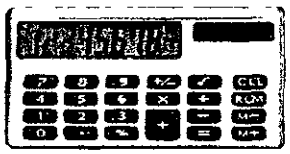
UNIVERSITY EXAMINATIONS



UNIVERSITEITSEKSAMENS

UNISA university of south africa

BIT2601

October/November 2018

Biotechnology

Duration 2 Hours

100 Marks

EXAMINERS

FIRST MS AAC HARRIS
SECOND PROF SL LEBELO

Programmable pocket calculator is permissible

Closed book examination

This examination question paper remains the property of the University of South Africa and may not be removed from the examination venue

This paper consists of three (3) pages

Answer the questions in the examination answer book provided

[TURN OVER]

QUESTION 1 **[20]**

State whether the following are true or false If true, provide a statement to show that you understand why it is true, and if false, correct the statement

1 1 DNA is said to have polarity due to the presence of the four nitrogenous bases

1 2 Because of the polarity in DNA, the two strands of DNA are parallel

1 3 RNA polymerase synthesises a complimentary strand of deoxyribonucleic acid

1 4 The group of mRNA nucleotides that code for an amino acid are referred to as codons

1 5 The rRNA and ribosomal subunits make up the overall structure of ribosomes

1 6 The recognition site is the site at which DNA is cleaved by ligase enzymes

1 7 Antibiotic resistance is used as a selective marker for cells transformed with recombinant plasmids

1 8 Electroporation is a technique used to separate DNA and protein samples.

1 9 Autoradiography is the technique used for the screening of DNA libraries

1 10 Polymerase chain reaction is usually used when there is a large sample of DNA

(2 x 10 = 20)

QUESTION 2 **[15]**

2 1 Explain the chemical processes that allow microbes to convert toxic compounds to harmless compounds. (8)

2 2 What are the advantages and draw backs of using phytoremediation in the clean-up of wastes? (4)

2 3 What does the term 'autocidal control' refer to? (3)

QUESTION 3 **[20]**

3 1 Describe practical examples of how biotechnology has contributed to the environment (10)

3 2 A researcher wishes to eliminate the activity of the enzyme α-amylase in a plant Describe how this could be achieved (2)

3 3 Discuss the methods that could be used by the researcher to carry out the process in 3 2 (8)

QUESTION 4 **[10]**

4 1 Describe a method to inactivate genes in nematodes (5)

4 2 Explain how crops are able to protect themselves from insects Provide examples (5)

QUESTION 5 **[15]**

5 1 The function of a gene in an organism is unknown Discuss a technique that may be used to determine the function (5)

5 2 Explain how aquatic biotechnology is used to track the expression of genes in cells (4)

5 3 Cyanobacteria such as *Spirogyra* and *Oedogonium* algae are used in the development of various medicines Explain how these substances contribute to the medical field and provide examples (6)

QUESTION 6 **[20]**

6 1 Why are the number of proteins made so much higher than the number of genes in organisms? (4)

6 2 Explain how researchers may identify a known sequence from a sample (4)

6 3 Describe the principle governing chromatography Substantiate your answer with examples (12)

TOTAL: 100 MARKS