MATHS

BOOKS - KC SINHA ENGLISH

3D - PLANES

Solved Examples

1. Find the Cartesian equation of the plane whose vector equation is $\overrightarrow{r}.\left(3\hat{i}+4\hat{j}-2\hat{k}\right)=5.$

Watch Video Solution

2. Find the Cartesian equation of the following plane: $\overrightarrow{r}=(\lambda-2\mu)\hat{i}+(3-\mu)\hat{j}+(2\lambda+\mu)\hat{k}.$

Watch Video Solution

3. Find the vector equation of the plane whose Cartesian equation is $2x + 3y - 9z = 4$

Watch Video Solution

4. Find the vector equation of the plane $x + 7y - 5z + 19 = 0$

Watch Video Solution

5. Find the equation of the plane which cuts equal intercepts on the axes and passes through the point (2,3,5).

Watch Video Solution

6. Find the equation of the plane which is parallel to x-axis and cuts intercepts 2 and 5 on y and z-axis respectively.

Watch Video Solution

7. Find the equation of the plane which is parallel to the plane $x + 5y - 4z + 5 = 0$ and the sum of whose intercepts on the coordinate axes is 15 units.

Watch Video Solution

8. Find the equation of the plane upon which the length of normal from origin is 10 and direction ratios of this normal are 3,2,6

Watch Video Solution

9. Find the equation of the plane which is at a distance of 5 units fom the origin and perpendiculat to $2\hat{i} - 3\hat{j} + 6\hat{k}$

Watch Video Solution

10. Find the equation of the plane through the point $2\hat{i} + 3\hat{j} - \hat{k}$ and perpendicular to vector $3\hat{i} + 3\hat{j} + 7\hat{k}$. Determine the perpendicular distance of this plane from the origin.

Watch Video Solution

11. Find a unit normal vector to the plane $x + 2y + 3z - 6 = 0$.

Watch Video Solution

12. What are the direction cosines of the normal to the plane $4x + 12y + 3z = 65$? Also find the lenth of perpendicular from the origin to the plane.

Watch Video Solution

13. Find the angle between the planes $-x + y + 2z = 9$ and $x + 2y + z = 5$

Watch Video Solution

14. Find the angle between the planes $\vec{r}.\left(\hat{i} + \hat{j} - 2\hat{k}\right) = 3$ and $\vec{r}.\left(2\hat{i} - 2\hat{j} + \hat{k}\right) = 22$

Watch Video Solution

15. Find the angle between the line $\overrightarrow{r} = \hat{i} + 2\hat{j} - \hat{k} + \lambda\left(\hat{i} - \hat{j} + \hat{k}\right)$ and the plane $\overrightarrow{r} \cdot \left(2\hat{i} - \hat{j} + \hat{k}\right) = 4.$

Watch Video Solution

16. Find the angle between the plane $x + y - 2z + 5 = 0$ and the line whose direction cosines are $\frac{1}{\sqrt{6}}, \frac{2}{\sqrt{6}}, \frac{1}{\sqrt{6}}.$

Watch Video Solution

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

Watch Video Solution

18. Find the general equation of plane pasing through the point $(1, 2, -3)$.

Watch Video Solution

19. Find the vector and the Cartesian equations of the plane passing through the point $(1, 2, 3)$ and perpendicular to the line with direction ratio $2, 3, -4$.

Watch Video Solution

20. Find the equation of the plane passing through the points $(2, 1, 2)$ and $(1, 3, -2)$ and parallel to the x-axis.

Watch Video Solution

21. If a plane passes through the point $(-3, -3, 1)$ and is normal to the line joining the points $(2, 6, 1)$ and $(1, 3, 0)$, find its equation.

Watch Video Solution

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

Watch Video Solution

23. Find the equation of the plane passing through (3, 4, -1), which is parallel to the plane $\vec{r} \cdot \left(2\hat{i} - 3\hat{j} + 5\hat{k}\right) + 7 = 0$.

