MATHS

BOOKS - ACCURATE PUBLICATION

THREE DIMENSIONAL GEOMETRY

Example Questions Carrying 6 Marks

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

Watch Video Solution

2. Find the equation of the straight line through the point (1,-3,2) and perpendicular to the lines $\frac{x-1}{1}=\frac{y-2}{2}=\frac{z-3}{3}$ and $\frac{x-1}{-3}=\frac{y-2}{2}=\frac{z-1}{5}$.

Watch Video Solution

3. Find the equation of the straight line passing through the point (-1,3,-2) and perpendicular to the linese $\frac{x-3}{7}=\frac{y}{3}=\frac{z-1}{2}$ and $\frac{x-1}{2}=\frac{1-y}{-2}=\frac{z-3}{7}$

Watch Video Solution

4. Find the equation of the straight line passing through the point (2,3,-1) and is perpendicular to the lines $\frac{x-2}{2}=\frac{y+1}{1}=\frac{z-3}{-3}$ and $\frac{x-3}{1}=\frac{y+2}{1}=\frac{z-1}{-1}$.

Watch Video Solution

5. Find the equation of the straight line passing through the point (2,3,-1) and is perpendicular to the lines $\frac{x-2}{2}=\frac{y+1}{1}=\frac{z-3}{-3}$ and $\frac{x-3}{1}=\frac{y+2}{1}=\frac{z-1}{-1}$.

Watch Video Solution

6. Find the equations of the straight line passing through the point (1, 2, -4) and is perpendicular to the lines : $\frac{x-8}{3}=\frac{y+19}{-16}=\frac{z-10}{7}$ and $\frac{x-15}{3}=\frac{y-29}{8}=\frac{z-5}{-5}$.

Watch Video Solution

7. Find the equation of the line passing through the point (1,-2,3) and perpendicular to the lines : $\vec{r}=\left(\hat{i}-2\hat{j}+\hat{k}\right)+\lambda\left(\hat{i}+\hat{j}+\hat{k}\right)$ and $\vec{r}=\left(\hat{i}-\hat{j}+2\hat{k}\right)+\mu\left(3\hat{i}-2\hat{j}-5\hat{k}\right)$

Watch Video Solution

8. Find the equation of the line passing through the point (2, -1, 3) and perpendicular to the lines : $\vec{r}=\left(\hat{i}-\hat{j}+\hat{k}\right)+\lambda\left(2\hat{i}+\hat{j}-3\hat{k}\right)$ and $\vec{r}=\left(\hat{i}+\hat{j}-\hat{k}\right)+\mu\left(\hat{i}+\hat{j}+\hat{k}\right)$

Watch Video Solution

9. Find the image of point (3,-1,2) in line $\frac{x+1}{3} = \frac{y-3}{4} = \frac{z+2}{5}$

Watch Video Solution

10. Find the image of the point (2, 0, 1) in the line given by the equations :

$\frac{x-3}{1} = \frac{y+3}{-2} = \frac{z-3}{5}$.

Watch Video Solution

11. Find the image of the point (5, 1, 0) in the line given by the equations :

$\frac{x-1}{2} = \frac{y-3}{-1} = \frac{z-4}{3}$.

Watch Video Solution

12. Find the image of point (0, 3, 7) in the line given by the equations

$\frac{x-4}{3} = \frac{y+3}{2} = \frac{z-6}{-1}$.

Watch Video Solution

13. Find the image of the point (1, 2, 3) in the line given by the equations :

$$\frac{x-6}{6}=\frac{y-7}{2}=\frac{z-7}{-2}.$$

Watch Video Solution

14. Find the shortest distance (S.D.) between the lines :

$$\vec{r}_1=\hat{i}-2\hat{j}+3\hat{k}+\lambda\left(-\hat{i}+\hat{j}-2\hat{k}\right)$$ and

$$\vec{r}_2=\hat{i}-\hat{j}-\hat{k}+\mu\left(\hat{i}+2\hat{j}-2\hat{k}\right)$$

Watch Video Solution

15. Find the shortest distance between the lines whose equations are :

$$\vec{r}=2\hat{i}+3\hat{j}+\hat{k}+\lambda\left(2\hat{i}-\hat{j}+3\hat{k}\right)$$ and

$$\vec{r}=7\hat{i}+5\hat{j}+6\hat{k}+\mu\left(\hat{i}+3\hat{j}+5\hat{k}\right)$$

Watch Video Solution

16. Find the shortest distance (S.D.) between the lines :

$\vec{r} = \hat{j} + \lambda\left(3\hat{i} + \hat{j} - 2\hat{k}\right)$ and $\vec{r} = 2\hat{i} + 3\hat{j} - \hat{k} + \mu\left(2\hat{i} - \hat{j} + 4\hat{k}\right)$

Watch Video Solution

17. Find the shortest distance between the lines whose equations are :

$\vec{r} = \hat{i} + 2\hat{j} + \hat{k} + \lambda\left(\hat{i} - 2\hat{j} + \hat{k}\right)$ and

$\vec{r} = 2\hat{i} - \hat{j} - \hat{k} + \mu\left(3\hat{i} + \hat{j} + 2\hat{k}\right)$.

Watch Video Solution

18. Find the shortest distance between the lines whose vector equations are $\vec{r} = \left(\hat{i} + 2\hat{j} + 3\hat{k}\right) + \lambda\left(\hat{i} - 3\hat{j} + 2\hat{k}\right)$ and

$\vec{r} = 4\hat{i} + 5\hat{j} + 6\hat{k} + \mu\left(2\hat{i} + 3\hat{j} + \hat{k}\right)$

Watch Video Solution

19. Find the shortest distance between the lines: $\vec{r} = 6\hat{i} + 2\hat{j} + 2\hat{k} + \lambda\left(\hat{i} - 2\hat{j} + 2\hat{k}\right)$ and $\vec{r} = -4\hat{i} - \hat{k} + \mu\left(3\hat{i} - 2\hat{j} -$

.

