

**BIT2601**

October/November 2017

**BIOTECHNOLOGY**

Duration 2 Hours

100 Marks

**EXAMINERS**

FIRST  
SECOND

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**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]**

Indicate whether the following statements are TRUE or FALSE

- 1 1 Eukaryotic DNA is associated with specialised protein histones
- 1 2 Nucleotides are joined by hydrogen bonds
- 1 3 DNA strands align parallel to each other
- 1 4 mRNA must first undergo modifications before being transcribed
- 1 5 Plasmid vectors have multiple origins of replication
- 1 6 Recognition sequences are specific sites cleaved by restriction enzymes
- 1 7 Genetic sequences of interest can be identified using complementary probes
- 1 8 Aerobic metabolism in bacteria does not require oxygen
- 1 9 Transformed bacteria can be selected by blue-white screening
- 1 10 Primers in the polymerase chain reaction (PCR) are short double-stranded DNA oligonucleotides

(2 x 10 = 20)

**QUESTION 2****[25]**

2 1 Briefly define the following terms

2 1 1 bioremediation

2 1 2 bioaugmentation

2.1 3 thermophiles

2 1 4 biosensor technology

2 1 5 phytovolatilisation

(2 x 5 = 10)

2 2 Briefly describe the following terms microbial, agricultural, animal and aquatic biotechnology (5)

2 3 Describe some benefits of genetically engineered crops (10)

**QUESTION 3****[20]**

3 1 Describe how a gene of interest would be identified when screening genomic libraries (10)

3 2 Discuss the polymerase chain reaction (PCR) in detail (10)

**[TURN OVER]**

**QUESTION 4** [20]

- 4.1 Define “plant transgenesis” and briefly discuss antisense technology, including an example (10)
- 4.2 Discuss reporter genes and provide an example of their practical application (10)

**QUESTION 5** [15]

- 5.1 List and describe four (4) types of chromatography (8)
- 5.2 Briefly explain how and why the Sanger method has been replaced by computer-automated DNA sequencing (4)
- 5.3 Briefly explain the basic principle of fluorescence in situ hybridisation (FISH) (3)

**TOTAL: 100 MARKS**