

ELEMENTS OF MATHEMATICS-I

MID-TEST

Time: 1hr

Total Marks: 40

Q.1. What are rational and irrational numbers. Discuss with examples. (4)

Q.2. Approximate the value of the following logarithms, given that $\log_5 2 \approx 0.43068$ and $\log_5 3 \approx 0.68261$.

(a) $\log_5(5^2 \cdot 6)$ and

(b) $\log_5(12)^{2/3}$ (6)

Q.3. Express $\frac{2}{\{(3\sqrt{5})-4\}^2}$ in the form of $\mathbf{a + b\sqrt{c}}$, where a and b are rational numbers. (4)

Q.4. Write the following in their simplest form (6)

(a) $\sqrt{63}$

(b) $\sqrt{180}$

(c) $\sqrt{18} - 2\sqrt{2} + \sqrt{8}$

Q.5. Prove that $\sqrt{6}$ is irrational. (4)

Q.6. For quadratic equation $x^2 + x - 4 = 0$ (6)

Find (a) The discriminant

(b) Nature of the roots and

(c) Roots

Q.7. Solve the quadratic equation by factorization method. (4)

$$x^2 - 18x + 45 = 0$$

Q.8. (6)

(a) Represent the complex number $\mathbf{z = 5 + 7i}$ on a complex plane with proper nomenclature. Also, find absolute value or modulus and argument .

(b) Calculate real and imaginary part of the complex number $\mathbf{Z = \frac{i-4}{2i-3} + i^{2012} + \frac{3-i}{1+i}}$.