Watch Video Solution

20. Find the shortest distance between two lines whose vector equations are : $\vec{r} = \hat{i} + 2\hat{j} + \hat{k} + \lambda\left(\hat{i} + \hat{j} + \hat{k}\right)$ and $\vec{r} = 2\hat{i} - \hat{j} - \hat{k} + \mu\left(2\hat{i} + \hat{j} + 2\hat{k}\right)$

Watch Video Solution

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

Watch Video Solution

22. Find the shortest distance between the lines

$\vec{r} = \left(\hat{i} + 2\hat{j} + \hat{k}\right) + \lambda\left(\hat{i} - \hat{j} + \hat{k}\right)$ and

$\vec{r} = 2\hat{i} - \hat{j} - \hat{k} + \mu\left(2\hat{i} + \hat{j} + 2\hat{k}\right)$

Watch Video Solution

23. Find the shrotest distance between the lines

$\vec{r} = \hat{i} - 7\hat{j} - 2\hat{k} + \lambda\left(\hat{i} + 3\hat{j} + 2\hat{k}\right)$ and

$\vec{r} = 3\hat{i} + 4\hat{j} - 2\hat{k} + \mu\left(-\hat{i} + 2\hat{j} + \hat{k}\right)$

Watch Video Solution

24. Find the shortest distance (S.D.) between the lines

$\vec{r} = 3\hat{i} + 5\hat{j} + 7\hat{k} + \lambda\left(\hat{i} - 2\hat{j} + \hat{k}\right)$ and

$\vec{r} = -\hat{i} - \hat{j} - \hat{k} + \lambda\left(7\hat{i} - 6\hat{j} + \hat{k}\right)$

Watch Video Solution

25. Find the shortest distance and the vector equation of the line of shortest distance between the lines given by : $\vec{r} = \left(3\hat{i} + 8\hat{j} + 3\hat{k}\right) + \lambda\left(3\hat{i} - \hat{j} + \hat{k}\right)$ and $\vec{r} = \left(-3\hat{i} - 7\hat{j} + 6\hat{k}\right) + \mu$.

Watch Video Solution

26. Find the shortest distance between the lies : $\vec{r_1} = \hat{i} + 2\hat{j} - 3\hat{k} + \lambda\left(3\hat{i} - 4\hat{j} - \hat{k}\right), \vec{r_2} = 2\hat{i} - \hat{j} + \hat{k} + \mu\left(\hat{i} + \hat{j} + 5\hat{k}\right)$

Watch Video Solution

27. Find the angle between the lines

$$\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4} \text{ and } \frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}$$

Watch Video Solution

28. Find the shortest distance between the lines $\left(\frac{x+1}{7}=\frac{y+1}{-6}=\frac{z+1}{1}\right.$ and $\left.\frac{x-3}{1}=\frac{y-5}{-2}=\frac{z-7}{1}\right)$

Watch Video Solution

29. Find the angle between the following lines

$$\frac{x+1}{1}=\frac{y-4}{1}=\frac{z-5}{2} \text{ and } \frac{x+3}{3}=\frac{y-2}{5}=\frac{z+5}{4}$$

Watch Video Solution

30. Find the equation of the plane through the line of intersection of the planes given by the.equations 2x + 3y - z = - 1 and x + y- 2z = - 3 which is perpendicular to the plane given by the equation 3x-y-2z= 4.

Watch Video Solution

31. Find the equation of the plane through the 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

32. Find the equation of the plane which is perpendicular to the plane 5 x + 3y + 6 z +8 = 0 and which contains the line of intersection of the planes x + 2 y + 3z-4-0 and 2x+y-z+5 -0.

Watch Video Solution

33. Find the equation of a plane through the points (3,-1,2), (1,-1,-3) and (4,-3,1)

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

37. Find the equation of plane that passes from the points A (1, 1, -1), B (6, 4, -5) and C (- 5, -2, 8) .

Watch Video Solution

38. Find the equation of plane passing through the points A (1,3,1), B (2,5,7) and C (4, 1,5).

Watch Video Solution

39. Find the equation of plane passing through the points A (2,1, -1), B (6,5,0) and C (2,-1,-5).

Watch Video Solution

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

Watch Video Solution

41. Find the eqation of plane passing through the points A(2,-1,1),B(4,3,2) and C(6,5,-2)

Watch Video Solution

42. Prove that the points (2, -1, 3), (1, 2, -1), (3, 4, 5) and (0, -7, -2) are co-planar. Also find the equation of the plane containing these points.

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

45. Find the equation of the plane through the points (2,-3,1) and (5,2,-1) and perpendicular to the plane $x - 2y + 4z = 10$

Watch Video Solution

46. Find the equation of plane passing through the points (-1,-1,3),(1,-2,7) and is perpendicular to the plane x+2y+z-9=0.

Watch Video Solution

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

Watch Video Solution

48. Find the equation of the plane passing through the points (2,1,0), (3,2,2) and is parallel to the line $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-3}{1}$.

Watch Video Solution

49. Find the equation of a plane passing through the points (1,1,2) and (1,0,-2) and parallel to the line $\frac{x-1}{1}=\frac{y-2}{3}=\frac{z-3}{5}$

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

54. 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

55. Find the equation of the plane passing through the point (1, -1 , 2) and perpendicular to the planes 2x + 3y - 2z = 5 and x + 2y - 3z = 8.

