TEVETA
Technical Education, Vocational and Entrepreneurship Training Authority

DIPLOMA IN SCIENCE LABORATORY TECHNOLOGY

LEVEL 6 YEAR I EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATIONS

SITTING: JULY/AUGUST 2026

SUBJECT: LABORATORY MANAGEMENT AND ETHICS

TIME: THREE (3) HOURS **TOTAL MARKS: 100**

PASS MARK: 50

INSTRUCTIONS TO CANDIDATE

1. Write your Examination number and National Registration Card (NRC) number on the answer booklet provided. Ensure you append your signature in the space provided on the answer booklet.
2. Write the ANSWER SCRIPT SERIAL NUMBER on the examination register and on the entry slip.
3. This paper has TWO (2) Sections.
   - SECTION A: Answer ALL questions.
   - SECTION B: Question one (1) is compulsory. Answer ANY OTHER FOUR (4) questions.
4. Diagrams may be used where necessary to clarify your answer.
5. Cell phone and programmable calculators are not allowed in the examination room.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

SECTION A **TOTAL MARKS: 20**

ANSWER ALL BY CHOOSING THE BEST OPTION.

1. What is the primary goal of laboratory management?
   A. Increase profits
   B. Eliminate experiments
   C. Reduce staff
   D. Ensure safety and efficiency

2. Which of the following is a key component of laboratory organisation.
   A. Random storage
   B. Proper labelling
   C. Ignoring procedures
   D. Overcrowding

3. Calibration of laboratory equipment ensures ----------
   A. Accuracy
   B. Speed
   C. Time management
   D. Orderliness

4. Professional ethics can best be defined as:
   A. The legal requirements that govern laboratory operations
   B.A set of moral principles, values, and standards of conduct that guide the behavior of professionals in their work environment
   C. The financial regulations that control laboratory budgets
   D. The safety protocols established by the health and safety committee

5. A laboratory scientist discovers that a colleague has deliberately falsified experimental data to secure research funding. The MOST ethical course of action is to:
A. Ignore the situation to avoid conflict with the colleague
B. Confront the colleague privately and threaten to report them unless they confess
C. Report the concern through the appropriate institutional channels (e.g., line manager, research integrity officer)
D. Publish the data themselves to expose the fraud

6. Laboratory fraud is BEST defined as:
A. A deliberate act of deception, falsification, or misrepresentation of laboratory data or processes for personal or institutional gain
B. An unintentional error in recording a test result
C. A minor deviation from a standard operating procedure
D. The accidental loss of a laboratory document

7. Data integrity in a laboratory context refers to:
   A. The physical security of laboratory equipment
   B. The completeness, consistency, and accuracy of data throughout its lifecycle
   C. The aesthetic presentation of laboratory reports
   D. The speed at which data is generated

8. The primary difference between laboratory fraud and an improper practice is that:
   A. Fraud involves deliberate intent to deceive, while improper practice may be unintentional or result from negligence
   B. Fraud is always accidental, while improper practice is intentional
   C. Improper practice is a criminal offense, while fraud is not
   D. There is no difference; the terms are interchangeable

9. A student copies a section of a lab report from an online source without citation, such work is referred to as ---
   A. Collaboration
   B. Data falsification
   C. Plagiarism
   D. Referencing error

10. A technician ignores standard operating procedures and uses a short cut method, resulting in contaminated samples. What is the key challenge?
   A. Equipment failure
   B. Poor labelling
   C. Time management
   D. SOP violation

11. Which instrument uses all the various physical properties of mercury contained in a tube to measure the amount of air or atmospheric pressure?
   A. Pump
   B. Thermometer
   C. Galvanometer
   D. Mercury Barometer

12. Which of the following is a legal liability of a store keeper.
   A. Maintenance of laboratory apparatus.
   B. To issue materials only in required amounts
   C. Damaged items
   D. Clean and disinfect storeroom.

