



(University of Choice)

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

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR**

FOURTH YEAR FIRST TRIMESTER EXAMINATIONS

**FOR THE DEGREE
OF
BACHELOR OF MEDICAL LABORATORY SCIENCES (DIRECT
ENTRY)
MAIN EXAM**

COURSE CODE: BML 414

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 5 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. The conditions normally present in food such as moisture, acidity and nutrients are referred to as?
 - A. Extrinsic factors.
 - B. Intrinsic factors
 - C. Endogenous factors
 - D. Exogenous factor
 2. The major carriers of salmonellosis are
 - A. Eggs and Milk
 - B. Eggs and meat
 - C. Eggs and fruits
 - D. Eggs and fish
 3. After few hours of evening party a student complained of having Abdominal pains and he was also Vomiting. He went to the clinic and his body temperature was low. This student could have likely taken food contaminated with which microorganism?
 - A. *Listeria monocytogenes*
 - B. *Cryptosporidium parvum*
 - C. *Campylobacter jejuni*
 - D. *Staphylococcus aureus*
 4. Microorganisms that grow at temperatures of about 55°C are known as
 - A. Mesophiles
 - B. Halophiles
 - C. Thermophiles
 - D. Psychrophiles
 5. Common food poisoning microbes are?
 - A. *Clostridium and Salmonella*
 - B. *Clostridium and E.coli*
 - C. *E. coli and Salmonella*
 - D. *Clostridium and Streptococcus*
 6. Most spoilage bacteria grow at?
 - A. Acidic pH
 - B. Alkaline pH
 - C. Neutral pH
 - D. Extreme alkalinity
 7. Coliform bacteria:

- A. Grow in the intestines of people and warm blooded animals
 - B. Usually cause diseases
 - C. Respond to water treatment differently than do most other pathogens
 - D. Exist only in water that contains pathogens
8. Which of the following organism does not belong to coliform group of bacteria?
- A. Salmonella
 - B. Serratia
 - C. Enterobacter
 - D. Proteus
9. 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
10. In bread manufacturing, fermentation is carried out by?
- A. *Streptococcus thermophilus*
 - B. *Saccharomyces cerevisiae*
 - C. *S. carlsbergensis*
 - D. *Lactobacillus bulgaricus*
11. 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
12. What is the Third HACCP Principle?
- A. Establish Critical Limits
 - B. Conduct a Hazard Analysis
 - C. Assemble the HACCP Team
 - D. Record review
13. What are the categories of food hazards?
- A. Biological, Chemical, Metal
 - B. Biological, Metal, Jaundice
 - C. Biological, Physical, Allergens
 - D. Biological, Physical, Chemical
14. Pasteurization is the heat treatment designed primarily to kill?
- A. Vegetable forms of microorganisms
 - B. All forms of microorganisms
 - C. Spore formers
 - D. Lactic acid bacteria

15. The target microorganism in canning is?
 - A. *Clostridium botulinum*
 - B. *Streptococcus thermophilus*
 - C. *Staphylococcus species*
 - D. *Lactobacillus bulgaricus*

16. Food intoxication is the ingestion of?
 - A. Toxin produced by microorganisms
 - B. Spores produced by microorganism
 - C. Toxin producing microorganism
 - D. Vegetative form of microorganism

17. Which is the qualitative method used in examination of microorganism in food sample
 - A. Colony-Forming Units
 - B. Most Probable Number(MPN)
 - C. Dye reduction test
 - D. Isolation of pathogen

18. Risk assessment is applied to data on toxicity and human exposure to:
 - A. Estimate the likelihood, or probability, of a toxic effect on exposed humans
 - B. To support risk management decisions for food substances
 - C. To derive Allowable Daily Intakes
 - D. Allowing levels of contamination based on what manufacturers believe is achievable

19. Which among the following is a physical method used in water treatment?
 - A. Chlorination
 - B. Bromination
 - C. Irradiation
 - D. Ozonation

20. Which of the following organisms when isolated from sewage show recent contamination
 - A. Coliforms
 - B. *Enterococci*
 - C. *Klebsiella*
 - D. *Citrobacter*

SECTION B: SHORT ANSWER QUESTIONS. ANSWER ALL QUESTIONS (40 MARKS)

1. Outline the following methods used in testing the quality of milk (4marks)
2. State four reasons for choosing *Escherichia coli* as an ideal coliform during water analysis (4 marks)
3. State any FOUR extrinsic factors influencing microbial growth in food (4 marks)
4. Discuss *Clostridium botulinum* in terms of: (4 Marks)
 - i) Cause of illness
 - ii) Symptoms

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5. Explain two types of bacterial poisoning? (4 marks)
6. Outline the procedure for membrane filtration method for water analysis (4marks)
7. The current floods have caused spread of cholera in many parts of Kenya.
 - i) State the causative agent of the above named disease (1 marks)
 - ii) Explain how the agent is transmitted (3 marks)
8. Outline milk pasteurization using Ultra High Temperature technique (4 marks)
9. Define the following terms as used in food and water microbiology: (4 marks)
 - i) Food toxicology
 - ii) Food spoilage
10. Explain risk assessment and risk management in relation to food toxicology (4 marks)

SECTION C: LONG ANSWER QUESTIONS. ANSWER ALL QUESTIONS (60 MARKS)

1. Discuss the principles of Hazard analysis critical control Point (10 marks)
2. Explain several interventions to reduce the burden of foodborne illness (10 marks)
3. Outline the presumptive test as used in enumeration of bacteria in water samples (10 marks)
4. Give Characteristics of a useful Indicator (10marks)
5. Discuss the waste treatment process (10 marks)
6. Discuss suggestions for enhanced public health against emerging food and water diseases (10 marks)