

# AN ROINN OIDEACHAIS

(Department of Education).

LEAVING CERTIFICATE EXAMINATION, 1952.

## MATHEMATICS—Algebra—Pass.

TUESDAY, 17th JUNE.—MORNING, 10 TO 12.30.

Six questions may be answered.

Mathematical Tables may be obtained from the Superintendent.

1. Solve the following equations, giving the answers correct to two places of decimals :

(i)  $3x^2 - 7x + 3 = 0$  ;

(ii)  $3(2x - 5)^2 - 7(2x - 5) + 3 = 0$  ;

(iii)  $12x^4 - 14x^2 + 3 = 0$ .

[33 marks.]

2. Factorise fully :

(i)  $6x^3 - 11x^2 - x + 6$  ;

(ii)  $a(b^2 - c^2) + b(c^2 - a^2) + c(a^2 - b^2)$  ;

(iii)  $a^3(b - c) + b^3(c - a) + c^3(a - b)$ .

[33 marks.]

3. Two numbers are expressed by the same two digits in different orders. The sum of the numbers is 143, and the sum of the squares of the digits exceeds the product of the digits by 49. Find the numbers.

[33 marks.]

4. The 10th term of an A.P. is 26 and the 25th term is 71. Find the first three terms, the  $n$ th term and the sum of the first 100 terms.

How many terms of the series must be taken so that their sum is 1026 ?

[33 marks.]

5. If  $x=49-20\sqrt{6}$ , express  $\sqrt{x}$  in simplest surd form, and simplify

$$\frac{1}{\sqrt{x}} + \frac{1}{\sqrt{98-x}}$$

[33 marks.]

6. In a geometrical progression the sum of the second and third terms is  $-18$ , and the sum of the third and fourth terms is  $12$ . Find the first term, the common ratio, and the sum of the first eight terms.

[34 marks.]

7. If, for all values of  $x$ ,

$$\frac{3x^2+2x-2}{(x-2)(x^3-1)} = \frac{A}{x-2} + \frac{B}{x-1} + \frac{Cx+D}{x^2+x+1}$$

A, B, C, D being independent of  $x$ , find the values of A, B, C, D.  
Check your answer for  $x=0$ .

[34 marks.]

Or

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

Find from your graph the range of values of  $x$  in that interval for which the function  $x^3-3x$  is (a) positive, (b) negative.

Find, also, from your graph the roots of the equations : (i)  $x^3-3x=0$ ,  
(ii)  $x^3-3x=1$ .

[34 marks.]