13.---------- are specific observable behaviours that effective managers exhibit.
   A. Administrative skills
   B. Managerial skills
   C. Thinking skills
   D. Cognitive skills

14. Which principle best explains the operation of a mercury barometer?
   A. Hydrostatic equilibrium between atmospheric pressure and mercury column.
   B. Pascal's principle
   C. Boyle's law
   D. Capillary action

15. Which practice is most critical for ensuring precise measurement with an analytical balance?
   A. Placing the balance near an open window
   B. Weighing hot samples immediately
   C. Allowing samples to reach room temperature
   D. Using large containers

16. A deioniser removes ions from water primarily through which process?
   A. Filtration
   B. Reverse Osmosis
   C. Ion exchange using resins
   D. Distillation

17. What is the main purpose of a laboratory distiller?
   A. To remove suspended particles only.
   B. To measure conductivity.
   C. To increase solution concentration.
   D. To separate components based on differences in boiling points.

18. What type of tax is excise duty?
   A. Indirect tax
   B. Direct tax
   C. Progressive tax
   D. Regressive tax

19. Which of the following best reflects a fundamental principle of Good Laboratory practice (GLP)?
   A. Maximising experimental speed regardless of documentation
   B. Ensuring data integrity, traceability, and reproducibility
   C. Minimising use of standard procedures
   D. Allowing informal recording of results.

20. Which measure is the most effective in preventing laboratory fraud?
   A. Avoiding replication of experiments
   B. Allowing unrestricted data editing
   C. Reducing supervision to increase independence
   D. Implementing audit trails and proper documentation system.

SECTION B **TOTAL MARKS: 80**

QUESTION ONE (1) IS COMPULSORY. ANSWER ANY OTHER FOUR (4) QUESTIONS.

QUESTION 1

a. State the importance of the following laboratory fittings. **[6 Marks]**
   i. Fume Cupboard (Fume Hood)
   ii. Eyewash Station
   iii. Gas Taps/Valves
b. Explain the key advantages of using artificial lighting in a laboratory. **[4 Marks]**
c. You are the laboratory manager, and a lecturer complains that students are frequently confusing the vacuum taps with the gas taps, leading to inefficient experiments and safety concerns.
   i. State the root cause of this problem in terms of bench fitting design. **[2 Marks]**
   ii. Describe:
   a. Two **(2)** specific safety measures to rectify this issue. **[4 Marks]**
   b. Importance of these safety measures in improving laboratory safety. **[4 Marks]**

TOTAL MARKS: 20

QUESTION 2

a. List two **(2)** types of water distillers. **[2 marks]**
b. Explain three **(3)** importance of laboratory balance room. **[9 marks]**
c. Explain two **(2)** factors which should be considered in designing a laboratory store room **[4 marks]**

TOTAL MARKS: 15

QUESTION 3

a. List three **(3)** features of a laboratory store. **[3 marks]**
b. State three **(3)** storage guidelines. **[6 marks]**
c. Explain two **(2)** legal liabilities of a storekeeper. **[6 marks]**

TOTAL MARKS: 15

QUESTION 4

a. List four **(4)** members of the basic staff of a typical laboratory except for the senior laboratory technologist (scientist). **[4 marks]**
b. State five **(5)** factors you would consider when formulating interview questions for a senior laboratory technologist position. **[5 marks]**
c. Explain two **(2)** specific consequences of poor staffing in a laboratory. **[6 marks]**

TOTAL MARKS: 15

QUESTION 5

a. Define Good Laboratory Practice (GLP). **[2 marks]**

b. Explain the;

i. Requirements for an organization to be GLP compliant. **[3 marks]**

ii. Different roles defined by GLP. **[3 marks]**

iii. Responsibilities defined by GLP. **[3 marks]**

c. As a manager of a laboratory interviewing candidates for a laboratory technician position. explain two key factors you would consider when asking questions and assessing the candidates. **[4 marks]**

TOTAL: 15 MARKS

QUESTION 6

a. Define an import. **[3 marks]**

b. List four **(4)** areas of emphasis of the Customs and Excise Act Chapter 322 of the Laws of Zambia. **[4 marks]**

c. Explain four **(4)** mandates of The Control of Goods Act Chapter 421 of The Laws of Zambia. **[8 marks]**

TOTAL MARKS: 15