



PAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH AND APPLIED SCIENCES

DEPARTMENT OF HEALTH SCIENCES

QUALIFICATION: BACHELOR OF HUMAN NUTRITION	
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COURSE CODE: MIB 611S	COURSE NAME: MICROBIOLOGY
SESSION: JUNE 2019	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
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INSTRUCTIONS
1. Answer ALL the questions. 2. Write clearly and neatly. 3. Number the answers clearly.

PERMISSIBLE MATERIALS

NONE

THIS QUESTION PAPER CONSISTS OF 6 PAGES (Including this front page)

SECTION A

QUESTION 1

(20 MARKS)

Select the most appropriate answer from the options provided. (Each correct answer earns 1 mark)

- 1.1 The target microorganism in canning:
 - a. *Clostridium botulinum*
 - b. *Streptococcus thermophilus*
 - c. pa 3679
 - d. *Lactobacillus bulgaricus*

- 1.2 Of the following which is not a category of ripened cheeses:
 - a. Hard ripened cheese
 - b. Semi-solid ripened cheese
 - c. Semi-hard ripened cheese
 - d. None of the above

- 1.3 The following pairs of sugars are disaccharides **except**:
 - a. Sucrose and maltose
 - b. Galactose and lactose
 - c. Lactose and maltose
 - d. Sucrose and lactose

- 1.4 Microorganisms multiply and die in:
 - a. Geometric order
 - b. Logarithmic order
 - c. A-logarithmic order
 - d. None of the above

- 1.5 In bread manufacturing, alcoholic fermentation is carried out by:
 - a. *Streptococcus thermophilus*
 - b. *Saccaromyces cerevisiae*
 - c. *Saccaromyces carlsbergensis*
 - d. *Lactobacillus bulgaricus*

- 1.6 Any change that renders food unfit for human consumption is called:
 - a. Processing
 - b. Spoilage
 - c. Deterioration
 - d. Preservation

- 1.7 Food intoxication is the ingestion of:
- Toxin produced by microorganisms
 - Toxin producing microorganisms
 - Both of the above
 - None of the above
- 1.8 *Clostridium botulinum* is:
- Yeast
 - Mold
 - Bacteria
 - Virus
- 1.9 Lactic acid bacteria include:
- Lactococcus lactis*
 - Lactococcus cremoris*
 - Bifidobacterium*
 - All the above
- 1.10 It is not recommended to eat raw eggs because:
- Raw eggs could be contaminated with *clostridium perfringenes* causing severe
 - abdominal pain
 - Raw eggs cannot be digested and may cause abdominal clamps
 - Raw eggs could be contaminated with salmonella resulting into severe infections
 - Eggs contain high amount of proteins that are more digestible upon cooking
- 1.11 The temperature of resistance of microorganisms in high acid food is:
- High
 - Medium
 - Low
 - No effect
- 1.12 *Clostridium botulinum* mainly result in spoilage of -----foods:
- Low acid food
 - High acid food
 - Medium acid food
 - Acidic food
- 1.13 Water activity can act as:
- An intrinsic factor influencing microbial growth
 - A processing factor
 - An extrinsic factor
 - All of the above

- 1.14 A psychrophilic halophile would be a microbe that prefers:
- Cold temperatures and increased amounts of salt
 - Warm temperatures and increased amounts of pressure
 - Cold temperatures and the absence of oxygen
 - Warm temperatures and increased amounts of acid
- 1.15 Yeast and mold count determination requires:
- Nutrient agar
 - Acidified potato glucose agar
 - MacConkey agar
 - Violet Red Bile agar
- 1.16 Of the following, which is the main carbohydrate in milk:
- Maltose
 - Sucrose
 - Lactose
 - Fructose
- 1.17 What are the intrinsic factors for the microbial growth:
- pH
 - Moisture content
 - Oxidation-reduction potential
 - All of the above
- 1.18 Most spoilage bacteria grow at:
- Acidic pH
 - Alkaline pH
 - Neutral pH
 - Any of the pH
- 1.19 During malting, barley and other grains are broken down by:
- Heating at 95°C
 - Lagering
 - Amylase
 - Yeasts
- 1.20 What is the collective term for disease causing micro-organisms:
- Parasites
 - Bacteria
 - Pathogen
 - virus

