# MATHS

# BOOKS - MODERN PUBLICATION

# THREE DIMENSIONAL GEOMETRY

## Exercise

**1.** Write what are the direction cosines of the straight line normal to the plane $2x + y + 2z + 8 = 0$.

View Text Solution

**2.** What is the angle between the planes $y + x = 0$ and $z = 0$ ? .

Watch Video Solution

**3.** If the line $\frac{x-3}{2} = \frac{y+k}{-1} = \frac{z+1}{-5}$ lies on the plane 2x-y+z-7 = 0,

then k = -$(2, -1, -2)$

Watch Video Solution

**4.** Fill in the blanks in the length of the projection of the line segment joining (1,3,-1) and (3,2,4)on z-axis is _____.

$[1, 3, 4, 5]$

Watch Video Solution

**5.** The image of the point (6,3,-4) with respect to yz-plane is _____.

$$\begin{bmatrix} 6 & 0 & -4 \\ 6 & -3 & 4 \\ -6 & -3 & -4 \\ -6 & 3 & -4 \end{bmatrix}$$

Watch Video Solution

**6.** The equation of a plane passing through $(1, 1, 2)$ and parallel to $x + y + z - 1 = 0$ is____

Watch Video Solution

**7.** The distance between the parallel planes $2x - 3y + 6z + 1 = 0$ and $4x - 6y + 12z - 5 = 0$ is____

Watch Video Solution

**8.** Find the equation of the line through $(-1, 0, 1)$ and perpendicular to the plane $x + 2y + 1 = 0.$

Watch Video Solution

**9.** If the line $\frac{x-3}{2} = \frac{y+k}{-1} = \frac{z+1}{-5}$ lies on the plane 2x-y+z-7 = 0,

then k = -$(2, -1, -2)$

Watch Video Solution

**10.** Find the equation of the plane passing through (3,-6,-9) and parallel to xz plane

Watch Video Solution

**11.** In which condition $x + y + z = \alpha + \beta + \gamma$ will contain the line $\frac{x - \alpha}{l} = \frac{y - \beta}{m} = \frac{z - \gamma}{n}$.

Watch Video Solution

**12.** The angle between the planes $x + y + I = 0$ and $y + z + I = 0$ is ____ .

View Text Solution

**13.** To which coordinate axis the line $x = 1$ and $y = 2$ is parallel.

Watch Video Solution

**14.** Find the number of points (x, y, z) in space other than the point (1,-2, 3), such that |x| = 1, |y| = 2 and |z|= 3.

Watch Video Solution

**15.** Write the ratio in which the line segment Joining the points (1, 2, —2) and (4, 3, 4) is divided by the $xy$— $pla \neq$ .

Watch Video Solution

**16.** What is the distant of the point (4,5,-3) from the $y - a\xi s$ ?

View Text Solution

**17.** Find the equation of the plane Paralel to the plane $2x - y + 3z + 1 = 0$ and at a distance 3 units away from it.

Watch Video Solution

**18.** Find the equation of the plane passing through the line of intersection of the planes. $x + 3y + 6 = 0$, $3x - y - 4z = 0$ and the point (1,1,1) .

Watch Video Solution

**19.** Bisecting the line segment joining $(-1, 4, 3)$ and $(5, -2, -1)$ at right angles.

Watch Video Solution

**20.** If P $(1, y, z)$ lies on the line through $(3, 2, -1)$ and $(-4, 6, 3)$ find y & z.

Watch Video Solution

**21.** Find the equation of the plane passing through the line of intersection of the planes $2x + 3y - z + 1 = 0$ and $x + y - 2z + 3 = 0$, which is perpendicular to $3x - y - 2z - 4 = 0$.

Watch Video Solution

**22.** Find the equation of the plane .Passing through the point $(2, 3 - 1)$ and parallel to the plane $3x - 4y + 7z = 0$.

