



# MASENO UNIVERSITY

## UNIVERSITY EXAMINATIONS 2017/2018

### FIRST YEAR FIRST SEMESTER EXAMINATIONS FOR THE DEGREE OF MASTER OF SCIENCE IN BIOMEDICAL SCIENCES

#### CITY CAMPUS

#### PMT 819: MOLECULAR GENETICS

Date: 16<sup>th</sup> March, 2018

Time: 8.00 - 11.00am

---

#### INSTRUCTIONS:

- Answer Question ONE and any other FOUR. Use diagrams where necessary.



1. Discuss the molecular basis of life under the following:
  - a) Evidence that DNA is the genetic material (5 marks)
  - b) The flow of genetic information (5 marks)
  - c) Properties of genetic material (5 marks)
  - d) Importance of gene regulation in humans (5 marks)
2. Discuss gene alteration under the following
  - a) Molecular basis of cancer (10 marks)
  - b) Molecular mechanism of point mutations (10 marks)
3. Discuss recombinant DNA technology under the following
  - a) Properties of a cloning vector (10 marks)
  - b) Applications of recombinant DNA technology in medicine (10 marks)
4. Discuss the gene regulatory mechanisms in a bacterial cell under the following
  - a) The Lac operon (10 marks)
  - b) Practical applications of the operon (10 marks)
5. Discuss DNA repair under the following
  - a) Mechanisms of DNA repair (10 marks)
  - b) Gene regulation of DNA repair (10 marks)
6. Discuss population genetics under the following:
  - a) Limitations of Hardy-Weinberg equilibrium (10 marks)

b) Role of genes in speciation (10 marks)