



EMBU UNIVERSITY COLLEGE

(A Constituent College of the University of Nairobi)

2015/2016 ACADEMIC YEAR

SECOND SEMESTER EXAMINATION

SECOND YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE (AGRICULTURE) AND BACHELOR OF SCIENCE (HORTICULTURE)

ACS 105: PRINCIPLES OF GENETICS

DATE: APRIL 13, 2016

TIME: 02:00-04:00

INSTRUCTIONS:

Answer Question ONE and ANY Other TWO Questions

QUESTION ONE

- a) Genetics is a science that has developed over a long time, describe two main timelines that you deem most important in its development. (2 Marks)
- b) i) A DNA double strand is 23.8 nm long. Demonstrate its physical appearance. (2 Marks)
- ii) Kendi is blood type O. Her two brothers have blood types A and B. Determine their parent's genotypes. (2 Marks)
- iii) A population has 60% of the people with genotype KK. Find the frequency (%) of those with KK, Kk and kk, if it is under Hardy-Weinberg equilibrium. (2 Marks)
- c) i) Explain factors that must be met for the law of segregation to apply. (3 Marks)
- ii) Give three reasons why meiosis results in daughter nuclei different from one another and from the parent nuclei. (3 Marks)

- iii) What is the probability of a calf being born either roan or white from a mating between a roan bull and a roan cow? Use RR for red, Rr for roan and rr for white. (2 Marks)
- iv) Using human blood typing, describe multiple allelism. (3 Marks)
- d) i) Describe two main types of cloning vectors. (4 Marks)
- ii) Explain the occurrence of compound sex chromosomes. (3 Marks)
- iii) Using human skin colour and polydactyly conditions as specific examples, differentiate penetrance from expressivity. (4 Marks)

QUESTION TWO

- a) Write an essay on chromosome structure, types and functions. (12 Marks)
- b) Describe chromosomal deletions and their phenotypic expression. (8 Marks)

QUESTION THREE

- a) Discuss the importance of sex determination and the role played by environment in determining sex. (10 Marks)
- b) Describe the structure, location and functions of the nucleus. (10 Marks)

QUESTION FOUR

- (a) Write an essay on extensions of Mendelian genetics. (10 Marks)
- (b) Discuss linkage and gene mapping. (10 Marks)

QUESTION FIVE

- a) Discuss cytokinesis in plant cells. (8 Marks)
- b) Discuss experiments that led to discovery and description of the genetic material (12 Marks)

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