



# MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE IN BIOLOGY

BACHELOR OF EDUCATION (SCIENCE)

SBT 202: GENERAL MICROBIOLOGY

DATE: 2/6/2022

TIME: 8.30-10.30 AM

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## INSTRUCTIONS

1. Answer Question 1 (compulsory) and **any two** questions in Section B.
2. Use clean well labelled diagrams wherever appropriate.

## SECTION A

### QUESTION ONE (30 MARKS)

- a) In the experiment below, cell growth was measured following sterilization of broth in a swan-necked flask and in a flask with a broken neck as shown.



- i. Predict the outcome of each experimental set up (A and B) (3 marks)
  - ii. How would the outcome of this experiment have been affected if spore-forming bacteria were present in the broth? (3 marks)
- b) Describe the concept of replication in Edward Jenner's experiment. (3 marks)
- c) An emergent microbe is believed to cause disease X, describe the protocol of confirming that disease X is caused by the new microbe. (3 marks)

- d) Describe the non-motility appendages of bacteria. (3 marks)
- e) What is the significance of peptidoglycan in Gram staining? (3 marks)
- f) Describe the contribution of Edward Koch to medical microbiology. (3 marks)
- g) Describe the process of preparing nutrient agar for growth of bacterial colonies. (3 marks)
- h) Describe with an illustration how the pour plate method results in bacterial dilution. (3 marks)
- i) After ten dilutions of a blood sample, a lab technologist cultured 0.01ml of the diluted sample on a general purpose media and observed 150 colonies. Calculate the CFUs. (3 marks)

## **SECTION B**

### **QUESTION TWO (20 MARKS)**

- a) Discuss Gram staining protocol in bacteriology. (10 marks)
- b) Discuss microbiological techniques. (10 marks)

### **QUESTION THREE (20 MARKS)**

Discuss bacterial virulence factors.

### **QUESTION FOUR (20 MARKS)**

Discuss the working of specified antimicrobial agents on the bacterial cell.

### **QUESTION FIVE (20 MARKS)**

- a) With illustrations, discuss three categories of media. (12 marks)
- b) Describe shapes of bacteria and their possible variants. (8 marks)