BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF AGRICULTURE AND ENVIRONMENTAL SCIENCE

AGC208

Department of Crop Science
BSc Agricultural Science (Honours) Part II Examination
Population and Quantitative Genetics

3 HOURS (100 Marks)

INSTRUCTIONS

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

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1. (a) Discuss the induction of haploid plants. [15 marks]
   (b) Analyse the use of the doubled haploid technology in plant breeding. [10 marks]

2. (a) Give an outline of the breeders' equation. [6 marks]
   (b) Discuss how plant breeders can increase genetic gain. [9 marks]
   (c) Critique the explanations to heterosis. [10 marks]

3. (a) Describe the development of seedless fruits. [6 marks]
   (b) Explain the different components of fitness. [12 marks]
   (c) Calculate the frequency of T and t if TT=0.36 and Tt=0.48 [7 marks]

4. (a) In a particular conglomerate population the frequency of *T* was 0.55. The frequency of *t* in the migrant population was 0.25. If the migrant population made up 10% of the whole population, calculate the frequency of T in the native population. [15 marks]
   (b) Outline the development of an alloploid. [6 marks]
   (c) State any four types of selection. [4 marks]

5. Write notes under the following topics;
   a) Principles of the Hardy-Weinberg law, [3 marks]
   b) Nonsense mutations, [2 marks]
   c) Chromosomal mutations. [20 marks]

6. (a) Explain the effects of three chemical mutagens on DNA. [12 marks]
   (b) Use information in the table below to calculate the selection intensity of the maize crop. [8 marks]

	Initial live count	Count after three months
Well watered	6084	5245
Drought stressed	3563	2331

c) Explain the significance of selection intensity to the plant breeder. [5 marks]

End of paper