MACHAKOS UNIVERSITY

University Examinations for 2021/2022

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF ENVIRONMENTAL SCIENCES

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE IN BIOLOGY

SBT 413: ENVIRONMENTAL MICROBIOLOGY

DATE: 15/3/2022 **TIME : 2:00 – 4:00 PM**

Instructions

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

SECTION A

QUESTION ONE

a. Outline the roles of primary participants in the carbon cycle. (3 marks)

b. Distinguish between bioaccumulation and bio-magnification. (3 marks)

c. Distinguish between differential media and selective media (3 marks)

d. Illustrate how to obtain a pure culture of bacteria "b" from contaminated water (3 marks)

e. Describe an illustration of a microbial mutualistic association (3 marks)

f. Describe eutrophication and its effects (3 marks)

g. Give two examples of indicator organisms and their general characteristics. (3 marks)

h. Describe the three categories of heterotrophic nutrition (3 marks)

i. Describe some roles played by bacteria in a soil ecosystem (3 marks)

j. Explain three characteristics of biogeochemical cycles (3 marks)

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. Highlight five economically important microorganisms of extreme environments (10 marks)

b. Describe the "Microbial loop" with respect to the aquatic ecosystem (10 marks)

QUESTION FIVE (20 MARKS)

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