



# MERU UNIVERSITY COLLEGE OF SCIENCE & TECHNOLOGY

P.O. Box 972-60200 Meru - Kenya. Tel: 020-2092048, 020 2069349  
Fax: 020-8027449

## University Examinations 2012/2013

SECOND YEAR, FIRST SEMESTER EXAMINATION FOR DIPLOMA IN AGRICULTURE

### BIO 0111: GENETICS AND PLANT BREEDING

DATE: DECEMBER 2012

TIME: 1 ½ HOURS

INSTRUCTIONS: Answer question **ONE** and any other **TWO** questions

#### QUESTION ONE – 30 MARKS

- (a) State the significance of the following types of cell division.
- (i) Mitosis (2Marks)
  - (ii) Meiosis (2Marks)
- (b) Outline the characteristics that made Gregor Mendel use garden pea *Pisum Sativa* as his model organism. (4Marks)
- (c) Define the following terms giving appropriate examples. (3Marks)
- (i) Allele
  - (ii) Recessive
  - (iii) Heterozygous
- (d) When a white flowered plant was pollinated with pollen grains from a red-flowered member of the same species the resultant seeds gave a generation of pink-flowered plants. Explain with the help of a punnet square what colour you would expect the next generation to be if:
- (i) Pink-flowered plants were allowed to self-pollinate. (2Marks)
  - (ii) Pink-flowered plants were crossed with the white-flowered parent. (2Marks)
- (e) State any 5 objectives of plant breeding. (5Marks)
- (f) Briefly discuss the undesirable effects of plant breeding. (4Marks)

(g) Briefly describe the significance of the following methods of reproduction in plant breeding

(6Marks)

- (i) Sexual reproduction
- (ii) Apomixis
- (iii)Vegetative

**QUESTION TWO – 15 MARKS**

- (i) What is hybridization? (3Marks)
- (ii) Distinguish between intervarietal and distant hybridization. (6Marks)
- (iii)Discuss the objectives of hybridization. (6Marks)

**QUESTION THREE – 15 MARKS**

- (i) Outline the merits and demerits of pedigree method. (3Marks)
- (ii) Outline the procedure for pedigree method. (12Marks)

**QUESTION FOUR – 15 MARKS**

A pea plant with long stems and axial flowers was crossed with a garden pea plant with short stems and terminal flowers. All the F<sub>1</sub> plants had long stems and axial flowers. Using letter A to represent genes for length of stems and letter D to represent genes for the position of the flowers. Use a punnet square to determine the phenotypes and the genotypic ratio of selfing F<sub>1</sub> plants.

**QUESTION FIVE – 15 MARKS**

Distinguish between primary and secondary plant introduction. (4Marks)

Discuss the purpose and merits of plant introduction (11 Marks)