



MERU UNIVERSITY COLLEGE OF SCIENCE & TECHNOLOGY

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

University Examinations 2011/2012

SECOND YEAR, FIRST SEMESTER EXAMINATIONS FOR DIPLOMA IN AGRICULTURE

BIO 0111: GENETICS AND PLANT BREEDING

DATE: AUGUST 2011

TIME: 1½ HOURS

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

QUESTION ONE – (30 MARKS)

- (a) Define the following terms:
 - (i) Dominant genes
 - (ii) Recessive genes(4 Marks)
- (b) Differentiate between reciprocal cross and test cross. (4 Marks)
- (c) Discuss the importance of genetics in the field of agriculture. (5 Marks)
- (d) State three importance of biotechnology in crop improvement. (3 Marks)
- (e) Describe the mechanisms that facilitate self pollination. (8 Marks)
- (f) Write short notes on the following chromosome structure changes:
 - (i) Duplication
 - (ii) Translocation(6 Marks)

QUESTION TWO – (15 MARKS)

- (a) State the mendelian law of dominance. (2 Marks)
- (b) A garden pea plant with red seeds was crossed with yellow seeds. The seeds in the F₁ generation were all red.
 - (i) State the dominant trait in this plant. (1 Mark)
 - (ii) Using letter R to represent the gene for red colour and letter Y to represent for yellow colour.
Give the genotype of the yellow and red seed plant. (1 Mark)
 - (iii) The F₁ plants were selfed to obtain the F₂ generation. Work out the genotypic ratio of the F₂ generation. (Show your working) (5 Marks)
- (c) Discuss the application of pureline selection in crop improvement. (8 Marks)

QUESTION THREE – (15 MARKS)

- (a) Describe how new plants arise by asexual reproduction. (10 Marks)
- (b) State the advantages of asexual reproduction plants. (5 Marks)

QUESTION FOUR – (15 MARKS)

- (a) Define mutation (2 Marks)
- (b) State three characteristics of mutation (5 Marks)
- (c) Explain two types of mutation (4 Marks)
- (d) Differentiate between meiosis and mitosis process of cell division. (6 Marks)

QUESTION FIVE – (15 MARKS)

- (a) What is anthesis? (2 Marks)
- (b) Discuss two types of pollination (6 Marks)
- (c) Describe two types of chromosome inversion. (7 Marks)