MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2017/2018

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN PHARMACEUTICAL SCIENCES WITH INFORMATION TECHNOLOGY

MAIN CAMPUS

PMT 415: MOLECULAR DIAGNOSTICS AND IMMUNOTECHNOLOGY

Date: 1st March, 2018   Time: 12.00 - 3.00pm

INSTRUCTIONS:

- Answer ALL Questions in Section A and B

Section A (40 marks)

Instructions

Answer ALL questions. Each question has equal value.

1. State any **FIVE (5)** advantages of microarray technique as a diagnostic tool (5 marks)

2. Explain any **TWO (2)** factors that affect hybridization of nucleic acid strands (5 marks)

3. Describe the major steps of any molecular diagnostic assay (5 marks)

4. Explain the operational principle of PCR-based Restriction Fragment Length Polymorphism (RFLP) (5 marks)

5. Describe the application of Microarray technique in detection of multiple infections (5 marks)

6. Differentiate between a nucleic acid 'probe' and 'target' strand (5 marks)

7. Explain any **TWO (2)** situations when molecular diagnosis will be most useful in bacteriology (5 marks)

8. Explain practical application of immunophenotyping in the diagnosis of viral infections (5marks)

Section B (30 marks)

9. You are a new staff who has been recruited in a molecular diagnostic laboratory and you are asked to design a molecular technique which you could use to characterize and diagnose a multiple infection in a patient. One of the oldest laboratory personnel suggests to you that PCR can be used.

   a) State and explain the PCR platform you would design to detect virus species in a sample (10 marks)

b) Explain the major components of PCR and state a function of each component (5 marks)

c) Describe the major steps in PCR technique (5 marks)

10. Giving one example, explain the steps you would use to characterize a virus using Fluorescent in situ hybridization (FISH) technique (10 marks)

11. Describe how you would apply western blot technique in diagnosis of *Mycobacterium tuberculosis* (10 marks)