NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCES

BACHELOR OF SCIENCE HONOURS DEGREE EXAMINATIONS

DEPARTMENT OF APPLIED BIOLOGY AND BIOCHEMISTRY

THEORY: ENZYME BIOTECHNOLOGY SBB 4202

JUNE 2004

3 HOURS (100 marks)

INSTRUCTIONS

Answer Four (4) Questions. Each question carries 25 marks. Where a question contains subdivisions, the mark value for each subdivision is given in brackets. Illustrate your answer where appropriate with large, clearly labelled diagrams.

1. a) Give a generalised overview of the stages expected in down stream processing of biological molecules. (10 marks)

   b) Explain how these steps would relate to the purification of an enzyme required for medical diagnostics. (15 marks)

2. Explain the value and application of affinity based purification methods to protein purification.

3. Give an overview, but with specific examples, of the use of hydrolase enzymes in the food industry.

4. Explain why the log P value and the water activity (Aw) are most important considerations in reactions involving enzymes in non-polar organic solvents.

5. Explain how the use of immobilised enzymes can extend the range of useful reactor designs in industrial enzyme use.

6. a) Describe the methods that can be used to immobilise cells for use in biotransformations. (15 marks)

   b) Briefly discuss the use of non-viable cells for biotransformations. (10 marks)

7. EITHER a) Give the principles and examples of the use of oxidases in medical diagnostics.

   OR b) Discuss how the existence of isozymes can be utilised in medical diagnosis.

8. Describe the basis of the term "biosensors" and explain using specific examples.

END OF EXAMINATION

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