BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF AGRICULTURE AND ENVIRONMENTAL SCIENCE

AG 109

Department of Crop Science

BSc. Education in Agriculture (Hons) Part 1 Examination
Principles of Genetics

3 HOURS (100 Marks)
INSTRUCTIONS
Answer any **FOUR** questions. Each carries 25 marks

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1 (a) Define the following:

(i) Allele **[2 marks]**
(ii) Genetics **[2 marks]**
(iii) Gene locus **[2 marks]**
(iv) Cytogenetics **[2 marks]**
(v) Heterozygous **[2 marks]**

(b) Discuss the importance of genetics to agriculture. **[10 marks]**

(c) Outline the different types of chromatin **[5 marks]**

2. (a) Describe the structure of DNA. **[15 marks]**

(b) Outline how Mendel formulated the first law of inheritance **[10 marks]**

3. (a) Explain with diagrams, the cell cycle. **[10marks]**

(b). Write notes on mitosis. **[10 marks]**

(c). Explain the significance of meiosis in the biological population. **[5 marks]**

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

(b). Outline the following types of epistasis,
i. Duplicate genes with cumulative effect (9:6:1) **[8 marks]**
ii. Duplicate recessive epistasis (9:7) **[5 marks]**
iii. Dominant epistasis (15:1) **[5 marks]**

(c) Outline the importance of promoters. **[5 marks]**

5. Explain the following types of gene interaction,

(a) Pleiotropic genes **[5 marks]**

(b) Maternally inherited traits **[6 marks]**

(c) Modifier genes **[5 marks]**

(d) The three main classes of genetics **[9 marks]**

6. (a) Describe five sex determination mechanisms in living organisms. **[15 marks]**

(b) Outline the classification of chromosomes based on the position of the centromere. **[10 marks]**

END OF PAPER