

Chapter 04

QUADRATIC EQUATIONS

Nature of the roots of the equation $ax^2 + bx + c = 0$:

(I) If a, b, c are real and

(i) $\Delta > 0$, then the roots are real and distinct.

(ii) $\Delta = 0$, then the roots are real and equal.

(iii) $\Delta < 0$, then the roots are unequal and imaginary.

NOTE: Clearly, for real roots, we must have, $D \geq 0$.

(II) If a, b, c are rational and

(i) $\Delta > 0$ and is a perfect square then the roots are rational and distinct.

(ii) $\Delta > 0$ and is not a perfect square then the roots are conjugate surds i.e., $\alpha \pm \sqrt{\beta}$, ($\beta \neq 0$).

(iii) $\Delta = 0$, then the roots are equal & rational.

(iv) $\Delta < 0$, then the roots are conjugate complex numbers i.e., $\alpha \pm i\beta$.