Hyperbola - Class XI

Related Questions with Solutions

Questions

Quetion: 01

Find the equation of the hyperbola whose foci are (8, 3), (0, 3) and eccentricity is $\dfrac{4}{3}$

A. $9(x - 4)^2 - 7(y - 3)^2 = 63$
B. $7(x - 4)^2 - 9(y - 3)^2 = 63$
C. $7(x + 4)^2 - 9(y + 3)^2 = 63$
D. $9(x + 4)^2 - 7(y + 3)^2 = 63$

Solutions

Solution: 01

The centre of the hyperbola is the mid-point of the line joining the two foci. So, the coordinates of the

centre are $\left(\dfrac{8+0}{2}, \dfrac{3+3}{2}\right)$ i.e., $(4, 3)$

Let 2*a* and 2*b* be the length of transverse and conjugate axes and let *e* be the

eccentricity. Then, the equation of the hyperbola is $\dfrac{(x-4)^2}{a^2} - \dfrac{(y-3)^2}{b^2} = 1$

..................[i]

$\therefore$ Distance between the two foci $= 2$ ae

$\Rightarrow \sqrt{(8-0)^2 + (3-3)^2} = 2ae$

$\Rightarrow ae = 4 \Rightarrow a = 3 \qquad\qquad [\because e = 4/3]$

$\therefore b^2 = a^2\left(e^2 - 1\right) \Rightarrow b^2 = 9\left(\dfrac{16}{9} - 1\right) = 7$

Substituting the values of *a* and *b* in [i], we get the equation of the hyperbola as

$\dfrac{(x-4)^2}{9} - \dfrac{(y-3)^2}{7} = 1 \Rightarrow 7(x-4)^2 - 9(y-3)^2 = 63$

Correct Options

Answer:01
Correct Options: B