

DIPLOMA IN SCIENCE LABORATORY TECHNOLOGY

LEVEL 6 -YEAR I EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATIONS

SITTING: NOVEMBER / DECEMBER 2025

SUBJECT: FOUNDATION MATHEMATICS

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 to append your signature in the spaces provided on the answer booklet.
2. Write your answer script serial number on the examination register provided and the entry slip.
3. There are Eight (8) questions in this paper. Answer Five (5) questions.
4. Diagrams may be used were 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) Compute $\frac{3.258\times10^2}{7.197\times10^4}$ **[3marks]**

b) Transpose the equation to make b the subject

$$V = m\left(\frac{1}{b} - \frac{5aR}{m}\right)$$ **[4marks]**

c) Solve $4x^2 - 11x + 3 = 0$ correct to 4 significant figures using completing the square method. **[6marks]**

d) The roots of the equation $2x^2 - 5x - 6 = 0$ are $\alpha \; and \; \beta$. Determine a quadratic equation whose roots are $\frac{1}{\alpha} \; and \; \frac{1}{\beta}$ **[7marks]**

[Total: 20marks]

QUESTION TWO

Below are the atomic weights of the three compounds:

- Methane, CH_4 has atomic weight 16,
- Glycerol, $C_3H_8O_3$ has atomic weight 92 and
- Water, H_2O has atomic weight 18.

If the linear system for each of the compounds is such that

$$C + 4H = 16$$
$$3C + 8H + 3O = 92$$
$$2H + O = 18$$

Using **crammers rule** determine the atomic weights of Carbon(C), Hydrogen(H) and Oxygen(O). **[20marks]**

[Total: 20marks]

QUESTION THREE

a) Determine the equation of the line that contains the point $(-1, -2)$ and is

i. parallel to line with equation $2x + 3y = 12$. **[5marks]**

ii. perpendicular to line with equation $2x + 3y = 12$. **[5marks]**

b) Resolve $\frac{x^2\text{-}x\text{-}13}{(x^2+7)(x-2)}$ into partial fractions. **[10marks]**

[Total: 20marks]

QUESTION FOUR

a) I. Determine the first four terms, in ascending powers of x, of the binomial expansion of $(1 + 2x)^7$. **[4marks]**

ii. Hence determine the coefficient of x in the expansion of $(1 + 2x)^7(3 + 2x)^4$ **[6marks]**

b) Convert

i. 11011_2 to a decimal number. **[5marks]**

ii. 0.40625_{10} to a binary number **[5marks]**

[Total: 20marks]

QUESTION FIVE

a) Convert $45°$ to radian measure. **[2marks]**

b) Prove the identity

$sin\theta(cot\theta + tan\theta) = sec\theta$ **[5marks]**

c) Solve ; $8sin^2x + 2sinx - 1 = 0$ **[7marks]**

d) In triangle ABC, a=4cm, A=34°, and B=45°.

Determine

i. Angle C. **[2marks]**

ii. b. **[2marks]**

iii. c. **[2marks]**

[Total: 20marks]

QUESTION SIX

a) Express $\frac{2+\sqrt{3}}{1-\sqrt{3}}$ in the form $a + b\sqrt{3}$. **[4marks]**

b) $f(x) = x^3 + ax^2 + bx + 4$ and $f(x)$ is exactly divisible by x-2. If the remainder is -24 when $f(x)$ is divided by x+2, determine

i) the value of a and b. **[8marks]**

ii) factorise the $f(x)$. **[8marks]**

[Total: 20marks]

QUESTION SEVEN

a) Given a circle with equation $x^2 + y^2 - 6x + 4y - 3 = 0$

Determine

i. The center. **[5marks]**

ii. The radius. **[3marks]**

b) The $6th$ term of an AP is 17and the 13th term is 38. Determine the 19th term **[8marks]**

c) Determine the sum of the first 12 terms of the series 5,9,13,17. **[4marks]**

[Total: 20marks]

QUESTION EIGHT

a) Given that $\boldsymbol{p} = 3\boldsymbol{i} - 2\boldsymbol{j} + \boldsymbol{k}$ and $\boldsymbol{q} = 4\boldsymbol{i} + 7\boldsymbol{j} - 2\boldsymbol{k}$, determine

i. $4\boldsymbol{p} + \boldsymbol{q}$ **[3marks]**

ii. $5\boldsymbol{p} - 2\boldsymbol{q}$ **[3marks]**

iii. $\boldsymbol{p} \times \boldsymbol{q}$ **[6marks]**

b) Solve the following equations

i. $4^{5-9x} = \frac{1}{8^{x-2}}$ **[3marks]**

ii. $2\log_9\sqrt{x} - \log_9(6x - 1) = 0$ **[5marks]**

[Total: 20marks]