UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

B.Sc. ENVIRONMENTAL HEALTH SCIENCE AND FOOD SCIENCE

SEMESTER I

FINAL EXAMINATION PAPER - DECEMBER 2016

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: CALCULATOR

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

QUESTION 1

a. Discuss the role of indicator microorganisms in food safety. [5]

b. Briefly describe the experimental procedures used to distinguish faecal coliforms from other bacteria from the Enterobacteriaceae family. [10]

c. Discuss the structural basis for distinguishing between Gram positive and Gram negative bacteria. [10]

[25 marks]

QUESTION 2

a. Describe the steps followed when conducting the dye reduction test and state the principles involved. [8]

b. With respect to food contact surfaces, explain how the effectiveness of a cleaning process can be evaluated. [7]

c. General and specialized agars can facilitate detection, enumeration, and identification of microorganisms in food. Name a typical agar that can be used in each of the following cases:

    a. Detection of *E. coli*. [2]

    b. Enumeration of faecal coliforms using Most Probable Number (MPN) method. [2]

    c. Aerobic mesophilic counts. [2]

    d. Enumeration of yeasts. [2]

    e. Detection of *Salmonella* sp. [2]

[25 marks]

QUESTION 3

a. Food handling premises can be categorized as "high risk or low risk" depending on the type of food handled.

    i. Define "risk" with respect to food safety. [2]

    ii. Name a potentially high risk food and explain why it should be regarded as such. [6]

b. Discuss the characteristics of Escherichia coli O104:H4 under the following headings:

    i. Symptoms. [5]

    ii. Infective dose. [2]

iii. Incubation period. [3]

iv. Duration. [2]

c. Discuss the risk factors associated with food poisoning due to *E. coli* O157:H7. [5]

[25 marks]

QUESTION 4

a. Distinguish between antibiotics and bacteriocins. [5]

b. Discuss the importance of gut flora to human health. [10]

c. Briefly explain why some lactic acid bacteria (LAB) are used probiotics. Use examples of LAB to support your answer. [10]

[25 marks]

QUESTION 5

a. State the information that should be included in a microbiological specification for food. [5]

b. Describe a typical sampling plan for microbiological examination of poultry products. Give reasons for your choice. [5]

c. A 22-year-old male college student presents to the ED with severe nausea and vomiting. He states that he has just broken up with his girlfriend and that he has mainly been surviving on leftovers. He reports that he began to experience symptoms a couple of hours after digesting old fried rice. Which of the following organisms is most likely to be responsible for this patient's symptoms? Give reasons for your answer. [5]

    i. *Bacillus cereus*

    ii. *Clostridium perfringens*

    iii. *Clostridium botulinum*

    iv. *E coli*

d. Distinguish between infant botulism and foodborne botulism. [10]

[25 marks]

END OF QUESTION PAPER