Watch Video Solution

**23.** Bisecting the line segment joining $(-1, 4, 3)$ and $(5, -2, -1)$ at right angles.

Watch Video Solution

**24.** Find the equation of the plane Paralel to the plane $2x - y + 3z + 1 = 0$ and at a distance 3 units away from it.

Watch Video Solution

**25.** Writing the equation of the plane $3x - 2y + z + 2 = 0$ in normal form find its distance from origin.

Watch Video Solution

**26.** A variable plane moves in such a way that the sum of the reciprocals of its intercepts on co-ordinate axes is constant. Show that the plane passes through a fixed point.

Watch Video Solution

**27.** In each of the following case, verift whether the four given points are coplanar or not. $(1, 1, 1), (3, 1, 2), (1, 4, 0), (-1, 1, 0)$

Watch Video Solution

**28.** Find the points of intersection of the line $\frac{x-1}{1} = \frac{y+2}{3} = \frac{z-1}{-1}$ and the plane $2x + y + z = 9.$

Watch Video Solution

**29.** Find the angle between the plane $x + y + 4 = 0$ and the line $\frac{x+3}{2} = \frac{y-1}{1} = \frac{z+4}{-2}$.

Watch Video Solution

**30.** If the edges of a rectangular parallelopiped are of lengths a, b, c, then the angle between four diagonals are $\cos^{-1}\left(\frac{\pm a^2 \pm b^2 \pm c^2}{a^2 + b^2 + c^2}\right)$.

Watch Video Solution

**31.** Find the equation of the bisector planes of the angles between the planes $2x— y + 2z + 3 = 0$and $3x— 2y + 6z + 8 = 0$ and specify the plane which bisects"the acute angle and the plane which bisects the obtuse angle.

Watch Video Solution

**32.** A variable plane meets the coordinate axes at P, Q, R points. If the plane passes through a fixed point (a, b, c), prove that the centre of

the shpere passing the origin and P, Q, R will lie on the surface $\frac{a}{x}+\frac{b}{y}+\frac{c}{z}=2$

Watch Video Solution

**33.** Find the equation of the straight line perpendicular to the line $\frac{x-2}{3}=\frac{y+1}{4}=\frac{z-6}{7}$ and lyinng in the plane x - 2y + 4z - 51 = 0.

Watch Video Solution

**34.** Find the distance of the point $(1, -2, 3)$ from the plane $x - y + z = 5$, measured parallel to the line $\frac{x}{2} = \frac{y}{3} = \frac{z}{-6}$

Watch Video Solution

**35.** Prove that the lines $\frac{x+3}{2} = \frac{y+5}{3} = \frac{z-7}{-3}$ and $\frac{x+1}{4} = \frac{y+1}{5} = \frac{z+1}{-1}$ are coplanar. Find the equation of plane containing them.

Watch Video Solution

**36.** Find the equation of the image of the line $\frac{x-1}{2} = (y+2) = (z-1)$ on the plane $2x - y + z + 1 = 0$.

Watch Video Solution

**37.** Find the shortest distance between the lines $\frac{x-8}{3} = \frac{y+9}{-16} = \frac{z-10}{7}$ and $\frac{x-15}{3} = \frac{y-29}{8} = \frac{z-5}{-5}$.

Watch Video Solution

**38.** Find the equation of the straight line perpendicular to the line $\frac{x-2}{3}=\frac{y+1}{4}=\frac{z-6}{7}$ and lyinng in the plane x - 2y + 4z - 51 = 0.

Watch Video Solution

**39.** Find the distance of the point $(-1,-5,-10)$ from the point of intersection of the line

$\frac{x-2}{2}=\frac{y+1}{4}=\frac{z-2}{12}$ and the plane $x-y+z=5$.

Watch Video Solution

**40.** Find the distance of the point $(1,-1,-10)$ from the line $\frac{x-4}{1}=\frac{y+3}{-4}=\frac{z+1}{7}$ measured parallelto the line $\frac{x+2}{2}=\frac{y-3}{-3}=\frac{z-4}{8}$

Watch Video Solution