Watch Video Solution

56. Find the co-ordinates of the foot of perpendicular drawn from the point (2, 3, 5) on the plane given by the equation : $2x - 3y + 4z + 10 = 0$

Watch Video Solution

57. Find the co-ordinates of the foot of perpendicular drawn from the point (4, - 1, 3) on the plane given by the equation : $2x + y - 5z - 9 = 0$

Watch Video Solution

58. Find the co-ordinates of the foot of perpendicular drawn from the point (3, - 2, 4) on the plane given by the equation :

$3x + y + 6z - 12 = 0.$

Watch Video Solution

59. Find the distance between the point (2, 3, - 1) and foot of perpendicular drawn from (3, 1, - 1) to the plane $x - y + 3z = 10.$

Watch Video Solution

60. Find the image of point $(1, 2, -1)$ in the plane $2x + y - z = 10.$

Watch Video Solution

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

Watch Video Solution

62. A variable plane which remains at a constant distance 3p from the origin cuts the coordinate axes at A,B,C. Show that locus of the O centroid of the triangle ABC is

$$\frac{1}{x^2}+\frac{1}{y^2}+\frac{1}{z^2}=\frac{1}{p^2}.$$

Watch Video Solution

63. A variable plane which is at a constant 6 p from the origin meets the axes in A,B and C respectively. Show that the locus of the centroid of the triangle ABC is $\frac{1}{x^2}+\frac{1}{y^2}+\frac{1}{z^2}=\frac{1}{4p^2}$

Watch Video Solution

64. A variable plane which is at a constant 6 p from the origin meets the axes in A,B and C respectively. Show that the locus of the centroid of the triangle ABC is $\frac{1}{x^2}+\frac{1}{y^2}+\frac{1}{z^2}=\frac{1}{4p^2}$

Watch Video Solution

65. Find the equation of the plane containing the line $\frac{x+3}{2}=\frac{y-2}{-1}=\frac{z-4}{4}$ and perpendicular to the plane $x+2y+z-6=0$.

Watch Video Solution

66. Find the equation of the plane containing the line : $\frac{x-1}{3}=\frac{y+2}{1}=\frac{z-3}{2}$ and perpendicular to the plane 2x - y + 2z -3= 0.

Watch Video Solution

67. Find the equation of the plane containing the line : $\frac{x+1}{1}=\frac{y-2}{2}=\frac{z-3}{3}$ and perpendicular to the plane 3 x - 2 y - z = 4.

Watch Video Solution

68. Find the equation of the plane containing the line $\frac{x+3}{2} = \frac{y-2}{-1} = \frac{z-4}{4}$ and perpendicular to the plane $x + 2y + z - 6 = 0$.

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

71. find the distance of the point (-1, -6, -9) from the point of Intersection of the line $\frac{x-2}{3}=\frac{y+2}{4}=\frac{z+2}{12}$ and the plane x - y + z = 5

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

74. Find the distance of the point (2, 3, -1) from the point of intersection of the line $\vec{r} = 3\hat{i} + \hat{j} - 2\hat{k} + \lambda\left(3\hat{i} + 6\hat{j} + 2\hat{k}\right)$ and the plane $\vec{r}.\left(2\hat{i} - \hat{j} + \hat{k}\right)$=3.

Watch Video Solution

75. Show that the two lines $x + \frac{1}{3} = y + \frac{3}{5} = z + \frac{5}{7}$ and $x - \frac{2}{1} = y - \frac{4}{3} = z - \frac{6}{5}$ intersect each other. Find also the point of intersection.

Watch Video Solution

76. Show that the two lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x-4}{5} = \frac{y-1}{2} = z$ intersect. Find also the point of intersection of these lines.

Watch Video Solution

77. Find the equations of the line passing through the point (1, -2, 3) and parallel to the planes x -y + 2z = 3 and 3x + 2y - z = 4.

Watch Video Solution

78. Find the equations of the line passing through the point (1, 2, -3) and parallel to the planes x + y -2z = 2 and 3x - 2y + z = 4.

Watch Video Solution

79. Find the equations of the line passing through the point (1,-2,-3) and parallel to the planes: $x - y + 2z = 5$ and $3x + 2y - z = 6$

Watch Video Solution

80. Find the equation of the plane containing the line $\frac{x-2}{7} = \frac{y-2}{1} = \frac{z-1}{5}$ and the point (4, 8, 7).

Watch Video Solution

81. Find the equation of the plane containing the line $\frac{x-4}{2}=\frac{y-2}{5}=\frac{z-4}{4}$ and the pomt (8, 9, 10).

Watch Video Solution

82. The lines $\frac{x-2}{1}=\frac{y-3}{1}=\frac{z-4}{-k}$ and $\frac{x-1}{k}=\frac{y-4}{2}=\frac{z-5}{1}$ are coplanar, if

Watch Video Solution

83. Show that the lines $\frac{x-1}{2}=\frac{y-3}{4}=-z$ and $\frac{x-4}{2}=\frac{y-1}{-2}=\frac{z-1}{1}$ are coplanar Also find the equation of the plane containing the lines.

Watch Video Solution

84. Prove that the lines : $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-3}{4}$ and $\frac{x-2}{3}=\frac{y-3}{4}=\frac{z-4}{5}$ are coplanar.

Watch Video Solution

85. Prove that the lines : $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-3}{4}$ and $\frac{x-2}{3}=\frac{y-3}{4}=\frac{z-4}{5}$ are coplanar.

Watch Video Solution

86. Find the image of the point (1, 2, 3) in the plane (as mirror) given by the equation : $3x+2y+z=24$

Watch Video Solution

87. Find the image of the point (2, - 1, 3) in the plane (as mirror) given by the equation $2x+y=8$

Watch Video Solution

88. Find the image of the point (3, 7, 5) in the plane (as mirror) given by the equation x +y+z=9.

Watch Video Solution

89. Find the shortest distance between the lines whose equations are :

$\vec{r} = \left(\hat{i} - \hat{j} + 2\hat{k}\right) + \lambda\left(2\hat{i} - \hat{j} + 4\hat{k}\right)$ and

$\vec{r} = \left(2\hat{i} - 4\hat{j} + \hat{k}\right) + \mu\left(3\hat{i} + \hat{j} - 5\hat{k}\right).$

Watch Video Solution

90. Find the shortest distance between the lines whose equations are :

$\vec{r} = \left(\hat{i} - 2\hat{j} + 3\hat{k}\right) + \lambda\left(\hat{i} + 3\hat{j} + 4\hat{k}\right)$ and

$\vec{r} = \left(2\hat{i} + \hat{j} + 5\hat{k}\right) + \mu\left(3\hat{i} - 4\hat{j} - \hat{k}\right).$

Watch Video Solution

91. Find the shortest distance between the lines whose equations are :

$\vec{r} = \left(\hat{i} - \hat{j} + 2\hat{k}\right) + \lambda\left(2\hat{i} - \hat{j} + 4\hat{k}\right)$ and

$\vec{r} = \left(2\hat{i} - 4\hat{j} + \hat{k}\right) + \mu\left(3\hat{i} + \hat{j} - 5\hat{k}\right)$.

