



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

P.O. Box 972-60200 – Meru-Kenya

Tel: +254(0) 799 529 958, +254(0) 799 529 959, + 254 (0) 712 524 293,

Website: [info@must.ac.ke](mailto:info@must.ac.ke) Email: [info@must.ac.ke](mailto:info@must.ac.ke)

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## University Examinations 2023/2024

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF  
BACHELOR OF SCIENCE IN MEDICAL LABORATORY

### HML 3426: FOOD AND WATER MICROBIOLOGY

DATE: APRIL 2024

TIME: 3 HOURS

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INSTRUCTIONS: ANSWER ALL QUESTIONS

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#### MCQ: CHOOSE ONE BEST ANSWER (20 MARKS)

- Which one of the following microorganisms is used in the preparation of bread?
    - Candida Utilis
    - Aspergillus Niger
    - Saccharomyces cerevisiae
    - Saccharomyces cevarum
  - Thermal Destruction of microorganisms follows the kinetics of
    - Zero Order
    - First order
    - Second order
    - Fractional order
  - Which one of the microorganisms given below is not responsible for ropy or stingy fermentation of milk?
    - Alcaligenes viscolactis
    - Enterobacter aerogenes
    - Streptococcus cremoris
    - Streptococcus lactis
  - Which of the following is a gram-positive bacterium?
    - Listeria monocytogenesis
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- b. Proteus Vulgaris
  - c. Salmonella Typhi
  - d. Shigella dysenteriae
5. Which of the following bacteria will stain purple color after gram staining?
- a. Bacillus subtilis
  - b. E. coli
  - c. Yersinia pestis
  - d. Pseudomonas aeruginosa
6. The incorrect pair of food borne illness and its causative microorganism is
- a. Brucellosis-Brucella species
  - b. Peptic ulcers-Bacillus subtitles
  - c. Bubonic plague-Yersinia pestis
  - d. Q fever-Coxiella bunetti
7. The primary bacterial spoilage of poultry meat at low temperature, with characteristic sliminess at the outer surface, is caused by
- a. Pseudomonas spp
  - b. Aspergillus spp
  - c. Bacillus spp
  - d. Candida spp
8. The steps followed in gram's staining of microorganisms are:
- P. Washing with neutral organic solvent
  - Q. Counter staining with contrast dye
  - R. Staining with basic dye
  - S. Fixing the color with suitable mordant
- Identify the correct sequence
- a) Q-S-R-P
  - b) Q-P-S-R
  - c) R-S-P-Q
  - d) P-Q-R-S
9. The chief contaminant in the canning industry is;
- a. Lactobacillus
  - b. Clostridium botulinum
  - c. Bacillus subtilis
  - d. Trichoderma polysporum
10. The intestinal bacteria in infants commonly used as probiotic is
- a. Helicobacter
  - b. Bacillus pumilus
  - c. Streptococcus thermophilus
  - d. Bifidobacteria
11. Which of the following produces citric acid?

- a. Aspergillus
  - b. Pseudomonas
  - c. Saccharomyces
  - d. Clostridium
12. Which organism is nitrogen-fixing and found in rice fields in symbiotic association with Azolla?
- a. Frankia
  - b. Tolypothrix
  - c. Spirulina
  - d. Anabaena
13. Which of the following is used as a biofertilizer for soybean crop?
- a. Rhizobium
  - b. Azotobacter
  - c. Nostoc
  - d. Azospirillum
14. A common biopesticide for preventing plants from butterfly caterpillars is:
- a. Trichoderma
  - b. Baculovirus
  - c. Glomus
  - d. Bacillus thuringiensis
15. Yeast is used for the production of:
- a. Tetracycline
  - b. Butanol
  - c. Ethanol
  - d. Citric Acid
16. Which alga can be used as food for humans?
- a. Chlorella
  - b. Polysiphonia
  - c. Ulothrix
  - d. Spirogyra
17. Which of the following microorganisms is not used as a biofertilizer?
- a. Rhizobium
  - b. Nostoc
  - c. Mycorrhiza
  - d. Agrobacterium
18. Find the incorrectly matched pair:
- a. Serratia — Drug addiction
  - b. Spirulina— Single cell protein
  - c. Rhizobium — Biofertilizer
  - d. Streptomyces — Antibiotic

19. *Trichoderma harzianum* is useful for:
- Bioremediation of contaminated soils
  - Gene transfer in higher plants
  - Reclamation of wastelands
  - Biological control of soil borne plant pathogens
20. Which organism is used in alcoholic fermentation?
- Pseudomonas*
  - Aspergillus*
  - Saccharomyces*
  - Penicillium*

**SECTION B: SHORT ANSWER QUESTIONS (40 MARKS)**

- Differentiate between Microfiltration and Ultrafiltration of contaminated water (5 Marks)
- Describe four common food spoilage organisms (5 Marks)
- Describe five pathogens known as major food contaminants (5 Marks)
- Describe roles played by chemical food preservatives (5 Marks)
- Discuss prime biological factors involved in food spoilage (5 marks)
- Describe procedure for sampling water from a water tap for microbiological quality analysis (5 marks)
- Describe four characteristics of *Escherichia coli* that make them suitable as faecal indicator organism (5 marks)
- Discuss lake environment in terms of microbial community (5 Marks)

**SECTION C: LONG ANSWER ALL QUESTIONS (40 MARKS)**

- After the September -December 2023 flooding in Kenya, Mr Karuri developed Cholera like symptoms. Karuri and his family live downstream of river Ewaso-Ngiro, the only water source in the semi-Arid area. Taking the example of John snow and cholera outbreak in England as an example, Discuss
  - How Cholera may contaminate water sources and lead to increased mortality (10 Marks)

b) Methods through which communities may evade water borne infections

(10 Marks).

2. Discuss five food preservation methods

(20 Marks)