



BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – M.Sc.(MLT)-2025

Course Name – Diagnostic Microbiology & Parasitology

Course Code - MMTC02002

(Semester II)

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) Mycolic acid is present in cell wall of
 - a) Staphylococcus.
 - b) Mycobacterium.
 - c) Mycoplasma.
 - d) Proteus.
- (ii) Define sterilization.
 - a) Killing of all microorganisms including spores
 - b) Reduction of microbial load to a safe level
 - c) Inhibition of microbial growth
 - d) Removal of visible dirt and debris
- (iii) The primary purpose of segregating biomedical waste is to
 - a) Reduce the overall amount of waste generated.
 - b) Separate infectious materials from non-infectious waste.
 - c) Lower the cost of waste disposal.
 - d) Recycle as much waste as possible.
- (iv) Lactophenol cotton blue stain is primarily used for
 - a) Differentiating Gram-positive and Gram-negative bacteria.
 - b) Observing fungal morphology.
 - c) Identifying bacterial motility.
 - d) Detecting the presence of endospores.
- (v) In which of the following phase secondary metabolites are produced during growth?
 - a) Lag phase
 - b) Log/Exponential phase
 - c) Stationary phase
 - d) Death phase
- (vi) In fluorescence microscopy, which of the following performs the function of removing all light except the blue light?
 - a) Exciter filter
 - b) Barrier filter
 - c) Dichroic mirror
 - d) Mercury arc lamp
- (vii) A soup container was forgotten in the refrigerator and shows contamination. Select contaminants which may be probably present ?
 - a) Thermophiles
 - b) Acidophiles
 - c) Mesophiles
 - d) Psychrotrophs

- (viii) What is the approximate size of the bacterial cell?
- 2mm in diameter
 - 1mm in diameter
 - 2 micrometer in diameter
 - 0.5 to 1.0 micrometer in diameter
- (ix) How do you identify the meaning of lag phase?
- Period of initial adjustment
 - Transitional period
 - Generation time
 - Period of rapid growth
- (x) If you want to inhibit bacterial DNA replication, Which of the following is useful?
- X ray
 - Gamma Ray
 - UV ray
 - Cathod ray
- (xi) The serological test for the diagnosis of syphilis is:
- TruNat
 - CBNAAT RT-PCR
 - RPR (Rapid Plasma Reagin)
 - CLIA
- (xii) What type of personal protective equipment (PPE) is most important to wear when treating a patient with tuberculosis?
- Gloves
 - Surgical mask
 - N95 respirator
 - Goggles
- (xiii) How do bacteriostatic antibiotics differ from bactericidal antibiotics?
- They inhibit cell wall synthesis
 - They prevent protein synthesis
 - They stop DNA replication
 - They inhibit bacterial growth without killing them
- (xiv) Select the type of media that contains inhibitors to suppress the growth of unwanted bacteria while allowing the growth of specific ones.
- Differential media
 - Selective media
 - Enriched media
 - Indicator media
- (xv) Identify the class of antibiotics that inhibits bacterial protein synthesis by binding to the 30S ribosomal subunit
- Aminoglycosides
 - Macrolides
 - Fluoroquinolones
 - Beta-lactams

Group-B

(Short Answer Type Questions)

3 x 5=15

- Elaborate on the definition of disinfection and classify different methods of disinfection, highlighting their respective modes of action. (3)
- What is the principle behind the Kirby-Bauer disc diffusion method? (3)
- How do you maintain aseptic conditions in the laboratory? (3)
- A bacterial culture starts with 2,000 cells and has a generation time of 50 minutes. How long will it take to reach 128,000 cells? (3)
- Analyze how carbohydrate concentration differences in TSI agar influence slant and butt reactions. (3)

OR

- Analyze why the slant and butt may show different color reactions in glucose-only fermenters. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

- Explain how the immune system differentiates between a live attenuated virus vaccine and a killed virus vaccine, and how each one provides protection. (5)
- Evaluate the advantages and disadvantages of PCR-based tests (e.g., RT-PCR) compared to serological tests (e.g., RPR) for diagnosing viral infections. (5)
- A child presents with symptoms of abdominal pain and diarrhea. Upon stool examination, helminth eggs are found. Discuss the life cycle, clinical manifestations, and treatment (5)

options for common intestinal helminths in children.

10. A qPCR assay shows late Ct values but a single sharp melt peak. Evaluate whether the result should be considered positive, considering amplification efficiency and template concentration. (5)
11. Evaluate the suitability of SEM versus TEM for studying viral morphology and justify your choice. (5)
12. Analyze how amplification plots differ between a SYBR Green-based qPCR assay and a TaqMan probe-based assay when non-specific amplification occurs. (5)

OR

Compare and analyze the performance of hydrolysis probes versus molecular beacon probes in detecting single nucleotide polymorphisms (SNPs). (5)

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