



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, SECOND SEMESTER EXAMINATION FOR DEGREE OF BACHELOR OF
SCIENCE IN HORTICULTURE

AHS 2205: GENETICS AND CYTOGENETICS

DATE: DECEMBER 2012

TIME: 2 HOURS

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

QUESTION ONE – 30 MARKS

- (a) State the two Mendelian Laws. (4Marks)
- (b) (i) What is a Phenotype? (2Marks)
- (ii) What are the three factors which affects the phenotype of an organism? (3Marks)
- (c) What are the Four factors which are responsible for non-mendelion inheritance ratios?
- (d) Draw a Deoxyribose sugar molecule. (5Marks)
- (e) (i) What is a transfer RNA. (2Marks)
- (ii) Draw a well labelled structure of a transfer RNA. (6Marks)
- (f) Duplication is one method used for causing Chromosome alterations. Explain how duplication works and its significance. (4Marks)

QUESTION TWO – 20 MARKS

- (a) What is Polyploidy (3Marks)
- (b) Give three reasons why polyploidy is not common in animals. (3Marks)
- (c) State three sources of polyploidy. (3Marks)
- (d) Explain how crossing-over takes place and its importance. (6Marks)
- (e) Define the following terms:
 - (i) Polygenes (1 Mark)
 - (ii) Modifying genes (2 Marks)
 - (iii) Additive gene action (2 Marks)

QUESTION THREE – 20 MARKS

- (a) (i) Using a graph, explain how the Hardy-Weinberg equation works in random mating in a given population. (7Marks)
- (ii) State and explain all the factors which cause changes in gene frequency. (8Marks)
- (b) (i) What is chromosome mapping? (2 Marks)
- (ii) State the importance of chromosome mapping. (3Marks)

QUESTION FOUR – 20 MARKS

Below is a single strand of the DNA

A A G C T T C C C G C A T G C T A A A G G T

- (i) Draw a complementary mRNA strand formed. (3Marks)
- (ii) Using the genetic code table, draw a polypeptide chain dictated by this DNA strand. (6Marks)
- (iii) State any three differences between RNA and DNA. (3Marks)
- (iv) Explain the procedure of protein synthesis involving both transcription and translation. (5Marks)

QUESTION FIVE – 20 MARKS

- (a) State any three differences between Mitosis and Meiosis. (6Marks)
- (b) What is qualitative inheritance? (3Marks)
- (c) Give three differences between Quantitative and Qualitative inheritance. (6Marks)
- (d) (i) What is gene linkage? (2Marks)
- (ii) Explain the importance of linkage in the study of genetics. (3Marks)