



**MASENO UNIVERSITY**

**UNIVERSITY EXAMINATIONS 2013/2014**

THIRD YEAR FIRST SEMESTR EXAMINATIONS FOR THE  
DEGREE OF BACHELOR OF SCIENCE IN PHARMACEUTICAL  
SCIENCE, BACHELOR OF SCIENCE IN MEDICAL  
BIOTECHNOLOGY AND BACHELOR OF SCIENCE IN  
LABORATORY SCIENCE WITH INFORMATION TECHNOLOGY

(MAIN CAMPUS)

**PMT 310: PRINCIPLES OF GENETICS**

*Date: 22<sup>nd</sup> November, 2013*

*Time: 11.00 a.m. - 1.00 p.m.*

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**PMT 310: PRINCIPLES OF GENETICS**  
**BSC PHARMACEUTICAL SCIENCE, BSC MEDICAL BIOTECHNOLOGY AND BSC**  
**MEDICAL LABORATORY SCIENCE**

**SECTION A {40 MARKS}**

*Attempt ALL questions. Each question carries 5 marks. Illustrate your answers with labeled diagrams where necessary.*

- Q1. Describe in detail the process of assaying DNA variation using PCR technique.
- Q2. Describe the Synthetic theory of evolution, state the Hardy-Weinberg equilibrium (HWE) principle and indicate the seven conditions in nature that permit the HWE principle.
- Q3. Describe one phenomenon in which the effects of multiple alleles of one gene are demonstrated.
- Q4. Outline Mendel's revolutionary findings in genetics.
- Q5. Discuss in detail three (3) main ways of generating genetic ratios in a population.
- Q6. Using relevant examples, describe the continuous variation in polygenic inheritance as applied in genetics.
- Q7. Using a relevant example, describe epistasis.

**SECTION B {30 MARKS}**

*Attempt any TWO questions in this section. Each question carries 15 marks. Illustrate your answer with labeled diagrams where necessary.*

- Q8. Discuss ways in which small population size affects evolution.
- Q9. Discuss with empirical examples how selection against the following affects gene frequency in the population:
- a) Selection against one of the homozygotes
  - b) Selection against the heterozygotes
- Q10. Describe in detail the potential ways in which genetic inheritance can affect the following behavioral traits:
- a) Alcoholism
  - b) Gayness
  - c) Violence