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G.325

DAY VOCATIONAL CERTIFICATE EXAMINATIONS, 1971

MATHEMATICS—PAPER II

TUESDAY, 15th JUNE—9.30–11.30 a.m.

Instructions

(*a*) Answer any *five* questions.
(*b*) All working must be clearly set out in your answer book.
(*c*) Mathematical Tables and squared paper are available from the Superintendent.
(*d*) All questions carry equal marks.

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1. A hallway floor, 6 metres long and 1·6 metres wide, is to be covered with square tiles of side 20 cm. The tiles are sold in packages of 20 and are marked at £1 per package.
   (i) How many packages of tiles must be purchased in order to tile the entire floor?
   (ii) What will be the total price, excluding tax, of these tiles?
   (iii) How much tax will have to be paid on the tiles if it is charged at the rate of 5% on the marked price?
   (iv) If labour and extras amount to £2·40, what is the total cost of tiling the floor?

2. (*a*) Use logarithms or a slide rule to evaluate

$$\frac{82 \times (8{\cdot}46)^2}{37{\cdot}9}$$

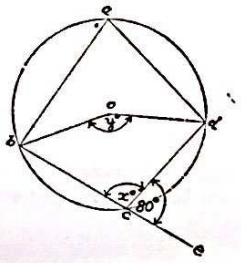
   (*b*) Without using tables or a slide rule calculate the square root of 78 correct to three significant figures.

3. (*a*) If $U = \{p, q, r, s, t, u, v\}$, $A = \{q, s, t, v\}$ and $B = \{p, s, r, v\}$, list the elements of each of the following sets:
   (i) $A \cup B$, (ii) $A \cap B$, (iii) B', (iv) $A \backslash B$, (v) $(A \cap B)'$.
   (*b*) Of the 30 students in a certain class 20 had read "The Islander" and 14 had read "Twenty Years a-Growing." 8 of these students had read both books. How many students had read
   (i) "The Islander" but not "Twenty Years a-Growing",
   (ii) "Twenty Years a-Growing" but not "The Islander",
   (iii) Neither "The Islander" nor "Twenty Years a-Growing".

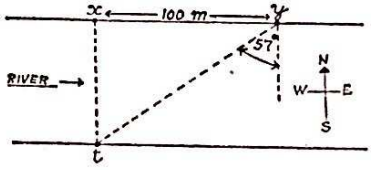
4. Find the solution set of each of the following:
   (i) $3x - 2(2x + 5) = 7(2 - x)$;
   (ii) $\left.\begin{aligned} x - 3y &= 8 \\ 2x + y &= 2 \end{aligned}\right\}$;
   (iii) $x^2 - 3x + 2 = 0$.

5. (*a*) Use the "less than" symbol, $<$, to order the elements in the set $\{\frac{5}{6}, \frac{2}{3}, \frac{1}{2}\}$.
   (*b*) If $x \in N$ show on the number line the solution set of $\{x \mid 2x + 1 < 9\} \cap \{x \mid 2 \leqslant x \leqslant 7\}$.
   (*c*) Plot the solution set of $\{(x, y) \mid x + y = 2\}$ where x and y are integers and $-2 \leqslant x \leqslant 2$.

6. (*a*) Prove that the sum of the opposite angles of a cyclic quadrilateral equals two right angles.
   (*b*) The point O is the centre of the circle shown and a, b, c, d are points of this circle. e lies on the line bc. If the angle dce is 80° calculate the values of x and y.



7. A river runs from west to east between parallel banks. To find the width of the river a boy picks out a tree, t, on the far bank and goes to a point x directly across the river from t. He then walks 100 metres east to a point y and measures the bearing of t from y as 57° west of south. Use trigonometrical tables to calculate the width of the river to the nearest metre.
   What is the distance of t from y?



8. Of the 630 students who attend a post-primary school 186 are in First Year classes, 108 are in Second Year classes, 164 are in Third Year classes, 100 are in Fourth Year, 40 are in Fifth Year and 32 are in Sixth Year. Draw up a table showing this information and add another column showing the numbers in each year rounded off to the nearest ten. Then, using squared paper, draw a suitable bar-chart representing this information as accurately and as neatly as you can.