Linears and Conics

1 Linear

1. If the two lines

$$\mathbf{L}_1 : \mathbf{x} = 5, \frac{y}{3-\alpha} = \frac{z}{-2}$$
$$\mathbf{L}_1 : \mathbf{x} = 2, \frac{y}{-1} = \frac{z}{z-\alpha}$$

are perpendicular,then the value of α

(a) $\frac{2}{3}$

(b) 3

(c) 4

(d) $\frac{7}{3}$

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

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

OR

Find the equation of the plane through the line of intersection of the planes $\vec{r}.(\hat{i} + 3\hat{j}) + 6 = 0$ and $\vec{r}.(3\hat{i} - \hat{j} - 4\hat{k}) = 0$, which is at a unit distance from the origin.

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

$$2x + 3y = 13 \quad (3)$$
$$x + y = 5 \quad (4)$$
$$2x + y = 7 \quad (5)$$
$$3x + 2y = 12 \quad (6)$$

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

5. Find the equation of the median through vertex A of the triangle ABC, having vertices $A(2, 5)$, $B(\hat{a}4, 9)$ and $C(\hat{a}2, \hat{a}1)$.

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

$$7x + 2y = 11 \quad (7)$$
$$4x - y = 2 \quad (8)$$

2 Conic

1. The point at which the normal to the curve $y = x + \frac{1}{x}$, $x > 0$ is perpendicular to the line $3x\hat{a}4y\hat{a}7 = 0is$:
   a)$(2, \frac{5}{2})$ b)$(\pm 2, \frac{5}{2})$
   c) $(-\frac{1}{2}, \frac{5}{2})$ d) $(\frac{1}{2}, \frac{5}{2})$

2. The points on the curve $\frac{x^2}{9} + \frac{y^2}{16} = 1$ at which the tangents are parallel to y-axis are:
   a)(0,±4) b)(±4,0)
   c) (±3,0) d) (0,±3)

3. For which value of m is the line $y = mx + 1$ a tangent to the curve $y^2 = 4x$?
   a)$\frac{1}{2}$ b) 1
   c)2 d)3