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QUESTION BANK

CHAPTER -11 THREE DIMENSIONAL GEOMETRY

1. Find the equation of the plane passing through the point (-1, 3, 2) and perpendicular to each of the planes x+2y+3z = 5 and 3x+3y+z = 0.

2. Find the equation of the plane passing through line of intersection of the planes x-2y+z = 1 and 2x+y+z = 8 and parallel to the line with the direction ratios 1,2,1. Also, find the perpendicular distance of (1, 1, 1) from this plane.

3. The Cartesian equations of a line are $6x-2=3y+1=2z-2$. Find its direction cosines.

4. Find the angle between the line $\frac{x-2}{3}=\frac{y+1}{-1}=\frac{z-1}{-2}$ and the plane 3x + 4y + z + 5 =0

5. Find the shortest distance between the two parallel lines whose vector equations are $\vec{r}=(\hat{\imath}+2\hat{\jmath}+3\hat{k})+\lambda(2\hat{\imath}+3\hat{\jmath}+4\hat{k})$ and $\vec{r}=(\widehat{2\imath}+4\hat{\jmath}+5\hat{k})+\mu(4\hat{\imath}+6\hat{\jmath}+4\hat{k})$.

6. Show that the four points A(2,3,4) , B (- 3 , 5, 1) , C (4, -1 , 2) and D (2, 0,1) are coplanar. Find the equation of the plane containing them.

7. Find the length of perpendicular drawn from the origin to the plane 2x -3y +6z +21= 0.

8. Write the direction cosines of a line parallel to the line $\frac{4-x}{3}=\frac{y+3}{3}=\frac{z+2}{6}$.
9. Find the distance of the plane through (1,1,1) and perpendicular to $\frac{x-1}{3}=\frac{y-1}{0}=\frac{z-1}{4}$ from the origin .
10. Find the equation of the plane through the line of intersection of the planes x+y+z = 1 and 2x +3y +4z = 5 which is perpendicular to the plane x-y+z = 0.
11. Find the angle and the shortest distance between the lines $\frac{x+1}{7}=\frac{y+1}{-6}=\frac{z+1}{1}$ and $\frac{x-3}{1}=\frac{y-5}{-2}=\frac{z-7}{1}$.
12. Find the vector and Cartesian equations of the plane passing through the point (1, 2 - 4) and parallel to the lines $\vec{r}=(\hat{\imath}+2\hat{\jmath}-4\hat{k})+\lambda(2\hat{\imath}+3\hat{\jmath}+6\hat{k})$ *and* $\vec{r}=(\hat{\imath}-3\hat{\jmath}+5\hat{k})+\mu(\hat{\imath}+\hat{\jmath}-\hat{k})$. Also find the distance of the point (9, -8 ,-10) from the obtained plane .
13. Find the equation of the line which is perpendicular from the point (3, - 1, 11) to the line $\frac{x}{2}=\frac{y-2}{3}=\frac{z-3}{4}$. Also find the foot of the perpendicular and length of perpendicular.

14. Find the shortest distance between the two lines whose vector equations are

(i) $\vec{r} = (\hat{\imath} + 2\hat{\jmath} + 3\hat{k}) + \lambda(\hat{\imath} - 3\hat{\jmath} + 2\hat{k})$ *and* $\vec{r} = (4\hat{\imath} + 5\hat{\jmath} + 6\hat{k}) + \mu(\widehat{2\imath} + 3\hat{\jmath} + \hat{k})$

(ii) $\vec{r} = (\hat{\imath} + 2\hat{\jmath} - 4\hat{k}) + \lambda(2\hat{\imath} + 3\hat{\jmath} + 6\hat{k})$ *and* $\vec{r} = (\hat{\imath} - 3\hat{\jmath} + 5\hat{k}) + \mu(\hat{\imath} + \hat{\jmath} - \hat{k})$.

14. Find the equation of the plane passing through the point A (1, 1, –1) perpendicular to the planes $x + 2y + 3z - 7 = 0$ and $2x - 3y + 4z = 0$.

15. Find the shortest distance between the lines, whose equations are
$\frac{x-8}{3} = \frac{y+9}{-16} = \frac{10-z}{-7}$ and $\frac{x-15}{3} = \frac{58-2y}{-16} = \frac{z-5}{-5}$.

16. Find the vector equation of the plane passing through the points (2,1,-1) and (-1,3,4) and perpendicular to the plane $x - 2y + 4z = 10$. Also show that the plane thus obtained contains the line $\vec{r} = (-\hat{\imath} + 3\hat{\jmath} + 4\hat{k}) + \lambda(3\hat{\imath} - 2\hat{\jmath} - 5\hat{k})$.

17. Find the length and foot of perpendicular from the point (1, 3/2 , 2) to the plane 2 x – 2 y +4 z + 5 =0 .

18. Find the image of the point with position vector $\hat{\imath} + 3\hat{\jmath} + 4\hat{k}$ *in the plane* $\vec{r}.(2\hat{\imath} - \hat{\jmath} + \hat{k}) + 3 = 0$.

19. Find the equation of the plane passing through the line of intersection of the planes 2x + y – z = 3 , 5x – 3 y +4z +9=0 and is parallel to the line $\frac{x-1}{2} = \frac{y-3}{4} = \frac{z-5}{5}$

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