Watch Video Solution

92. Find the shortest distance between the lines :

$\frac{x+1}{4} = \frac{y-3}{-6} = \frac{z+1}{1}$ and $\frac{x+3}{3} = \frac{y-5}{2} = \frac{z-7}{6}$.

Watch Video Solution

93. Find the shortest distance between the lines :

$\frac{x+1}{5} = \frac{y+1}{-6} = \frac{z+1}{2}$ and $\frac{x-3}{4} = \frac{y-5}{-2} = \frac{z-7}{1}$.

Watch Video Solution

Questions Carrying 1 Mark Type I Multiple Choice Questions

1. The equation of xy-plane is equal to :

A. x=0

B. y=0

C. z=0

D. x+y+z=0

Answer: C

Watch Video Solution

2. If a line makes angles α, β, γ with x-axis and z-axis respectively, then $\sin^2\alpha + \sin^2\beta + \sin^2\gamma =$

A. 0

B. 1

C. 2

D. None of these

Answer: C

Watch Video Solution

3. Direction cosines of the line $\frac{x-2}{3}=\frac{y+1}{-1}=\frac{z-3}{-2}$ are :

A. $\left(\frac{-3}{\sqrt{14}}, \frac{-1}{\sqrt{14}}, \frac{-2}{\sqrt{14}}\right)$

B. $\left(\frac{3}{\sqrt{14}}, \frac{-1}{\sqrt{14}}, \frac{2}{\sqrt{14}}\right)$

C. $\left(\frac{3}{\sqrt{17}}, \frac{-1}{\sqrt{17}}, \frac{2}{\sqrt{17}}\right)$

D. $\left(\frac{3}{\sqrt{13}}, \frac{-1}{\sqrt{13}}, \frac{2}{\sqrt{13}}\right)$

Answer: B

Watch Video Solution

4. Direction cosines of the line $\frac{x+3}{-2}=\frac{y-5}{4}=\frac{z+6}{-2}$ are :

A. $\left(\frac{2}{\sqrt{22}}, \frac{4}{\sqrt{22}}, \frac{2}{\sqrt{22}}\right)$

B. $\left(\frac{2}{\sqrt{22}}, \frac{4}{\sqrt{22}}, \frac{2}{\sqrt{2}}\right)$

C. $\left(\frac{-2}{\sqrt{22}}, \frac{4}{\sqrt{22}}, \frac{-2}{\sqrt{22}}\right)$

D. $\left(\frac{-2}{\sqrt{22}}, \frac{4}{\sqrt{22}}, \frac{-2}{\sqrt{22}}\right)$

Answer: B

Watch Video Solution

5. The direction cosines of the line joining the points (- 2, 1, 0) and (3, 2, 1) are,

A. $< 5, 1, 1 >$

B. $\left(\frac{5}{3\sqrt{3}}, \frac{1}{3\sqrt{3}}, \frac{1}{3\sqrt{3}}\right)$

C. $\left(\frac{-5}{\sqrt{6}}, \frac{1}{\sqrt{6}}, \frac{1}{\sqrt{6}}\right)$

D. $< -5, -1, -1 >$

Answer: B

Watch Video Solution

6. The point which lies in the plane given by the equations $2x + y - 3z = 10$ is :

A. (0,0,0)

B. (1, 1, 1)

C. (1, 10, 1)

D. (1, 11, 1)

Answer: D

Watch Video Solution

7. The point which lies in the plane given by the equations $2x + y - 3z = 10$ is :

A. (0,0,0)

B. (0,0,5)

C. (0,5, 0)

D. (5,0,0)

Answer: D

Watch Video Solution

8. If line makes angles $90^\circ, 45^\circ, 135^\circ$ with X, Y and Z axes respectively then its direction ratios are =.

A. $< 1, -1, 1 >$

B. $< 0, -1, 1 >$

C. $< -1, 0, 1 >$

D. $< 0, 1, -1 >$

Answer: C

Watch Video Solution

9. If line makes angles $90^\circ, 45^\circ, 135^\circ$ with X, Y and Z axes respectively then its direction ratios are =.

