



MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2016/2017

**SECOND YEAR FIRST SEMESTER EXAMINATIONS FOR THE
DEGREE OF BACHELOR OF SCIENCE IN HORTICULTURE,
SOIL SCIENCE, AGRONOMY, ANIMAL SCIENCE,
AGRICULTURAL EDUCATION AND EXTENSION AND
EDUCATION WITH INFORMATION TECHNOLOGY**

MAIN CAMPUS

AAG 201: BASIC GENETICS

Date: 30th November, 2016

Time: 8.30 - 11.30 am

INSTRUCTIONS:

- Answer ALL questions.

MASENO UNIVERSITY

ISO 9001:2008 CERTIFIED



AAG 201: BASIC GENETICS

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1. Is each of the following statements true or false? (10 marks)

- The idea of particulate inheritance proposed by Gregory Mendel is adequately explained by the theory of acquired characters.
- A ratio of 9:3:3:1 is a result of dihybrid segregation in segregation in F₂ for contrasting characters.
- During Meiosis I pairing takes place between non-homologous chromosomes.
- Reduction division of the cell takes place during mitosis I.
- A test cross between F₁ and its parent with recessive gene giving 1:1:1:1 ratio suggests lack of linkage between the loci.
- Autosome chromosomes have no influence over sex linkage.
- Two paired DNA strands are transcribed during RNA synthesis.
- Cytoplasmic genes are not located in the nucleolus.
- Each unduplicated eukaryotic chromosome has four DNA molecules.
- Transcription in plant cells leads to formation of only mRNA.

2.

- State Mendelian Law of Segregation. (4 marks).
- Differentiate between linkage and sex linkage. (6 marks).
- Define each of the following.
 - Chiasmata. (4 marks).
 - Template DNA strand. (4 marks).
 - Transduction. (4 marks).

3.

- Briefly describe what takes place in meiosis II of cell division. (10 marks).

b. In an experiment to study the inheritance of seed color and hairiness of the pod in green grams the following progeny data were obtained.

Yellow seeds and hairy pods	320 plants
Yellow seeds and hairless pods	325 plants
Black seeds and hairy pods	80 plants
Black seeds and hairless pods	90 plants

- i. Indicate progenies that are due to crossing over and those that are due to non crossing over. (8 marks).
- ii. Calculate the map distance between the loci controlling the two traits. (10 marks).

c. A tandem chromosome duplication was discovered in a grain amaranth plant. The plant which was heterozygous for the duplication had the following pair of affected chromosomes.

A. B. C. D. B. C. D. E. F. G. H

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A. B. C. D. E. F. G. H.

By use of a diagram illustrate how the two chromosomes will pair up during meiosis I. (10 marks).