SECTION A: MATHEMATICS

PART I (24 marks)

Answer ALL the questions in this part.

1. Simplify $\dfrac{7^{-3} \times 3^4}{3^2 \times 7^5 \times 5^{-2}}$, expressing the answer with positive indices. (3 marks)

2. Express 47 seconds as a percentage of 5 minutes. (2 marks)

3. Express $\dfrac{12}{17}$ as a decimal correct to 3 significant figures. (2 marks)

4. A water tank is 2 m long 75 cm wide and 50 cm high. Determine the:

   (a) capacity of the tank in litres; (2 marks)

   (b) wetted area when the tank is $\dfrac{3}{4}$ full. (2 marks)

5. The length of a rectangular box with square ends is 15 cm greater than the breadth. If the total length of the edges is 2.04 m, determine the dimensions of the box. (4 marks)

6. Solve the simultaneous equations:

$$2x - y = 4$$
$$x + y = 5$$

   (4 marks)

7. Make G the subject of formular in the equation $\nu = \dfrac{K + \frac{4}{3}G}{P}$. (2 marks)

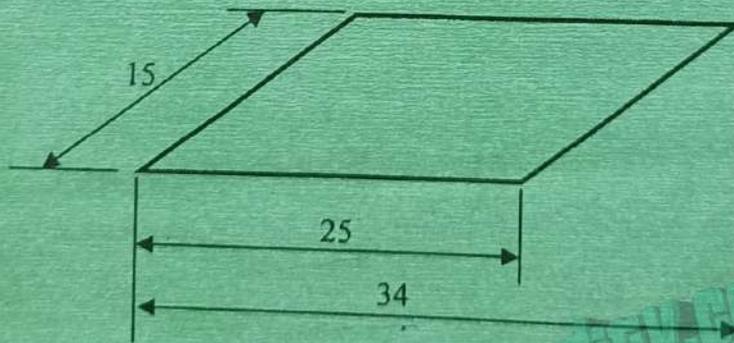8. Determine the area of the parallelogram shown in Figure 1 if all the dimensions are in millimetres. (3 marks)

Fig. 1

0101/215   0202/215   0305/215   2
0103/215   0301/215   0401/215
0105/215   0302/215   0402/215
0106/215   0304/215   0404/215
                      0405/215
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*Answer any **TWO** questions from this part.*

9. (a) A hollow shaft 1.8 m long has an outside diameter of 4.9 cm and an inside diameter of 2.8 cm. Determine the cross sectional area of the shaft. (3 marks)

    (b) A square right pyramid has a base of sides 5 cm and a vertical height of 12 cm. Determine the:

        (i)   volume;
        (ii) total surface area. (5 marks)

10. (a) The following set of data refers to the lengths of sticks. Determine the mean, median and mode.

        27.90, 34.70, 54.40, 18.92, 47.60, 39.68 (5 marks)

    (b) Triangle DEF has sides DE = 8, EF = 17 and DEF = 90°. Determine sin EDF. (3 marks)

11. (a) The roots of a quadratic equation are 8 and -2. Determine the equation. (2 marks)

    (b) Without plotting a graph, determine the gradient and the y-axis intercept for the equation $y - 2 = 4x + 9$. (3 marks)

    (c) Two aircrafts leave an airfield at the same time. One travels due north at an average speed of 300 km/h and the other due west at an average speed of 220 km/hr. Calculate their distance apart after 4 hours. (3 marks)

SECTION B: SCIENCE

PART I (24 marks)

Answer ALL questions from this part.

12. State the units of measurement for each of the following:

    (a) pressure;
    (b) luminous intensity. (2 marks)

0101/215   0202/215   0305/215   3   **Turn over**
0103/215   0301/215   0401/215
0105/215   0302/215   0402/215
0106/215   0304/215   0404/215
                        0405/215

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SECTION A: MATHEMATICS

PART I (24 marks)

Answer ALL the questions in this part.

1.   Solve the equation $\frac{3x}{5} - \frac{x}{2} = \frac{1}{2}$.   (3 marks)

2.   Figure 1 shows a quadrant of radius 14 cm. Determine the area of the shaded part.   (3 marks)
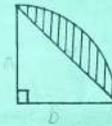

Fig. 1

3.   6 kg of tea of a certain grade is mixed with 3 kg of tea costing Sh. 27 more per kg. The value of the mixture is Sh. 100 per kg. Calculate the cost of the cheaper tea.   (3 marks)

4.   Solve the equation $b^2 - 3b - 4 = 0$.   (3 marks)

5.   A dress is sold at Sh. 1,800. The profit made is Sh. 300. Calculate the percentage profit.   (3 marks)

6.   A certain sum of money is sufficient to pay the wages of 18 people for 20 days. If each person is given the same daily wage, determine the number of days the same amount will be sufficient to pay 24 people.   (3 marks)

7.   Make U the subject of the formula

$$S = \frac{1}{2}(U + V)t$$

(3 marks)

8.   Without using a calculator, evaluate $\frac{8(5^3 - 3^3)}{2^3 - 8 \div 2}$ (3 marks)

SECTION A: MATHEMATICS

PART I (24 marks)

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6. Solve the simultaneous equations:

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   $x + y = 5$ (4 marks)

7. Make G the subject of formular in the equation $\nu = \dfrac{K + \frac{4}{3}G}{P}$. (2 marks)

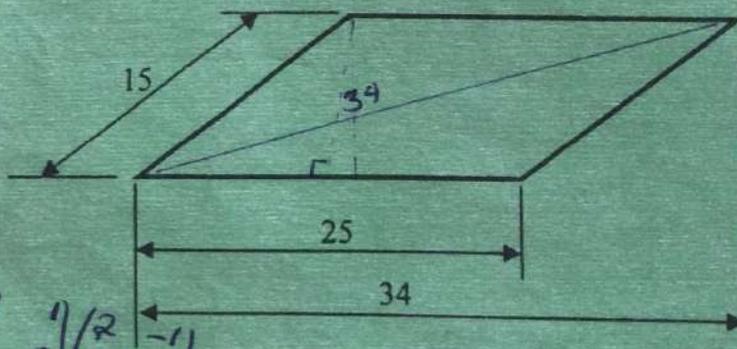8. Determine the area of the parallelogram shown in Figure 1 if all the dimensions are in millimetres. (3 marks)

15   34   25   34

Fig. 1

0101/215   0202/215   0305/215
0103/215   0301/215   0401/215
0105/215   0302/215   0402/215
0106/215   0304/215   0404/215
                      0405/215

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Handwritten working:

$\left(\begin{smallmatrix} 1 \\ -1 \end{smallmatrix} \; \begin{smallmatrix} 1 \\ 2 \end{smallmatrix} \right) \left(\begin{smallmatrix} 2 \\ 1 \end{smallmatrix} \; \begin{smallmatrix} -1 \\ 1 \end{smallmatrix} \right)$

$1 \times 2 + -1 \times 1 \quad 1 \times 1 + 1 \times 1$
$-1 \times 2 + 2 \times 1 \quad -1 \times 1 \times 1 \times 2 \times 1$

$\left(\begin{smallmatrix} 4 \\ 5 \end{smallmatrix} \right) \left(\begin{smallmatrix} 1 & 1 \\ -2 & 2 \end{smallmatrix} \right)$

4G

$\nu = \dfrac{K + \frac{4}{3}G}{P}$

$\nu P = K + \frac{4}{3}G \quad \frac{4}{3}G = \nu P - K$

$3 \times \frac{4}{3}G = (\nu P - K) \times 3$