SECTION B

QUESTION 2

(17 MARKS)

- 2.1 Explain the term food borne illnesses. (2)
- 2.2 Outline one common symptom associated with food borne illness (1)
- 2.3 Explain the following terms related to food borne illnesses
- 2.3.1 Intoxication (2)
- 2.3.2 Toxico-infection (2)
- 2.3.3 Infection (2)
- 2.4 Explain the term water activity (2)
- 2.5 Explain the three types of food based on their moisture content (6)

QUESTION 3

(15 MARKS)

- 3.1 Match the following bacteria genera based on their ability to grow in presence or absence of oxygen (each correct answer earns 1 mark) (5)

	Bacteria species		Categories
3.1.1	<i>Salmonella</i>	A	Aerobes
3.1.2	<i>Campylobacter</i>	B	Facultative anaerobes
3.1.3	<i>Escherichia</i>		
3.1.4	<i>Pseudomonas</i>		
3.1.5	<i>Listeria</i>		

- 3.2 Match the following food borne illnesses with their respective causative agent in table below (each correct answer earns 1 mark) (10)

	Disease		Causative agent
3.2.1	Gastroenteritis	A	Molds
3.2.2	Listeriosis	B	Hepatitis A
3.2.3	Mycotoxin	C	<i>Clostridium botulinum</i>
3.2.4	Staph poisoning	D	Yeasts
3.2.5	Salmonellosis	E	<i>Campylobacter jejuni</i>
3.2.6	Enteritis	F	<i>Yersinia enterocolitica</i>
3.2.7	Botulism	G	<i>Salmonella typhi</i>
3.2.8	Brucellosis	H	<i>Staphylococcus aureus</i>
3.2.9	Yersiniosis	I	<i>Clostridium perfringens</i>
3.2.10	Viral infection	J	<i>Salmonella serovars</i>
		K	<i>Listeria monocytogenes</i>
		L	<i>Brucella abortus</i>
		M	<i>Streptococcus thermophiles</i>

SECTION C

QUESTION 4

(25 MARKS)

- 4.1 List the five (5) major causes of spoilage. (5)
- 4.2 Mr. Shilongo of Khomsdal bought five packets of home processed canned meat from Save and Pay supermarket. All the family members including his wife and three children consumed the meat. After 12 hours, all people in the house became sick and developed a range of symptoms that included; vomiting nausea, double vision, drooping eyelids and some were paralysed. The baby became lethargic and died on the way to the hospital.
- 4.2.1 Name the condition that caused this illness. (2)
- 4.2.2 What is the name of organism responsible for such illness. (2)
- 4.2.3 Mention four (4) characteristics of this organism responsible for the illness. (4)
- 4.2.4 Mention two (2) measures that can be used to prevent transmission of this organism in food. (2)
- 4.3 During the manufacture of sauerkraut, cabbage was cleaned, trimmed and shredded into fine and uniform pieces and mixed with salt (2.25). The mixture was packaged in the container and tightly sealed. The container was then incubated at 18°C for two months.
- 4.3.1 Which type of fermentation was used in this kind of processing condition? (2)
- 4.3.2 Which type of organism was involved in the fermentation process? (2)
- 4.3.3 What was the source of this organism? (2)
- 4.3.4 What was the importance of adding salt to the mixture? (2)
- 4.3.5 What was the importance of trimming and shredding cabbage? (2)

SECTION D

QUESTION 5

(23 MARKS)

- 5.1 Describe the five (5) intrinsic factors that influence microbial growth in food. (10)
- 5.2 Discuss the steps followed in the processing of yoghurt. (5)
- 5.3 When microorganisms are inoculated and incubated in a given food medium the growth follows a definite process. Discuss this growth curve in a food medium. (8)

GOOD LUCK!