

BINDURA UNIVERSITY OF SCIENCE EDUCATION
DEPARTMENT OF BIOLOGICAL SCIENCES
BSc HONOURS IN BIOLOGICAL SCIENCES
GENETIC ENGINEERING (BTEC214)

JUN 2023

EXAMINATION

2 HOURS (100 MARKS)

INSTRUCTIONS

Answer **FOUR** questions. You **MUST** answer **QUESTION 1** (Section A) and any **THREE** questions from Section B. Each question carries **25 MARKS**. Where a question contains subdivisions, the mark value of each subdivision is given in brackets. Illustrate your answers where appropriate with large, clearly labelled diagrams. You should not spend more than thirty minutes on each question.

SECTION A (COMPULSORY)

1. The table below shows some of the stages in the commercial production of human insulin in bacteria.

Table 1 Stages in the commercial production of human insulin in bacteria

Stage 1	
Stage 2	Human insulin gene inserted into plasmid
Stage 3	
Stage 4	Bacteria grown and human insulin produced
Stage 5	

- (a) Copy and Complete the table above by describing what is happening in stages 1, 3 and 5. (6)
- (b) Name the method of producing insulin described above. (2)
- (c) How is the insulin gene is inserted into a plasmid. (5)
- (d) Name the bacterium used in the production of human insulin and explain why it is a suitable host. (3)
- (e) Describe **THREE** benefits of producing human insulin in bacteria. (9)

SECTION B

2. Write short notes on any **FIVE** of the the following:
 - (a) dideoxynucleotides. (5)
 - (b) genomic library. (5)
 - (c) gel electrophoresis. (5)
 - (d) restriction enzymes. (5)
 - (e) Ti plasmid. (5)
 - (f) Colony hybridization. (5)
3. Describe the essential features of a **NAMED** bacterial cloning vector.
4. Describe gene amplification using the polymerase chain reaction (PCR).
5. Discuss the application of genetic engineering in agriculture.
6. Outline the benefits of transgenic animals to human beings.

END OF EXAMINATION QUESTION PAPER