1. A variable plane is at a constant distance p from the origin and meets the coordinate axes in points A, B and C respectively. Through these points, planes are drawn parallel to the coordinate's planes.

The locus of their point of intersection is

(1) $\dfrac{1}{x^2}+\dfrac{1}{y^2}+\dfrac{1}{z^2}=\dfrac{1}{p^2}$

(2) $-\dfrac{1}{x^2}+\dfrac{1}{y^2}+\dfrac{1}{z^2}=\dfrac{1}{p^2}$

(3) $\dfrac{1}{x^2}+\dfrac{1}{y^2}-\dfrac{1}{z^2}=\dfrac{1}{p^2}$

(4) $\dfrac{1}{x^2}-\dfrac{1}{y^2}+\dfrac{1}{z^2}=\dfrac{1}{p^2}$

2. Given the equations of the line
$3x - y + z + 1 = 0,\ 5x + y + 3z = 0$.

Then which of the following is correct?

(1) Symmetrical form of the equation of line is
$$\dfrac{x}{2}=\dfrac{y-\dfrac{1}{8}}{-1}=\dfrac{z+\dfrac{5}{8}}{1}$$

(2) Symmetrical form of the equations of line is
$$\dfrac{x+\dfrac{1}{8}}{1}=\dfrac{y-\dfrac{5}{8}}{1}=\dfrac{z}{-2}$$

(3) Equation of the plane through (2, 1, 4) and perpendicular to the given lines is
$2x - y + z - 7 = 0$

(4) Equation of the plane through (2, 1, 4) and perpendicular to the given lines is
$x + y - 2z + 5 = 0$

3. A plane meets the coordinate axes in A, B, C such that the centroid of triangle ABC is the point $(p,\ q,\ r)$. If the equation of the plane is $\dfrac{x}{p}+\dfrac{y}{q}+\dfrac{z}{r}=k$, then $k =$

(1) 1   (2) 2

(3) 3   (4) None of these

4. Distance between two non-intersecting planes P_1 and P_2 is 5 units, where P_1 is $2x - 3y + 6z + 26 = 0$ and P_2 is $4x + by + cz + d = 0$. The point $A(-3, 0, -1)$ lies between the planes P_1 and P_2, then the value of $3b + 4c - 5d$ is equal to

(1) 580   (2) 120

(3) -18 (4) -120

5. If the planes $x - cy - bz = 0$, $cx - y + az = 0$ and $bx + ay - z = 0$ pass through a line, then the value of $a^2 + b^2 + c^2 + 2abc$ is

6. The equation of a plane passing through the line of intersection of the planes $x + 2y + 3z = 2$ and $x - y + z = 3$ and at a distance $2/\sqrt3$ from the point $(3, 1, -1)$, is

(1) $5x - 11y + z = 17$ (2) $\sqrt2 x + y = 3\sqrt2 - 1$

(3) $x + y + z = \sqrt3$ (4) $x - \sqrt2 y = 1 - \sqrt2$

7. If the image of the point $P(1, -2, 3)$ in the plan, $2x + 3y - 4z + 22 = 0$ measured parallel to the line $\dfrac{x}{1}=\dfrac{y}{4}=\dfrac{z}{5}$ is Q then PQ is equal to

(1) $\sqrt{42}$ (2) $6\sqrt5$

(3) $3\sqrt5$ (4) $2\sqrt{42}$

8. The distance of point $(1, -2, 3)$ from the plane $x - y + z = 5$ measured parallel to the line $\dfrac{x}{2}=\dfrac{y}{3}=\dfrac{z}{-6}$ is:

(1) 7   (2) 1

(3) $\dfrac{1}{7}$ (4) $\dfrac{7}{5}$

9. Let P be the plane, which contains the line of intersection of the planes, $x + y + z = 6$ and $2x + 3y + z + 5 = 0$ and it is perpendicular to the xy-plane. Then the distance of the point $(0, 0, 256)$ from P is equal to:

(1) $205\sqrt5$ (2) $63\sqrt5$

(3) $\dfrac{11}{\sqrt5}$ (4) $\dfrac{17}{\sqrt5}$

10. The distance of the point $(1, -5, 9)$ from the plane $x - y + z = 5$ measured along the line $x = y = z$ is:

(1) $\dfrac{10}{\sqrt{3}}$

(2) $\dfrac{20}{3}$

(3) $3\sqrt{10}$

(4) $10\sqrt{3}$

Answer Key

1. (1)
2. (2, 4)
3. (3)
4. (2)
5. (1)

6. (1)
7. (4)
8. (2)
9. (3)
10. (4)