



# TECHNICAL UNIVERSITY OF MOMBASA

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FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

**UNIVERSITY EXAMINATION FOR:**

**BACHELOR OF SCIENCE FOOD TECHNOLOGY AND QUALITY**

**ASSURANCE**

**AAB 4108: INTRODUCTION TO GENETICS PAPER I**

**END OF SEMESTER EXAMINATION**

**SERIES: DECEMBER 2016**

**TIME: 2 HOURS**

**DATE: Dec 2016**

## **Instructions to Candidates**

You should have the following for this examination

*-Answer Booklet, examination pass and student ID*

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

**Do not write on the question paper.**

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## **Question ONE**

- (a) (i) Describe Mendel's law of independent assortment (2 marks)
- (ii) Give an example and show phenotypic and genotypic ratios of the law mentioned above (4 marks)
- (b) Describe the detection of the following patterns of inheritance in human pedigrees
- i) Autosomal dominant inheritance (3 marks)
- ii) X-linked dominant inheritance (3 marks)
- (c) Outline the different types of genetic load (3 marks)

- (d) What are the necessary conditions for the maintenance of Hardy – Weinberg equilibrium in any population? (5 marks)
- (e) Outline the general characteristics of animal species (5 marks)
- (f) Explain the various sub-stages of Prophase I of meiotic cell division (5 marks)

### **Question TWO**

- (a) Explain the types of isolating mechanisms that prevent gene exchange between population of related species (14 marks)
- (b) In rabbits certain short-haired individuals when crossed with long haired ones produce only short-haired progeny.

Other short-haired individuals when crossed with long-haired ones produce approximately equal numbers of short-haired and long-haired offspring. When long-haired individuals are inter-crossed, they always produce progeny like themselves.

- (i) Outline an hypothesis to explain these results and show genotypes of all individuals (3 marks)
- (ii) How would you proceed to test this hypothesis? Show the results you would expect in the crosses you describe (3 marks)

### **Question THREE**

- (a) With the help of a suitable diagram describe the mechanism of semi-discontinuous DNA synthesis in Prokaryotes (15 marks)
- (b) Explain the preference of the use of pea plant as an experimental material by Mendel in his hybridization experiments (5 marks)

### **Question FOUR**

- (a) Discuss speciation as follows:
  - (i) Quantum speciation (4 marks)

(ii) Allopatric speciation (4 marks)

(iii) Sympatric speciation (4 marks)

(b) Outline the post-transcriptional gene regulation in eukaryotes (8 marks)

**Question FIVE**

(a) Describe the Clover Leaf structure of tRNA (10 marks)

(b) Explain the mechanism for crossing over (10 marks)