



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

P.O. Box 972-60200 – Meru-Kenya

Tel: +254(0) 799 529 958, +254(0) 799 529 959, + 254 (0) 712 524 293,

Website: [info@must.ac.ke](mailto:info@must.ac.ke) Email: [info@must.ac.ke](mailto:info@must.ac.ke)

---

## University Examinations 2024/2025

SECOND YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR  
OF SCIENCE IN BIOCHEMISTRY

### SHC 3203: LABORATORY TECHNIQUES

DATE: JANUARY 2025

TIME: 2 HOURS

INSTRUCTIONS: Answer question *one* and any other *two* questions

#### QUESTION ONE (30 MARKS)

- a) Outline three essential safety rules that must be followed in a laboratory (3 marks)
- b) Describe the hazard symbols used to warn of the following hazards:
  - (i) Corrosive (1 mark)
  - (ii) Flammable (1 mark)
  - (iii) Toxic (1 mark)
- c) Explain briefly three types of fire extinguishers commonly found in laboratories (3 marks)
- d) Describe briefly the following equipments and their uses
  - (i) Centrifuge (2 marks)
  - (ii) Autoclave (2 marks)
- e) Describe a simple method for calibrating a volumetric pipette (2 marks)
- f) Outline the factors to consider when storing laboratory reagents (3 marks)
- g) Calculate the molarity of a solution containing 10 grams of NaCl (MW=58.44g/mol) in 500ml of water (2 marks)

- h) Explain the difference between precision and accuracy in analytical measurements (2 marks)
- i) Describe acids and bases according to the Bronsted-Lowry theory (2 marks)
- j) Explain the Beer-Lambert law and its mathematical expression (3 marks)
- k) Describe briefly three factors that influence the choice of a cell disruption method (3 marks)

**QUESTION TWO (20 MARKS)**

- a) Discuss the steps involved in DNA extraction from various biological samples (10 marks)
- b) Describe the principles and applications of the following protein concentration methods:
  - (i) Biuret assay (5 marks)
  - (ii) Lowry assay (5 marks)

**QUESTION THREE (20 MARKS)**

Describe the principle of spectrophotometry and its application in biochemical analysis

**QUESTION FOUR (20 MARKS)**

- a) Describe the principles of agarose gel electrophoresis (10 marks)
- b) Discuss the importance of pH, ionic strength, and reducing agents in extraction buffers (10 marks)