

1. If the two lines

$$L_1 : x = 5, \frac{y}{3 - \alpha} = \frac{z}{-2} \quad (1)$$

$$L_2 : x = 2, \frac{y}{-1} = \frac{z}{2 - \alpha} \quad (2)$$

are perpendicular, then the value of α is

- (a) $\frac{2}{3}$
- (b) 3
- (c) 4
- (d) $\frac{7}{3}$

2. (a) Find the shortest distance between the following lines and hence write whether the lines are intersecting or not.

$$\frac{x - 1}{2} = \frac{y + 1}{3} = z, \frac{x + 1}{5} = \frac{y - 2}{1}, z = 2 \quad (3)$$

- (b) Find the equation of the plane through the line of intersection of the planes

$$\vec{r} \cdot (\hat{i} + 3\hat{j}) + 6 = 0 \quad (4)$$

and

$$\vec{r} \cdot (3\hat{i} - \hat{j} - 4\hat{k}) = 0, \quad (5)$$

which is a unit distance from the origin.

3. If segment of the line intercepted between the coordinate-axes is bisected at the point $M(2, 3)$, then the equation of this line is

- (a) $2x + 3y = 13$
- (b) $x + y = 5$
- (c) $2x + y = 7$
- (d) $3x + 2y = 12$

4. The equation of a line through $(2, -4)$ and parallel to x-axis is _____

5. Find the equation of the median through vertex \vec{A} of the

$$\triangle ABC$$

, having vertices $A(2, 5), B(-4, 9)$ and $C(-2, -1)$.

6. Solve the system of linear equations, using matrix method:

$$7x + 2y = 11 \quad (6)$$

$$4x - y = 2 \quad (7)$$