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University Examinations 2023/2024

SECOND YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION AND BACHELOR OF AGRICULTURE

SBT 3250: GENETIC AND CYTOGENETIC

DATE: APRIL 2024 **TIME: 2 HOURS**

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

QUESTION ONE (30 MARKS)

a) Distinguish between the following

i. Monohybrid and Dihybrid crosses (2 marks)

ii. Gene and Allele (2 marks)

iii. Genotype and phenotype (2 marks)

b) Outline any three inheritance involving multiple alleles (3 marks)

c) Draw a well labelled diagram of a pair of chromosome (4 marks)

d) i. Explain four types of chromosomes using illustrations (4 marks)

ii. State four significance of mitosis in cell division (4 marks)

e) describe the three qualities that make an organism suitable for genetic experiment (3 marks)

f) Freckles (F) are dominant to no freckles (f) brown (B) eyes are dominant to blue (b) eyes. Both traits exhibit complete dominance two individuals ae heterozygous for both genes.

Show possible allele combinations that each individual can produce in their gametes. If there two procreate, state the likely phenotypic ratio of their offspring's (6 marks)

QUESTION TWO (20 MARKS)

Discuss five gene interactions and exceptions to Mendelian inheritance

QUESTION THREE (20 MARKS)

Discuss the major evolutionary forces that influence the distribution and frequencies of alleles in a population

QUESTION FOUR (20 MARKS)

Discuss sources and maintenance of variation in crops and livestock to improve productivity