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)

INSTRUCTIONS

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

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1. (a) Outline the gene for gene concept used when breeding for disease tolerance. **[5 marks]**

   (b) Discuss five secondary traits which a breeder may measure during the evaluation of maize plants for drought and nitrogen stress tolerance. **[20 marks]**

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

   (b) Discuss the use of any 3 classes of germplasm. **[12 marks]**

   (c) Discuss the two broad methods of germplasm collection. **[11 marks]**

3. (a) Assess the value of any five types of cultivars. **[20 marks]**

   (b) Outline the importance of introductions to plant breeding. **[5 marks]**

4. Write notes on the following topics;

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

   (b) Heterotic grouping of breeding lines, **[5 marks]**

   (c) RAPDs, **[5 marks]**

   (d) The single seed descent method, **[10 marks]**

5. (a) You have been provided with 20 maize inbred lines each of which has a strength against specified biotic and abiotic stresses. Outline how you would use reciprocal recurrent selection to accumulate the desirable genes in a few individuals. **[15 marks]**

(b) With the aid of examples, discuss the selection of mating designs. **[10 marks]**

6. (a) Teosinte a plant found in the wilds of Mexico is a 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