Watch Video Solution

24. Find the equation of the plane passing through the point $(-1, -1, 2) and$ perpendicular to the planes $3x + 2y - 3z = 1 and 5x - 4y + z = 5.$

Watch Video Solution

25. Find the equation of the plane through the points (2,2,1) and (9,3,6) and perpendicular to the plane $2x + 6y + 6z = 1$

Watch Video Solution

26. Find the vector equation to the plane through the point $-\hat{i} + 3\hat{j} + 2\hat{k}$ perpendicular to each of the planes $\vec{r}.\left(\hat{i} + 2\hat{j} + 2\hat{k}\right) = 25 \text{ and } \vec{r}.\left(3\hat{i} + 3\hat{j} + 2\hat{k}\right) = 8.$

Watch Video Solution

27. Find the equation of the plane through the point $\hat{i}+4\hat{j}-2\hat{k}$ and perpendicular to the line of intersection of the planes $\overrightarrow{r}.\left(\hat{i}+\hat{j}+\hat{k}\right)=10$ and $\overrightarrow{r}.\left(2\hat{i}-\hat{j}+3\hat{k}\right)=18.$

Watch Video Solution

28. Find the equation of the plane passing through the points (0,-1,-1), (4,5,1) and (3,9,4). Also find the vector equation of the plane.

Watch Video Solution

29. Find the vector equation of the plane passing through the points $(6,\ -1,1),(5,1,2)$ and $(1,\ -5,\ -4)$. Also find the Cartesian equation of the plane.

Watch Video Solution

30. Show that the four points $(0, -1, 0), (2, 1, -1), (1, 1, 1)$ and $(3, 3, 0)$ are coplanar. Also, find equation of plane through them.

Watch Video Solution

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

Watch Video Solution

32. Find the image of the point $P(3, 5, 7)$ in the plane $2x + y + z = 0$.

Watch Video Solution

33. Find the distance of the point $(2, 3, 4)$ from the plane $3x + 2y + 2z + 5 = 0$ measured parallel to the line $\frac{x+3}{3} = \frac{y-2}{6} = \frac{z}{2}$.

Watch Video Solution

34. Find the vector equationof the line passing through the point (3,1,2) and perpendicular to the plane $\vec{r}.\left(2\hat{i} - \hat{j} + \hat{k}\right) = 4$. Find also the point of intersection of this line and the plane.

Watch Video Solution

35. Find the equation of a plane containing the line of intersection of the plane $x + y + z - 6 = 0$ and $2x + 3y + 4z + 5 = 0$ and passing through (1, 1, 1).

Watch Video Solution

36. The vector equation of the plane through the point $(2, 1, -1)$ and passing through the line of intersection of the plane $r\cdot\left(\hat{i}+3\hat{j}-\hat{k}\right)=0$ and $r\cdot\left(\hat{j}2\hat{k}\right)=0$, is

Watch Video Solution

37. Find the equation of the plane passing through the line of intersection of the lanes $2x+y\equiv 3,\ 5x-3y+4+9=0$ and parallel to the lie $\dfrac{x-1}{2}=\dfrac{y-3}{4}=\dfrac{z-5}{5}.$

Watch Video Solution

38. Let $P=0$ be the equation of a plane passing through the line of intersection of the planes $2x-y=0and3z-y=0$ and perpendicular to the plane $4x+5y-3z=8$. Then the points which lie on the plane $P = 0$ is/are a. $(0, 9, 17)$ b. $(1/7, 21/9)$ c. $(1, 3, -4)$ d. $(1/2, 1, 1/3)$

Watch Video Solution

39. Find the equation of the plane which is perpendicular to the plane $5x + 3y + 6z + 8 = 0$ adn which containls the line of intersedtion of the planes $x + 2y + 3z - 4 = 0 and 2x + y - z + 5 = 0.$

Watch Video Solution

40. Find the equation of the plane through the intersection of the planes $x + 3y + 6 = 0$ and $3x - y - 4z = 0,$ whose perpendicular distance from the origin is unity.

Watch Video Solution

41. Find the Cartesian as well as vector equations of the planes through the intersection of the planes $\rightarrow r 2\hat{i} + 6\hat{j} + 12 = 0 \, and \, \rightarrow r 3\hat{i} - \hat{j} + 4\hat{k} = 0$ which are at a unit distance from the origin.

Watch Video Solution

42. The plane $x - y - z = 4$ is rotated through an angle 90° about its line of intersection with the plane $x + y + 2z = 4$. Then the equation of the plane in its new position is

Watch Video Solution

43. Find the equation of the plane through the point (3,4,-5) and parallel to the vectors $3\hat{i} + \hat{j} - \hat{k}$ and $\hat{i} - 2\hat{j} + \hat{k}$.

