



MACHAKOS UNIVERSITY
University Examinations for 2021/2022 Academic Year
SCHOOL OF PURE AND APPLIED SCIENCES
DEPARTMENT OF BIOLOGICAL SCIENCES
FOURTH YEAR SECOND SEMESTER EXAMINATION FOR
BACHELOR OF SCIENCE IN BIOLOGY
SBT 412: APPLIED MICROBIOLOGY

DATE:

TIME:

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) Distinguish between basic microbiology and applied microbiology (3 marks)
- b) Describe why bacteria are considered as extremophiles (3 marks)
- c) Outline three microorganisms involved in the process of fermentation (3 marks)
- d) Describe the factors that determine the composition and distribution of digestion menagerie (3 marks)
- e) Describe briefly the process of the nitrogen cycle (3 marks)
- f) Explain why the naturally occurring bacteria are not sufficient in treating organically polluted aquatic ecosystems. (3 marks)
- g) Describe three key limitations to the application of the Bioremediation technology. (3 marks)
- h) Explain the application of microorganisms in energy production. (3 marks)
- i) Explain a typical bioremediation cycle. (3 marks)
- j) Describe the biocontrol action of the 'friendly' bacteria. (3 marks)

SECTION B: ANSWER ANY OTHER TWO QUESTIONS

QUESTION TWO (20 MARKS)

- a) Using examples, explain the concept of bioremediation. (10 marks)
- b) As an environmental officer in charge of organic waste treatment department, Discuss the various Bioremediation techniques you can recommend. (10 marks)

QUESTION THREE (20 MARKS)

With the help of a diagram, describe how you can solve the water crisis in Machakos County through waste water treatment.

QUESTION FOUR (20 MARKS)

- a) Describe the impact of how microorganisms can be applied to ameliorate the impacts of aquaculture wastes to the environment. (10 marks)
- b) Discuss the role of microorganisms in groundwater ecosystem. (10 marks)