



**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**FACULTY OF APPLIED SCIENCE**  
**DEPARTMENT OF APPLIED BIOLOGY AND BIOCHEMISTRY**  
**MASTER OF SCIENCE DEGREE IN APPLIED MICROBIOLOGY AND**  
**BIOTECHNOLOGY**  
**ADVANCED FOOD MICROBIOLOGY (SBB5204)**

**Main Examination Paper**

**MARCH 2025**

This examination paper consists of 2 pages

Time Allowed : 3 hours  
Total Marks : 100  
Special Requirements : NONE  
Examiner's Name : DR H. NYATI

**INSTRUCTIONS**

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

**MARK ALLOCATION**

<b>QUESTION</b>	<b>MARKS</b>
1.	25
2.	25
3.	25
4.	25
5.	25
6.	25
<b>TOTAL</b>	<b>100</b>

1. Review critically the ecology and pathogenesis of the following:
  - (a) Enterohaemorrhagic *Escherichia coli*. (10 marks)
  - (b) *Salmonella Typhi*. (8 marks)
  - (c) *Staphylococcus aureus*. (7 marks)
2. Giving specific examples, demonstrate how members of the family Lactobacillaceae play a significant role in the microbiology of foods.
3. Discuss the role of the following in the preservation of foods:
  - (a) Benzoic acid. (5 marks)
  - (b) Sulphur dioxide. (5 marks)
  - (c) High pressure processing. (5 marks)
  - (d) Vacuum packaging. (5 marks)
  - (e) Ultra-violet radiation. (5 marks)
4. (a) Give an account of the factors that determine the susceptibility of spoilage and pathogenic microorganisms to thermal processing, indicating their relevance to operations in the canning industry. (10 marks)  
(b) Comment on the significance of the following in thermally processed foods:
  - (i) *Clostridium nigrificans*. (5 marks)
  - (ii) *Bacillus stearothermophilus*. (5 marks)
  - (iii) *Clostridium thermosaccharolyticum*. (5 marks)
5. Describe the clinical manifestations and events leading to the following:
  - (a) *Clostridium perfringens* gastroenteritis. (10 marks)
  - (b) Emetic *Bacillus cereus* syndrome. (9 marks)
  - (c) Noroviral gastroenteritis. (6 marks)
6. (a) Give an account of the spoilage patterns observed in raw and pasteurized milk products. (15 marks)  
(b) Outline the factors predisposing fish products to early spoilage at chill temperatures. (10 marks)

**END OF EXAMINATION**