



BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – B.Sc.(MLT)-2022/B.Sc.(MLT)-2023/B.Sc.(MLT)-2024

Course Name – Microbial Techniques and Bacteriology

Course Code - BMLTS403

(Semester IV)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) Select the correct pressure in an autoclave required to achieve complete sterilization
 - a) 15Lbs
 - b) 10Lbs
 - c) 20lbs
 - d) 25lbs
- (ii) Choose the optimum incubation temperature for bacterial samples
 - a) 30 Degree C
 - b) 25 degree C
 - c) 37 degree C
 - d) 32 degree C
- (iii) Choose the option indicating the correct purpose of flaming the inoculation loop before and after use
 - a) To sterilize the loop
 - b) To dry the loop
 - c) To prevent corrosion of the loop
 - d) To cool the loop
- (iv) In a loopful inoculation technique, what does the word loopful refer to?
 - a) Using a small loop to streak the culture
 - b) Transferring a loopful of culture to a new medium
 - c) Creating a loop-shaped pattern on the agar plate
 - d) Allowing the loop to touch the agar surface
- (v) Select the component of a stain that helps to preserve the structure of microorganisms during staining
 - a) Mordant
 - b) Fixative
 - c) Chromogen
 - d) Solvent
- (vi) Select the purpose of the decolorization step during Gram's staining
 - a) To remove excess stain
 - b) To differentiate between Gram-positive and Gram-negative bacteria
 - c) To enhance bacterial visibility
 - d) To fix bacterial cells to the slide
- (vii) Acid-fast bacteria are resistant to

- a) Antibiotics
c) Decolorization with acid-alcohol
- b) Staining with carbol fuchsin
d) Heat fixation
- (viii) Select the option that best describes the sample processing in CBNAAT
- a) It requires extensive sample preparation
c) It only works with blood samples
- b) It can directly process sputum samples
d) It requires overnight incubation
- (ix) Select the typical turnaround time for CBNAAT results
- a) 24 hours
c) Less than 2 hours
- b) 48 hours
d) 1 week
- (x) What does a positive Citrate test result indicate about the bacterial species being tested?
- a) It can utilize citrate as a carbon source
c) It produces acids from glucose fermentation
- b) It cannot utilize citrate as a carbon source
d) It produces alcohols from glucose fermentation
- (xi) Choose the organism that is likely to produce a positive Voges-Proskauer test result
- a) Escherichia coli
c) Klebsiella pneumoniae
- b) Staphylococcus aureus
d) Pseudomonas aeruginosa
- (xii) Select the color change indicating a positive Citrate test result
- a) Yellow to red
c) Green to blue
- b) Blue to green
d) Green to blue-green
- (xiii) Select the enzyme that is essential for the reverse transcription step in RT-PCR
- a) DNA polymerase
c) Reverse transcriptase
- b) RNA polymerase
d) Ligase
- (xiv) Select the purpose of a primary barrier in biosafety levels
- a) To protect the environment
c) To sterilize equipment
- b) To protect laboratory personnel
d) To regulate temperature
- (xv) Select the staining technique that helps in demonstrating spore structure in bacteria as well as free spores
- a) Acid-fast stain
c) Capsule stain
- b) Endospore stain
d) Flagella stain

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Explain the significance of the decolorization step in Albert's staining (3)
3. Explain the principle of capsule staining in microbiology (3)
4. Explain the components of a stain (3)
5. Discuss the principle of Citrate Utilization Test (3)
6. Analyze the reason behind Gram positive and Gram negative bacteria appearing different after staining (3)

OR

Analyze the mechanism by which ethanol or alcohol decolorizes Gram-negative bacteria during the Gram staining procedure (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Describe the basic principle of an antibiotic susceptibility test (5)
8. Define biohazards and classify them based on their potential risks to human health and the environment. (5)
9. Analyze the role of acid-fast staining in the diagnosis of tuberculosis and other mycobacterial infections. (5)
10. Explain the different kinds of fixation used in preparing bacterial smears for staining. (5)

11. Decolorizing step of Gram staining procedure is the most critical step- how would you justify (5)
this statement
12. Decolorizing step of Gram staining procedure is the most critical step- how would you explain (5)
this statement

OR

95% alcohol should be used in case of Gram staining but not 70% alcohol-How can you explain (5)
this?

LIBRARY
Brainware University
Barasat, Kolkata -700125