MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR

FOURTH YEAR FIRST TRIMESTER
EXAMINATIONS

FOR THE DEGREE
IN
MEDICAL LABORATORY SCIENCES (DIRECT ENTRY)

COURSE CODE: **BML 414**

SPECIAL/SUPPLEMENTARY

COURSE TITLE: FOOD AND WATER MICROBIOLOGY

DATE: **TIME:**

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 This Paper Consists of 6 Printed Pages. Please Turn Over.

SECTION A: MULTIPLE CHOICE QUESTIONS (20 MKS)
Instructions to the candidate

- The section has twenty (20) multiple choice questions (MCQs)
- Each question has a stem and four (4) completion options, of which only one is correct
- Write your answers on the provided university examination booklet.

1. 12 years old child was diagnosed with amoebic dysentery after drinking contaminated water from one of the rural area of Kakamega County. The child was infected with
   A. *Hepatitis A virus.*
   B. *Hepatitis E virus*
   C. *Entamoeba histolytica*
   D. *Shigella dysenteriae*
2. Bacterial flora in the colon are:
   A. Obligate aerobes
   B. Obligate anaerobes
   C. Facultative anaerobes.
   D. Microaerophilic.
3. Rice water stool with mucus flakes is usually associated with
   A. Rotavirus enteritis
   B. Vibrio cholera
   C. Enterotoxigenic *Escherichia coli*
   D. Shigellosis
4. Which of the following microorganisms is not a bacteriological indicator
   A. Escherichia coli
   B. Staphylococcus aureus
   C. Clostridiun perfringens
   D. Streptococcus faecalis
5. Which of the following is not as a characteristics of Escherichia coli is a coliform organism
   A. Capable of fermenting lactose at 37°C and at 44°C
   B. Able to produce indole in peptone water containing tryptophan
   C. Gives a positive result in the methyl red test
   D. Able to use sodium citrate as its sole source of carbon
6. 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
7. Which one of the following is not associate with food-borne infections?

A. *Giardia lamblia*
B. *Entamoeba histolytica*
C. *Balantidium coli*
D. *Ascaris lumbricoides*

8. Microorganisms that grow at temperatures of about 55°C are known as
   A. Mesophiles
   B. Halophiles
   C. Thermophiles
   D. Psychrophiles
9. 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
10. Which one of the following bacteria is not non- sporing
    A. *Escherichia coli*
    B. *Edwardsiella spp*
    C. *Clostridium perfringens*
    D. *Pseudomanas aeruginosa*
11. Milk falls into the following categories except
    A. Pasteurized milk
    B. Sterilized milk
    C. Untreated milk
    D. Cleaned milk
12. The following bacteria are derived from milk ducts except

    A. Staphylococcus
    B. Pseudomonas
    C. Streptococcus
    D. Lactobacilli
13. How is milk pasteurized?

    A. The milk is brought to a rolling boil and then immediately cooled.
    B. The milk is centrifuged for a certain period of time.
    C. Using high pressure pumps, the milk is pressed through small filter holes at a specified pressure.
    D. The milk is heated to a certain temperature and held at that temperature for a certain amount of time
14. Which organism causes food poisoning from the enterotoxin produced in rice or other cereals that have been cooked and stored in warm temperature
    A. Bacillus cereus
    B. Shigella dysentriae
    C. Enterotoxigenic *Escherichia coli*
    D. Clostridium perfrigens

15. What is the most ideal media for isolating Staphylococcus aureus from faecal specimen when investigating staphylococcal food poisoning?
    A. Mannitol egg york phenol red polymyxin agar
    B. Mannitol salt agar
    C. Robertsons cooked meat media
    D. Blood agar
16. Bacteria that form a centrally placed endospore include
    A. Clostridium perfringens
    B. Streptococcus faecalis
    C. Staphylococcus aureus
    D. Salmonella typhi
17. The following is a disease caused by toxins in food at the time of ingestion

    A. Cholera
    B. typhoid fever
    C. Shigellosis
    D. Travelers' diarrhea
18. What is the First HACCP Principle?
    A. Establish Critical Limits
    B. Conduct a Hazard Analysis
    C. Assemble the HACCP Team
    D. Record review
19. Which among the following is a chemical method used in water treatment?
    A. Chlorination
    B. pressure
    C. Irradiation
    D. boiling
20. Microorganisms that grow at temperatures of about -10- 20°C are known as
    A. Mesophiles
    B. Halophiles
    C. Thermophiles
    D. Psychrophiles

Section B: SHORT ANSWE QUESTIONS (60 MARKS)

1. Describe the symptoms of Shigellosis (**5 marks**)

2. Discuss the following:

i) Eijkiman test **(2 marks)**

ii) Indole test **(3 marks)**

3. Discuss the Factors influencing microbial activity in food **(5marks).**
4. Outline milk pasteurization using 63-66ºC and 72ºC **(5marks)**
5. Describe the Principle of following:

i) Eijkiman test **(5 marks)**

6. State any Five intrinsic factors influencing microbial growth in food (**5 marks**)
7. State any Five protozoa that cause food borne disease **(5 marks**
8. define the following terms s used in water microbiology (5 marks)

i) Coliforms
ii) Food borne illness

Section C: LONG ANSWER QUESTIONS (60 MARKS)

1. Describe Indicator organisms used for the indication of faecal pollution (**10marks)**
2. Enumerate the causes of food poisoning? (10 marks)
3. Discuss the multiple tube technique for counting fecal coliforms **(10 marks**
4. Describe the membrane filtration method. **(10marks)**
5. Discuss the following categories of diseases associated with water **(10 marks**)
   i) Water-based infections
   ii) Water-related diseases
6. 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 microscopic and cultural characteristics of *Closridium perfringens* **(4marks)**