



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

**FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
EDUCATION AND BACHELOR OF SCIENCE**

SBT 401: GENERAL GENETICS

DATE: Thursday, 24th November, 2011

TIME: 4.30 p.m. – 6.30 p.m.

INSTRUCTIONS:

Answer **ALL** questions in Section A in the spaces provided and **ONE** chosen from Section B in the answer booklet provided.

SECTION A – SHORT ANSWER QUESTIONS EACH 5 MARKS (TOTAL 40 MARKS)

1. Using an appropriate example, explain Mendel's second principle of inheritance.
(5 marks)

2. Differentiate co-dominance and incomplete dominance using appropriate examples. (5 marks)
3. Using the ABO blood grouping system explain the effect of having more than two alleles controlling a characteristic within a population. (5 marks)

4. Explain the following phenotypic ratios in the F₂ generation of dihybrid inheritance: (5 marks)
- i) 9:3:3:1
 - ii) 3:6:3:1:2:1
 - iii) 1:2:1:2:4:2:1:2:1
 - iv) 12:3:1
 - v) 10:3:2:1

5. List down the five assumptions of Hardy-Weinberg principle on populations. (5 marks)

6. Discuss the advantages of using of genetics in crop improvement. (5 marks)

7. Explain the effects of genetic drift in a population. (5 marks)

8. Explain the difference between genotypic and environmental variation. (5 marks)

SECTION B: Answer ONE question. Total marks 30

1. Explain the use of the following techniques in improving livestock production in developing countries.

- i) Artificial insemination (15 marks)
- ii) Embryo transfer (15 marks)

2. Discuss the various types of mutations and highlight how they contribute to evolution (30 marks)

3. a) Explain the three criteria that must be met for a successful mapping cross. (6 marks)

- b) A cross between a female fruit-fly with yellow body color (y), white eyes (w) and hairy body (h) all of which are recessive is crossed with a wild-type male y^+ , w^+ and h^+ but heterozygous. After the cross, the following off-springs were obtained:-

y w h^+ -----	120
y^+ w^+ h -----	180
y w^+ h -----	10
y^+ w^+ h^+ -----	3,250
y^+ w h -----	65
y w^+ h^+ -----	40
y w h -----	3,500
y^+ w h^+ -----	15

From the above information, construct a genetic map showing the order of the genes and the distances between them. (12 marks)

- c) Using an example in each case, explain:

- i) Short lasting maternal effect (6 marks)
- ii) Long lasting maternal effect (6 marks)