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INTERMEDIATE CERTIFICATE EXAMINATION, 1933

MATHEMATICS (Algebra).

TUESDAY, 20th JUNE.—AFTERNOON, 3.30 P.M. TO 6 P.M.

The total number of questions answered should not exceed *seven*.

(Candidates should see that answers to questions in excess of *seven* are cancelled.)

Mathematical Tables may be obtained from the Superintendent.

1. Find the value of

$$\frac{x^2+3x-4}{x^2+2x-8} \times \frac{2x^2-x-6}{3x^2-x-2} \text{ when } x=2\frac{2}{3}.$$

[25 marks.]

2. Solve the equation $3x^2-7x-1=0$, giving your results to two places of decimals.

[25 marks.]

3. A bus is timed to do a journey of x miles in y hours. It travels for a hours at the rate of b miles per hour: how much farther has it to go? At what speed must the remainder of the journey be done so that the whole journey may be completed in the time allowed?

[25 marks.]

4. Factorise as fully as possible:

(i) $a^2(b-c)+b^2(c-a)$.

(ii) $(p+q)^3-(p-q)^3$.

(iii) x^4+4x^2+16 .

[27 marks.]

5. Solve for x and y :

$$\left. \begin{aligned} \frac{3}{2x} + \frac{4}{3y} &= -1. \\ \frac{2}{3x} + \frac{1}{9y} &= 1. \end{aligned} \right\}$$

[27 marks.]

6. Two boys, P and Q, started together to run from school to a shop, 273 yards distant, and back. P, returning, met Q 21 yards from the shop and reached the school $19\frac{1}{2}$ seconds before him. Find P's time.

[28 marks.]

7. A triangle ABC is right-angled at C; its perimeter is 60 ins., and AB is 2 ins. longer than AC. Find the length of each of the sides and the perpendicular drawn from C to AB.

[28 marks.]

8. Define "logarithm of a number n to a base b ," and hence prove that

$$\log_b \frac{xy}{z} = \log_b x + \log_b y - \log_b z.$$

(i) Solve the equation:

$$\log_{10}(3x+7) + \log_{10}(2x+8) - \log_{10}(x+1) = 2.$$

[30 marks.]

9. Solve the equation $x^2 - 4x + 1 = 0$.

Find the value of the expression $(2x-5)(x^2-4x+1)+8$ when (i) $x=2+\sqrt{3}$. (ii) $x=2-\sqrt{3}$. What other value of x would give this same value to the expression?

[30 marks.]

10. Using Tables and the formula $A = P \left[1 + \frac{r}{100} \right]^n$ find:

(i) the value of n when $r=5$, $A=3P$.

(ii) the value of r when $n=10$, $P=16$, $A=24$.

[30 marks.]