RAVI MATHS TUITION CENTER, CHENNAI-82. WHATSAPP - 8056206308

Three Dimensional Geometry

12th Standard

Maths

10 x 2 = 20

1) The Cartesian equation of a line AB is $\frac{2x-1}{\sqrt{3}} = \frac{y+2}{2}\frac{z-3}{3}$. Find the direction cosines of a line parallel to AB.

2) Find the direction cosines of the line passing through the following points: (-2, 4, -5), (1, 2, 3).

3) Find the distance of the plane 3x - 4y + 12z = 3 from the origin.

4) Find the Cartesian equation of the line which passes through the point (-2, 4, -5) and is parallel to the line $\frac{x+3}{3} = \frac{4-y}{5} = \frac{z+8}{6}$

5) Find the direction ratios of a line passing through the points (2, 1, 0) and (1, -2, 3) so directed that it makes an acute angle with the x- axis.

6) Find the coordinates of a point, where the line $\frac{x+2}{1} = \frac{y-5}{3} = \frac{z+1}{5}$ cuts yz-plane.

7) Write the vector equation of a line passing through the point (1,-1,2) and parallel to the line whose equations are , $\frac{x-3}{1} = \frac{y-1}{2} = \frac{z+1}{-2}$

8) write the vector equation of the line passing through (1, 2, 3) and perpendicular to the plane $\check{r} + (\check{r} + 2\check{j} - 5\check{k}) + 9 = 0$

9) Find the length of the perpendicular drawrt from the origin to the plane 2x - 3y + 6z + 21 = 0

10) Find the vector and cartesian equation of the planes that passes through the point (1,0, - 2) and the normal to the plane is $\hat{i} + \hat{j} - \hat{k}$.

10 x 3 = 30

11) Show that the lines $\frac{x+3}{-3} = \frac{y-1}{1} = \frac{z-5}{5}$ and $\frac{x+1}{-1} = \frac{y-2}{2} = \frac{z-5}{5}$ are coplanar. Also find the equation of the plane containing the lines.

12) Find the shortest distance between the lines whose vector equations are $\vec{r} = (1-t)\hat{i} + (t-2)\hat{j} + (3-2t)\hat{k}$ and $\vec{r} = (s+1)\hat{i} + (2s-2)\hat{j} - (2s+1)\hat{k}$

13) Find the equation of the plane that contains the point(1,-1,2) and is perpendicular to each of the planes.
2x+3y-2z=5 and x+2y-3z=8

14) Show that the line through the points(1,-1,2),(3,4,-2) is perpendicular to the line through the points(0,3,2) and (3,5,6)

15) Find the value of p so that the lines:
$\frac{1-x}{3} = \frac{7y-14}{2p} = \frac{z-3}{2} \quad and \quad \frac{7-7x}{3p} = \frac{y-5}{1} = \frac{6-z}{5}$
are at right angles.

16) Find the distance of the point(-1,-5,-10) from the point of intersection of the line: $\vec{r}.\left(\hat{i} - \hat{j} + 2\hat{k}\right) + \lambda\left(3\hat{i} + 4\hat{j} + 2\hat{k}\right)$and the plane $\vec{r}.\left(\hat{i} - \hat{j} + \hat{k}\right) = 5$

17) Find the shortest distance between the lines
$\vec{r} = (\hat{i} + 2\hat{j} + \hat{k}) + \lambda(\hat{i} - \hat{j} + \hat{k}) and$
$\vec{r} = (2\hat{i} - \hat{j} - \hat{k}) + \mu(2\hat{i} + \hat{j} + 2\hat{k})$

18) Find the length and the foot of the perpendicular drawn from the point (2,-1,5) to the line $\frac{x-11}{10} = \frac{y+2}{-4} = \frac{z+8}{-11}$.

19) Find the points on the line $\frac{x+2}{3} = \frac{y+1}{2} = \frac{z-3}{2}$ at a distance of 5 units from the point P(1,3,3).

20) Find the image of the point having position vector $\hat{i} + 3\hat{j} + 3\hat{k}$ in the plane $\vec{r}.(2\hat{i} - \hat{j} + \hat{k}) + 3 = 0$.

5 x 5 = 25

21) Find the distance of the point$3\hat{i} - 2\hat{j} + \hat{k}$from the plane 3x+y-z+2=0 measured parallel to the line $\frac{x-1}{2} = \frac{y+2}{-3} = \frac{z-1}{1}$. Also, find the foot of the . Also, find the foot of the perpendicular from the given point upon the given plane.

22) Find the vector and cartesian forms of the equation of the plane passing through the point (1, 2, - 4) and parallel to the lines $\vec{r} = \left(\hat{i} + 2\hat{j} - 4\hat{k}\right) + \lambda\left(2\hat{i} + 3\hat{j} + 6\hat{k}\right)$

and $\vec{r} = \left(\hat{i} - 3\hat{j} + 5\hat{k}\right) + \mu\left(\hat{i} + \hat{j} - \hat{k}\right)$

Also, find the distance of the point (9, -8, -10) from the plane thus obtained.

23) Find the co-ordinates of the foot of the .$\perp$ and the length of the .L drawn from the point P(5, 4, 2) to the line

$\vec{r} = -\hat{i} + 3\hat{j} + \hat{k} + \lambda(2\hat{i} + 3\hat{j} - \hat{k})$ Also find the image of P in this line.

24) Define skew lines. Using only vector approach, find the shortest distance between the following two skew lines

$\vec{r} = (8 + 3\lambda)\hat{i} - (9 + 16\lambda)\hat{j} + (10 + 7\lambda)\hat{k}$

$\vec{r} = 15\hat{i} + 29\hat{j} + 5\hat{k} + \mu(3\hat{i} + 8\hat{j} - 5\hat{k})$

25) Find the equation of the plane passing through the line of intersection of the planes

$\vec{r}.\left(\hat{i} + \hat{j} + \hat{k}\right) = 1$ and $\vec{r}.\left(2\hat{i} + 3\hat{j} - \hat{k}\right) + 4 = 0$ which is perpendicular to the plane

$\vec{r}.\left(\hat{i} + \hat{j} - 4\hat{k}\right) = 5$

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