

Conic Section: Ellipse - Class XI

Past Year JEE Questions

Questions

Question: 01

The locus of mid-points of the line segments joining $(-3, -5)$ and the points on the ellipse

$$\frac{x^2}{4} + \frac{y^2}{9} = 1 \text{ is :}$$

- A. $9x^2 + 4y^2 + 18x + 8y + 145 = 0$
- B. $36x^2 + 16y^2 + 90x + 56y + 145 = 0$
- C. $36x^2 + 16y^2 + 108x + 80y + 145 = 0$
- D. $36x^2 + 16y^2 + 72x + 32y + 145 = 0$

Solutions

Solution: 01

Explanation

General point on $\frac{x^2}{4} + \frac{y^2}{9} = 1$ is $A(2\cos\theta, 3\sin\theta)$

given $B(-3, -5)$

midpoint $C\left(\frac{2\cos\theta - 3}{2}, \frac{3\sin\theta - 5}{2}\right)$

$$h = \frac{2\cos\theta - 3}{2}; k = \frac{3\sin\theta - 5}{2}$$

$$\Rightarrow \left(\frac{2h+3}{2}\right)^2 + \left(\frac{2k+5}{3}\right)^2 = 1$$

$$\Rightarrow 36x^2 + 16y^2 + 108x + 80y + 145 = 0$$