



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2010/2011

**SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR
OF SCIENCE (CROP IMPROVEMENT AND PROTECTION)**

KST 209: PRINCIPLES OF CROP IMPROVEMENT

DATE: Tuesday 5th April 2011

TIME: 11.00a.m – 1.00p.m

INSTRUCTIONS: Answer **ALL** questions in section A and any **TWO** in section B

SECTION A: Answer ALL questions (40 Marks)

1. Explain why the size of F₂ population is important when breeding self-pollinated crops. (5 marks)
2. Briefly explain the relationship between inbreeding and inbreeding depression. (5 marks)
3. Briefly explain the following terms:
 - a. Vegetative propagation (1 mark)
 - b. Locus (1 mark)
 - c. Backcross breeding (1 mark)
 - d. Gene recombination (1 mark)
 - e. Inbreeding depression (1 mark)
4. Explain the differences between breeders and certified seed. (5 marks)
5. Briefly describe the basic goals of plant breeding. (5 marks)
6. Distinguish between transgressive segregation and heterosis. (5 marks)
7. Briefly describe the mass breeding procedure and give one of its major weaknesses. (5 marks)
8. Explain why centres of crop origin are important to plant breeders. (5 marks)

SECTION B: Answer any TWO questions (30 marks)

9. Discuss the procedural differences between pedigree and breeding bulk method.
(15 marks)
10. Illustrate the differences between reciprocal recurrent and mass selection methods used in population improvement programs. (15 marks)
11. A maize plant heterozygous for the alleles for pigmy and crinkly-leaf (both recessive to normal size of plant and normal leaf) is self pollinated and 160 seeds are harvested and germinated. How many would you expect to show;
- a) crinkly leaves? (3 marks)
 - b) normal size? (3 marks)
 - c) normal leaves and normal size? (3 marks)
 - d) normal leaves and pigmy? (3 marks)
 - e) If pollen from the maize described above was used to pollinate a plant which showed both pigmy size and crinkly leaves (i.e. was homozygous for the recessive alleles), what offspring phenotypes would be expected and in what proportions?
(3 marks)
12. Discuss the main features of the following methods of breeding:
- a) Pure line (6 marks)
 - b) Backcross breeding (9 marks)