Hyperbola - Class XI

Past Year JEE Questions

Questions

Quetion: 01

A hyperbola passes through the foci of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ and its transverse and conjugate axes coincide with major and minor axes of the ellipse, respectively. If the product of their eccentricities is one, then the equation of the hyperbola is :

A. $\frac{x^2}{9} - \frac{y^2}{4} = 1$

B. $\frac{x^2}{9} - \frac{y^2}{16} = 1$

C. $\frac{x^2}{9} - \frac{y^2}{25} = 1$

D. $x^2 - y^2 = 9$

Solutions

Solution: 01

Explanation

$e_1 = \sqrt{1 - \frac{16}{25}} = \frac{3}{5}$ foci $(\pm ae, 0)$

Foci = $(\pm 3, 0)$

Let equation of hyperbola be $\frac{x^2}{A^2} - \frac{y^2}{B^2} = 1$

Passes through $(\pm 3, 0)$

$A^2 = 9$, $A = 3$, $e_2 = \frac{5}{3}$

$e2^2 = 1 + \frac{B^2}{A^2}$

$\frac{25}{9} = 1 + \frac{B^2}{9} \Rightarrow B^2 = 16$

Equation of the hyperbola

$\frac{x^2}{9} - \frac{y^2}{16} = 1$