Watch Video Solution

44. Find the equation of the plane passing through (1,2,0) which contains the line $\frac{x+3}{3}=\frac{y-1}{4}=\frac{z-2}{-2}$

Watch Video Solution

45. Find the distance of the point (1,2,0) from the plane $4x+3y+12z+16=0$

Watch Video Solution

46. Show that the distance between planes $2x-2y+z+3=0$ and $4x-4y+2z+5=0 is \frac{1}{6}$

Watch Video Solution

47. Find the distance of the point (1,2,5) from the plane $\vec{r}.\left(\hat{i}+\hat{j}+\hat{k}\right)+17=0$

Watch Video Solution

48. Find the co- ordinates of the foot of perpendicular drawn from the point $(1, 1, 2)$ to the plane $2x-2y+4z+5=0.$

Watch Video Solution

49. Find the distance between the parallel planes: $\vec{r}.\left(2\hat{i}-\hat{j}+3\hat{k}\right)=4 \text{ and } \vec{r}.\left(6\hat{i}-3\hat{j}+9\hat{k}\right)+13=0$

Watch Video Solution

50. Find the distance between the parallel planes x+y−z+4=0 and x+y−z+5=0.

Watch Video Solution

51. Find the equation of the line of intersection of the planes $4x + 4y - 5z = 12, 8x + 12y - 13z = 32$ in the symmetric form.

Watch Video Solution

52. Show that the line represented by equation $x = ay + b, z = cy + d$ in symmetric form is $\frac{x-b}{a} = \frac{y}{1} = \frac{z-d}{c}$

Watch Video Solution

Exercise

1. Find the Cartesian equations of the following planes whose vector equations are: $\overrightarrow{r}.\left(3\hat{i}+3\hat{j}-4\hat{k}\right)=0$

Watch Video Solution

2. Find the Cartesian equations of the following planes whose vector equations are: $\overrightarrow{r}.\left(2\hat{i}-7\hat{j}+4\hat{k}\right)+\ =0$

Watch Video Solution

3. Find the Cartesian equations of the following planes whose vector equations are: $\overrightarrow{r}.\left(\hat{i}+\hat{j}-\hat{k}\right)=2$

Watch Video Solution

4. Find the Cartesian equation of the following planes :

(a) $\overrightarrow{r}.\left(\hat{i}+\hat{j}-\hat{k}\right)=2$

(b) $\overrightarrow{r}.\left(2\hat{i}+3\hat{j}-4\hat{k}\right)=1$

(c) $\overrightarrow{r}.\left[(s-2t)\hat{i}+(3-t)\hat{j}+(2s+t)\hat{k}\right]=15$

Watch Video Solution

5. Find the vector equation of the following planes whose Cartesian equations are $2x+3y-z-1=0$

Watch Video Solution

6. Find the vector equation of the following planes :

(i) $6x+7y-z=12$

(ii) $x+2y+3z+5=0$

Watch Video Solution

7. Find the equation of the plane with intercepts 2, 3 and 4 on the x, y and z-axis respectively.

Watch Video Solution

8. Find the equation of the plane with intercept 3 on the y-axils and parallel to ZOX plane.

Watch Video Solution

9. Find the equation of the plane which cuts intercepts 2,3,-4 on the axes.

Watch Video Solution

10. Find the intercepts of tehplane $3x + 4y - 7z = 84$ on the axes. Also find the length of perpendicular from origin to this plane and direction cosines of this normal.

Watch Video Solution

11. Find the intercepts cut off by the plane $2x + y - z = 5$.

Watch Video Solution

12. Find the equation of a plane which meets the axes in $A, BandC,$ given that the centroid of the triangle ABC is the point (α, β, γ)

Watch Video Solution

13. Find the vector equation of a plane which is at a distance of 7 units from the origin and normal to the vector $3\hat{i} + 5\hat{j} - 6\hat{k}$.

Watch Video Solution

14. Find the vector equation of the plane which is at a distance of $\frac{6}{\sqrt{29}}$ from the origin and its normal vector from the origin is $2\hat{i} - 3\hat{j} + 4\hat{k}$. Also, find its Cartesian form.

