



MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF ENVIRONMENTAL SCIENCE

ENS 433: ENVIRONMENTAL BIOTECHNOLOGY

DATE: 19/10/2020

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 scopes of Environmental Biotechnology (3 marks)
- b) Describe guanosine diphosphate (3 marks)
- c) Describe THREE mechanisms of metal-microbial interactions during biotransformation (3 marks)
- d) Outline the biological components of biosensors (3 marks)
- e) Explain the role of post transcription processing (3 marks)
- f) Outline an enzyme catalysed Microbial cell biotransformation (3 marks)
- g) Describe immobilization and a biotransformation method (3 marks)
- h) Explain the Microbial cells auto-oxidation (3 marks)
- i) Describe the role of Flavobacterium in bioremediation (3 marks)
- j) Describe the bioremediation of chromium (3 marks)

SECTION B: ANSWER ANY TWO QUESTIONS (40 MARKS)

QUESTION TWO (20 MARKS)

- a) Discuss the use of lactose in monitoring bacterial contaminations (10 marks)
- b) Discuss microorganisms and their uses in bioremediation (15 marks)

QUESTION THREE (20 MARKS)

Discuss:

- a) Discuss capping in post-transcription processing (5 marks)
- b) Describe the gene structure using appropriate diagram. (15 marks)

QUESTION FOUR (20 MARKS)

You have been appointed to lead a clean up of an environment with a higher concentrations of mercury, gold and copper. Discuss in a step by step plan that will help achieve your objectives

QUESTION FIVE (20 MARKS)

- a) Discuss the features of a bacterial plasmid vectors (10 marks)
- b) Discuss the use of bacteria in the transformation of genetically engineered plants (10 marks)