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LEAVING CERTIFICATE EXAMINATION, 1955

MATHEMATICS—Algebra—Pass.

TUESDAY, 14th JUNE.—MORNING 10 TO 12.30.

All questions to be answered.

Mathematical Tables may be obtained from the Superintendent

1. Solve the equations

$$\left. \begin{array}{l} 4x^2 + 4xy + y^2 = 25 \\ 4x + y = 1 \end{array} \right\}$$

[25 marks.]

2. Factorise fully each of the following :

(i) $a^2 + 2ac - b^2 + 2bc$;

(ii) $6x^3 + 17x^2 - 2x - 21$;

(iii) $a^2(b-c) + b^2(c-a) + c^2(a-b)$.

[25 marks.]

3. A firm employs two men, A and B, at commencing salaries of £200 per annum and £150 per annum, respectively. A's salary is to be increased each year by £10 per annum, while B's salary is to be increased each year by £15 per annum. When will B's salary for a year equal A's salary for the same year ?

After how many years will the total sum which B has received equal the total sum which A has received, and after how many years will B have received in all £250 more than A ?

[30 marks.]

4. Show that the sum to n terms of the series a, ar, ar^2, \dots is

$$\frac{a(1-r^n)}{1-r}$$

The sum of the first three terms of a geometric series is 21, and the sum of the first six terms is 189. Find the common ratio and, also the first term of the series.

[30 marks.]

5. (a) Solve the equation: $x - 9\sqrt{x+2} = 8$;

(b) If $x = 11 - \sqrt{72}$, find the value of $\frac{1}{\sqrt{x}}$, correct to two decimal places.

[30 marks.]

6. (i) Prove that $\log_a x = \frac{\log_b x}{\log_b a}$.

If $\log_2 3 = p$ and $\log_3 5 = q$, prove that $\log_2 5 = pq$.

(ii) If $\log_2 x = a$, and $\log_4 8x = b$, show that $a - 2b + 3 = 0$.

[30 marks.]

7. Draw the graph of the function $(x^2 - 1)(x - 3)$ for values of x from -2 to $+4$.

Using your graph solve the equations:—

(i) $(x^2 - 1)(x - 3) = 2$;

(ii) $(x^2 - 1)(x - 3) = x$.

[30 marks.]