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LEAVING CERTIFICATE EXAMINATION, 1934.

PASS.

MATHEMATICS
(ALGEBRA)

MONDAY, 18*th* *JUNE*.—AFTERNOON, 3.30 TO 6 P.M.

Seven questions may be answered. 9 (*a*) or 9 (*b*) may be answered, but not both.

Mathematical Tables may be obtained from the Superintendent.

1. Solve the equations :

(i) $$\left.\begin{aligned} xy &= 80 \\ \frac{1}{x} - \frac{1}{y} &= \frac{1}{5} \end{aligned}\right\}$$

(ii) $$\frac{1}{x-a} + \frac{1}{x-b} = \frac{1}{a} + \frac{1}{b}.$$

[28 marks.]

2. Factorise as fully as possible :

(i) $6x^3-13x^2-21x+18$.

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

[28 marks.]

3. Explain why $\log_{10}346{\cdot}7$ and $\log_{10}3{\cdot}467$ have the same mantissa. Solve the equation : $\log(35-x^3) = 3\log(5-x)$.

[28 marks.]

4. Solve the equation $lx^2+mx+n=0$, and express in simplest form the difference of the roots.

Find for what values of n the equation $3x^2-10x+n=0$ has real roots. When are these real roots (i) both positive ; (ii) one positive, and the other negative ?

[28 marks.]

5. 25 Arithmetic Means are inserted between -5 and 47: find their sum.

How many terms of the series thus formed beginning with -5 should be taken to give a sum of 280?

[28 marks.]

6. Insert *two* Geometric Means between 2 and $6\frac{3}{4}$.

Assuming that p, q, l, m, are successive terms of a Geometrical Progression, prove that $(p+m)(q+l)-(p+l)(q+m)=(q-l)^2$.

[29 marks.]

7. Prove that $\sqrt{\dfrac{a^2+b^2}{2}}$, $\dfrac{a+b}{2}$, $\sqrt{ab}$ are in descending order of magnitude, where a and b are any positive and unequal quantities.

[29 marks.]

8. The expression px^2+qx+r has the values -2, 3, 38, when x has the values 1, 2, -3 respectively. Determine the values of p, q, r, and find the minimum value of the expression.

[29 marks.]

9 (*a*) If $a+b+c=0$, prove that

$$\left[\frac{b-c}{a}+\frac{c-a}{b}+\frac{a-b}{c}\right]\left[\frac{a}{b-c}+\frac{b}{c-a}+\frac{c}{a-b}\right]=9.$$

[29 marks.]

or,

9. (*b*) Write down the first *four* terms and the rth term of the expansion of $\left(1+\dfrac{1}{a}\right)^n$.

Assuming that the expansion holds for all values of n, express $\sqrt[5]{33}$ in the form $b\sqrt[5]{1+\dfrac{1}{a}}$, and find its value to four significant figures.

[29 marks.]