A. $< 1, -1, 1 >$

B. $< 0, -1, 1 >$

C. $< -1, 0, 1 >$

D. $< 0, 1, -1 >$

Answer: D

Watch Video Solution

10. The distance of the point (3, 2, 7) from YZ-plane is equal to:

A. 2 unit

B. 3 unit

C. 7 unit

D. 5 unit

Answer: B

Watch Video Solution

11. The distance of the point (3, 2, 7) from XY-plane is equal to :

A. 3 unit

B. 2 unit

C. 5 unit

D. 7 unit

Answer: D

Watch Video Solution

12. Distance between plane $3x + 4y - 20 = 0$ and point (0, 0, - 7) is :

A. 4 units

B. 3 units

C. 2 units

D. 1 units

Answer: A

Watch Video Solution

13. The distance of the plane $2x - 3y + 6z + 14 = 0$ from the point (0, 2, 1) equals :

A. -2

B. 3

C. 2

D. 5

Answer: C

Watch Video Solution

14. The distance of the plane 2x-3y-6z+14=0 from point (3, 2, 0) is :

A. 3

B. 2

C. -2

D. 5

Answer: B

Watch Video Solution

15. Distance between plane defined by $3x + 4y + 5 = 0$ and the point (5, 0, 7) is

A. 3 units

B. 4 units

C. 5 units

D. 6 units

Answer: B

Watch Video Solution

16. Distance between plane defined by $3y + 4z + 10 = 0$ and the point (7, 5, 0) is :

A. 3 units

B. 4 units

C. 5 units

D. 6 units

Answer: C

Watch Video Solution

17. Distance between the point (0,1,7) and the plane $3x + 4y + 1 = 0$ is:

A. 1 unit

B. 2 unit

C. 3 unit

D. 4 unit

Answer: A

Watch Video Solution

18. Distance between the point (1, 0 , 9) and the plane $4x + 3y + 1 = 0$ is

A. 1 unit

B. 2 unit

C. 3 unit

D. 4 unit

Answer: A

Watch Video Solution

19. Direction ratios of line $\frac{x-1}{3} = \frac{5-y}{1} = \frac{2z+4}{6}$ are

A. $< 3, -1, 6 >$

B. $< 3, 1, 3 >$

C. $< 3, -1, 3 >$

D. $< 3, 1, 6 >$

Answer: C

Watch Video Solution

20. Find the equation of line passing from the points (2, 5, 6) and (1, 2, -10).

A. $\frac{x-2}{1}=\frac{y-5}{3}=\frac{z-6}{16}$

B. $\frac{x-2}{1}=\frac{y-5}{3}=\frac{z-6}{16}$

C. $\frac{x-2}{4}=\frac{y-5}{3}=\frac{z-6}{16}$

D. $\frac{x-2}{5}=\frac{y-5}{3}=\frac{z-6}{16}$

Answer: A

Watch Video Solution

21. Direction ratios of line given by line $\frac{x-1}{3}=\frac{2y+6}{12}=\frac{1-z}{-7}$ are :

A. $<3, 10, -17>$

B. $<3, -5, 7>$

C. $<3, 5, 7>$

D. $<3, 5, -7>$

Answer: C

Watch Video Solution

22. Direction ratio of line given by $\frac{x-1}{3}=\frac{6-2y}{10}=\frac{1-z}{-7}$ are :

A. $<3,10,-17>$

B. $<3,-5,7>$

C. $<3,5,7>$

D. $<3,5,-7>$

Answer: B

Watch Video Solution

23. The equation of line is $\frac{2x-5}{4}=\frac{y+4}{3}=\frac{6-z}{6}$ then the d.c.'s ofline parallel of this line are :

A. $\left(\frac{4}{7},\frac{3}{7},\frac{6}{7}\right)$

B. $\left(\frac{2}{7},\frac{3}{7},\frac{-6}{7}\right)$

C. $\left(\frac{4}{7},\frac{3}{7},\frac{6}{7}\right)$

D. None of these

Answer: B

Watch Video Solution

24. Direction ratios of normal to plane which is parallel to the plane $3x + y - z = 11$ are :

A. $< 3, 1, -1 >$

B. $< 0, 1, 1 >$

C. $< -3, 1, -1 >$

D. $< 1, 1, 0 >$

Answer: A

Watch Video Solution

25. The distance between the planes, $3x+2y-6z-14=0$ and $3x+2y-6z+21=0$ is,

A. 35

B. 7

C. 1

D. 5

Answer: D

Watch Video Solution

26. The distance between the planes, $3x+2y-6z-14=0$ and $3x+2y-6z+21=0$ is,

A. 35

B. 7

C. 1

D. 3

Answer: D

Watch Video Solution

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

A. 2 units

B. $\frac{4}{\sqrt{29}}$ units

C. 8 units

D. $\frac{2}{\sqrt{29}}$ units

Answer: D

Watch Video Solution

28. The planes $2x - y + 4z = 5$ and $5x - 2.5y + 10z = 6$ are :

A. Perpendicular

B. Parallel

C. intersect y-axis

D. passes through $\left(0, 0, \frac{5}{4}\right)$

Answer: B

Watch Video Solution

29. The co-ordinates of foot of the perpendicular drawn from the point (2,5,7) on the x axis are given by:

A. (2,0,0)

B. (0,5,0)

C. (0, 0, 7)

D. (0,5,7)

Answer: A

Watch Video Solution

30. P is a point on the line segment joining the points (3, 2, -1) and (6, 2,-2). If x co-ordinates of P is 5, then its y co-ordinate is

A. 2

B. 1

C. -1

D. -2

Answer: A

Watch Video Solution

31. If α, β, γ are the angles that a line makes with the positive direction of x, y, z axis repectively, then the direction cosines of the line are:

A. $\sin\alpha, \sin\beta, \sin\gamma$

B. $\cos\alpha, \cos\beta, \cos\gamma$

C. $\tan\alpha, \tan\beta, \tan\gamma$

D. $\cos^2\alpha, \cos^2\beta, \cos^2\gamma$

Answer: B

Watch Video Solution

32. The distance of a point P(a, b, c) from z-axis is

A. $\sqrt{a^2+c^2}$

B. $\sqrt{a^2+b^2}$

C. $\sqrt{b^2+c^2}$

D. b^2+c^2

Answer: C

Watch Video Solution

33. The equation of x-axis is of the form

A. x=0, y=0

B. x=0,2=0

C. x=0

D. y=0,z=0

Answer: D

Watch Video Solution

34. If a line makes equal angles with coordinates axes its direction - cosines are.

A. $\pm(1, 1, 1)$

B. $\pm\left(\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right)$

C. $\pm\left(\frac{1}{3}, \frac{1}{3}, \frac{1}{3}\right)$

D. $\pm\left(\frac{1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}\right)$

Answer: B

Watch Video Solution

35. Distance of the point (α, β, γ) from y-axis is

Watch Video Solution

36. If the direction cosine of a line are < k,k,k >, then,

A. $k > 0$

B. $0 < k < 1$

C. k=1

D. $k = \frac{1}{\sqrt{3}}$ or $-\frac{1}{\sqrt{3}}$

Answer: D

Watch Video Solution

37. The distance of the plane $\vec{r} \cdot \left(2\hat{i} + 3\hat{j} - 6\hat{k}\right) = 7$ from origin is :

A. 1

B. 7

C. $\frac{1}{7}$

D. None of these

Answer: A

Watch Video Solution

38. The reflection of the point (α, β, γ) in the xy-plane is:

A. $(\alpha, \beta, 0)$

B. $(0, 0, \gamma)$

C. $(-\alpha, -\beta, \gamma)$

D. $(\alpha, \beta, -\gamma)$

Answer: D

Watch Video Solution

39. The area of the quadrilateral ABCD, where A 0,4, 1), B (2, 3, -1), C (4, 5, 0) and D (2, 6, 2) is equal to

A. 9 sq. units

B. 18 sq. units

C. 27 sq. units

D. 81 sq. units

Answer: A

Watch Video Solution

40. The locus represented by x y + yz=0 is

A. A pair of perpendicular

B. A pair of parallel lines

C. A pair of parallel planes

D. A pair of perpendicular planes

Answer: D

Watch Video Solution

Questions Carrying 1 Mark Type Ii Fill In The Blanks Questions

1. The equation of yz-plane is equal to :

Watch Video Solution

2. The direction cosines of the line joining the points (-2, 4, -5) and (1, 2, 3) is :

Watch Video Solution

3. The direction cosines of the line joining the points (-1, -1, -1) and (2, 3, 4) are,

Watch Video Solution

4. The point which lies in the plane given by the equation $5x + y - z = 7$ is

Watch Video Solution

5. If a line makes angle $90^\circ, 135^\circ, 45^\circ$ with X,Y and Z-axis respectively, then its direction cosines are

