Short Answer Type Questions – I

[2 marks]

Que 1. If one of the zeros of the quadratic polynomial $f(x) = 4x^2 – 8kx – 9$ is equal in magnitude but opposite in sign of the other, find the value of k.

Sol. Let one root of the given polynomial be a.

Then the other root = -a

∴ Sum of the roots = (-a) + a = 0

$\Rightarrow \frac{-b}{a} = 0 \quad or \quad \frac{8k}{4} = 0 \quad or \quad k = 0$

Que 2. If one of the zeros of the quadratic polynomial $(k – 1)x^2 + kx + 1$ is -3 then find the value of k.

Sol. Since -3 is a zero of the given polynomial

∴ $(k – 1)(-3)^2 + k(-3) + 1 = 0$

$\Rightarrow 9k – 9 - 3k + 1 = 0 \Rightarrow k = \frac{4}{3}$

Que 3. If 1 is a zero of the polynomial $p(x) = ax^2 – 3(a- 1)x – 1$, then find the value of a.

Sol. Put x = 1 in p(x)

∴ $p(1) = a(1)^2 – 3(a – 1) \times 1 – 1 = 0$

$\Rightarrow a – 3a + 3 – 1 = 0 \quad \Rightarrow \quad -2a = -2 \quad \Rightarrow \quad a = 1$

Que 4. If a and b are zeros of polynomial $p(x) = x^2 – 5x + 6$, then find the value of $a + b – 3ab$.

Sol. Here, $a + b = 5, \quad ab = 6$

∴ $a + b – 3ab = 5 – 3 \times 6 = -13$

Que 5. Find the zeros of the polynomial $p(x) = 4x^2 – 12x + 9$.

Sol. $P(x) = 4x^2 – 12x + 9 = (2x – 3)^2$

For zeros, p(x) = 0

$\Rightarrow (2x – 3)(2x – 3) = 0 \Rightarrow x = \frac{3}{2}, \frac{3}{2}$.

Que 6. If one root of the polynomial $p(y) = 5y^2 + 13y + m$ is reciprocal of other, then find the value of m.

Sol. Let the roots be a and $\frac{1}{a}$. Then $a(\frac{1}{a}) = \frac{m}{5} \quad or \quad 1 = \frac{m}{5} \quad or \quad m = 5$

Que 7. If a and b are zeros of p(x) = $x^2 + x - 1$, then find $\frac{1}{a} + \frac{1}{b}$.

Sol. Here, a + b = -1, ab = -1, so $\frac{1}{a} + \frac{1}{b} = \frac{b+a}{ab} = \frac{-1}{-1} = 1$

Que 8. Given that one of the zeros of the cubic polynomial ax3 + bx2 + d is zero, find the product of the other two zeros.

Sol. Let a, b, r, be the roots of the given polynomial and a = 0.

Then ab + br + ra = $\frac{c}{a} \quad \Rightarrow \quad br = \frac{c}{a}$

Que 9. If the product of two zeros of the polynomial p(x) = $2x^3 + 6x^2 - 4x + 9$ is 3, then find its third zero.

Sol. Let a, b, r be the roots of the given polynomial and ab = 3

Then abr = $-\frac{9}{2} \quad \Rightarrow 3 \times r = \frac{-9}{2} \; or \; r = \frac{-3}{2}$

Que 10. Find a quadratic polynomial each with the given numbers as the sum and product of its zeros respectively.

(i) $-\frac{1}{4}, \frac{1}{4}$ (ii) $\sqrt{2}, \frac{1}{3}$

Sol. Let a,b be the zeros of polynomial.

(i) we have, a + b = $-\frac{1}{4}$ and $ab = \frac{1}{4}$

Thus, polynomial is

P(x) = x^2 – (a + b) x + ab

$= x^2 - (-\frac{1}{4})x + \frac{1}{4} = x^2 + \frac{1}{4}x + \frac{1}{4} = \frac{1}{4}(4x^2 + x + 1)$

∴ Quadratic polynomial = $4x^2 + x + 1$

(ii) We have, a + b = $\sqrt{2} \; and \; ab = \frac{1}{3}$

Thus, polynomial is p(x) = x^2 – (a + b) x + ab

$= x^2 - \sqrt{2}x + \frac{1}{3} = \frac{1}{3}\left(3x^2 - 3\sqrt{2}x + 1\right)$

∴ Quadratic polynomial = 3x2 - $3x^2 - 3\sqrt{2}x + 1$