



BRAINWARE UNIVERSITY

Term End Examination 2024-2025

Programme – M.Sc.(MLT)-2023/M.Sc.(MLT)-2024

Course Name – Point of Care Testing & Laboratory Automation

Course Code - MMTC01004

(Semester I)

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) What is the primary principle behind glucose estimation using a glucometer?
 - a) Enzymatic reaction
 - b) Spectrophotometric analysis
 - c) Gas chromatography
 - d) Mass spectrometry
- (ii) Which of the following best describes the principle of lateral flow immunoassay?
 - a) Separation of analytes by size
 - b) Utilizing magnetic resonance imaging
 - c) Binding of specific antibodies to target molecules
 - d) Measuring electrical conductivity
- (iii) What is a crucial precaution when performing a pregnancy test (HCG slide test)?
 - a) Using a well-maintained centrifuge
 - b) Avoiding contamination of test components
 - c) Using expired reagents
 - d) Conducting the test at room temperature
- (iv) What is a potential demerit of using rapid diagnostic kits for COVID-19?
 - a) Longer shelf life of test components
 - b) Reduced need for trained laboratory personnel
 - c) Limited sensitivity in detecting early infections
 - d) High cost of manufacturing
- (v) Which of the following best defines POCT in Medical Laboratory Technology?
 - a) Pointless Observation and Clinical Testing
 - b) Portable Onsite Clinical Testing
 - c) Preoperative Clinical Testing
 - d) Precise Observation of Clinical Targets
- (vi) Illustrate some disadvantages of point-of-care testing (POCT) when compared to traditional laboratory testing??
 - a) Slower results
 - b) Greater cost
 - c) Limited portability
 - d) Reduced accuracy
- (vii) What is the commonly used portable device for rapid Troponin T detection in clinical settings?
 - a) PCR Machine
 - b) Centrifuge

- c) Lateral Flow Immunoassay Card d) Haemocytometer
- (viii) What are the methods and strategies for establishing a correlation between Point-of-Care Testing (POCT) results and laboratory-based pathological tests
- a) By ignoring the laboratory test results b) By using different units of measurement
- c) By comparing results and assessing their agreement d) By conducting POCT and pathological tests simultaneously
- (ix) Quality control in POCT helps ensure?
- a) Faster testing b) Fewer patient samples
- c) Accurate and reliable results d) Reduced technician workload
- (x) Which parameter can be analyzed using a Lateral Flow Immunoassay?
- a) Troponin T b) Hemoglobin
- c) Urine PH d) Blood glucose
- (xi) What portable device is commonly used for rapid hemoglobin estimation in clinical settings?
- a) Flow cytometer b) Hemoglobinometer
- c) Spectrophotometer d) PCR machine
- (xii) What is one of the responsibilities of a technician in the maintenance of analyzers in automated systems?
- a) Patient diagnosis b) Sample collection
- c) Equipment calibration and maintenance d) Data analysis
- (xiii) Identify two merits and two demerits of rapid hemoglobin estimation.
- a) Merits: Speedy results, cost-effectiveness; Demerits: Limited accuracy, complexity b) Merits: High accuracy, lengthy turnaround time; Demerits: High cost, unavailability
- c) Merits: Low cost, inaccuracy; Demerits: Quick results, complexity d) Merits: Complexity, high technician workload; Demerits: Accuracy, rapid results
- (xiv) Calculate the result when glucose is oxidized in the presence of glucose oxidase.
- a) Production of carbon dioxide and water b) Production of gluconic acid and hydrogen peroxide
- c) Release of oxygen and carbon d) Production of glucose and water
- (xv) Rapid diagnostic kits for HIV typically detect
- a) Antibodies b) Bacteria
- c) Viral RNA d) White blood cells

Group-B

(Short Answer Type Questions)

3 x 5=15

2. What are the advantages of using lateral flow immunoassays for Troponin T testing in POCT? (3)
3. What is the significance of specific reagent areas in urine dipsticks? (3)
4. Design a flow diagram for the basic principle and protocol of the HCG slide test. (3)
5. Define POCT and explain its significance in Medical Laboratory Technology (3)
6. Explain the significance of rapid results in POCT for biochemical parameters? (3)

OR

Explain the purpose of a Pregnancy test in clinical pathology. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Describe the principle of glucose estimation using a glucometer, including the chemical reaction involved and how it provides a glucose reading. (5)
8. Explain and judge why it is important to follow precautions when using a glucometer for glucose estimation. Provide specific precautions. (5)

9. Explain the significance of quality control in Point of Care Testing (POCT) for Troponin T, and (5) describe the steps involved in performing quality control for this test.
10. Explain the sample preparation process for rapid hemoglobin estimation, including the handling of blood samples and any necessary reagents. (5)
11. Prepare list about the precautions should be followed during urine analysis using dipsticks to ensure accurate results? (5)
12. Explain why rapid diagnosis is essential in the case of infectious diseases like COVID-19 and how it impacts public health responses. (5)

OR

Discuss to express the importance of quality control in laboratory automation and provide examples of quality control measures. (5)

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