UNIVERSITY OF EMBU

2016/2017 ACADEMIC YEAR

SECOND SEMESTER EXAMINATION

FIRST YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION

AEX 104: GENETICS AND EVOLUTION

DATE: APRIL 6, 2017 **TIME: 11:00AM-1:00PM**

INSTRUCTIONS:

Answer Question ONE and ANY other TWO Questions

QUESTION ONE:

a) Define the following terms
   - i) Genetics (1 mark)
   - ii) Gene (1 mark)
   - iii) Recessive (1 mark)
   - iv) True breeding parent (1 mark)
   - v) Phenotype (1 mark)

b) Differentiate between
   - i) Cross over and gene expression (2 marks)
   - ii) Chromosome and sex limited traits (2 marks)
   - iii) Genetic engineering and genetic disorder (2 marks)

c) Write short notes on the following
   - i) The differences between continuous and discontinuous variation in a population (5 marks)
   - ii) Reasons why Mendel chose to work on a pea plant for his experiments (4 marks)
   - iii) Dominance inheritance (5 marks)

d) Assume that you are employed by University of Embu as a graduate assistant. You have received students from Nebule polytechnique who wants to learn the consequences of gene mutations in a population. Discuss your talking points (5 marks)

QUESTION TWO

a) Discuss why we should study evolution (8 marks)

b) Discuss the key observations of Darwin's theories (5 marks)

c) Assume that you have been hired by University of Embu as a technician. You have year one students who wants to learn combinations of genetic alleles in a cross. Using a punnet square

i) Demonstrate a cross between a heterozygous green bean plant crossed with a homozygous yellow bean plant and show the combinations of the genetic alleles (3 marks)

ii) Indicate the ratio of the genotypes formed (2 marks)

iii) Indicate the phenotype of the progenies (2 marks)

QUESTION THREE

a) Write short notes on the differences between X and Y chromosomes (4 marks)

b) Citing examples, discuss the role of environment in sex determination in living organisms (4 marks)

c) Discuss theories that explain the origin of life. (12 marks)

QUESTION FOUR

Discuss the process of meiosis in eukaryotes (20 marks)

QUESTION FIVE

a) Using an ABO blood group illustration, show the following;

i) Possible genes in each of the blood type (3 marks)

ii) Donor of the blood for each of the blood type (3 marks)

b) Discuss the evidence to evolution 10 marks)

Citing relevant examples, discuss pleiotropy phenomenon as applied in genetics. (4 marks)

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