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(Department of Education).

LEAVING CERTIFICATE EXAMINATION, 1951.

MATHEMATICS—Algebra—Pass.

TUESDAY, 12th JUNE.—MORNING, 10 TO 12.30.

Six questions may be answered.

All questions are of equal value.

Mathematical Tables may be obtained from the Superintendent.

1. Solve for x and y the simultaneous equations :

$$\left. \begin{array}{l} 3x+2y=5 \\ x^2-3xy+y^2=31 \end{array} \right\}$$

2. Factorise

(i) $4x^4-(x-1)^2$;

(ii) $6x^3+7x^2-14x-15$;

(iii) $ab(a+b)+bc(b+c)+ca(c+a)+2abc$.

3. Prove the formula for the sum of n terms of an Arithmetical Progression.

The n th term of an Arithmetical Progression is $3n-1$: show that the first term is 2 and the common difference 3 and find the sum of the first 100 terms.

4. Two boys, A, B, left P at the same time and cycled at uniform speeds to Q, 10 miles from P. A, cycling three miles per hour faster than B reached Q 10 minutes before B: find A's speed.

5. If $x = \frac{3+\sqrt{5}}{3-\sqrt{5}}$, prove that $x^2-7x+1=0$ and find the value of $x^3-7x^2+3x-10$ in simplest surd form.

Or,

5. If $a+b+c=0$, prove that $a^3+b^3+c^3=3abc$.

Hence solve the equation

$$\sqrt[3]{x-1} + \sqrt[3]{x-2} + \sqrt[3]{x+3} = 0.$$

6. Prove that (i) $\log_a \sqrt[n]{b} = \frac{1}{n} \log_a b$;

$$(ii) \log_x y = \frac{1}{\log_y x}.$$

Using Tables, find the value of $\log_{2.73} 10,000$.

Or,

6. If a is the first term and r the common ratio of a Geometrical Progression, write down the first five terms and the n th term.

The product of the first three terms of a Geometrical Progression is equal to 8 and the product of the third, fourth and fifth terms is equal

to $\frac{729}{512}$: find the first term and the common ratio.

7. Draw the graph of the expression $x(x+3)(x-2)$ from $x=-4$ to $x=4$.

From the graph find approximately the maximum value and the minimum value of the expression and the corresponding values of x .