



# MACHAKOS UNIVERSITY

University Examinations for 2017/2018 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

THIRD YEAR SECOND SEMESTER EXAMINATION FOR DIPLOMA IN  
AGRICULTURE

SBT 0204: MICROBIOLOGY

DATE: 15/12/2017

TIME: 11:00 – 1:00 PM

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**Instructions:**

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

**SECTION A (COMPULSORY)**

**QUESTION ONE (30 MARKS)**

- a) Explain the **three** challenges of waste water treatment (3 marks)
- b) Describe the production of live attenuated vaccines. (3 marks)
- c) Highlight **three** characteristics of ideal microorganisms used in the production of microbial biomass. (3 marks)
- d) Describe how the fecal indicator test performed. (3 marks)
- e) Explain **one** application of biosurfactants. (3 marks)
- f) Explain the term commensalism. (3 marks)
- g) Highlight **three** advantages of bioleaching. (3 marks)
- h) Highlight **three** applications of microorganisms in industry. (3 marks)
- i) Explain **three** reasons why organic compounds are more effectively degraded in an environment containing microbial community than in a pure culture of a single organism. (3 marks)
- j) List down **three** advantages of using *Zymomonas mobilis* over *Saccharomyces cerevisiae* in industrial ethanol production. (3 marks)

**SECTION B: ANSWER ANY OTHER TWO QUESTIONS**

**QUESTION TWO**

Discuss:

i. Mechanism of nitrogen fixation. (10 marks)

ii. Nitrification (10 marks)

**QUESTION THREE**

Explain four methods of bioremediation. (20 marks)

**QUESTION FOUR**

Discuss the waste water treatment process. (20 marks)

**QUESTION FIVE**

Discuss **two** applications of bacteria as indicators for environmental pollution. (20 marks)