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INTERMEDIATE CERTIFICATE EXAMINATION, 1951.

MATHEMATICS (Algebra).

TUESDAY, 12th JUNE.—MORNING, 10 TO 12.30.

The total number of questions answered should not exceed six.

Mathematical Tables may be obtained from the Superintendent.

1. (a) Solve the equation $\frac{2}{3}x + 2 - \frac{1}{4}(x-3) = \frac{1}{15}x - \frac{1}{2}$.

(b) Find, correct to two decimal places, the values of x which satisfy the equation $x^2 + 8x = 10$.

[30 marks.]

2. Find the highest common factor of $x^4 - x$ and $x^4 - x^3 - x^2 - 2x$, and find the value of

$$\frac{x^3 - 1}{x^3 - x^2 - x - 2} - \frac{x^3 - x^2 - x - 2}{x^3 - 1} \text{ when } x = \frac{1}{4}.$$

[30 marks.]

3. A man had a certain sum of money. He spent half of it on books at 3s. each and one-third of the remainder on books at 2s. 6d. each. If he got 7 books altogether, how much money had he left?

[30 marks.]

Or,

3. A person had a sum of £5 made up of shillings and half-crowns. He spent one-third of the shillings and one-quarter of the half-crowns, and had then £3 12s. 6d. left. Find how many shillings and half-crowns he had at first.

[30 marks.]

4. Factorise :

(i) $9a^2 - (b-2c)^2$,

(ii) $(a+b)^2 - 5(a+b)c - 6c^2$.

If

$$a^3 - 2a^2b + 3ab^2 - 2b^3 \equiv (a-b)(a^2 + lab + mb^2)$$

for all values of a and b , find the numerical values of l and m .

[35 marks.]

[OVER.]

5. Solve the equation

$$\sqrt{5x+5} - \sqrt{6-x} = \sqrt{2x-1}$$

and test your solutions.

[35 marks.]

6. A bought a motor car for £200 and sold it to B at a profit. B then sold the car for £276, and his percentage profit was 5 greater than A's percentage profit. Find how much B paid for the car.

[35 marks.]

Or,

6. By using $2^3 < 10$ and $3^2 < 10$, show that $\log_{10} 2 < \frac{1}{3}$ and $\log_{10} 3 < \frac{1}{2}$. Show that $2^{10} > 10^3$ and $3^4 > 2^3 \times 10$, and deduce that $\log_{10} 2 > 0.3$ and $\log_{10} 3 > 0.475$.

Hence show that $\log_{10} 360$ lies between 2.55 and 2.67.

[35 marks.]

7. Using the same axes and the same scales, draw the graphs of $y = x^3$ and $y = 6x + 4$ from $x = -2$ to $x = 3$.

Find from the graphs, as accurately as you can, the values of x for which $x^3 = 6x + 4$.

[35 marks.]