AN ROINN OIDEACHAIS M.38

INTERMEDIATIATE CERTIFICATE EXAMINATION, 1968

MATHEMATICS (Algebra)

FRIDAY, 14th JUNE - Afternoon, 2.30 to 5

ALL questions to be answered

Mathematical Tables may be obtained from the Superintendent

1. (a) Solve the equation $\frac{1}{2}(2x - 5) - \frac{2}{3}(x - 1) = 1$.

(b) Solve the simultaneous equations:

$2x + 3y = 1$,

$3x - 4y = 10$.

(26 marks)

2. Denoting John's age by x and James' age by y express each of the following statements in terms of x and y:

(i) John's is 12 years older than James;

(ii) John's age if four times that of James';

(iii) one year ago John was five times older than James then was;

(iv) in eight years time James will be half as old as John will be.

(28 marks)

3. (a) Find correct to two places of decimals the values of x which satisfy the equation $2x^2 - 5x - 1 = 0$.

(b) Find the values of a and b such that $x^2 - 3 = a(1 - x^2) + b(2 - x^2)$ will be an identity.

(28 marks)

4. (a) Factorise $16 - (x - a)^2$.

(b) If $x + 1$ is a factor of $2x^3 - 9x^2 + 4x + p$, find the value of p and factorize the expression fully.

(c) Show that $x = 1 + \sqrt{2}$ satisfies the equation $x^3 - x^2 - 3x - 1 = 0$.

(28 marks)

5. Using the same axes and the same scales plot the graph of $x^2 - 2x - 5[= y]$ and the graph of $-2x[= y]$ for values of x from -3 to $+4$.

Using either or both of the graphs where necessary

(a) solve the equations $x^2 - 2x - 5 = 0$ and $x^2 - 2x - 4 = 0$,

(b) evaluate $\sqrt{5}$; (explain your method).
[Give your answers as accurately as your graphs allow.]

(30 marks)

6. An express train does a journey of 351 miles at uniform speed. If the speed were increased by 2 miles per hour, the time for the journey would be decreased by one-quarter hour. Find the speed of the train.

(30 marks)

7. (a) Prove that $\log_a(mn) = \log_a m + \log_a n$.

(b) Solve each of the following equations:

(i) $2\log x = \log 5 + \log(4x - 15)$;

(ii) $2^{2x+1} - 9(2^x) + 4 = 0$.

(30 marks)