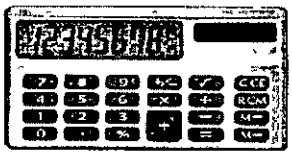
UNIVERSITY EXAMINATIONS



UNIVERSITEITSEKSAMENS

UNISA university of south africa

BIT2601
SECOND PAPER

May/June 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

Answer the questions in the examination answer book provided

[TURN OVER]

QUESTION 1 **[20]**

Indicate whether the following statements 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 Ribosomes are present in prokaryotes and eukaryotes

1 2 The two strands of the DNA molecule are held together by phosphodiester bonds

1 3 Each three-nucleotide units of mRNA is called an anti-codon, and codes for a single amino acid

1 4 Plasmid DNA vectors, which are a linear form of self-replicating DNA, which accept, carry and replicate other pieces of DNA

1 5 Competent cells refer to cells able to take up calcium chloride through their plasma membrane

1 6 Selection of transformed bacterial cells enables selection of mutant cells

1 7 Reverse transcriptase is used to generate genomic libraries

1 8 Polymerase chain reaction can be used to amplify DNA of unknown sequences

1 9 Oxidation reactions occurs in aerobic reaction but not anaerobic reactions

1 10 Rhizofiltration involves the use of plants to reduce the bioavailability of pollutants in the environment by stabilizing them in soils

(2 x 10 = 20)

QUESTION 2 **[20]**

2 1 A researcher creates a genomic library and wishes to identify a particular gene of known sequence Describe a technique that may be used (10)

2 2 Outline the basic principles in generating a cDNA library (10)

QUESTION 3 **[20]**

3 1 Distinguish between aerobic and anaerobic reactions in bioremediation (6)

3 2 Discuss thermophiles and the importance in biotechnology (4)

3 3 Suggest a possible technique that can be used to measure harmful compounds such as 2,4-Toluene diamine (2,4-T) and polychlorinated biphenyls (PCBs) (4)

3 4 Discuss techniques employed to manage agricultural insect pest (6)

QUESTION 4 **[15]**

4 1 Briefly discuss the contribution biotechnology has made on the environment (10)

4 2 Consider a plant that expresses gene, X, that causes the plant to perish after 12 days Develop a technique that can be used prevent the expression of this gene (5)

QUESTION 5 **[25]**

5 1 Explain how biotechnology can protect corn plants from Monarch butterflies (5)

5 2 Discuss how genetic material may be inserted into animal cells Provide examples (10)

5 3 A scientist produces a sample with DNA of varying size, discuss the technique that may be employed to separate this sample (10)

TOTAL MARKS: 100