



UNIVERSITY OF SWAZILAND
FACULTY OF HEALTH SCIENCES
B.Sc. ENVIRONMENTAL HEALTH AND FOOD SCIENCE
SEMESTER I
MAIN EXAM
DECEMBER 2017

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. Discuss how the following parameters influence the growth of microorganisms in food:
 - i. Water activity. [5]
 - ii. Redox potential. [5 marks]
- b. Briefly explain why some microorganisms have a positive Gram reaction while others are negative. [10]
- c. Give 2 examples of typically Gram positive and 3 typically Gram negative microorganisms. [5]

[Total: 25 marks]

QUESTION 2

- a. Define an indicator microorganism. [2 marks]
- b. State the criteria used to categorise a microorganism as an indicator microorganism. [8 marks]
- c. What is the significance of the presence of faecal coliforms in food? [5 marks]
- d. Briefly discuss the type of food poisoning caused by *E. coli* O157:H7, highlighting the infective dose, incubation period, symptoms, and duration of illness. [10 marks]

[Total: 25 marks]

QUESTION 3

Explain the meaning and significance of the following terms in food safety:

- a. Danger zone temperature. [8 marks]
- b. Psychrotrophs. [5 marks]
- c. Mesophiles. [5 marks]
- d. Modified Atmosphere Packaging. [7 marks]

[Total: 25 marks]

QUESTION 4

- a. Discuss the following sampling plans for microbiological testing of pasteurized liquid, frozen, and dried egg products with respect to:
- i. The types of sampling plan and the stated limits. [5 marks]
 - ii. The risks associated with the microorganisms involved. [5 marks]

				Limit per gram	
Test	Plan class	n	c	m	M
AMC	3	5	2	5×10^4	10^6
<i>Salmonella</i> sp.	2	15	0	0	-

Source: ICMSF, *Microorganisms in food - 2*

- b. Define and distinguish Consumer's risk and Producer's risk in microbiological sampling. [10 marks]
- c. How does the presence of villi and flagella on pathogenic microorganisms such as *Salmonella* sp. influence the virulence of the pathogen? [5]

[Total: 25 marks]

QUESTION 5

- a. Compare and contrast the following methods used in the microbial testing of food and food-contact surfaces:
- i. Plate count (PC) and Most Probable Number (MPN) methods. [10 marks]
 - ii. Pour plating and spread plating. [4 marks]
 - iii. Dye reduction and selective enrichment. [6 marks]
- b. Why is it important to determine the microbial quality of food contact surfaces? [5]

[Total: 25 marks]

END OF QUESTION PAPER