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INTERMEDIATE CERTIFICATE EXAMINATION, 1926.

MATHEMATICS (I).

THURSDAY, 17*th* *JUNE*.—Morning, 10 a.m. to 12.30 p.m.

Seven questions may be answered. Somewhat higher marks will be awarded to the questions at the end of the paper.

Logarithmic Tables may be obtained from the Superintendent.

1. Simplify the result of substituting $x = \frac{3ab}{a-b}$ in

$$\frac{1}{x-2b} + \frac{2}{x+a} + \frac{1}{a}.$$

2. Solve the equations :—

$$(a) \quad \frac{3x-5}{5(x-1)} + \frac{7-3x}{7(1+x)} = \frac{1}{35\left(1-\frac{1}{x}\right)} + \frac{1}{7}$$

$$(b) \quad \left.\begin{aligned} ax + \frac{b}{y} &= 2ab \\ bx + \frac{a}{y} &= a^2 + b^2 \end{aligned}\right\}$$

3. If $\frac{7x+13}{43}$ exceeds $\frac{3x-5}{20}$ by unity, show that these quantities represent consecutive integers and find the integers.

4. If $a^2 = b^2 + c^2 - 2bc\text{Q}$, resolve $4b^2c^2(1-\text{Q}^2)$ into four factors not involving Q.

5. State the *Remainder Theorem*.

Find values of a and b so that

$$x^3 + ax^2 + bx - 6$$

may be divisible by $x-2$ and by $x+3$.

6. Graph on the same axes and with the same scales, $x - 1\cdot27$ and $\dfrac{0\cdot67}{x}$

Hence solve the equation

$$x^2 - 1\cdot27x - 0\cdot67 = 0$$

and verify the solution otherwise.

7. A man being asked his age replies, "The product of my digits gives a number which was my age 12 years ago. If you reverse my digits, the number formed will be my age 54 years hence." How old is he?

8. Prove that $\log_a MN = \log_a M + \log_a N$.

Use your tables to evaluate

$$\text{(i).}\quad \frac{17\cdot86 \times 0\cdot8625}{\cdot00437 \times 9\cdot8647}$$

$$\text{(ii).}\quad \frac{\sqrt[5]{3}}{\sqrt[3]{5}}$$

9. ABC is an equilateral triangle of unit side. Points P, Q, R, are taken in order on the sides such that $AP = BQ = CR = x$.

Find an expression for the area of triangle PQR. Find x if $\triangle PQR = n \triangle ABC$ and hence find n in order that $\triangle PQR$ may be as small as possible.