



**MASINDE MULIRO UNIVERSITY OF  
SCIENCE AND TECHNOLOGY  
(MMUST)**

**BUSIA CAMPUS (UPGRADING)**

**UNIVERSITY EXAMINATIONS  
2017/2018 ACADEMIC YEAR**

**SECOND YEAR  
EXAMINATIONS**

**FOR THE DEGREE  
IN  
MEDICAL LABORATORY SCIENCES**

**COURSE CODE: BML 414**

**COURSE TITLE: FOOD AND WATER MICROBIOLOGY  
MAIN EXAM**

**DATE: TIME:**

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**INSTRUCTIONS TO CANDIDATES**

This paper is divided into three sections, **A B** and **C**, carrying respectively: Multiple Choice Questions (**MCQs**), Short Answer Questions (**SAQs**) and Long Answer Questions (**LAQs**)

**TIME: 2 Hours**

**MMUST observes ZERO tolerance to examination cheating**

## Section A : MCQs

1. The following bacteria cause food poisoning **EXCEPT**
  - a) *Staphylococcus aureus*
  - b) *Bacillus Cereus*
  - c) *Salmonella pollurium*
  - d) *Clostridium tetani*
2. Rice water stool with mucus flakes is usually associated with
  - a) Rotavirus enteritis
  - b) *Vibrio cholera*
  - c) Enterotoxigenic *Escherichia coli*
  - d) Shigellosis
3. The following are bacteriological indicator organisms except
  - a) *Escherichia coli*
  - b) *Staphylococcus aureus*
  - c) *Clostridium perfringens*
  - d) *Streptococcus faecalis*
4. Why is a Durham inserted in Lauryl sulphate lactose broth during water analysis
  - a) To allow growth and multiplication of the bacteria
  - b) To determine the amount of lactose fermented by the bacteria
  - c) To preserve the bacteria found in water
  - d) To detect production of gas by the micro-organism
5. Which of the following is **NOT** a characteristic of the total coliform enterobactericiae
  - a) Bacteria that are able to ferment lactose at 44-45<sup>0</sup>C
  - b) They are oxidase negative
  - c) They are able to ferment lactose at 37<sup>0</sup>C
  - d) They are aerobes and others facultative anaerobes
6. The following characteristics describe coliforms **EXCEPT**
  - a) They are Gram negative rod shaped bacterium
  - b) Ferment lactose at 35-37<sup>0</sup>C with production of acid and gas within 24-48 hours
  - c) Are able to grow in the presence of bile salts.
  - d) They are oxidase positive.
7. The following test is used to differentiate *Escherichia coli* type 1 from other members of the coliform group.
  - a) Citrate utilization test
  - b) Eijkman test
  - c) Catalase test

- d) Oxidase test
- 8. The following helminths are associated with water bacteriology except
  - a) Round worm
  - b) Thread worm
  - c) Balantidium coli
  - d) Hydatid disease
- 9. Which of the following is **NOT** a water borne virus
  - a) Rotavirus
  - b) Poliovirus
  - c) Hepatitis
  - d) None of the above
- 10. Microorganisms that grow at temperatures of about 55°C are known as
  - a) Mesophiles
  - b) Halophiles
  - c) Thermophiles
  - d) Psychrophiles
- 11. Which of the following organisms when isolated from sewage show recent contamination
  - a) Coliforms
  - b) Enterococci
  - c) Klebsiella
  - d) Citrobacter
- 12. Transport medium for specimen suspected to be having *Vibrio cholerae* is
  - a) Alkaline peptone water
  - b) Stuarts transport media
  - c) Amies transport media
  - d) Selenite F
- 13. The following bacteria are non- sporing except
  - a) *Escherichia coli*
  - b) *Edwardsiella* spp
  - c) *Clostridium perfringens*
  - d) *Pseudomonas aeruginosa*
- 14. Milk falls into the following categories except
  - a) Pasteurized milk
  - b) Sterilized milk
  - c) Untreated milk
  - d) Cleaned milk
- 15. The following are bacterial growth phases in a fluid media, which one is **NOT**
  - a) Lag phase
  - b) Log phase
  - c) Exponential phase
  - d) Thermostable phase

16. The following bacteria are derived from milk ducts except
- Staphylococcus*
  - Pseudomonas*
  - Streptococcus*
  - Lactobacilli*
17. How is milk pasteurized?
- The milk is brought to a rolling boil and then immediately cooled.
  - The milk is centrifuged for a certain period of time.
  - Using high pressure pumps, the milk is pressed through small filter holes at a specified pressure.
  - The milk is heated to a certain temperature and held at that temperature for a certain amount of time
18. Which organism causes food poisoning from the enterotoxin produced in rice or other cereals that have been cooked and stored in warm temperature
- Bacillus cereus*
  - Shigella dysenteriae*
  - Enterotoxigenic *Escherichia coli*
  - Clostridium perfringens*
19. What is the most ideal media for isolating *Staphylococcus aureus* from faecal specimen when investigating staphylococcal food poisoning?
- Mannitol egg yolk phenol red polymyxin agar
  - Mannitol salt agar
  - Robertsons cooked meat media
  - Blood agar
20. Bacteria that form a centrally placed endospore include
- Clostridium perfringens*
  - Streptococcus faecalis*
  - Staphylococcus aureus*
  - Salmonella typhi*

### Section B: Short Answer Questions

1. The current floods have caused spread of cholera in many parts of Kenya
- State the causative agent of the above named disease (**2 marks**)
  - Explain how the agent is transmitted (**2 marks**)
  - Name the isolating media for the agent (**2 marks**)
  - Outline oxidase test for the agent (**4marks**)
- 2) a) Discuss the following:
- Eijkiman test (**2 marks**)

ii) Indole test ( **2 marks**)

b). Describe the following, giving an example of each:

i). Aerobic respiration (**3marks**)

ii). Anaerobic respiration (**3marks**)

3. Discuss the following

a). Membrane filtration technique (**4mark**).

b). Factors influencing microbial activity in food (**6marks**).

4 a). Outline milk pasteurization using 63-66°C and 72°C (**4marks**)

b). Outline the following methods used in testing the quality of milk

1) Phosphatase (**3marks**)

11). Methylene blue (**3marks**).

### **Section C: LAQs**

1. Describe Indicator organisms and coliform group of bacteria (**10marks**).

2. Discuss the multiple tube technique for counting fecal coliforms (**10 marks**)

3. Describe the procedure for presumptive coliform count (**10marks**).

4 a) Name a selective media and a diagnostic test used for isolation and identification of the bacteria found in food

i) *Clostridium perfringens* (**2 marks**)

ii) *Staphylococcus aureus* (**2 marks**)

iii) *Campylobacter jejuni* (**2 marks**)

b. Describe the morphological and cultural characteristics of *Clostridium perfringens* (**4marks**)