



## BRAINWARE UNIVERSITY

Term End Examination 2024-2025

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

Course Name – Laboratory Automation

Course Code - BMLTS303

( Semester III )

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) Tell the condition when 13s Rule can be applied in a Westgard Rule setup -
  - a) To detect systematic errors
  - b) To identify random errors
  - c) To monitor long-term trends
  - d) To assess the accuracy of a single measurement
- (ii) Which type of analyzer is primarily focused on identifying relevant information from a given dataset?
  - a) Descriptive Analyzer
  - b) Comparative Analyzer
  - c) Inferential Analyzer
  - d) Evaluative Analyzer
- (iii) When would a liquid handling analyzer be most related in a laboratory automation setup
  - a) Analyzing chemical composition
  - b) Measuring pH levels
  - c) Dispensing precise volumes of liquids
  - d) Conducting microscopy studies
- (iv) State the main advantage of using a Levey-Jennings chart in quality control-
  - a) It provides a historical record of data.
  - b) It helps select appropriate statistical tests.
  - c) It explains the causes of data variation.
  - d) It relates data to quality control procedures.
- (v) State the primary purpose of using Westgard rules in quality control
  - a) To identify trends in data
  - b) To select appropriate statistical tests
  - c) To discuss quality control procedures
  - d) To detect errors and deviations in test results
- (vi) Discuss the primary purpose of Bactek automation in microbiology laboratories
  - a) To identify specific bacterial species
  - b) To select appropriate culture media
  - c) To discuss laboratory safety protocols
  - d) To streamline the processing of microbial samples
- (vii) Show the process by using Bactek automation enhance the accuracy of microbial identification compared to manual methods

- a) It introduces more opportunities for human error.      b) It eliminates the need for culture media.
- c) It standardizes the incubation and detection process.      d) It relies on subjective interpretation of results.
- (viii) Discuss the primary purpose of a colony counter in automation within a microbiology laboratory
- a) To identify bacterial species      b) To select appropriate culture media
- c) To count and record microbial colonies      d) To discuss laboratory safety protocols
- (ix) Cite the primary role of the side scatter (SSC) parameter in flow cytometry
- a) To count cells      b) To measure cell size
- c) To measure cell density      d) To measure fluorescence
- (x) Which of the following is a common use of an electrocardiogram (ECG) in clinical diagnostics
- a) To measure blood pressure      b) To count and analyze blood cells
- c) To assess heart rhythm and function      d) To analyze DNA sequences
- (xi) State the type of laboratory testing method which is more relatable for high-throughput testing scenarios
- a) Manual methods      b) Automated methods
- c) both manual and automated method      d) none of these
- (xii) In a clinical laboratory, choose the correct action that is required to maintain a clean and sterile work environment
- a) Analyze equipment calibration      b) Apply proper disinfection and sterilization techniques
- c) Interpret test results      d) Relate patient histories
- (xiii) When transporting a microbiology specimen, what should be applied to maintain the specimen's viability
- a) Freeze the specimen      b) Use a warm transport container
- c) Keep the specimen at room temperature      d) Use an appropriate transport medium
- (xiv) In an Internal QC program, state the purpose for using control material
- a) To clean laboratory instruments      b) To calibrate laboratory instruments
- c) To provide a known standard for testing      d) To maintain laboratory documentation
- (xv) Cite a relevant standard-setting organization often referenced in External QC programs for food safety.
- a) ISO 9001.      b) OSHA.
- c) FDA.      d) SEC

### Group-B

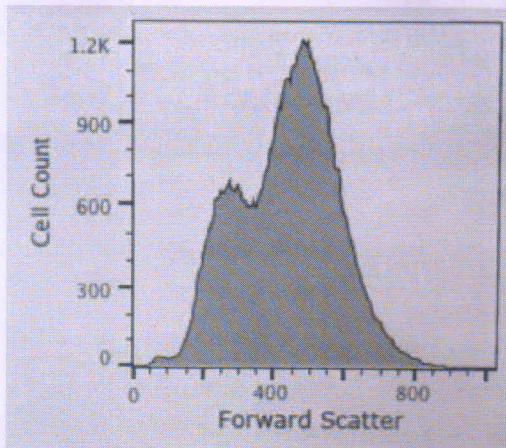
(Short Answer Type Questions)

3 x 5=15

2. Discuss the advantages of using auto analyzers in clinical laboratories (3)
3. Define internal quality control in the laboratory (3)
4. Define automation in a clinical laboratory. (3)
5. Describe the working process of barcode in an automated clinical laboratory (3)



6.

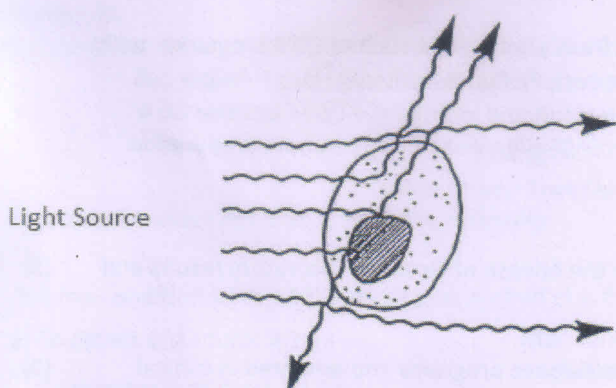


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(3)

Conclude the flowcytometry data

OR



(3)

Predict and describe Forward Scatter(FSC) and Side Scatter(SSC) of light source radiated from that cell

### Group-C

(Long Answer Type Questions)

5 x 6=30

7. Discuss Standard Operating Procedure (SOP) for conducting Troponin T testing using a lateral flow immunoassay method. (5)
8. Critique the ethical considerations related to the use of genetic testing in clinical laboratories and its impact on patient privacy. (5)
9. Explain the merits and demerits of laboratory automation in clinical settings. (5)
10. Explain how NABL address the validation and verification of test methods in clinical laboratories, and what procedures should laboratories follow to validate and verify their analytical methods to meet NABL standards (5)

