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INTERMEDIATE CERTIFICATE EXAMINATION, 1950.

MATHEMATICS (Algebra).

TUESDAY, 13*th* *JUNE*.—MORNING, 10 TO 12.30.

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

Mathematical Tables may be obtained from the Superintendent.

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1. Solve the following equations :

(i) $\frac{5}{12}(5x-6)-\frac{1}{8}(10x-21)=5x+12$;

(ii) $\left.\begin{array}{l}2x+5y=1\\5x+2y=-1\end{array}\right\}$

[30 marks.]

2. Prove that the expression $(3x-1)$ is a common factor of $3x^2+8x-3$ and $6x^3-5x^2-2x+1$.

Find the Least Common Multiple of $3x^2+8x-3$ and $6x^3-5x^2-2x+1$.

[30 marks.]

3. Six pounds of tea and nine pounds of sugar together cost £1, while eight pounds of tea and seven pounds of sugar together cost 25s. Find the cost of (i) one pound of tea, (ii) one pound of sugar.

[30 marks.]

4. Factorise fully each of the following :

(i) $6x^2-5x-6$;

(ii) $x(x+z)-y(y+z)$;

(iii) $(1+x)+2(1+x)^2+(1+x)^3$;

(iv) $a^3+(a-2)^3$.

[35 marks.]

5. If $x=3+\sqrt{5}$, prove that $x^2-6x+4=0$. Express in simplest form the value of x^3-6x^2+5x-3 when $x=3+\sqrt{5}$.

[35 marks.]

Or,

5. Solve the equation $\sqrt{6-x}+\sqrt{3x+10}-2\sqrt{x+7}=0$. Test your solutions.

[35 marks.]

6. Explain the difference between a "conditional equation" and an "identical equation."

If $A(x^2-x+1)+(Bx+C)(x+1)=3$, for all values of x, what are the values of A, B, C respectively?

[35 marks.]

Or,

6. Prove that $\log_a \frac{P}{Q}=\log_a P-\log_a Q$.

The difference between two numbers is 18, and the difference between their logarithms to the base 10 is 1: find the numbers.

[35 marks.]

7. A man travelled a distance of 48 miles at a uniform speed. If he had travelled three miles per hour slower, the journey would have taken 32 minutes longer. At what speed did he travel?

[35 marks.]

Or,

7. ABC is a triangle in which AB=4″, AC=3″ and the angle BAC=90°. From a point P on BC perpendiculars PQ, PR are drawn to AB, AC respectively. If BP=x″, prove that the area of the rectangle AQPR is $\frac{3}{5}x(4-\frac{4}{5}x)$ sq. ins.

Draw the graph of the expression $\frac{3}{5}x(4-\frac{4}{5}x)[=y]$ from $x=0$ to $x=5$. From the graph find the greatest area that AQPR can have and the corresponding value of x.

[35 marks.]