Conic Section: Ellipse - Class XI

Past Year JEE Questions

Questions

Quetion: 01

Let an ellipse $E : \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, a^2 > b^2$, passes through $\left(\sqrt{\frac{3}{2}}, 1\right)$ and has eccentricity $\frac{1}{\sqrt{3}}$. If a circle, centered at focus F(α, 0), $\alpha > 0$, of E and radius $\frac{2}{\sqrt{3}}$, intersects E at two points P and Q, then PQ^2 is equal to :

A. $\frac{8}{3}$

B. $\frac{4}{3}$

C. $\frac{16}{3}$

D. 3

Solutions

Solution: 01

Explanation

$\frac{3}{2a^2} + \frac{1}{b^2} = 1$ and $1 - \frac{b^2}{a^2} = \frac{1}{3}$

$\Rightarrow a^2 = 3b^2 = 3$

$\Rightarrow \frac{x^2}{3} + \frac{y^2}{2} = 1$ ..... (i)

Its focus is (1, 0)

Now, eqn of circle is

$(x-1)^2 + y^2 = \frac{4}{3}$ ..... (ii)

Solving (i) and (ii) we get

$y = \pm\frac{2}{\sqrt{3}}, x = 1$

$\Rightarrow PQ^2 = \left(\frac{4}{\sqrt{3}}\right)^2 = \frac{16}{3}$