Watch Video Solution

15. Determine the direction cosines of the normal to the plane and its distance from the origin: $2x - 3y + 4z - 6 = 0$

Watch Video Solution

16. In each of the following cases, determine the direction cosines of the normal to the plane and the distance from the origin.(a) $z = 2$ (b) $x + y + z = 1$ (c) $2x + 3yz = 5$(d) $5y + 8 = 0$

Watch Video Solution

17. In each of the following cases, determine the direction cosines of the normal to the plane and the distance from the origin.(a) $z = 2$ (b) $x + y + z = 1$ (c) $2x + 3yz = 5$(d) $5y + 8 = 0$

Watch Video Solution

18. In each of the following cases,determine the direction cosines of the normal to the plane ned its distance from the origin: $5y + 8 = 0$

Watch Video Solution

19. In each of the following cases, determine the direction cosines of the normal to the plane and the distance from the origin.(a) $z=2$ (b) $x+y+z=1$ (c) $2x+3yz=5$(d) $5y+8=0$

Watch Video Solution

20. Find the angle between the planes whose vector equations are $\overrightarrow{r}.\left(2\hat{i}+2\hat{j}-3\hat{k}\right)=5$ and $\overrightarrow{r}.\left(3\hat{i}-3\hat{j}+5\hat{k}\right)=3.$

Watch Video Solution

21. Find the angle between the plane: $2x-y+z=6$ and $x+y+2z=7$

Watch Video Solution

22. Find the angle between the plane: $7x + 5y + 6z + 30 = 0$ and $3x - y - 10z + 4 = 0$

Watch Video Solution

23. Find the angle between the plane: $3x - 6y + 2z = 7$ and $2x + 2y - 2z = 5$

Watch Video Solution

24. Find the angle between the plane: $2x + y - 2z = 5$ and $3x - 6y - 2z = 7$

Watch Video Solution

25. Determine whether the following pair of planes are parallel or perpendicular and in case they are neither find the angle between them: $2x - y + 3z - 1 = 0$ and $2x - y + 3z + 3 = 0$

Watch Video Solution

26. Determine whether the following pair of planes are parallel or perpendicular and in case they are neither find the angle between them: $2x - 2y + 4z + 5 = 0$ and $3x - 3y + 6z - 10$

Watch Video Solution

27. Determine whether the following pasir of planes are parallel or perpendicular and in case they are neither find the angle between them: $2x + y + 3z - 2 = 0$ and $x - 2y + 5 = 0$

Watch Video Solution

28. Determine whether the following pasir of planes are parallel or perpendicular and in case they are neither find the angle between them: $4x + 8y + z - 8 = 0$ and $y + z - 4 = 0$

Watch Video Solution

29. Determine whether the following pair of planes are parallel or perpendicular and in case they are neither find the angle between them: $3x - 4y + 5z = 0$ and $2x - y - 2z = 5$

Watch Video Solution

30. Find the angle between the line $\frac{x+1}{2} = \frac{y}{3} = \frac{z-3}{6}$ and the plane $10x + 2y - 11z = 3$.

Watch Video Solution

31. 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 $x + 2y - 3z = 8.$

Watch Video Solution

32. Find the equation of the plane passing through the oint $(-1, -1, 2)$ and perpendicular to each of tehpalnes $2x + 3y - 3z = 2 \text{ and } 5x - 4y + z = 6.$

Watch Video Solution

33. 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 $3x + 3y + z = 0$

Watch Video Solution

34. Find the vector and cartesian equation of a plane which passes through the point $(1, 4, 6)$ and perpendicular to $\left(\hat{i} - 2\hat{j} + \hat{k}\right)$.

Watch Video Solution

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

Watch Video Solution

36. If O be the origin and the coordinates of P be$(1, \quad 2, \quad 3)$, then find the equation of the plane passing through P and perpendicular to OP.

Watch Video Solution

37. Find the equation of the plane passing through (3, 4, -1), which is parallel to the plane $\vec{r} \cdot \left(2\hat{i} - 3\hat{j} + 5\hat{k}\right) + 7 = 0.$

Watch Video Solution

38. Find the equation of the plane passing through (a,b,c) and parallel through plane $\vec{r} . \left(\hat{i} + \hat{j} + \hat{k}\right) = 2.$

Watch Video Solution

39. find the equation of the plane passing through the point (3,3,1) and perpendicular to the line joining (3,4,-1) and (2,-1,5).

Watch Video Solution

40. Find the equation of the plane passing through the point (3,4,1) and (0,1,0) and parallel to the line $\frac{x+3}{2}=\frac{y-3}{7}=\frac{z-2}{5}$

Watch Video Solution

41. Find the vector and Cartesian equations of the plane which passes through the pointy (5, 2, -4) and perpendicular to the line with direction ratios 2, 3,-1.

