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(Department of Education)

LEAVING CERTIFICATE EXAMINATION, 1960.

MATHEMATICS—Algebra—Pass.

TUESDAY, 14*th JUNE.*—Morning, 10 to 12.30.

All questions to be answered.

Mathematical Tables may be obtained from the Superintendent.

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1. Solve the simultaneous equations

$$\left.\begin{array}{l} x^2 - xy - 2y^2 + 5x - 2y = 16 \\ x^2 - xy - 2y^2 + 2x - y = 9 \end{array}\right\}$$

[25 marks.]

2. Factorise fully

   (i) $a^2 - 10ab - 24b^2$,

   (ii) $6x^3 - x^2 - 10x - 3$,

   (iii) $x(y^2 - z^2) + y(z^2 - x^2) + z(x^2 - y^2)$.

[25 marks.]

3. (i) The sum of the first three terms of an arithmetical progression is 15 and the sum of the first four terms is 26. Find the first term and the common difference.

  (ii) Find the sum to n terms of the geometrical progression 3, 6, 12, ... and show that it is less than twice the nth term.

[30 marks.]

4. (i) Find the values which the coefficients A, B, C must have if
$$x^2 + 2x + 5 = A(x-1)^2 + B(x+1)^2 + C(x^2 - 1)$$
is to be an identity.

  (ii) Express $\dfrac{1}{\sqrt{5} - \sqrt{2}}$ and $\dfrac{1}{1 + \sqrt{2} + \sqrt{3}}$ as fractions having rational denominators.

[30 marks.]

5. Write down the values of $\log_3 27$, $\log_4 8$, $\log_{10} 1$, $\log_2 \frac{1}{2}$.

Denoting $\log_{10} 2$ by a express each of the following in terms of a without using the Tables: $\log_{10} 8$, $\log_{10} 80$, $\log_8 80$.

If $\log_{10} x = 1 + p$ and $\log_{10} y = 1 - p$, find the value of xy.

[30 marks.]

6. A train leaves P to travel to Q at x m.p.h. and at the same time another train leaves Q to travel to P at $(x+5)$ m.p.h. The trains meet t hours later at R. Express the distances PR, RQ in terms of x and t.

If the first train takes 4 hours to travel from R to Q and the other train takes $2\frac{1}{4}$ hours to travel from R to P, find the values of x and t and the distance PQ.

[30 marks.]

7. Draw a graph of the function $x^3 - 5x - 1$ for values of x from -3 to $+3$.

Write an account of how the function varies in sign and in magnitude as the value of x varies from -3 to $+3$.

[30 marks.]