

## LEAVING CERTIFICATE EXAMINATION, 1964.

## MATHEMATICS—ALGEBRA—PASS.

TUESDAY, 9th JUNE — Morning, 10 to 12.30.

All questions to be answered.

Mathematical Tables may be obtained from the Superintendent.

1. Solve the simultaneous equations

$$\begin{aligned}x^3 + y^3 &= 9, \\x + y &= 3.\end{aligned}$$

(25 marks.)

2. (i) Factorise
- $x^2 + 11x - (a^2 - 13a + 12)$
- .

(ii) If  $(x + 3)$  and  $(x + 4)$  are factors of the expression  $x^3 + px^2 + qx + 72$ , find the value of  $p$  and the value of  $q$  and factorise the expression fully.

(25 marks.)

3. In an arithmetical progression the fifth term is equal to the square of the second term and the eighth term is three times the third term. Find the first term and the common difference.

Given that  $p, q, r$  are in geometrical progression, prove that  $\log p, \log q, \log r$  are in arithmetical progression.

(30 marks.)

4. A shopkeeper bought a certain number of articles, each at the same price, for 30s. 0d. He sold all except two of the articles and made one penny profit on each one he sold. He made a total profit of 9s. 4d. Find how many articles he bought and the selling price of each.

(30 marks.)

5. The first term of a geometrical progression is
- $\frac{1}{8}$
- . The difference between the sixth and fourth terms is twice the difference between the fifth and third terms. Find the sum of the first 10 terms.

If the sum of the first  $n$  terms is less than  $2^{30}$ , find the largest value of  $n$ .

(30 marks.)

6. (i) Solve the equation
- $x - \sqrt{x-1} = 1$
- .

(ii) Express  $\sqrt{7 - \sqrt{24}}$  in the form  $\sqrt{x} - \sqrt{y}$ .

(iii) Write down the value of each of the following:

$$\log_2 16, \log_{\frac{1}{4}} 4, \log_{\frac{1}{4}} \frac{1}{2}, \log_{(a-1)} (a^2 - 2a + 1).$$

(30 marks.)

7. Draw a graph of
- $\frac{24}{x}$
- for values of
- $x$
- from +1 to +6.

Using the same axes and the same scale draw a graph of  $x^2$  from  $x = 0$  to  $x = 4$ .Find as accurately as you can from your graphs the value of  $\sqrt[3]{24}$ .

(30 marks.)