



MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF ENVIRONMENTAL SCIENCE

SBT 413: ENVIRONMENTAL MICROBIOLOGY

DATE: 29/4/2019

TIME: 2.00-4.00 PM

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) Outline the roles of primary participants in the carbon cycle. (3 marks)
- b) Distinguish between bioaccumulation and bio-magnification. (3 marks)
- c) Differentiate between differential media and selective media (4 marks)
- d) Illustrate how to obtain a pure culture of bacteria "B" from contaminated pond water. (3 marks)
- e) Describe an illustration of a microbial mutualistic association (2 marks)
- f) Describe eutrophication and its effects. (3 marks)
- g) Explain the general characteristics of indicator organisms and give two examples (3 marks)
- h) Describe three categories of heterotrophic nutrition (3 marks)
- i) Describe three roles of bacteria in soil ecosystem (3 marks)
- j) Explain three characteristics of biogeochemical cycles (3 marks)

SECTION B

QUESTION TWO (20 MARKS)

Discuss

- a) Nitrogen cycle. (15 marks)
- b) Sulfur cycle (5 marks)

QUESTION THREE (20 MARKS)

- a) Give two examples of the use of bacteria to remove pollutants. (2 marks)
- b) Discuss detection of coliforms in water (18 marks)

QUESTION FOUR (20 MARKS)

- a) Describe five economically important microorganisms of extreme environments (10 marks)
- b) Describe the “Microbial loop” with respect to aquatic ecosystem (10 marks)

QUESTION FIVE (20 MARKS)

- a) Describe the use of the Biological Oxygen Demand in water quality testing (5 marks)
- b) Discuss the groupings of microorganisms based on temperature of their habitats (15 marks)