



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

MASTERS OF SCIENCE IN BIOTECHNOLOGY

ACH 5123: BIOCHEMISTRY AND BIOCHEMICAL TECHNIQUES

SPECIAL/ SUPPLEMENTARY EXAMINATIONS

SERIES: SEPTEMBER 2018

TIME: 3HOURS

DATE: Pick Date Sep 2018

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **SIX** questions. Attempt Choose instruction.

Do not write on the question paper.

Question ONE

- i. Explain the principle of centrifugation. (10 marks)
- ii. List five applications of ultracentrifuges. (5 marks)
- iii. Discuss the significance and limitations of radioisotope labeling. (10 marks)

Question TWO

- i. Explain the process of protein ionization using laser desorption mode and Matrix-assisted laser desorption ionization (MALDI) of sample ionization (15 marks)
- ii. Describe the process of protein purification using affinity chromatography (10 marks)

Question THREE

- i. Describe the principle behind X-ray crystallography (5 marks)
- ii. Using a diagram describe any two methods of sample crystallization (10 marks)
- iii. Describe sample analysis by X-ray crystallography (10 marks)

Question FOUR

- i. Give a detailed account of protein analysis using NMR spectroscopy. (15 marks)
- ii. Using a diagram illustrate the basic components of NMR spectroscopy (10 marks)

Question FIVE

- i. List the chromatographic figure of merit (3 marks)
- ii. Discuss general elution problem chromatography and explain how it can be solved. (15 marks)
- iii. Explain how proteins can be separated using SDS-PAGE (7 marks)

Question Six

- i. Explain the principle involved in the separation of biomolecules using gel filtration chromatography (10 marks)
- ii. Outline the applications of gel filtration chromatography. (3 marks)
- iii. Describe Enzyme Assay and methods used in measurements of enzyme activity. (12 marks)