



# MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF ENVIRONMENTAL SCIENCE

ENS 243: ENVIRONMENTAL MICROBIOLOGY

DATE: 24/11/2020

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: COMPULSORY (30 MARKS)

### QUESTION ONE (30 MARKS)

- a) Highlight three economically important microbes of extreme environments (3 marks)
- b) Describe the “Microbial loop” with respect to the aquatic ecosystem (3 marks)
- c) Distinguish between bioaccumulation and bio-magnification. (3 marks)
- d) Illustrate how to obtain a pure culture of bacteria “b” from contaminated water (3 marks)
- e) Describe two bioremediation strategies (3 marks)
- f) Describe eutrophication and its effects (3 marks)
- g) State two examples of coliforms and their general characteristics. (3 marks)
- h) Classify bacteria into three groups on the basis of adaptation to environmental temperature (3 marks)
- i) Describe some roles played by bacteria in a soil ecosystem (3 marks)
- j) Explain three characteristics of biogeochemical cycles (3 marks)

**SECTION B: ANSWER ANY TWO QUESTIONS (40 MARKS)**

**QUESTION TWO (20 MARKS)**

Discuss and illustrate the Nitrogen cycle.

**QUESTION THREE (20 MARKS)**

Discuss detection of coliforms in water

**QUESTION FOUR (20 MARKS)**

Discuss classification of bacterial growth media

**QUESTION FIVE (20 MARKS)**

Discuss microbial population interactions