



**UNIVERSITY OF ESWATINI**

**FACULTY OF HEALTH SCIENCES**

**B.Sc. ENVIRONMENTAL HEALTH AND FOOD  
SCIENCE**

**B.Sc. ENVIRONMENTAL HEALTH SCIENCE**

**SEMESTER I**

**MAIN EXAM**

**DECEMBER 2018**

**TITLE OF PAPER:** FOOD MICROBIOLOGY

**COURSE CODE:** EHM407

**DURATION:** 2 HOURS

**INSTRUCTIONS:**

1. READ THE QUESTIONS CAREFULLY.
2. ANSWER ANY 4 QUESTIONS.
3. EACH QUESTION CARRIES 25 MARKS. WHERE A QUESTION IS SUBDIVIDED INTO PARTS, THE MARK FOR EACH PART IS SHOWN IN BRACKETS.
4. NO PAPER SHOULD BE BROUGHT INTO THE EXAMINATION ROOM.
5. WRITE NEATLY AND CLEARLY
6. BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

**SPECIAL REQUIREMENTS:** NONE

**DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR.**

**QUESTION 1**

- a. Briefly discuss the role of coliforms as indicator microorganisms in food. [5 marks]
- b. Discuss the type of food poisoning caused by ingesting the following types of microorganisms in food, highlighting the infective dose, symptoms, and the severity of the disease in each case:
  - i. *Escherichia coli* O157:H7 [10 marks]
  - ii. *Listeria monocytogenes* [10 marks]

**[Total: 25 marks]**

**QUESTION 2**

- a. Explain the principles behind the Gram staining technique and how it is used to categorise different types of microorganisms. [10 marks]
- b. Discuss indirect methods of detecting microorganisms in food under the following headings:
  - a. Dye reduction technique. [7 marks]
  - b. Most Probable Number (MPN) method. [8 marks]

**[Total: 25 marks]**

**QUESTION 3**

- a. Define functional foods. [2 marks]
- b. State the criteria used to characterise microorganisms as being probiotic. [8 marks]
- c. Discuss five health benefits associated with consuming foods containing probiotic microorganisms. [15 marks]

**[Total: 25 marks]**

**QUESTION 4**

- a. Distinguish between 2-class and 3-class attribute sampling. Give examples of situations where each of the plans may be used. [10 marks]

The following represents a microbial specification for dried and instant food for infants and children.

Test	Sample size (n)	c	m (per g)	M (per g)
Aerobic mesophilic count	5	2	$10^3$	$10^4$
Coliforms count	5	1	Less than 3	20
<i>Salmonella sp.</i>	60	0	0	-

- b. Explain what these recommendations mean. State the meaning of the values n, c, m, and M in each case. [15 marks]

[Total: 25 marks]

### QUESTION 5

- a. Name appropriate media used to detect each of the following pathogens in food:
- Staphylococcus aureus*. [2 marks]
  - Faecal coliforms. [2 marks]
  - Bacillus cereus*. [2 marks]
  - Clostridium botulinum*. [2 marks]
  - Salmonella typhi*. [2marks]
- b. Discuss what should be included in a microbiological specification for food. [10 marks]
- c. Explain why a microbiological specification is needed for food contact surfaces. [5 marks]

[Total: 25 marks]

**END OF QUESTION PAPER**