UNIVERSITY OF ESWATINI

FACULTY OF HEALTH SCIENCES

B.Sc. ENVIRONMENTAL HEALTH AND FOOD SCIENCE

B.Sc. ENVIRONMENTAL HEALTH SCIENCE

SEMESTER I

FINAL EXAM

DECEMBER 2019

TITLE OF PAPER: FOOD MICROBIOLOGY

COURSE CODE: EHS323

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) Describe the characteristics of *Listeria monocytogenes* as a food poisoning microorganisms, highlighting the following:

i. Infective dose. [3 marks]
ii. Incubation period. [3 marks]
iii. Symptoms. [7 marks]

b) Discuss the circumstances that made it difficult to detect and control the listeriosis outbreak reported in South Africa in 2017/2018. [13 marks]

[TOTAL: 25 marks]

QUESTION 2

a. What is the significance of detecting faecal coliforms in food? [5 marks]

b. *E. coli* O157:H7 is reported to be acid tolerant. What is the significance of this finding? [5 marks]

c. *E. coli* O104:H4 was reported in bean sprouts in a food poisoning outbreak in Germany in 2012. Explain why this strain was particularly virulent and difficult to stop. [15 marks]

[TOTAL: 25 marks]

QUESTION 3

a. Briefly explain the purpose of the Gram stain. [5 marks]

b. Explain why some microorganisms stain Gram negative while others Gram positive. [10 marks]

c. What should be included in a microbiological specification for food? [10 marks]

[TOTAL: 25 marks]

QUESTION 4

a. Explain the difference between Class 2 and Class 3 attribute sampling plans. [5 marks]

b. The following table shows sampling plans and recommended microbiological limits for pasteurized liquid, frozen, and dried egg products.

				Limit per gram	
Test	**Plan class**	**n**	**c**	**m**	**M**
AMC	3	5	2	$5x10^4$	10^6
Coliforms	3	5	2	10^1	10^3
Salmonella, normal routine	2	5	0	0	-
Salmonella, for high risk population	2	15	0	0	-

Source: ICMSF, Microorganisms in food - 2

Explain the justification for selecting each plan and limits for the different groups/types of microorganisms. [20 marks]

[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 marks]

[TOTAL: 25 marks]

END OF EXAMINATION PAPER