



MACHAKOS UNIVERSITY

University Examinations for 2021 Academic Year

**SCHOOL OF PURE AND APPLIED SCIENCES
DEPARTMENT OF BIOLOGICAL SCIENCES**

**FOURTH YEAR SUPPLEMENTARY/SPECIAL EXAMINATION FOR
BACHELOR OF SCIENCE IN BIOLOGY**

SBT 412: APPLICATION OF MICROBIOLOGY

DATE: 6/3/2023

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.

QUESTION ONE (30 MARKS)

- a) Describe the significant of the extremophile nature of micro-organisms (3 marks)
- b) Outline the three benefits of microbes in the process of nutrient cycling (3 marks)
- c) List the three factors that determine the composition and distribution of digestion menagerie (3 marks)
- d) Describe briefly the process of the fermentation (3 marks)
- e) Explain the Concept of Biostimulation
- f) Differentiate between probiotic and prebiotic (3 marks)
- g) Describe why the naturally occurring bacteria are not sufficient in treating organically polluted aquatic ecosystems (3 marks)
- h) List the three (3) advantages of the application of the Bioremediation technology (3 marks)
- i) Discuss why the bioremediation technique is highly preferred when treating organic pollutants (3 marks)

- j) Describe factors that determine microbial interactions between surface and underground waters (3 marks)

QUESTIONS TWO (20 MARKS)

- a) Describe the process of the nitrogen cycle (10 Marks)
- b) Using examples, explain the concept of bioremediation (10 Marks)

QUESTIONS (20 MARKS)

- a) Describe how you can solve the water crisis in Machakos County through groundwater management (10 Marks)
- b) Describe the utilization of microorganisms as bioindicators (10 Marks)

QUESTIONS (20 MARKS)

As an environmental officer in charge of waste water treatment department, describe the process of sewage treatment (20 Marks)