BINDURA UNIVERSITY OF SCIENCE EDUCATION
FACULTY OF SCIENCE AND ENGINEERING
BIOLOGICAL SCIENCES DEPARTMENT
HBScBioTec/BScBZH
MOLECULAR GENETICS(BZH208/BTEC212)/MOLECULAR BIOLOGY(BTEC231)
EXAMINATION
2 HOURS (100 MARKS)

APR 2025

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. Discuss the use of gel electrophoresis and UV spectrophotometry in quantification of DNA highlighting the strengths and weaknesses of each method.

SECTION B

2. (a) Describe the central dogma of molecular biology as proposed by Francis Crick. (10 marks)
   (b) Outline modifications made to the dogma to date. (15 marks)

3. Write short notes on any FIVE of the following:
   (a) Essential amino acids. (5 marks)
   (b) Differences between DNA and RNA. (5 marks)
   (c) Pseudogenes. (5 marks)
   (d) Hershey and Chase experiment. (5 marks)
   (e) Properties of genetic material. (5 marks)
   (f) Ames test. (5 marks)

4. (a) Give a detailed description of DNA packaging in chromosomes. (20 marks)
   (b) Distinguish between euchromatin and heterochromatin. (5 marks)

5. Explain the following mechanisms of DNA repair:
   (a) Base Excision Repair (BER). (8 marks)
   (b) Mismatch Repair (MMR). (8 marks)
   (c) Double Strand Break Repair. (9 marks)

6. Write an essay on regulation of gene expression in prokaryotes.

END OF EXAMINATION QUESTION PAPER