Watch Video Solution

6. The distance of the point (3, 2, 7) from ZX- plane is equal to :

Watch Video Solution

7. The distance of the plane 2x-3y-6z+14=0 from point (3, 2, 0) is :

Watch Video Solution

8. Find the distance of the plane $2x - 3y + 4z - 6 = 0$ from the origin.

Watch Video Solution

9. Distance between plane defined by $3x + 4z + 15 = 0$ and the point (5, 7, 0) is

Watch Video Solution

10. Distance between the point (10, 0 , 1) and the plane $3y + 4z + 1 = 0$ is

Watch Video Solution

11. Direction-ratios of line given by $x - \frac{1}{3} = y + \frac{6}{10} = 1 - \frac{z}{7}$ are

Watch Video Solution

12. The distance between the planes, 3x + 2y - 6z - 18 =0 and 3x+2y-6z+10=0 is,

Watch Video Solution

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

Watch Video Solution

Watch Video Solution

14. If a line makes angle $90^\circ, 135^\circ, 45^\circ$ with X,Y and Z-axis respectively, then its direction cosines are

Watch Video Solution

15. If $\cos\alpha, \cos\beta, \cos\gamma$ are the direction-cosines of a line, then the value of $\sin^2\alpha + \sin^2\beta + \sin^2\gamma =$

Watch Video Solution

16. If a line makes an angle of $\frac{\pi}{4}$ each of y and z axis, then the angle which it makes with x-axis is ..... .

Watch Video Solution

17. A plane passes through the points (2, 0, 0) (0, 3, 0) and (0, 0, 4). The equation of plane is .....

Watch Video Solution

18. The direction cosines of the vector $\left(2\hat{i}+2\hat{j}-\hat{k}\right)$ are ..... .

Watch Video Solution

19. The vector equation of the line $\frac{x-5}{3}=\frac{y+4}{7}=\frac{z-6}{2}$ is .....

Watch Video Solution

20. The vector equation of the line through the points (3, 4, - 7) and (1, - 1,6) is .....

Watch Video Solution

21. Find the Cartesian equation of the following plane:

$\vec{r} \cdot \left(\hat{i} + \hat{j} - \hat{k}\right) = 2$

Watch Video Solution

Questions Carrying 1 Mark Type Iii True Or False Questions

1. The points (1, 2, 3), (-2, 3, 4) and (7,0,1) are collinear.

Watch Video Solution

2. The vector equation of the line passing through the points (3,5, 4) and (5, 8, 11) is

$\vec{r} = 3\hat{i} + 5\hat{j} + 4\hat{k} + \lambda\left(2\hat{i} + 3\hat{j} + 7\hat{k}\right)$

Watch Video Solution

3. The unit vector normal to the plane $x + 2y + 3z - 6 = 0$ is $\frac{1}{\sqrt{14}}\hat{i} + \frac{2}{\sqrt{14}}\hat{j} + \frac{3}{\sqrt{14}}\hat{k}$

Watch Video Solution

4. The intercepts made by the plane $2x - 3y + 5z + 4 = 0$ on the co-ordinate axis are $-2, \frac{4}{3}, -\frac{4}{5}$,

Watch Video Solution

5. Show that the line , $\vec{r} = 2\hat{i} - 3\hat{j} + 5\hat{k} + \lambda\left(\hat{i} - \hat{j} + 2\hat{k}\right)$ lies in the plane $\vec{r} \cdot \left(3\hat{i} + \hat{j} - \hat{k}\right) + 2 = 0.$

Watch Video Solution

6. The vector equation of the line $\frac{x-5}{3} = \frac{y+4}{7} = \frac{z-6}{2}$ is .....

Watch Video Solution

7. The equation of a line, which is parallel to $2\hat{i}+\hat{j}+3\hat{k}$ and which passes through the point (5,-2,4) is $\frac{x-5}{2}=\frac{y+2}{-1}=\frac{z-4}{3}$

Watch Video Solution

8. If the foot of perpendicular drawn from the origin to a plane is (5,-3,-2), then the equation of plane is $\vec{r}.\left(5\hat{i}-3\hat{j}-2\hat{k}\right)=38.$

Watch Video Solution

9. A line can have $45^\circ, 60^\circ, 120^\circ$ as direction angles.

Watch Video Solution

10. A line can have $45^\circ, 60^\circ, 120^\circ$ as direction angles.

Watch Video Solution

11. If a line makes an angle of $\frac{\pi}{4}$ each of y and z axis, then the angle which it makes with x-axis is ..... .

Watch Video Solution

12. Write the direction cosine of a line parallel to the line : $\frac{3-x}{3}=\frac{y+2}{-2}=\frac{z+2}{6}$

Watch Video Solution

13. Show that the lines $\frac{x-5}{7}=\frac{y+2}{-5}=\frac{z}{1}$ and $\frac{x}{1}=\frac{y}{2}=\frac{z}{3}$ are perpendicular to each other

Watch Video Solution

14. The shortest distance between two parallel line $\vec{r}_2 = \vec{a}_1 + \lambda \vec{b}, \vec{r}_2 = \vec{a}_2 + \mu \vec{b}$ is given by ……..

