

UNIVERSITY EXAMINATIONS

FIRST SEMESTER 2025/2026 ACADEMIC YEAR

**FIRST YEAR EXAMINATION FOR THE DEGREE OF
BACHELOR OF BIOMEDICAL SCIENCE AND
TECHNOLOGY**

BMED 112: INTRODUCTION TO BIOMEDICAL SCIENCE

STREAM: R

TIME: 2 HRS

DAY: WEDNESDAY [2.30 – 4.30 P.M]

DATE: 28/01/2026

THIS QUESTION PAPER CONSISTS OF FOUR (4) PAGES

PLEASE DO NOT OPEN UNTIL THE INVIGILATOR SAYS SO.

Instruction

Attempt all questions in Section A and ANY two in Section B

SECTION A**QUESTION ONE**

- a) State any **four** components of a light microscope and their functions **(4 Marks)**
- b) Differentiate between a scanning and transmission electron microscope **(2 Marks)**

QUESTION TWO

- a) State the particulate theory of matter **(4 Marks)**
- b) Distinguish mixtures from compounds in describing matter **(2 Marks)**

QUESTION THREE

- a) Highlight **six** SI base units and their equivalent base quantities **(3 Marks)**
- b) Explain calibration as a laboratory procedure and give reasons why it is important **(3 Marks)**

QUESTION FOUR

- a) Outline the uses of a centrifuge **(3 Marks)**
- b) Enumerate safety measures when using an autoclave **(3 Marks)**

QUESTION FIVE

- a) Elaborate on ethical issue in biomedical research **(2 Marks)**
- b) Describe the principle of ethics in biomedical and veterinary practice **(3 Marks)**
- c) Explain why it is necessary for biomedical professionals to have code of conduct **(1 Mark)**

QUESTION SIX

Differentiate between **(6 Marks)**

- a) Simple and differential stain
- b) General and selective media
- c) Prokaryotic and eukaryotic cell

QUESTION SEVEN

Explain how a flow cytometer works

(4 Marks)

SECTION B: ANSWER ANY TWO QUESTIONS**QUESTION EIGHT (15 MARKS)**

The results of cholera prevalence from a sample of 1000 patients that sought treatment at Nakuru Level 5 hospital in the month of July, showed that the true positives were 40, false positives were 24, false negatives were 15 and the rest were true negatives.

- a) How will you define sensitivity and specificity of a test? **(2 Marks)**
- b) From the above results, calculate the following parameters and clearly show your workings
 - i. Sensitivity of the test **(2 Marks)**
 - ii. Specificity of the test **(2 Marks)**
 - iii. Negative predictive value **(2 Marks)**
 - iv. Positive predictive value **(2 Marks)**
- c) Describe the uses of polymerase chain reaction procedure **(5 Marks)**

QUESTION NINE (15 MARKS)

- a) Outline the basic properties of cells **(5 Marks)**
- b) Discuss any five organelles found in a eukaryotic cell **(10 Marks)**

QUESTION TEN (15 MARKS)

In a rural community of a population of 200,000 people there was sudden spike of acute watery diarrhea and feverish cases mostly during 2025 festive seasons that has persisted for over 3 weeks.

The following observations were observed

- (i) Most affected were children under the age of ten
- (ii) Over 20 cases required hospitalization
- (iii) Community members rely on a single river for drinking, bathing and irrigation

(iv) The festivities outsourced outside catering

Heavy rains and flooding occurred 1 month earlier

- (a) Outline short term interventions to control the outbreak. **(4 Marks)**
- (b) What long-term strategies could prevent future outbreak. **(4 Marks)**
- (c) Identify the community members/leaders that you will involve in solving the problem and their roles. **(3 Marks)**
- (d) Discuss the role of cell culture of staining in diagnosing the health problems in this community.