



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2010/2011

INSTITUTIONAL BASED PROGRAMME (IBP) DECEMBER SESSION EXAMINATION FOR THE DEGREE OF MASTER OF SCIENCE IN PLANT BREEDING

KST 531: QUANTITATIVE GENETICS AND STATISTICAL TOOLS

DATE: Thursday, 28th April 2011

TIME: 2.00 p.m. – 5.00 p.m.

INSTRUCTIONS:

ANSWER ANY FOUR QUESTIONS, EACH 25 MARKS

1. Idealized populations are in Hardy-Weinberg equilibrium unlike real populations. Discuss the applications of Hardy-Weinberg law and reasons for the differences between the two populations.
2. Phenylketonuria (PKU) is a human metabolic disease caused by a single recessive gene. Homozygotes can be detected at birth when selective elimination is assumed to be negligible. Test of babies born in Kenya, over 3 years period detected 5 cases in 55,715 babies.

The frequency of heterozygotes denoted H' is given by the formula

$$H' = \frac{2q(1-q)}{(1-q)^2 + 2q(1-q)}$$

- (a) Simplify the equation. (5 marks)
- (b) Calculate the frequency of babies born with PKU. (5 marks)
- (c) Calculate the frequency of the recessive allele. (5 marks)
- (d) Calculate frequency of the carriers (heterozygotes). (10 marks)

3. Discuss methods of Diallel analyses using Griffing's approach.
4. Discuss the statistics used in the study of continuous variation.
5. Discuss heterosis and their measurements.