Watch Video Solution

42. Find the equation of the plane through the point $(1, 4, -2)$ and paralle to the plane $-2x+y-3z=7.$

Watch Video Solution

43. Find the equation of the plane throughathe points (2,-3,1) and (5,2,-1) and perpendicular to the plane $x - 4y + 5z + 2 = 0$

Watch Video Solution

44. Find the equation of the passing through the points $(-1, 1, 1)$ and $(1, -1, 1)$ and perpendicular to the plane $x + 2y + 2z = 5$.

Watch Video Solution

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

Watch Video Solution

46. Find the equation of the plane through points (2,1,0),(3,-2,-2), and (3,1,7).

Watch Video Solution

47. Find the equations of the plane that passes through three points (1,1,0),(1,2,1),(-2,2,-1).

Watch Video Solution

48. Find the vector equation of the plane passing through the points $P(2\,5,\ -3),\ Q(-2,\ -3,\ 5)\ and\ R(5,\ 3,\ -3)$.

Watch Video Solution

49. Find the vector equation of the plane passing through the points $P(2\,5, \; -3), \; Q(-2, \; -3, \; 5) \; and \; R(5, \; 3, \; -3)$.

Watch Video Solution

50. Find the coordinates of the point where the line $\frac{\mathrm{x}+1\backslash}{2}=\frac{\mathrm{y}+2}{3}=\frac{\mathrm{z}+3}{4}$ meets the plane $\mathrm{x}+\mathrm{y}+4\mathrm{z}=6.$

Watch Video Solution

51. Find the coordinates of the point where the line through $(3, \; -4, \; -5)$and $(2, \; -3, 1)$crosses the plane$2x+y+z=7.$

Watch Video Solution

52. Find the coordinates of the point where the line through the points $A(3, 4, 1)$ and $B(5, 1, 6)$ crosses the XZ plane. Also find the angle which this line makes with the XZ plane.

Watch Video Solution

53. Find the coordinates of the point where the line through (5, 1, 6) and (3, 4, 1) crosses the ZX-plane.

Watch Video Solution

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

Watch Video Solution

55. Find the co-ordinates of the foot of perpendicular drawn from origin to the plane $x - y - z = 1$.

Watch Video Solution

56. Find the coordinates of the foot of perpendicular drawn from origin to the planes: $3y + 4z - 6 = 0$

Watch Video Solution

57. Find the coordinates of the foot of perpendicular drawn from origin to the planes: $5y + 8 = 0$

Watch Video Solution

58. Find the coordinates of the foot of perpendicular drawn from origin to the planes: $2x + 3y + 4z - 12 = 0$

Watch Video Solution

59. Find the coordinates of the foot of perpendicular drawn from origin to the planes: $2x - 3y + 4z - 6 = 0$

Watch Video Solution

60. Find the image of the point $(1, 3, 4)$ in the plane $2x - y + z + 3 = 0$.

Watch Video Solution

61. From the point $P(1, 2, 4)$ a perpendicular is drawn on the plane $2x + y - 2z + 3 = 0$. Find the equation the length and the coordinates of the foot of perpendicular.

Watch Video Solution

62. Find the equation of the plane passing through the intersection of the planes $\vec{r} = 2\hat{i} + \dot{\hat{j}} + 3\hat{k} = 7, \vec{r} = 2\hat{i} + 5\dot{\hat{j}} + 3\hat{k} = 9$ the point $(2, 1, 3)\cdot$

Watch Video Solution

63. Find the equation of the plane passing through the intersection of the planes

$\vec{r}.\left(2\hat{i}+\hat{j}+3\hat{k}\right)=7, \vec{r}.\left(2\hat{i}+5\hat{j}+3\hat{k}\right)=9$ and the point (3,2,-1)`.

Watch Video Solution

64. Find the equation of the plane passing through the intersection of the planes $\vec{r}=2\hat{i}+\dot{\hat{j}}+3\hat{k}=7, \vec{r}=2\hat{i}+5\dot{\hat{j}}+3\hat{k}=9$ the point $(2, 1, 3)\cdot$

Watch Video Solution

65. Find the vector equation of the plane passing through the intersection of the planes $\vec{r}.\left(\hat{i}+\hat{j}+\hat{k}\right)=6, \vec{r}.\left(2\hat{i}+3\hat{j}+4\hat{k}\right)=-5$ and the point $(1, 1, 1)$.

