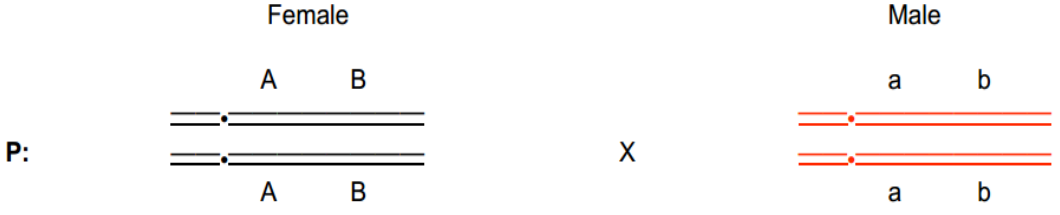
Instructions

1. Anwer Question 1 (**compulsory**) and **<u>any two</u>** questions in Section B.
2. Use clean well labelled diagrams wherever appropriate.

SECTION A

Question 1. – Compulsory (30 marks) – This question should cut across the entire course content. It should have 10 subsections, each worth a maximum of 3 marks.

a) Explain the importance of multiple allelism (3 marks)
b) Explain how the light purple aleurone colour in maize comes about (3 marks)
c) Using an example, explain pleitropy (3 marks)
d) Explain the following as used in genetics (3 marks)
   a. Phenocopies
   b. Linked genes
   c. Discontinous traits
e) Using a relevant example, describe how interactions between nuclear and cytoplasmic genomes occur (3 marks)
f) Consider a case where two genes A and B are linked. What gametes would be produced by F1 in case there's a crossing over



(3 marks)

g) Outline three sources of genetic variation (3 marks)
h) Outline the causes of genetic drifts (3 marks)

i) State the Hardy-Weinberg equilibrium (3 marks)
j) Draw a graph showing continous variation of height in a population (3 marks)

SECTION B

QUESTION TWO

Discuss the mechanisms of gene interactions in organisms (20 marks)

QUESTION THREE

Discuss the theories of multiple allelism (16 marks)

Illustrate existence of multiple alleles in humans (4 marks)

QUESTION FOUR

Assess the ways in which genetic variance affects evolution of populations (20 marks)

QUESTION FIVE

Draw a genetic map of LGS genes (order unknown) which confer the following traits in maize?

Maize:

l l - lazy or prostrate growth

g g - glossy leaves

s s - sugary endosperm

Triple Heterozygote: L G S / l g s X Recessive homozygote: l g s / l g s

Progeny Phenotype	Genotypes of offspring	Number
Wildtype	**L G S / l g s**	**286**
Lazy	**l G S / l g s**	**33**
Glossy	**L g S / l g s**	**59**
Sugary	**L G s / l g s**	**4**
Lazy, Glossy	**l g S / l g s**	**2**
Lazy, Sugary	**l G s / l g s**	**44**
Glossy, Sugary	**L g s / l g s**	**40**
Lazy, Glossy, Sugary	**l g s / l g s**	**272**
Total		**740**

20 marks