



**MASENO UNIVERSITY**  
**UNIVERSITY EXAMINATIONS 2013/2014**

**FIRST YEAR SECOND SEMESTER EXAMINATIONS FOR  
THE DEGREE OF MASTER OF SCIENCE IN GENETICS  
AND PLANT BREEDING  
(MAIN CAMPUS)**

**AAG 825: POPULATION AND QUANTITATIVE GENETICS**

Date: 15<sup>th</sup> August, 2014

Time: 9.00 – 12.00 noon

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**INSTRUCTIONS:**

- Answer ALL questions in Section A and ANY TWO questions in Section B.



MSc. GENETICS AND PLANT BREEDING  
AAG 825: POPULATION AND QUANTITATIVE GENETICS  
TIME 3 HOURS

**INSTRUCTIONS:** Answer ALL questions in section A and ANY TWO (2) in section B.

**SECTION A: Answer ALL questions: 2 hrs.**

1. Compare  $h^2_a$  and  $h^2_b$  in terms of components of variation **10 marks)**
2. What are the main goals of population and quantitative genetics and what are the underlying assumptions in quantitative genetic analysis **(10 marks)**
3. In a sample of a random mating *D. melanogaster* population, a total of 1600 individuals were evaluated for the traits **normal eyes** and **bar-eye** mutants. There were found 400 bar eyed individuals. Calculate the gene frequencies for the two traits assuming Hardy Weinberg Law **(10 marks)**.
4. How would you set up a field trial to estimate genetic parameters for an important trait in a set of a breeder's material? **(10 marks)**

**SECTION B: Comprehensive answer section: Answer any Two (2) questions.**

**1 hr**

5. Why is it that in-breeders are said to have a lower unfitness load than out-breeders? **(10 MARKS)**.
6. Give an outline of general features of General Combining Ability **(10 Marks)**
7. Provide a detailed outline of each procedure and compare the partition of variance approach with that of regression in determining genetic components **(10 marks)**.