UNIVERSITY OF EMBU

2016/2017 ACADEMIC YEAR

SECOND SEMESTER EXAMINATION

FIRST YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE (AGRICULTURE, HORTICULTURE, AGRICULTURAL EDUCATION AND EXTENSION, RANGE MANAGEMENT, AGRIBUSINES MANAGEMENT, MANAGEMENT OF AGRO-ECOSYSTEMS AND ENVIRONMENT)

ACS 105: PRINCIPLES OF GENETICS

DATE:APRIL 12, 2017 **TIME:2:00-4:00PM**

INSTRUCTIONS:

Answer Question ONE and ANY Other TWO Questions.

QUESTION ONE

a) A woman with type AB blood gave birth to a baby with type B blood. Two different men claim to be the father. One has type A blood, and the other type O blood. Explain how you can use this evidence to confirm the real father. (3 Marks)

b) Explain the conditions that must apply for the law of segregation to apply (3 Marks)

c) Explain crossing over and its biological significance (3 Marks)

d) Mention three reasons why meiosis results in daughter nuclei that are different from one another and from the parent nuclei. (3 Marks)

e) Outline the Chromosomal theory of linkage as proposed by Thomas Morgan (3 Marks)

f) Describe various ways in which sex is determined in honey bees (3 Marks)

g) State three characteristics of a good cloning vector (3 Marks)

h) Give three functions of the nucleus (3 Marks)

i) Consider three gene pairs AaBbCc each of which affect different characters. These genes assort independently. Calculate the probability of obtaining:

   i. AaBBCc zygote from AaBbCc x AaBbCc cross (2 Marks)

   ii. Abc phenotype from AaBbCc x aaBbcc cross (2 Marks)

   iii. A DNA molecule is 23.8 nm long. Describe its physical appearance (2 Marks)

QUESTION TWO

a) Discuss the structure, location and functions of nucleic acids (12 Marks)

b) Write an essay on chromosomal deletions (8 Marks)

QUESTION THREE

a) Discuss the importance of sex determination and the role played by environment in determining sex. (10 Marks)

b) A centromere is key in chromosome description. Discuss this statement. (10 Marks)

QUESTION FOUR

a) Discuss the cell cycle and its biological significance (10 Marks)

b) Discuss linkage and gene mapping (10 Marks)

QUESTION FIVE

a) Outline conditions necessary for Hardy-Weinberg law to apply (10 Marks)

b) Write an essay on Extensions of Mendelian genetics (10 Marks)

END