BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF AGRICULTURE AND ENVIRONMENTAL SCIENCE

AGC208

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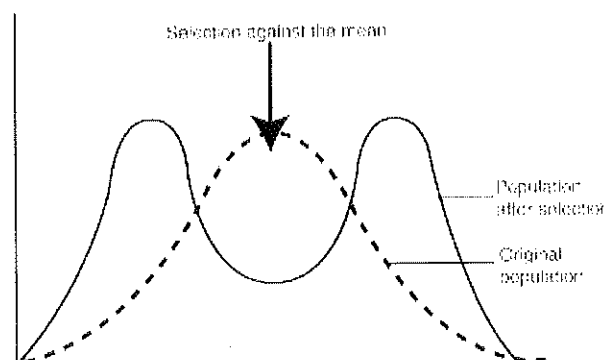### Population and Quantitative Genetics

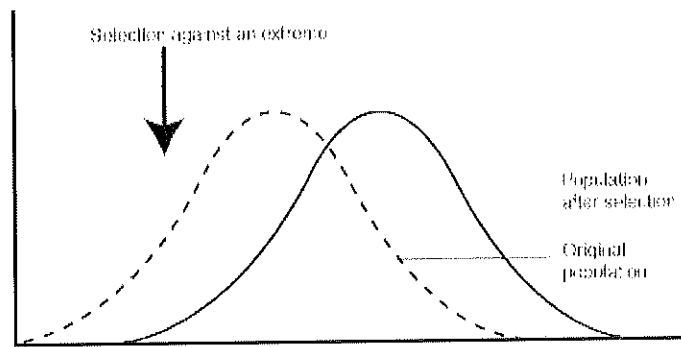**3 HOURS (100 Marks)**

INSTRUCTIONS

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

1. (a) Contrast quantitative traits from qualitative traits. [12 marks]
   (b) Outline the different types of quantitative traits. [8 marks]
   (c) Discuss the use of tandem selection in plant breeding. [5 marks]

2. (a) Explain why deletion and addition mutations have higher impact than replacements. [13 marks]

   (b) Discuss the possible explanations to heterosis. [12 marks]

3. (a) Use diagrams to determine the inbreeding coefficient of full and half-sibs. [12 marks]

   (b)Write notes on interaction variance. [5 marks]
   (c) Discuss the assumption of large populations in the Hardy-Weinberg equilibrium. [8 marks]

4. (a) Outline the procedure used when improving an existing variety using mutations. [10 marks]

   (b) Explain the application of selection types depicted by the following diagrams. [15 marks]
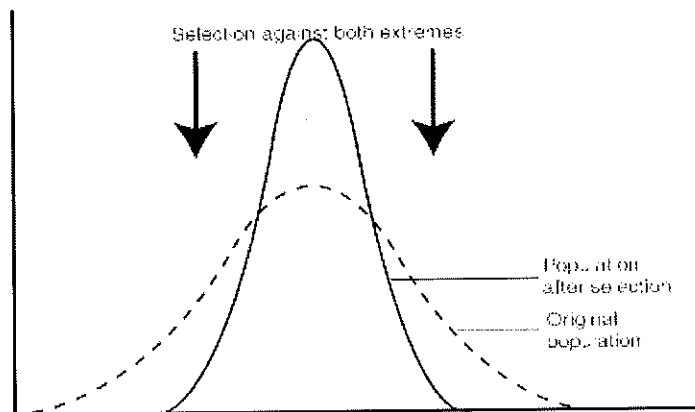
   i.

ii.

Selection against an extreme

Population after selection

Original population

iii.

Selection against both extremes

Population after selection

Original population

5. (a) Outline mutation induction using physical mutagens. [15 marks]
   (b) Describe Nilsson-Ehle's experiment exposing its significance to plant breeding.
   [10 marks]

6. (a) Describe the different types of male sterility. [19 marks]
   (b) Discuss the application of application of male sterility in plant breeding.
   [6 marks]

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