Watch Video Solution

Watch Video Solution

66. Find the equation of the plane through the intersection of the planes $3x - y + 2z = 4 \, and \, x + y + z = 2$ and the point (2, 2, 1).

Watch Video Solution

67. Find the vector 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 $x - y + z = 0.$

Watch Video Solution

68. Find the equation of the plane passing through the line of intersections of the planes $\vec{r}.\left(\hat{i}+\hat{j}+\hat{k}\right)=1$ and $\vec{r}.\left(2\hat{i}+3\hat{j}-\hat{k}\right)+4=0$ and parallel to x-axis.

Watch Video Solution

Watch Video Solution

69. Find the equation of the plane which contains the line of intersection of the planes $\vec{r}\cdot\left(\hat{i}+2\hat{j}+3\hat{k}\right)-4=0$ and $\vec{r}\cdot\left(2\hat{i}+\hat{j}-\hat{k}\right)+5=0$ and which is perpendicular to the plane $\vec{r}\cdot\left(5\hat{i}+3\hat{j}-6\hat{k}\right)+8=0.$

Watch Video Solution

70. 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.

Watch Video Solution

71. Show that the lines $\frac{x-3}{2}=\frac{y+1}{-3}=\frac{z+2}{1}$ and $\frac{x-7}{-3}=\frac{y}{1}=\frac{z+7}{2}$ are

coplanar. Also find the equation of the plane containing them.

Watch Video Solution

72. Find the distance of each of the following points from the corresponding given plane: $(-6, 0, 0)$, $2x - 3y + 6z - 2 = 0$

Watch Video Solution

73. Find the perpendicular distance from the point $(2, 3, -5)$ to the plane $z + 2y - 2z - 9 = 0$.

Watch Video Solution

74. Find the distance of each of the following points from the corresponding given plane: $(0, 0, 0)$, $3x - 4y + 12z = 3$

Watch Video Solution

75. Find the distance of each of the following points from the corresponding given plane: $(3, -2, 1), (2x - y + 2z + 3 = 0$

Watch Video Solution

76. Find the distance of a point $(2, 5, 3)$from the plane $\rightarrow r6\hat{i} - 3\dot{\hat{j}} + 2\hat{k} = 4.$

Watch Video Solution

77. Prove that if a plane has the intercepts $a, b, c\,and$ is at a distance of p units from theorigin, then $\frac{1}{a^2} = \frac{1}{b^2} + \frac{1}{c^2} = \frac{1}{p^2}.$

Watch Video Solution

78. Find the distance of the point P(6,5,9) from the plane determined by the points $A(3, -1, 2)$, $B(5, 2, 4)$ and $C(-1, -1, 6)$.

Watch Video Solution

79. Distance between the two planes $2x + 3y + 4z = 4$ and $4x + 6y + 8z = 12$ is

Watch Video Solution

80. Find the equation of the line through point (1,2,3) and parallel to line $x - y + 2z = 5, 3x + y + z = 6.$

Watch Video Solution

81. the two lines $x = ay + b, z = cy + d$ and $x = a'y + b, z = c'y + d'$ will be perpendicular, if and only if:

(A) $aa' + cc' + 1 = 0$

(B) $aa' + bb' + cc' + 1 = 0$

(C) $aa' + bb' + cc' = 0$

(D) $(a + a') + (b + b') + (c + c') = 0$

Watch Video Solution

82. Find the vector equation of the line passing through (1, 2, 3) and parallel to the planes $\vec{r} \cdot \left(\hat{i} - \hat{j} + 2\hat{k}\right) = 5$ and $\vec{r} \cdot \left(3\hat{i} + \hat{j} + \hat{k}\right) = 6.$

Watch Video Solution

83. A plane meets the coordinate axes at P, Q and R such that the centroid of the triangle is (3,3,3). The equation of he plane is (A) $x+y+z=9$ (B) $x+y+z=1$ (C) $x+y+z=3$ (D) $3x+3y+3z=1$

Watch Video Solution

84. The equation $xy=0$ in three dimensional space is represented by (A) a plane (B) two planes at righat angles (C) a pair of parallel planes (D) a pair of straighat lines

Watch Video Solution

85. The equation $(x-1)(x-2)=0$ in thre dimensional space is represented by (A) a pair of straighat lines (B) a pair of parallel planes (C) a sphere (D) none of these

