BINDURA UNIVERSITY OF SCIENCE EDUCATION

SCIENCE & MATHEMATICS EDUCATION DEPARTMENT DipScEdSc

HEREDITY AND GENETICS (DB004/BZ005)

EXAMINATION
2 HOURS (100 MARKS)

NOV 2023

INSTRUCTIONS TO CANDIDATES
Answer FOUR questions. You MUST answer QUESTION 1 (Section A) and any THREE questions from Section B. Each question carries 25 MARKS. Where a question contains sub-divisions, the mark value of each sub-division is given in brackets. Illustrate your answer where appropriate with large clearly labelled diagrams. You should not spend more than thirty minutes on each question.

SECTION A (COMPULSORY)

1. A large population of randomly mating laboratory mice contains 35% white mice.
White coloring is caused by a double recessive genotype, "aa". Calculate:
(a) The allelic frequencies of this population. (6 marks)
(b) The genotypic frequencies for this population. (9 marks)
(c) The phenotypic ratios of this population. (6 marks)
(d) State the conditions that should be met for this population to be in the Hardy Weinberg equilibrium. (4 marks)

SECTION B

2. Write short notes on any **FIVE** of the following:
(a) Differences between DNA and RNA. (5 marks)
(b) mutation (5 marks)
(c) Lethal alleles. (5 marks)
(d) Quantitative traits. (5 marks)
(e) Chromosomal basis of inheritance. (5 marks)
(f) Down Syndrome. (5 marks)

3(a) Outline the transformation experiment (15)

(b)Describe codominance, multiple alleles and sex linkage (10)

4. Write an essay on mechanisms of sex determination among different species.
5. Describe the experiments that proved that DNA is the genetic material.
6. (a) Describe the main stages of mitosis. (15 marks)
(b) In tabular form, list the differences between mitosis and meiosis (10 marks)

END OF QUESTION PAPER