



MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE IN BIOLOGY

SBT 413: ENVIRONMENTAL MICROBIOLOGY

DATE: 11/8/2021

TIME: 8:30 -10:30 AM

INSTRUCTIONS

1. Answer Question 1 (compulsory) 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 use of BOD in testing water quality (3 marks)
- b) Explain the concept of quorum sensing (3 marks)
- c) Illustrate the groups of microbes based on temperature (3 marks)
- d) Explain the challenge of culturing psychrophiles in the lab (3 marks)
- e) Outline characteristics of biogeochemical cycles (3 marks)
- f) Explain why bioremediation is a superior process of decontamination. (3 marks)
- g) Explain harmful effects of microbial biofilm formation (3 marks)
- h) Describe the zonation of an aquatic ecosystem with regards to microbial distribution (3 marks)
- i) Microbes are the unsung heroes in any ecosystem. Explain (3 marks)
- j) Explain the use of coliforms as indicators of water pollution (3 marks)

SECTION B: ANSWER ANY OTHER TWO QUESTIONS

QUESTION TWO (20 MARKS)

- a) Discuss economically important microorganisms of extreme environments (12 marks)
- b) Describe the “Microbial loop” with respect to the aquatic ecosystem (8 marks)

QUESTION THREE (20MARKS)

- a) Discuss microbial mechanisms of bioremediation (10 marks)
- b) Describe the membrane filter technique for water quality analysis (10 marks)

QUESTIONS FOUR (20 MARKS)

Discuss the use of coliform assays for water quality analysis

QUESTION FIVE (20 MARKS)

Discuss with illustrations, the microbial population interactions