



**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: 30<sup>th</sup> November, 2016

Time: 8.30 - 11.30 am

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**INSTRUCTIONS:**

- Answer ALL questions.



MAIN CAMPUS

AAG 201: BASIC GENETICS

Date:

Time:

INSTRUCTIONS:

Answer ALL Questions

1. Is each of the following statements true or false? (10 marks)
  - a. The idea of particulate inheritance proposed by Gregory Mendel is adequately explained by the theory of acquired characters.
  - b. A ratio of 9:3:3:1 is a result of dihybrid segregation in segregation in F<sub>2</sub> for contrasting characters.
  - c. During Meiosis I pairing takes place between non-homologous chromosomes.
  - d. Reduction division of the cell takes place during mitosis I.
  - e. A test cross between F<sub>1</sub> and its parent with recessive gene giving 1:1:1:1 ratio suggests lack of linkage between the loci.
  - f. Autosome chromosomes have no influence over sex linkage.
  - g. Two paired DNA strands are transcribed during RNA synthesis.
  - h. Cytoplasmic genes are not located in the nucleolus.
  - i. Each unduplicated eukaryotic chromosome has four DNA molecules.
  - j. Transcription in plant cells leads to formation of only mRNA.
  
2.
  - a. State Mendelian Law of Segregation. (4 marks).
  - b. Differentiate between linkage and sex linkage. (6 marks).
  - c. Define each of the following.
    - i. Chiasmata. (4 marks).
    - ii. Template DNA strand. (4 marks).
    - iii. Transduction. (4 marks).
  
3.
  - a. 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).