BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF AGRICULTURE AND ENVIRONMENTAL SCIENCE

AGC402/AGC411

Department of Crop Science
Bachelor of Agricultural Science (Honours) Part IV Examination
Plant Breeding

3 HOURS (100 Marks) JUN 2024

INSTRUCTIONS

Answer any ***FOUR*** questions. Each question carries **25 marks**.

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1. (a) Discuss the significance of vertical and horizontal resistance in breeding program. **[10 marks]**

   (b) Outline the procedures on how line selection for low nitrogen and drought stress tolerance may be undertaken. **[15 marks]**

2. (a) Define the term germplasm. **[2 marks]**

   (b) Describe how variation can be created by plant breeders. **[12 marks]**

   (c) Explain the factors that are considered when selecting a mating design. **[11 marks]**

3. (a) Explain how mass selection can be used to develop multiline varieties. **[15 marks]**

   (b) Outline the steps of the evaluation process of candidate varieties. **[10 marks]**

4. Write notes on the following topics;

   (a) Microsatellites, **[5 marks]**

   (b) North Carolina Design III, **[6 marks]**

   (c) The PCR cycle, **[5 marks]**

   (d) The single seed descent method, **[9 marks]**

5. (a) You have been provided with 50 maize inbred lines that are in two heterotic groups. Outline how you would use the reciprocal recurrent selection method to develop a single cross variety. **[17 marks]**

(b) Analyze factors that affect the separation of DNA fragments during electrophoresis. **[8 marks]**

6. (a) Teosinte a plant found in the wilds of Mexico is a wild relative of maize. Genes can be transferred between the two through hybridisations. More often the crossing fails. Discuss why the mating usually fails. **[15 marks]**

(b) Analyse the factors to consider when selecting a DNA polymerase for use in PCR work. **[10 marks]**

END OF PAPER