Past Year JEE Questions

Quetion: 01

A circle C touches the line x = 2y at the point (2, 1) and intersects the circle

$C_1 : x^2 + y^2 + 2y - 5 = 0$ at two points P and Q such that PQ is a diameter of C_1. Then the diameter of C is :

A. $7\sqrt{5}$

B. 15

C. $\sqrt{285}$

D. $4\sqrt{15}$

Solutions

Solution: 01

Explanation

$(x - 2)^2 + (y - 1)^2 + \lambda(x - 2y) = 0$

$C : x^2 + y^2 + x(\lambda - 4) + y(-2 - 2\lambda) + 5 = 0$

$C_1 : x^2 + y^2 + 2y - 5 = 0$

$S_1 - S_2 = 0$ (Equation of PQ)

$(\lambda - 4)x - (2\lambda + 4)y + 10 = 0$ Passes through $(0, -1)$

$\Rightarrow \lambda = -7$

$C : x^2 + y^2 - 11x + 12y + 5 = 0$

$= \frac{\sqrt{245}}{4}$

Diameter $= 7\sqrt{5}$