



# MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FOURTH YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN BIOLOGY

SBT 412: APPLIED MICROBIOLOGY

DATE: 22/7/2019

TIME: 2.00-4.00 PM

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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

- a) Identify and explain three areas of study in microbiology (3 marks)
- b) Outline factors that determine effectiveness of antimicrobial agents (3 marks)
- c) Describe sterilization by use of steam under pressure (3 marks)
- d) Distinguish between the following terms
  - i. Isolation and Inoculation (2 marks)
  - ii. Sterilization and disinfection (2 marks)
- e) Illustrate how you would obtain a pure culture of bacteria "B" from a contaminated water sample. (4 marks)
- f) In relation to structure illustrate the difference between gram positive and gram negative bacteria (3 marks)
- g) Explain how the temperature of steam can be raised above 100°C? (3 marks)
- h) Outline three characteristics of biogeochemical cycles (3 marks)

- i) Explain the mode of action of the following agents of microbial control
- i. Low temperatures (2 marks)
  - ii. Pasteurization (2 marks)

**QUESTION TWO (20 MARKS)**

- a) Describe the general characteristics of coliforms (5 marks)
- b) Outline three steps applicable in assessing water quality (15 marks)

**QUESTION THREE(20 MARKS)**

- a) Discuss the modes of action of antimicrobial agents (12 marks)
- b) Describe FOUR economically important microorganisms isolated from extreme environments. (8 marks)

**QUESTION FOUR (20 MARKS)**

- a) Evaluate the importance of soil microorganisms in the **nitrogen cycle**. (15 marks)
- b) Discuss eutrophication and its effects. (5 marks)

**QUESTION FIVE (20 MARKS)**

Discuss five industrial applications of microorganisms