

**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**

MAY 2005

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. Write briefly on these techniques in enzyme purification protocols:
  - (a) Protein precipitation. (12.5 marks)
  - (b) Gel filtration chromatography (12.5 marks)
2. Describe and explain the value of the different "binding pairs" in affinity purification in general and the particular role of dye molecules for enzyme purification.
3. Write an essay on the possible biological sources and materials available for commercial enzyme production, including heterologous expression systems.
4. Write an essay on amylases used in the food industry.
5. Discuss the value of using immobilized enzymes in industrial processes and some of the possible reactor configurations for their use.
6. Describe briefly the nature of the active and binding sites in lipases. Explain why these and other hydrolases are useful for organic syntheses in certain organic solvents.
7. Write an essay on the use of both non-viable and viable cells in the biotransformation of organic molecules.
8. Describe the possible uses of enzymes in medical diagnoses, with specific examples.

**END OF EXAMINATION**