Watch Video Solution

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

Watch Video Solution

16. Find the value of k for whicj the planes: $3x - 6y - 2z = 7$ and $2x + y - kz = 5$ are perpendicular to each other.

Watch Video Solution

17. The planes $2x - y + 4z = 5$ and $5x - 2.5y + 10z = 6$ are :

Watch Video Solution

Questions Carrying 6 Marks

1. Find the direction cosines of a line which makes equal angles with the coordinate axes.

Watch Video Solution

2. If the equations of a line AB are $\frac{3-x}{1} = \frac{y+2}{-2} = \frac{z-5}{4}$, then the direction ratios of a line parallel to AB are .....

Watch Video Solution

3. If the cartesian equations of a line are : $\frac{3-x}{5} = \frac{y+4}{7} = \frac{2z-6}{4}$, write the vector equation for the line.

Watch Video Solution

4. Find the vector equation of a line passing through $(2, -1, 1)$ and parallel to the line whose equation is $\frac{X-3}{2} = \frac{Y+1}{7} = \frac{Z-2}{-3}$.

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

8. 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

9. Find the value of p so that the lines : $l_1 : \frac{1-x}{3} = \frac{7y-14}{2p} = \frac{z-3}{2}$ and $l_2 : \frac{7-7x}{3p} = \frac{y-5}{1} = \frac{6-z}{5}$ are at right angles. also find the equations of the line passing through (3,2,-4) and parallel to line l_1.

Watch Video Solution

10. Find the vector and cartesian equation of a line through the point (1, – 1, 1) and perpendicular to the lines joining the points (4, 3, 2), (1, -1,0) and (1, 2,-1), (2, 1, 1).

Watch Video Solution

11. Find the vector and cartesian equation of the line passing through the point (2,1,3) and perpendicular to the lines.

$\frac{x-1}{1}=\frac{y-2}{2}=\frac{z-3}{3}$ and $\frac{x}{-2}=\frac{y}{2}=\frac{z}{5}$

Watch Video Solution

12. Find the equation of the line passing through the point (2, -1, 3) and perpendicular to the lines : $\vec{r}=\left(\hat{i}-\hat{j}+\hat{k}\right)+\lambda\left(2\hat{i}+\hat{j}-3\hat{k}\right)$ and $\vec{r}=\left(\hat{i}+\hat{j}-\hat{k}\right)+\mu\left(\hat{i}+\hat{j}+\hat{k}\right)$

Watch Video Solution

13. Find the equation of a line passing through the points A(0, 6, -9) and B(-3,-6,3). If D is the foot of the perpendicular drawn from a point C(7,4,-1) on the line AB, then find the coordinates of the point D and the equation of line CD.

Watch Video Solution

14. Find the image of the point (1,6,3) in the line : $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$.

Watch Video Solution

15. Find the co ordinates of the foot of perpendicular and the length of the perpendicular drawn from the point P(5,4,2) to the line : $\vec{r} = -\hat{i} + 3\hat{j} + \hat{k} + \lambda\left(2\hat{i} + 3\hat{j} - \hat{k}\right)$. Also find the image of P in this line.

Watch Video Solution

16. Find the shortest distance between the lines :

$\vec{r} = \hat{i} - \hat{j} + \lambda\left(2\hat{i} + \hat{k}\right)$ and $\vec{r} = 2\hat{i} - \hat{j} + \mu\left(\hat{i} + \hat{j} - \hat{k}\right)$

Watch Video Solution

17. Find the shortest distance between the following lines whose vector equations are :

$\vec{r} = (1-t)\hat{i} + (t-2)\hat{j} + (3-2t)\hat{k}$ and $\vec{r} = (s+1)\hat{i} + (2s-1)\hat{j} - (2$

where t and s are scalars.

Watch Video Solution

18. Find the shortest distance between the lines $\vec{r} = \hat{i} + 2\hat{j} + 3\hat{k} + \lambda\left(\hat{i} - 3\hat{j} + 2\hat{k}\right)$ and $\vec{r} = 4\hat{i} + 5\hat{j} + 6\hat{k} + \lambda\left(2\hat{i} + 3\hat{j} + \hat{k}\right)$

Watch Video Solution

19. Find the shortest distance (S.D.) between the lines :

$\vec{r} = \hat{j} + \lambda\left(3\hat{i} + \hat{j} - 2\hat{k}\right)$ and $\vec{r} = 2\hat{i} + 3\hat{j} - \hat{k} + \mu\left(2\hat{i} - \hat{j} + 4\hat{k}\right)$

Watch Video Solution

20. Write the vector equation of the following lines and hence find distance between them $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z+4}{6}, \frac{x-3}{4}=\frac{y-3}{6}=\frac{z+5}{12}$

Watch Video Solution

21. Find the shortest distance between the lines x+1=2y=-12z and x=y+2=6z-6

Watch Video Solution

22. Show that the lines: $\vec{r}=\left(\hat{i}+\hat{j}\right)+\lambda\left(2\hat{i}-\hat{k}\right)$ and $\vec{r}=\left(2\hat{i}-\hat{j}\right)+\mu\left(\hat{i}+\hat{k}-\hat{k}\right)$ do not intersect.

Watch Video Solution

23. Determine whether the following pair of lines intersect :

$\vec{r} = \hat{i} + \hat{j} - \hat{k} + \lambda\left(3\hat{i} - \hat{j}\right)$ and $\vec{r} = 4\hat{i} - \hat{k} + \mu\left(2\hat{i} + 3\hat{k}\right)$

Watch Video Solution

24. Find the vector and cartesian equation of the plane which bisects the line joining the points (3,-2, 1) and (1,4, -3) at right angles.

Watch Video Solution

25. Find the equation of the plane passing through the point (3,-3, 1) and perpendicular to the line joining the points (3, 4, - 1) and (2, - 1,5). Also find the coordinates of the foot of the perpendicular, the equation of the perpendicular line and the length of perpendicular drawn from the origin to the plane.

Watch Video Solution

26. Find the co-ordinates of the foot of the perpendicular distance of the point P(3,2,1) from the plane $2x - y + z + 1 = 0$. Find also , the image of the point in the plane.

