



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF ENVIRONMENTAL SCIENCES

DEPARTMENT OF ENVIRONMENTAL SCIENCE

**BACHELOR OF SCIENCE HONOURS DEGREE IN ENVIRONMENTAL SCIENCE AND
HEALTH**

BIOTECHNOLOGY AND THE ENVIRONMENT

ESH 4106

Final Examination Paper

December 2024

This examination paper consists of 2 printed pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements: None

Examiner's Name: Dr M. Ndabambi

INSTRUCTIONS

1. Answer any **FOUR** questions
2. Each question carries 25 marks

MARK ALLOCATION

QUESTION	MARKS
1.	25
2.	25
3.	25
4.	25
5.	25
6.	25
TOTAL	100

1. (a) Describe the desirable properties of cloning vectors. [5]
(b) List any four (4) cloning vectors you studied and describe their properties. [20]

2. (a) Outline the basic steps in replacement gene therapy. [5]
(b) Describe the use of viruses in gene therapy, highlighting their advantages and disadvantages. [16]
(c) Using examples, explain why some genetic diseases may be treated using gene therapy while others may not. [4]

3. (a) Describe how selectable markers may be removed from transgenic plants. [15]
(b) Describe some practical and potential uses of transgenic plants. [10]

4. (a) Describe the factors that may affect the use of microorganisms in bioremediation. [12]
(b) Discuss the pros and cons of using microorganisms in bioremediation. [13]

5. Discuss the environmental implications of growing and using genetically modified crops for food and animal feed.

6. Write an essay on the various applications of biotechnology.