Watch Video Solution

86. A plane meets of axes in P,Q and R such that centroid PQR is (1,2,3). The equation of the plane is (A) $6x+3y+2z=6$ (B) $6x+3y+2z=1$ (C) $6x+3y+2z=18$ (D) $x+2y+3z=1$

Watch Video Solution

87. The distasnce of the plane $2x-3y+6z+14=0$ from the origin is (A) 2 (B) 4 (C) 7 (D) 11

Watch Video Solution

88. The equation of the plane through the origin and parallel to the plane $3x-4y+5z-6=0$ is

(A) $3x-4y-5z-6=0$

(B) $3x - 4y + 5z + 6 = 0$

(C) $3x - 4y + 5z - 6 = 0$

(D) $3x + 4y - 5z + 6 = 0$

Watch Video Solution

89. The equation of the plane containing the line $2x + z - 4 = 0nd2y + z = 0$ and passing through the point (2,1,-1)$is(A)$x+y-z=4(B)x-y-z=2(C)x+y+z+2=0(D)x+y+z=2`

Watch Video Solution

90. The equation $xy + yz = 0$ represents (A) a pair of straight lines (B) a pair of parallel lines (C) a pair of parallel planes (D) a pair of perpendicular planes

Watch Video Solution

91. The direction cosines of a normal to the plane $2x - 3y - 6z + 14 = 0$ are (A) $\left(\frac{2}{7}, \frac{-3}{7}, \frac{-6}{7}\right)$ (B) $\left(\frac{-2}{7}, \frac{3}{7}, \frac{6}{7}\right)$ (C) $\left(\frac{-2}{7}, \frac{-3}{3}, \frac{-6}{7}\right)$ (D) none of these

Watch Video Solution

92. If the plane $2x - 3y + 6z = 11$ makes an angle $\sin^{-1}(\alpha)$ with the $x - a\xi s$, then the value of α is

Watch Video Solution

93. The acute angle between the plane $5x - 4y + 7z = 13$ and the y-axis is givne by (A) $\sin^{-1}\left(\frac{5}{\sqrt{90}}\right)$ (B) $\sin^{-1}\left(\frac{-4}{\sqrt{90}}\right)$ (C) $\sin^{-1}\left(\frac{7}{\sqrt{90}}\right)$ (D) $\sin^{-1}\left(\frac{4}{\sqrt{90}}\right)$

Watch Video Solution

94. The plane $x + y = 0$ (A) is parallel to y-axis (B) is perpendicular to z-axis (C) passes through y-axis (D) none of these

Watch Video Solution

95. The points $A(1, 1, 0), B(0, 1, 1), C(1, 0, 1)$ and $D\left(\frac{2}{3}, \frac{2}{3}, \frac{2}{3}\right)$ are (A) coplanar (B) non coplanar (C) vertices of a parallelogram (D) none of these

Watch Video Solution

96. The equation of the plane whose intercepts on the axes are thrice of those made by the plane $2x - 3y + 6z - 11 = 0$ is (A)

$6x - 9y + 18z - 11 = 0$ (B) $2x - 3y + 6z - 33 = 0$ (C) $2x - 3y + 6z + 33 = 0$ (D) none of these

Watch Video Solution

97. The equation of the righat bisecting plane of the segment joiningteh points (a, a, a) and $(-a, -a, -a), a \neq 0$ is (A) $x + y + z = a$ (B) $x + y + z = 3a$ (C) $x + y + z = 0$ (D) $x + y + z + a = 0$

Watch Video Solution

98. The equation of plane parallel to the plane $x + y + z = 0$ and passing through $(\alpha, \beta, \gamma 0$ is (A) $x + y + z = \alpha + \beta + \gamma$ (B) $x + y + z = \alpha\beta + \beta\gamma + \gamma\alpha$ (C) $x + y + z + \alpha + \beta + \gamma = 0$ (D) none of these

Watch Video Solution

99. The three planes $x+y=0, y+z=0$ and $x+z=0$ (A) meet in the unique point (B) meet in a line (C) meet taken two at a time i parallel lines (D) none of these

Watch Video Solution

100. The equation $x^2-x-2=0$ in three dimensional space is represented by (A) a pair of parallel planes (B) as pair of straight lines (C) a pair of perpendicular planes (D) a set containing two distinct points