Watch Video Solution

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

Watch Video Solution

28. A plane meets the coordinates axes in A, B and C such that the centroid of the triangle ABC is the point (p, q, r), show that the eqation of the plane is $\frac{x}{p} + \frac{y}{q} + \frac{z}{r} = 3$.

Watch Video Solution

29. Find the direction ratios of the normal to the plane, which passes through the points (1, 0, 0) and (0, 1, 0) and makes angle $\frac{\pi}{4}$ with the plane $x + y = 3$. Also find the equation of the plane.

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

33. 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

34. If from a point P(a,b,c) perpendicular PA and PB are drawn to yz and zx-planes, find the vector equation of the plane OAB.

Watch Video Solution

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

Watch Video Solution

36. Find the equations of the perpendicular from the point (3, -1, 11) to the line $\frac{x}{2} = \frac{y-2}{3} = \frac{z-3}{4}$. Also find the coordinates of the foot of the perpendicular and length of the perpendicular.

Watch Video Solution

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

Watch Video Solution

38. Find the distance between the point (7,2,4) and the plane determined by the points: A(2,5,-3),(B(-2,-3,5), C(5,3,-3).

Watch Video Solution

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

Watch Video Solution

40. Find the cartesian and vector equations of the planes passing through the intersection of te planes $\vec{r} \cdot \left(2\hat{i} + 6\hat{j}\right) + 12 = 0$ and $\vec{r} \cdot \left(3\hat{i} - \hat{j} - 4\hat{k}\right) = 0$ which are at a unit distance from the origin.

Watch Video Solution

41. Find the co-ordinates of the points where the line through the points (3,-4,-5) and (2,-3,1) crosses the plane $2x + y + z = 7$

Watch Video Solution

42. Find the coordinates of the point where the line through the points A (3, 4, 1) and B (5, 1, 6) crosses the plane determined by the points P (2, 1, 2), Q(3, 1, 0) and R (4, -2,1)

Watch Video Solution

43. Find the distance of the point (3,4,5) from the plane $x + y + z = 2$ measured parallel to the line $2x = y = z$.

Watch Video Solution

44. 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

45. Show that the lines: $\vec{r} = \left(\hat{i} + \hat{j} - \hat{k}\right) + \lambda\left(3\hat{i} - \hat{j}\right)$ and $\vec{r} = \left(4\hat{i} - \hat{k}\right) + \mu\left(2\hat{i} + 3\hat{k}\right)$

are intersecting. Hence find their point of intersection.

Watch Video Solution

46. Find cartesian equations of the plane containing the lines: $\vec{r} = 2\hat{i} + \hat{j} - 3\hat{k} + \lambda\left(\hat{i} + 2\hat{j} + 5\hat{k}\right)$ and $\vec{r} = 3\hat{i} + 3\hat{j} - 7\hat{k} + \mu\left(3\hat{i} - 2\hat{j} + 5\hat{k}\right)$

Watch Video Solution

47. Find the equation of the plane containingg the lines: $\vec{r} = \hat{i} + \hat{j} + \lambda\left(\hat{i} + 2\hat{j} - \hat{k}\right)$ and $\vec{r} = \hat{i} + \hat{j} + \mu\left(-\hat{i} + \hat{j} - 2\hat{k}\right)$.

Find the distance of this plane from origin and also from the point (1,1,1).

Watch Video Solution

48. Find the value of k for which the following lines are perpendicular to each other:

$\frac{x+3}{k-5} = \frac{y-1}{1} = \frac{5-z}{-2k-1}, \frac{x+2}{-1} = \frac{2-y}{-k} = \frac{z}{5}$

Hence, find the equation of the plane containing the above lines.

Watch Video Solution

49. Find the equation of the plane passing through the points (2,1,0), (3,2,2) and is parallel to the line $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{1}$.

Watch Video Solution

50. Find the vector and Cartesian form of the equation of the plane passing through the point (1, 2, -4) and parallel to the lines

$\vec{r} = \hat{i} + 2\hat{j} - 4\hat{k} + \lambda\left(2\hat{i} + 3\hat{j} + 6\hat{k}\right)$ and

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

Watch Video Solution

51. The lines $x + 3y - 1 = 0$ and $x - 4y = 0$ intersect each other. Find their point of intersection.

Watch Video Solution

52. Show that the lines : $\vec{r} = 3\hat{i} + 2\hat{j} - 4\hat{k} + \lambda\left(\hat{i} + 2\hat{j} + 2\hat{k}\right)$ and $\vec{r} = 5\hat{i} - 2\hat{j} + \mu\left(3\hat{i} + 2\hat{j} + 6\right.$ are intersecting. Hence, find their point of intersection.

Watch Video Solution

53. Show that the lines $\frac{x - a + d}{\alpha - \delta} = \frac{y - a}{\alpha} = \frac{z - a - d}{\alpha + \delta}$ and $\frac{x - b + c}{\beta - \gamma} = \frac{y - b}{\beta} = \frac{z - b - c}{\beta + \gamma}$ are coplanar.

Watch Video Solution

54. Let $P(3, 2, 6)$ be a point in space and Q be a point on the line $r = \left(\hat{i} - \hat{j} + 2\hat{k}\right) + \mu\left(-3\hat{i} + \hat{j} + 5\hat{k}\right)$. Then the value of μ for which the vector the vector PQ is parallel to the plane $x - 4y + 3z = 1$ is

Watch Video Solution

55. Find the equation of the plane passing through the point A(1, 2, 1) and perpendicular to the line joining the points P(1, 4, 2) and Q(2, 3, 5). Also, find the distance of this plane from the line $\frac{x+3}{2} = \frac{y-5}{-1} = \frac{z-7}{-1}$

Watch Video Solution

56. Find the equation of the plane passing through the point (1,1,1) and containing the line: $\vec{r} = \left(-3\hat{i} + \hat{j} + 5\hat{k}\right) + \lambda\left(3\hat{i} - \hat{j} + 5\hat{k}\right)$. Also, show that the plane contains the line: $\vec{r} = \left(-\hat{i} + 2\hat{j} + 5\hat{k}\right) + \lambda\left(\hat{i} - 2\hat{j} - 5\hat{k}\right)$.

Watch Video Solution