

Three Dimensional Geometry - Class XII

Past Year JEE Questions

Questions

Question: 01

If the angle between the line $x = \frac{y-1}{\lambda} = \frac{z-3}{4}$ and the plane $x + 2y + 3z = 4$ is $\cos^{-1}\left(\sqrt{\frac{5}{14}}\right)$, then λ equals

- A. $\frac{3}{2}$
- B. $\frac{2}{3}$
- C. $\frac{5}{3}$
- D. $\frac{2}{5}$

Solutions

Solution: 01

Explanation

If θ be the angle between the given line and plane, then

$$\sin \theta = \frac{1 \times 1 + 2 \times 2 + \lambda \times 3}{\sqrt{1^2 + 2^2 + \lambda^2} \sqrt{1^2 + 2^2 + 3^2}}$$

$$= \frac{5 + 3\lambda}{\sqrt{14} \sqrt{5 + \lambda^2}}$$

But it is given that

$$\theta = \cos^{-1} \sqrt{\frac{5}{14}} \Rightarrow \sin \theta = \frac{3}{\sqrt{14}}$$

$$\therefore \frac{5 + 3\lambda}{\sqrt{14} \sqrt{5 + \lambda^2}} = \frac{3}{\sqrt{14}} \Rightarrow \lambda = \frac{2}{3}$$