University of Fort Hare
Together in Excellence

Be safe in Jesus

CODE MIC222

Degree Examination
October/November 2024

Time: **3 hours**

Subject: **Microbiology**

Paper: **Introduction to Microbial Genetics and Genetic recombination**

Marks: **100**

This paper consists of 2 pages including the cover page

Internal Examiner:

Dr EG Ngwenya

Internal exam moderators

N. Ntozonke

Instructions

Answer all questions:
Use labeled diagrams and colored pens to illustrate and enhance the value of your answer.

Question 1 (20 Marks)

Give full details, using drawings and explaining experiments using bacteria and viruses to demonstrate that "DNA is the Genetic Material" (20 Marks)

Question 2 (30 Marks)
Draw diagrams give details of processes of bacterial gene transfer under the following
(a) Generalized versus Special Transduction (15 Marks)
(b) Conjugation (F^+, HFr, F') versus transformation (15 Marks)

Question 3 (10 Marks)
Give only illustrations of the following:
(a) Gene structure (5 Marks)
(b) DNA replication (5 Marks)

Question 4 (20Marks)
Draw and give details on the account of bacterial gene expression starting from initiation, elongation to termination (20 Marks)

Question 5 (20 Marks)
Draw a detailed diagram of the lactose Operon and explain its control mechanisms. (20 Marks)

Maranatha!!!!!

UNIVERSITY OF FORT HARE

MIC 221

EXAMINATIONS

NOVEMBER

2024

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Time:	**3 Hours**
Subject:	**Soil and Environmental Microbiology**
Marks:	**100**

This paper consists of 2 pages including the cover page

Internal Examiners
Dr. N Nontongana
Mr. N Ntozonke

External Examiners

INSTRUCTIONS

1. **Answer all questions**

Question 1 **(25 Marks)**

1.1 List three chemical contaminants that are routinely found in soil and groundwater. Mention the chemical class, frequency of occurrence as well as its bioremediation technology status (15 Marks)

1.2 What is the natural microflora of soil? Describe this by indicating the estimated presence of each microbe in 1g of soil. (10 Marks)

Question 2 **(25 Marks)**

2.1 What are the five interactive factors in soil formation? (10 Marks)

2.2 With the aid of a diagram, illustrate the steps of Fluorescence In Situ Hybridization (15 Marks

Question 3 **(25 Marks)**

3.1 What conditions influence the growth of microorganisms in the soil? (12 Marks)

3.2 Draw nitrogen cycle. In your diagram, discuss each step and state the role of microorganisms in some of the steps in the cycle. (13 Marks)

Question 4 **(25 Marks)**

Sulfur cycle, just like nitrogen cycle is governed by specialized group of microorganisms.

4.1 Discuss 4 biochemical changes made by microorganisms involved in Sulfur cycle. (10 Marks)

4.2 What is the name of a laboratory column technique which facilitates the isolation of various sulphur-metabolizing bacteria? (1 Mark)

4.3 Name the 4 contents/ materials needed to make the column technique in 4.2 above. (4 Marks)

4.4 Draw and label the column technique in 4.2 above showing the different trophic niches and microorganisms governing each niche. (10 Marks)