



## **FACULTY OF SCIENCE**

**DEPARTMENT OF FOOD TECHNOLOGY  
NATIONAL DIPLOMA IN FOOD TECHNOLOGY  
NATIONAL DIPLOMA IN BIOTECHNOLOGY**

**MODULE: FTN3BFM  
FOOD MICROBIOLOGY III  
CAMPUS: DFC**

**SUPPLEMENTARY EXAMINATION**

**DATE: 09/ 01/ 2017**

**TIME: 08:00 AM – 11:00**

**ASSESSORS**

**DR B C DLAMINI**

**INTERNAL MODERATOR**

**MS D METCALFE**

**EXTERNAL MODERATOR**

**DR F TABIT**

**DURATION: 3 HOURS**

**TOTAL MARKS: 120**

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**NUMBER OF PAGES: 4**

**INSTRUCTIONS:**

1. Answer ALL questions.
2. Ensure your student number appears on all material you submit.
3. Questions may be answered in any sequence but **sub-sections must be answered together.**
4. Hand in examination paper and answer sheet together

### **QUESTION 1**

A food company wishes to produce canned Tuna (meat product).

- a) Advise the company on the canning of Tuna to ensure that it is microbiologically safe. (6)
- b) Discuss the concepts used for the thermal destruction of microorganisms. (9)
- c) A number of hurdles (intrinsic & extrinsic) are involved in the production of Tuna. Discuss three hurdles involved for Tuna canned in brine. (10)

**[25]**

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### **QUESTION 2**

- a) Industrial fermentations involve the use of starter cultures. Briefly discuss four reasons for starter culture problems. (4) (8)
- b) Define quorum sensing and explain how this phenomenon aids the pathogenicity of species. (7)
- c) Respiration generally yields far more cell energy (ATP) than fermentation. Explain why brewing yeast ferment in brewer's wort instead of respiring? (5)

**[20]**

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### **QUESTION 3**

Briefly discuss the spoilage of the following food products with respect to product characteristics and microorganisms associated with their spoilage.

- a) Pasteurised milk (7)
- b) Eggs (7)
- c) Vacuum packed meats (7)

**[21]**

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### **QUESTION 4**

- a) Indicator microorganism are normally used in ensuring the safety of foods. Define indicator microorganism and give reasons why they are sometimes preferred in ensuring the safety of our foods. (8)

b) Write short notes on the following foodborne pathogens in terms of the following: pathogen characteristics, pathogenesis and the type of food they are often association with.

i) *Staphylococcus aureus* (8)

ii) *Toxoplasma gondii* (8)

iii) *Norovirus* (8)

[32]

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### **QUESTION 5**

Table 1 (Appendix A) shows the microbial reference criteria for ready-to-eat (RTE) cooked hamburger patties to be imported into South Africa. You are part of the South African Inspection Services team, your task includes determining whether hamburger patties can be released into the South African market or must be rejected at the point of entry to assure the safety of imported RTE products.

a) Use the information provided in **Table 1 and 2** to indicate the class plan for each bacterium and also to decide whether the consignment should be released from the point of entry or be rejected and sent back at the exporter's cost. (15)

*NB: Provide a detailed interpretation of the microbiological results and conclusion.*

b) Briefly discuss how you would analyse for the total aerobic counts. (7)

[22]

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**TOTAL MARKS: 120**

## APPENDIX A

Table 1. Microbial reference criteria for cooked hamburger patties

Microorganism	n	c	m	M
* Aerobic plate count (cfu/g)	5	2	$\leq 10^4$	$\leq 10^5$
<i>Bacillus cereus</i> (cfu/g)	5	2	$\leq 10^2$	$\leq 10^3$
<i>Campylobacter jejuni</i> (cfu/10g)	5	0	0	N/A
<i>Clostridium perfringens</i> (cfu/g)	5	2	$\leq 10^2$	$\leq 10^3$
<i>Staphylococcus aureus</i> (cfu/g)	5	2	$\leq 10^2$	$\leq 10^3$
<i>Salmonella</i> species (cfu/25g)	5	0	0	N/A
<i>Listeria monocytogenes</i> (cfu/25g)	5	0	0	N/A

\* At 35 °C

Table 2. Microbiological quality results of cooked hamburger patties

Microorganism	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Aerobic plate count (cfu/g)	$5 \times 10^3$	$3 \times 10^4$	$5 \times 10^3$	$5 \times 10^5$	$5 \times 10^6$
<i>B. cereus</i> (cfu/g)	$10^3$	$10^2$	$10^2$	$10^2$	$10^3$
<i>C. jejuni</i> (cfu/10g)	0	0	1	0	0
<i>C. perfringens</i> (cfu/g)	$10^2$	$10^2$	10	10	10
<i>S. aureus</i> (cfu/g)	$10^2$	$10^2$	10	$10^3$	$10^3$
<i>Salmonella</i> species (cfu/25g)	0	0	1	1	0
<i>Listeria monocytogenes</i> (cfu/25g)	0	0	0	0	0