



MACHAKOS UNIVERSITY

University Examinations for 2024/2025 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

**FOURTH YEAR FIRST SEMESTER EXAMINATION FOR DEGREE IN
BACHELOR OF SCIENCE IN ANALYTICAL CHEMISTRY**

SAN403:BIOANALYTICAL TECHNIQUES AND INSTRUMENTATIONS

DATE: 17TH JANUARY, 2025

TIME: 8.30 AM – 10.30 AM

INSTRUCTIONS:

- Answer question **ONE (Compulsory)** and **any other TWO** questions
- Use clean well labelled diagrams wherever appropriate

QUESTION ONE (30 MARKS)

- Using an example describe distribution coefficient. (3marks)
- Describe separation factor as used in phase equilibria. (3 marks)
- With an illustration describe the principle of centrifugations. (3 marks)
- Describe the mobile phase of TLC. (3 marks)
- With examples explain cation exchangers in column chromatography. (3 marks)
- Distinguish between direct and indirect ELISA. (3 marks)
- Explain the functions of three components of PCR master mix. (3 marks)
- Outline three ways you can cleave peptides during protein sequencing. (3 marks)
- Describe the Fluorescent In-Situ Hybridization method. (3 marks)
- Describe the role of Sodium Dodecyl Sulphate in proteomics. (3marks)

QUESTION TWO (20 MARKS)

With illustrations discuss:

- Molecular exclusion chromatography. (10 marks)
- Adsorption chromatography. (10 marks)

QUESTION THREE (20 MARKS)

Discuss 4 types of centrifugation.

QUESTION FOUR (20 MARKS)

Discuss two mechanisms of ionization in Mass spectrophotometry.

QUESTION FIVE (20 MARKS)

Discuss optimisations of chromatographic processes.