

Question 4: If α is a root of the equation $2x(2x+1) = 1$, then the other root is

(a) $3\alpha^3 + 4\alpha$

(b) α^2

(c) $-2\alpha(\alpha+1)$

(d) none of these

Solution:

Given $2x(2x+1) = 1$

$$\Rightarrow 4x^2 + 2x - 1 = 0$$

Let α, β be the roots of $4x^2 + 2x - 1 = 0$

Since α is a root of $2x(2x+1) = 1$, we can write

$$2\alpha(2\alpha+1) = 1$$

$$\Rightarrow \alpha(2\alpha+1) = \frac{1}{2} \dots(i)$$

$$\alpha + \beta = -\frac{1}{2} \text{ (sum of roots} = -b/a)$$

$$\Rightarrow \beta = -\frac{1}{2} - \alpha$$

$$\Rightarrow = -\alpha(2\alpha+1) - \alpha \text{ (from (i))}$$

$$= -2\alpha^2 - \alpha - \alpha$$

$$= -2\alpha^2 - 2\alpha$$

$$= -2\alpha(\alpha+1)$$

Hence option c is the answer.