Past Year JEE Questions

Questions

Quetion: 01

Let P be the point $(1, 0)$ and Q a point on the parabola $y^2 = 8x$. The locus of mid point of PQ is

A. $y^2 - 4x + 2 = 0$

B. $y^2 + 4x + 2 = 0$

C. $x^2 + 4y + 2 = 0$

D. $x^2 - 4y + 2 = 0$

Solutions

Solution: 01

Explanation

$P = (1, 0)$ $Q = (h, k)$ Such that $k^2 = 8h$

Let (α, β) be the midpoint of PQ

$\alpha = \frac{h+1}{2},\ \ \beta = \frac{k+0}{2}$

$\therefore 2\alpha - 1 = h \quad 2\beta = k.$

$(2\beta)^2 = 8(2\alpha - 1) \Rightarrow \beta^2 = 4\alpha - 2$

$\Rightarrow y^2 - 4x + 2 = 0.$