

BINDURA UNIVERSITY OF SCIENCE EDUCATION  
BIOLOGICAL SCIENCES DEPARTMENT  
HBScBioTec  
Animal biotechnology (BTEC 237)

MAR 2024

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.

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**SECTION A (COMPULSORY)**

1. Describe a procedure used to transform *Escherichia coli* strain TG1 cells with a viral coat protein.

**SECTION B**

2. Describe the development of transgenic mosquitoes for the control of malaria, highlighting the issues related to their release into the environment.

3. Describe the following methods used to produce transgenic farm animals:

- a) Pronuclear microinjection method (7 marks)
- b) Embryonic stem cell method (10 marks)
- c) Retro virus-mediated gene transfer. (8 marks)

4. a) Outline the use of artificial embryo twinning in cloning cows. (10 marks)

- b) Describe the development of a genetically engineered Salmon fish. (15 marks)

5. Discuss the use of animal models in research.

6. Describe how three named viruses have been used as vectors of gene transfer in the treatment of inherited human diseases.

**END OF EXAMINATION QUESTION PAPER**