UNIVERSITY OF SWAZILAND
Faculty of Health Sciences

DEGREE IN ENVIRONMENTAL HEALTH
FINAL EXAMINATION PAPER 2010

TITLE OF PAPER	:	FOOD MICROBIOLOGY
COURSE CODE	:	EHS 503
DURATION	:	2 HOURS
MARKS	:	100
INSTRUCTIONS	:	READ THE QUESTIONS & INSTRUCTIONS CAREFULLY
	:	ANSWER ANY FOUR (4) QUESTIONS
	:	EACH QUESTION CARRIES 25 MARKS.
	:	WRITE NEATLY & CLEARLY
	:	NO PAPER SHOULD BE BROUGHT INTO NOR OUT OF THE EXAMINATION ROOM.
	:	BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

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

Microbial behavior is not open to negotiation, unlike 'costing' or 'marketing concepts'. Microbes do not see, hear or respond to human pleas. They have no respect of persons or hierarchical status. What they can and will do is to multiply rapidly unless positive preventative action is taken.

Question 1

a. Citing appropriate examples, explain the basic microbial classification in reference to bacterial biochemical properties. [5]
b. What do you understand by early neonate listeriosis? [3]

c. How does food become contaminated with *Staphylococcus aureus*? [8] (show all the possible routes)
d. Why are the coagulase and thermonuclease tests important during the enumeration and isolation of *Staphylococcal aureus* from suspected food.[4]
e. How would you control future staphylococcal foodborne outbreak? [5]

[25 Marks]

Question 2

a) The isolation and identification of salmonellae in food is based on three 3 steps, that is enrichment, isolation and identification.
Outline the procedures in: [Bacteriological Analytical Manual (BAM) Procedure]
- Pre-enrichment [5]
- Selective enrichment [5]
- Selective plating on
  - Bismuth sulfate (BS) agar [2]
  - Hektoen enteric (HE) agar [2]
  - Xylose lysine desoxycholate (LXD) agar [2]

b) Salmonellosis exhibit three major infection syndromes. Which are they? [3]

c) The non-typhoid and typhoid Salmonella species presents different symptoms. Why is that so? [6]

[25 Marks]

Question 3
a. What does (O) and (H) signify in the strain designation of *Escherichia coli O157:H7*? [5]
b. Which two (2) foods are likely to be implicated in *E.coli O157:H7* disease and why [3]

c. Show the three types of symptoms that are likely to be manifested by *E.coli 0157: H7* [6]

d. You have been given a food sample and you want to enumerate and isolate *Escherichia coli* strains by using the Violet Red Bile [VRB] agar method. Show how this lab experiment would be conducted or executed? [6]

e. How does Listeria monocytogenes get into food? [5]

[25 Marks]

Question 4

a) Choose two environmental factors for bacterial growth and show how they affect the food microflora. [Answer should include appropriate examples]. [15]

b) How does the classification of bacteria such as gram negative and gram positive influence or affect survival in food? [6]

c) Sobhiyoza restaurant in Nhlangano has reported that both the chicken and beef stews develop spoilage yet they are both kept at "Hot Holding Temperatures". Explain why this is occurring. [4]

[25 Marks]

Question 5

a) Using appropriate examples, explain the three (3) groups of Lactobacillus mainly employed in food fermentation. [10]

b) Why are probiotics an important food supplements? [3]

c) Why is fermented milk safer than non-fermented milk? [3]

d) Which lactic acid bacteria (LAB) can be used in the fermentation of cabbages and why? [4]

e) Lactic acid bacteria (LAB) can be divided into two groups according to their metabolism pathways and the products produced. Using appropriate examples explain this division. [5]

[25 Marks]