UNIVERSITY EXAMINATIONS

UNIVERSITEITSEKSAMENS

UNISA university of south africa

BIT2601

May/June 2017

BIOTECHNOLOGY

Duration 2 Hours

100 Marks

EXAMINERS

FIRST MS AAC HARRIS

SECOND DR SL LEBELO

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

You have two (2) hours to answer all the questions

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 Amino acids are the building blocks of DNA

1 2 Prokaryotic DNA is associated with specialised protein histones

1 3 Nucleotides are joined by hydrogen bonds

1 4 Chromatids are composed of two chromosomes

1 5 mRNA is first modified by translation before being transcribed

1 6 Plasmid vectors are able to carry and replicate foreign DNA

1 7 Restriction enzymes cleave DNA at random sequences

1 8 *Taq* polymerase synthesises the primer in the polymerase chain reaction

1.9 Aerobic metabolism in bacteria does not require oxygen

1 10 Thermophiles are organisms that cannot thrive in extreme environments

(2 x 10 = 20)

QUESTION 2 **[15]**

2 1 Briefly define the following terms

2 1 1 Bioremediation

2 1 2 Biosensor

2 1 3 Phytoremediation

2 1 4 Chromatography

2 1.5 Embryonic stem cells

(2 x 5 = 10)

2 2 Discuss the use of restriction enzymes and ligase in gene cloning (5)

QUESTION 3 **[30]**

3 1 Briefly describe transformation in bacteria and how recombinant bacteria are selected (5)

3 2 Distinguish between genomic libraries and complementary DNA (cDNA) libraries and list the disadvantages of each (10)

3 3 Discuss the polymerase chain reaction in detail (PCR) (15)

QUESTION 4 **[20]**

4 1 List and briefly discuss three (3) facts in support of the use of genetically modified foods (3)

4 2 Discuss the methods used in plant transgenesis (6)

4 3 Briefly describe cloning technology in animals. (7)

4 4 Briefly describe how gene knockouts are created (4)

QUESTION 5 **[15]**

5 1 Briefly explain how and why the Sanger method has been replaced by computer-automated DNA sequencing (4)

5 2 Briefly explain the principle of agarose gel electrophoresis (6)

5 3 List five (5) methods used to purify proteins (5)

TOTAL: 100 MARKS