Watch Video Solution

101. The angle between the plane $3x+4y=0$ and the line $x^2+y^2=0$ is (A) 0^0 (B) 30^0 (C) 60^0 (D) 90^0

Watch Video Solution

102. The locus of a first degree equation in x,y and z is a (A) straighat line (B) plane (C) sphere (D) none of these

Watch Video Solution

103. If the points $(-0, -1, -2), (-3, -4, -5), (-6, -7, -8)$ and (x, x, x) are coplanar then x is (A) -2 (B) 0 (C) 3 (D) any real number

Watch Video Solution

104. The points $(3, -2, -1), (-1, 1, 2), (2, 3, -4)$ and $(4, 5, \lambda)$ are coplanar when $\lambda = (A)0(B)$(-146)/17$(C)1(D)$(-17)/9`

Watch Video Solution

105. The equation of the righat bisector plane of the segment joining (2,3,4) and (6,7,8) is (A) $x+y+z+15=0$ (B) $x+y+z-15=0$ (C) $x-y+z-15=0$ (D) none of these

Watch Video Solution

106. The equation of the plane through the point (1,2,-3) which is parallel to the plane $3x-5y+2z=11$ is given by (A) $3x-5y+2z-13=0$ (B) $5x-3y+2z+13=0$ (C) $3x-2y+5z+13=0$ (D) $3x-5y+2z+13=0$

Watch Video Solution

107. The distance between the parallel planes $x+2y-3z=2$ and $2x+4y-6z+7=0$ is (A) $\frac{1}{\sqrt{14}}$ (B) $\frac{11}{\sqrt{56}}$ (C) $\frac{7}{\sqrt{56}}$ (D) none of these

Watch Video Solution

108. The acute angle between the planes $2x-y+z=5$ and $x+y+2z=7$ is

Watch Video Solution

109. Lines OA and OB are drawn from O with directioncosines proportional to (1,-2,-1) and (3,-2,3) respectively. The direction ratios of the normal to the planes AOB are (A) (4,3,2) (B) (4,-3,-2) (C) (-4,3,-2) (D) (4,3,-2)

Watch Video Solution

110. The equation of the plane through the point of intersection of plane $x+2y+3z=4$ and $2x+y-z-5$ and perpendicular to the plane $5x+3y+6z+8=0$ is

(A) $7x-2y+3z+81=0$ (B) $23x+14y-9z+48=0$ (C) $51x+15y+50z+173=0$ (D) none of these

Watch Video Solution

111. The distance of the point $(2, 1, -1)$ from the plane $x-2y+4z=9$ is

Watch Video Solution

112. The equation of the plane passing through the intersection of the planes $x+2y+3z+4=0adn4x+3y+2z+1=0$ and the origin ils (A) $3x+2y+z+1=0$ (B) $3x+2y+z=0$ (C) $2x+3y+z=0$ (D) $x+y+z=0$

Watch Video Solution

113. If p is the length of perpendicular from the origin to the line whose intercepts on the axes are a and b, then show that $\frac{1}{p^2}=\frac{1}{a^2}+\frac{1}{b^2}$.

Watch Video Solution

114. Consider the points $P(p,0,0)$, $Q(0,q,0)$ and $R(0,0,r)$ where $pqr\neq 0$ then the equation of the plane PQR is (A) $px+qy+r=1$ (B) $\frac{x}{p}+\frac{y}{q}+\frac{z}{r}=1$ (C) $x+y+z+\frac{1}{p}+\frac{1}{q}+\frac{1}{r}=0$ (D) none of these

Watch Video Solution

115. The planes x=0 and y=0` (A) are parallel (B) are perpendicular to each other (C) interesect in z-axis (D) none of these

Watch Video Solution

116. The plane $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=1$ (A) does not pass through origin (B) is at a distance $\frac{1}{\sqrt{a^{-2}+b^{-2}+c^{-2}}}$ from origin (C) makes intercepts of a,b,c on the coordinates axes (D) all of a,b,c

Watch Video Solution

117. The distance of the plane $\vec{r}\left(\frac{2}{7}\hat{i}+\frac{3}{7}\hat{j}-\frac{6}{7}\hat{k}\right)=1$ from the origins is.

Watch Video Solution

118. The planes $\vec{r}.\left(2\hat{i}+3\hat{j}-6\hat{k}\right)=7$ and $\vec{r}.\left(\frac{-2}{7}\hat{i}-\frac{3}{7}\hat{j}+\frac{6}{7}\hat{k}\right)=0$ are

(A) parallel (B) at righat angles (C) equidistant from origin (D) none of these

Watch Video Solution