MIC222

Degree Examination

SUPPLEMENTARY EXAM

JANUARY/FEBRUARY 2018

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

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Instructions
Answer all questions
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]

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