

# UNIVERSITY OF FORT HARE

MIC 221

## EXAMINATIONS January 2019

---

**Time: 3 HOURS**

**Subject: ENVIRONMENTAL MICROBIOLOGY**

**Marks: 100**

**This paper consists of 2 pages including cover page**

### Internal Examiner

Prof UU NWODO

DR BC IWERIEBOR

### Instructions

Answer all questions.

### **Question 1**

1a. What is a biogeochemical cycle? How can prokaryotes influence biogeochemical cycles?

1b. With the aid of a diagram describe the nitrogen cycle. How do human activities influence the cycle?

### **Question 2**

2a. What is meant by culture-dependent approaches to microbial ecology? How about culture-independent approaches? Which approach is better?

2b. What is FISH? Is FISH a culture-dependent or independent method?

2c. How does a total bacterial count done with a microscope differ from enumeration by viable plate counts?

2d. What are the four approaches to microbial ecology presented in the lecture? Be able to articulate and give examples for each approach.

2e. You did PCR for the 16S rRNA gene from 10 soil samples and got a 1500 bp band on a gel, describe how you could determine the genetic diversity of the DNA in the PCR tube by clone library and by DGGE. Which method would be faster? Which method would give you more conclusive results about the types of organisms in the soil samples?

### **Question 3**

What is metagenomics? Why is this approach used in microbial ecology studies?

**QUESTION 4**

What is mycorrhiza? Why is it important to plants? List seven type of mycorrhiza and describe one of the types listed

**Question 5**

Define biofilm. What are the economic impacts of biofilm in our lives?