



MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2013/2014

**THIRD YEAR FIRST SEMESTER EXAMINATIONS FOR BACHELOR
OF SCIENCE IN PHARMACEUTICAL SCIENCES, MEDICAL
BIOTECHNOLOGY AND MEDICAL LABORATORY SCIENCE WITH
INFORMATION TECHNOLOGY**

(MAIN CAMPUS)

PMT 313: BIOCHEMICAL TECHNIQUES II

Date: 21st November, 2013

Time: 11.00am - 1.00pm

Section A (Short answer questions)

Answer all questions in this section. Clarity will be awarded.

1. Describe the principle of dialysis and its application in a biochemistry laboratory. (4 marks)
2. Explain any FOUR properties of chromatographic matrix. (4 marks)
3. Write short notes on the following:
 - a) Sedimentation coefficient (2 mark)
 - b) Isoelectric focusing (2 marks)
4. Describe how you would maintain protein stability during protein purification process. (4 marks)
5. Briefly describe operational principle of western blot technique. State one function of the technique. (4 marks)
6. Describe any TWO biochemical methods used in nucleic acid research. (4 marks)
7. State any FOUR objectives of any protein purification process. (4 marks)
8. Explain any TWO factors which will influence the rate of protein sedimentation. (4 marks)
9. Give and state a function of any TWO major reagents used in SDS-PAGE. (4 marks)
10. Explain the applications of polymerase chain reaction. (4 marks)

Section B (Essay questions)

Answer question 11 and ANY other question in this section.

11. A student walks into Maseno University clinic complaining of abdominal cramps, diarrhea, fever and vomiting. The clinician suspects food poisoning by *Staphylococcus aureus* and requests for a test which turns positive. The student is put on medication. The student after completing his/her dose comes back to the clinic complaining about the same symptoms. The clinician suspects a resistant strain of the bacteria and suggests for analysis of an enzyme that may be involved in this resistance. Discuss how you would design a technique for analyzing the enzyme under the following:

- a) Fractionation (5 marks)
- b) Purification (5 marks)
- c) Quantification (5 marks)
- d) Biological activity (5 marks)

12. Discuss electrophoresis under the following

- a) Stacking gels and their significance (5 marks)
- b) Principle and medical application of western blot technique (5 marks)

13. Discuss the determination of structure of a protein under the following:

- a) Edman degradation (5 marks)
- b) NMR spectroscopy (5 marks)