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UNIVERSITY EXAMINATIONS 2022/2023 ACADEMIC YEAR

THIRD YEAR 2ND SEMESTER MAIN EXAMINATIONS

**FOR THE DEGREE OF BACHELOR OF SCIENCE AGRICULTURE AND
BIOTECHNOLOGY**

COURSE CODE: ASS 323

COURSE TITLE: SOIL BIOLOGY AND BIOREMEDIATION

DATE: 20TH APRIL 2023

TIME: 9 – 11 AM

INSTRUCTIONS TO CANDIDATES

Answer Question ONE and any other TWO Questions.

TIME: 2 Hours

This paper consists of 2 printed pages. Please Turn Over



QUESTION ONE = 30 MARKS (Compulsory)

- a) Differentiate between Total and Viable counts as quantifications methods of Soil Organisms (2 Marks)
- b) Describe the genetic recombination in bacteria (6 Marks)
- c) State and explain the importance of mycorrhizae in the soil (9 Marks)
- d) Describe the procedure of Chloroform Fumigation Incubation as a measure of microbial biomass in the soil (7 Marks)
- e) Briefly explain the limitation of signature molecules as a measure of microbial biomass (2 Marks)
- f) "Many researchers doubt whether plate count can be used for quantification of soil Microbiota". Validate this statement (4 Marks)

QUESTION TWO = 20 MARKS

- a) Differentiate between Bioremediation and Decontamination (4 Marks)
- b) Discuss the Carbon and Potassium nutrient biogeochemical cycle (16 Marks)

QUESTION THREE = 20 MARKS

Giving examples, describe FIVE microbial interactions in soils and their importance in optimal soil functioning. (20 Marks)

QUESTION FOUR = 20 MARKS

- a) Describe the bacterial cell structures (10 Marks)
- b) Giving examples, describe the free living nitrogen fixing bacteria (10 Marks)

QUESTION FIVE = 20 MARKS

Discuss the signature molecules as a measure of microbial biomass and microbial community structures (20 Marks)