BINDURA UNIVERSITY OF SCIENCE EDUCATION

BIOLOGICAL SCIENCES DEPARTMENT

HBScBioTec

PROTEIN ENGINEERING (BTEC224)

EXAMINATION
2 HOURS (100 MARKS)

NOV 2024

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. Explain principles of protein separation methods based on the following:
   (a) Different Solubility Characteristics. (7 marks)
   (b) Different Adsorption Characteristics. (7 marks)
   (c) Size differences. (6 marks)
   (d) Charge. (5 marks)

SECTION B

2. Describe random and site directed mutagenesis methods in protein engineering.

3. Write short notes on any **FIVE** of the following:

   (a) Protein denaturation. (5 marks)
   (b) Osmolyte assisted protein folding. (5 marks)
   (c) Structure and function of fibrous proteins. (5 marks)
   (d) Protein biomarker discovery. (5 marks)
   (e) Protein secretion in eukaryotes. (5 marks)
   (f) Transmembrane helix method of protein structure prediction. (5 marks)

4. Discuss recovery of recombinant proteins from inclusion bodies of *Escherichia coli*.

5. Discuss application of protein array technology.

6. Write an essay on molecular engineering of antibodies for therapeutic and diagnostic purposes.

END OF EXAMINATION QUESTION PAPER