



24. The equation of the plane containing the line $2x - 5y + z = 3$, $x + y + 4z = 5$ and parallel to the plane $x + 3y + 6z = 1$, is

- (1) $2x + 6y + 12z = 13$ (2) $x + 3y + 6z = -7$ (3) $x + 3y + 6z = 7$ (4) $2x + 6y + 12z = -13$

Answer:

The equation of plane containing the line $2x - 5y + z = 3$, $x + y + 4z = 5$ is

$$2x - 5y + z - 3 + \lambda(x + y + 4z - 5) = 0$$

$$\text{or } (2 + \lambda)x + (\lambda - 5)y + (4\lambda + 1)z - (3 + 5\lambda) = 0 \quad (1)$$

$$\text{Also } 1.x + 3.y + 6.z - 1 = 0 \rightarrow (2)$$

Both the equation (1) and (2) are parallel therefore ratio must be equal

$$\frac{2+\lambda}{1} = \frac{\lambda-5}{3} = \frac{4\lambda+1}{6} \text{ or } 6 + 3\lambda = \lambda - 5 \text{ or } \lambda = -\frac{11}{2}$$

Equation of plane

$$\frac{-7}{2}x - \frac{21}{2}y - 21z - \left(3 - \frac{55}{2}\right) = 0$$

$$\text{or } 7x + 21y + 42z - 49 = 0$$

$$\text{or } x + 3y + 6z - 7 = 0$$

Correct option (3) $x + 3y + 6z = 7$