

BINDURA UNIVERSITY OF SCIENCE EDUCATION

DEPARTMENT OF BIOLOGICAL SCIENCES

BSc HONOURS IN BIOLOGICAL SCIENCES

PLANT BIOTECHNOLOGY (BZG 406 / BTEC236)

**EXAMINATION
2 HOURS**

JUN 2023

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. (a) Outline the stages involved in micropropagation. (15 marks)
(b) Outline the contents and functions of any media used for plant tissue cultures. (10 marks)

SECTION B

2. (a) Describe the concept of plant transformation. (12 marks)
(b) Outline the molecular methods used to validate the success of the transformation. (13 marks)
3. (a) Describe strategies involved in the production of secondary metabolites. (15 marks)
(b) Outline the importance of microscope cultures. (10 marks)
4. (a) Explain the differences between direct and indirect somatic embryogenesis. (13 marks)
(b) Outline the application of meristem culture in cryopreservation. (10 marks)
5. (a) Discuss strategies for engineering tolerance to water stress. (15 marks)
(b) Describe the applications of RNAi Technology. (10 marks)
6. Write short notes on any **FIVE** of the following:
 - (a) Protoplast fusion. (5 marks)
 - (b) Embryo culture. (5 marks)
 - (c) Heat shock proteins. (5 marks)
 - (d) T-DNA. (5 marks)
 - (e) Reporter genes. (5 marks)
 - (f) Protein electrophoresis. (5 marks)

END OF EXAMINATION QUESTION PAPER