University of Fort Hare
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MIC222

Degree Examination

SUPPLEMENTARY EXAM

NOVEMBER/DECEMBER 2024: JANUARY/FEBRUARY 2025

Time: **3 hours**

Subject: **Microbiology**

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

Marks: **100**

This paper consists of 4 pages including the cover page

Internal Examiner:
Dr EG Ngwenya

Internal exam moderator
N Ntozonke

Instructions
Answer all questions

"Learn from an ant.. and learn." Prov 6:6

Question one [18 marks]

1.1 Define the following terms:

Merozygote_____

_____

_____[1]

Constitutive_____

_____

_____[1]

Transposons_____

_____

_____[1]

Restriction enzyme_____

_____

_____[1]

Introns_____

_____

_____[1]

Okazaki fragment_____

_____

_____[1]

1.2 Give at list four (4) differences between genetic materials of prokaryotic versus eukaryotic cells. [4]

Procaryotes	Eucaryotes
_____	_____
_____	_____
_____	_____

1.3 Draw and label the structures of:

(a) tRNA [4]

(b) rRNA [4]

Question two **[22 marks]**

[a] With the aid of labeled drawings, fully describe the principles behind the AMES test in the detection and isolation of mutant bacteria. [12]

[b] Write on how DNA repair mechanism needed to correct errors in DNA sequences. [10]

Question three **[20 marks]**

[a] Is DNA an informational molecule? Give a historical account in the following years
(a). 1928 [6],
(b). 1944 [2]
(c). and 1952 to prove that DNA was indeed a genetic informational material. [2]

[b] Describe the following about the structure of a typical gene and genetic code:
(i) Degeneracy [2]
(ii) Sense codon [2]
(iii) Exons [2]
(iv) Antisense strand [2]
(v) Leader sequence [2]

Question Four **[15 marks]**

Supported by labeled structures e.g. tRNA etc., describe the entire process of protein synthesis. [15]

Question Five **[25 marks]**

Describe how bacteria transfer their genetic information through the following:
(i) Conjugation (F^+), HFr and F' [12]
(ii) Transformation [2]
(iii) Transduction [11]

*oo"**Return back to the author of your genes, God**"...by EG Ngwenya*