



MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

FIRST YEAR SECOND SEMESTER MAIN EXAMINATIONS

FOR THE DEGREE OF MASTER OF SCIENCE IN PLANT GENETICS
AND BREEDING

COURSE CODE: APB 823

COURSE TITLE: POPULATION AND QUANTITATIVE GENETICS

DATE: 21ST APRIL, 2022

TIME: 12-3PM

INSTRUCTIONS TO CANDIDATES

Answer ALL questions in section A and ANY THREE questions in section B.

Time: 3 hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 2 Printed Pages. Please Turn Over.

Section A (30 MARKS)

1. Write short notes on
 - a. Blending inheritance (5 marks)
 - b. Problem with blending inheritance (5 marks)
 - c. Mendel's view of Inheritance (5 marks)
2. Discuss ANY FIVE tools used in detecting natural variation in DNA (15 marks)

Section B (30 MARKS)

3. Discuss different types of mutations that alter DNA sequences and thus protein function (10 marks)
4. Explain the five major assertions in the theory of natural selection as proposed independently by Charles Darwin and Alfred Russel Wallace (10 marks)
5. Discuss the forces that Change Allele Frequencies (10 marks)
6. Suppose loci A and B are linked, with $c = 0.25$. Further, suppose $\text{freq}(AB) = 0.1$, $\text{freq}(A) = 0.5$ and $\text{freq}(B) = 0.5$. Assume a random mating population.
 - a. Under Hardy-Weinberg, what is the frequency of an AA homozygote? A BB homozygote? (2 marks)
 - b. Assuming gametes combine at random, what is the expected frequency of an AABB individual assuming the above gamete frequencies (2 marks)
 - c. What is the initial disequilibrium for the AB gamete, DAB? (2 marks)
 - d. After four generations of recombination, what is the disequilibrium, DAB (4)? (2 marks)
What is $\text{freq}(AB)$? What is $\text{freq}(AABB)$? (2 marks)