TEVETA
Technical Education, Vocational and Entrepreneurship Training Authority

DIPLOMA IN SCIENCE LABORATORY

LEVEL 6 YEAR I EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATIONS

SITTING: JULY/ AUGUST 2026

SUBJECT: MATHEMATICS I

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

PASS MARK: 50

INSTRUCTIONS TO CANDIDATE

1. **Write your examination number and National Registration Card Number on the answer booklet provided. Ensure you append your signature in the space provided in the answer booklet.**
2. **Write the answer script serial number on the examination register and on the entry slip.**
3. **There are eight (8) questions in this paper. Answer any Five (5) questions.**
4. **Diagrams may be used where necessary to clarify your answer.**
5. **Cell phones and programmable calculators are not allowed in the examination room.**

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

QUESTION ONE

a) Simplify

$\sqrt{75} + 2\sqrt{12} + \sqrt{27}$ **[3marks]**

b) Rationalize the denominator

$\frac{2-3\sqrt{5}}{1-\sqrt{5}}$ **[5marks]**

c) Show that the root of the equation $ax^2 + bx + c = 0$ is given by $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

[7marks]

d) Solve the equation $2x^2 - x - 4 = 0$. **[5marks]**

[Total: 20marks]

QUESTION TWO

Resolve the following into partial fractions

a) $\frac{x-9}{(x+5)(x-2)}$ **[10marks]**

b) $\frac{1}{(x+3)^2(x-2)}$ **[10marks]**

[Total: 20marks]

QUESTION THREE

a) Evaluate $(5.2 \times 10^5)(4.8 \times 10^6)$ using scientific notation leaving your answer in scientific notation **[2marks]**

b) Write the repeating decimal $0.3\overline{7}$ as a fraction in its simplest form. **[5marks]**

c) Prove the identity $\sin x(\cot x + \tan x) = secx$ **[5marks]**

d) Solve the following equations for θ

$6\sin^2\theta + 7\ \sin\theta + 2 = 0$ for $0° \leq \theta \leq 360°$ **[8marks]**

[Total: 20marks]

QUESTION FOUR

a) The matrices **A**, **B** and **C** are given below in terms of the scalar constants a, b, c and d by

$$\boldsymbol{A} = \begin{pmatrix} -2 & 3 \\ 1 & a \end{pmatrix}, \boldsymbol{B} = \begin{pmatrix} b & -1 \\ 2 & -4 \end{pmatrix} \text{ and } = \begin{pmatrix} 1 & c \\ d & 4 \end{pmatrix}.$$

Given that $\boldsymbol{A} + \boldsymbol{B} = \boldsymbol{C}$, determine a, b, c and d **[6marks]**

b) The 2 × 2 matrices **A** and **B** that given by $\boldsymbol{A} = \begin{pmatrix} 4 & 3 \\ 1 & 0 \end{pmatrix}, \boldsymbol{B} = \begin{pmatrix} 2 & 1 \\ 5 & -4 \end{pmatrix}$

Determine

i) $\boldsymbol{A} \times \boldsymbol{B}$ **[5marks]**

ii) $\boldsymbol{B} - 2\boldsymbol{A}$ **[4marks]**

iii) $\boldsymbol{B}^{-1}$ **[5marks]**

[Total: 20marks]

QUESTION FIVE

Solve the system of equations below using either elimination, substitution or crammers rule

$$x + y + z = 50$$
$$3x + 4y + 2z = 160$$
$$2x + 3y + 3z = 130$$

[Total: 20marks]

QUESTION SIX

a) Simplify

$$\frac{x^7 y^3 x^2}{x^3 z^4}$$ **[3marks]**

b) Solve the following equations

i) $3^{5x-2} = 27^{2x+1}$ **[4marks]**

ii) $\log_4(x + 7) = 2\log(x - 3)$ **[6marks]**

iii) $9^{x+1} - 28(3^x) + 3 = 0$ **[7marks]**

[Total: 20marks]

QUESTION SEVEN

The line AB has equation $3x + 5y = 8$ and the point A has coordinates (6,-2).

a) Determine

i) The gradient and y-intercept of AB **[5marks]**

ii) An equation of the straight line which is perpendicular to AB and passes through A. **[5marks]**

b) The line AB intersects the equation $2x + 3y = 3$ at the point B.

Determine the

i) Coordinates of B. **[7marks]**

ii) Distance between A and B **[3marks]**

[Total: 20marks]

QUESTION EIGHT

A science laboratory technologist measured serum cholesterol levels (mml/L) of 60 patients attending a hospital laboratory. The results were grouped as follows:

Cholesterol Level (mml/L)	Frequency
3.0-3.9	4
4.0-4.9	8
5.0-5.0	14
6.0-6.9	16
7.0-7.9	10
8.0-8.9	8

a) Construct a cumulative frequency table **[5marks]**

b) Construct a cumulative frequency curve (mml/L) on graph paper. **[5marks]**

c) Use the cumulative frequency curve to estimate

i) The median cholesterol level **[3marks]**

ii) The lower quartile **[2marks]**

iii) The upper quartile **[2marks]**

d) Calculate the interquartile range **[3marks]**

[Total: 20marks]