



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## University Examinations 2012/2013

SECOND YEAR, FIRST SEMESTER EXAMINATIONS FOR DIPLOMA IN AGRICULTURE

### BIO 0111: GENETICS AND PLANT BREEDING

DATE: APRIL 2013

TIME: 1½ HOURS

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**INSTRUCTIONS:** Answer questions *one* and any other *two* questions

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#### QUESTION ONE – (30 MARKS)

- a. Describe the importance of genetics in agriculture. (5 Marks)
- b. Differentiate between genotype and phenotype. (4 Marks)
- c. State the Mendel's second law. (2 Marks)
- d. Differentiate between mitosis in plants and animal cells. (4 Marks)
- e. Discuss the mass selection as a method of crop population improvement. (8 Marks)
- f. Explain the significance of mitosis. (6 Marks)
- g. Define the term cytokinesis. (1 Mark)

#### QUESTION TWO – 15 MARKS

- a. What is plant breeding? (2 Marks)
- b. In peas, the allele for round seed (R) is dominant over the allele for wrinkled seed (r). The allele for yellow seed (Y) is dominant over the allele for green seed (y). If two pea plants with the genotype YyRr and Yyrr one crosses together, what ratio of phenotypes is expected in the offspring. (5 Marks)
- c. Discuss the potential benefits of genetic modification. (8 Marks)

#### QUESTION THREE – 15 MARKS

- a. Briefly describe the following chromosome mutation: (8 Marks)
  - i. Duplication
  - ii. Translocation
- b. Discuss the factors that cause mutation. (7 Marks)

#### QUESTION FOUR – 15 MARKS

- a. What is cross pollination? (2 Marks)
- b. Discuss the mechanisms that facilitate cross pollination. (8 Marks)
- c. Explain how the environment and gene can affect the phenotypic expression of an organism. (5 Marks)

**QUESTION FIVE – 15 MARKS**

- a. Explain the mechanisms of disease resistance. (6 Marks)
- b. Describe two types of disease resistance. (4 Marks)
- c. Outline the characteristics of telophase II. (3 Marks)
- d. Define the term parthenogenesis. (2 Marks)