MATHS

BOOKS - RD SHARMA MATHS (HINGLISH)

STRAIGHT LINE IN SPACE

Solved Examples And Exercises

1. Find the shortest distance between the lines $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-3}{4} and \frac{x-2}{3}=\frac{y-4}{4}=\frac{z-5}{5}$.

Watch Video Solution

2. If the points $A(-1,3,2), B(-4,2,-2) and C(5,5,\lambda)$ are collinear, find the value of λ.

Watch Video Solution

3. 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

4. Find the length of the perpendicular from the point $(1, 2, 3)$ to the line $\frac{x-6}{3} = \frac{y-7}{2} = \frac{z-7}{-2}$.

Watch Video Solution

5. Find the vector equation of a line which passes through the point with position vector $2\hat{i} = \hat{j} + 4\hat{k}$ and is in the direction of $\hat{i} + \hat{j} - 2\hat{k}$. Also, reduce it to Cartesian form.

Watch Video Solution

6. Find the vector equation of the line through $A(3, 4, -7) and B(1, -1, 6)$. Find also, its Cartesian equations.

Watch Video Solution

7. Find the vector equation of a line passing through a point with position vector $2\hat{i} - \hat{j} + \hat{k}$, and parallel to the line joining the points $-\hat{i} + 4\hat{j} + \hat{k} and \hat{i} + 2\hat{j} + 2\hat{k}$. Also, find the Cartesian equivalent of this equation.

Watch Video Solution

8. $\overrightarrow{A}B = 3\hat{i} - \hat{j} + \hat{k} and \overrightarrow{C}D = -3\hat{i} + 2\hat{j} + 4\hat{k}$ are two vectors. The position vectors of the points $A and C$ are $= 6\hat{i} + 7\hat{j} + 4\hat{k} and = -9\hat{j} + 2\hat{k}$ respectively. Find the position vector of a point P on the line AB and a point Q on the line CD such that $\overrightarrow{P}Q$ is perpendicular to $\overrightarrow{A}B and \overrightarrow{C}B$ both.

Watch Video Solution

Watch Video Solution

9. Find the direction cosines of teh line $\frac{x-2}{2}=\frac{2y-5}{-3}, z=-1.$

Also, find the vector equation of the line.

Watch Video Solution

10. Show that the lines $\frac{x-1}{3}=\frac{y+1}{2}=\frac{z-1}{5} and \frac{x+2}{4}=\frac{y-1}{3}=\frac{z+1}{-2}$ do not intersect.

Watch Video Solution

11. Find the equations of the two lines through the origin which intersect the line $\frac{x-3}{2}=\frac{y-3}{1}=\frac{z}{1}$ at angle of $\frac{\pi}{3}$ each.

Watch Video Solution

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

Watch Video Solution

13. The Cartesian equations of a line are $x = ay + b, z = cy + \cdot$ Find its direction ratios and reduce it to vector form.

Watch Video Solution

14. By computing the shortest distance determine whether the following pairs of lines intersect or not:

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

Watch Video Solution

15. Find the proof of perpendicular from the point $(2, 3, 4)$ to the line $\frac{4-x}{2} = \frac{y}{6} = \frac{1-z}{3}$. Also, find the perpendicular distance from the given point to the line.

Watch Video Solution

16. Find the image of the point $(1, 6, 3)$ in the line $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$. Also, write the equation of the line joining the given point and its image and find length of the segment joining the given point and its image.

Watch Video Solution

17. Show that the distance d from point P to the line l having equation $\vec{r} = \vec{a} + \lambda \vec{b}$ is given by $d = \frac{\left|\vec{b} \times \vec{PQ}\right|}{\left|\vec{s}\right|}, where Q$ is any point on the line l.

Watch Video Solution

18. Find the angle between two lines whose direction ratios are proportional to $1, 1, 2 and \left(\sqrt{3}-1\right), \left(-\sqrt{3}-1\right), 4$.

Watch Video Solution

19. Find the angle between the lines $\frac{x-2}{3}=\frac{y+1}{-2}, z=2$ and $\frac{x-1}{1}=\frac{2y+3}{3}=\frac{z+5}{2}$.

Watch Video Solution

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

Watch Video Solution

21. Find the vector equation of a line passing through the point with position vector $\hat{i}-2\hat{j}-3\hat{k}$ and parallel to the line joining the points

with position vectors $\hat{i} - \hat{j} + 4\hat{k} and 2\hat{i} + \hat{j} + 2\hat{k}$. Also, find the Cartesian equivalent of this equation.

Watch Video Solution

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

Watch Video Solution

23. Find the equation of the line passing 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

24. Find the equation of the line passing through the point $\hat{i} + \hat{j} - \hat{k}$ and perpendicular to the lines

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

Watch Video Solution

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

Watch Video Solution

26. Vertices $BandC$ of ABC lie along the line $\frac{x+2}{2} = \frac{y-1}{1} = \frac{z-0}{4}$. Find the area of the triangle given that A has coordinates $(1, -1, 2)$ and line segment BC has length 5.

Watch Video Solution

27. Find the distance from the point $P(3, 8, 1)$ to the line $\frac{x-3}{3} = \frac{y+7}{-1} = \frac{z+2}{5}$.

Watch Video Solution

28. Show that the line $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-3}{4} and \frac{x-4}{5}=\frac{y-1}{2}$ intersect. Find their point of intersection.

Watch Video Solution

29. Find the value of λ so that the following lines are perpendicular to each other. $\frac{x-5}{5\lambda+2}=\frac{2-y}{5}=\frac{1-z}{-1}, \frac{x}{1}=\frac{2y+1}{4\lambda}=\frac{1-z}{-3}$

Watch Video Solution

30. Find the foot of the perpendicular from $(1, 2, -3)$ to th lin $\frac{x+1}{2}=\frac{y-3}{-2}=\frac{z-3}{-1}$.

Watch Video Solution

31. Find the length of the perpendicular drawn from the point $(5, 4, -1)$. to the line $\vec{r} = \hat{i} + \lambda\left(2\hat{i} + 9\hat{j} + 5\hat{k}\right)$.

Watch Video Solution

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

Watch Video Solution

33. Find the coordinates of the foot of perpendicular drawn from th point $A(1, 8, 4)$ to the line joining the points $B(0, -1, 3)$and $C(2 - 3, -1)$.

Watch Video Solution

34. By computing the shortest distance determine whether the following pairs of line intersect or not:

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

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

Watch Video Solution

35. Find the foot of the perpendicular drawn from the point $2\hat{i} - \hat{j} + 5\hat{k}$ to the line $\vec{r} = \left(11\hat{i} - 2\hat{j} - 8\hat{k}\right) + \lambda\left(10\hat{i} - 4\hat{j} - 11\hat{k}\right)$. Also find the length of the perpendicular.

Watch Video Solution

36. By computing the shortest distance determine whether the following pairs of lines intersect or not:

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

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

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

$\frac{x-5}{4}=\frac{y-7}{-5}=\frac{z+3}{-5}and\frac{x-8}{7}=\frac{y-7}{1}=\frac{z-5}{3}.$

Watch Video Solution

37. Find the foot of the perpendicular from the point $(0, 2, 3)$ on the line $\frac{x+3}{5}=\frac{y-1}{2}=\frac{z+4}{3}$. Also, find the length of the perpendicular.

Watch Video Solution

38. The Cartesian equations of a line are $6x-2=3y+1=2z-2$. Find its direction ratios and also find vector equation of the line.

Watch Video Solution

39. Prove that the lines through $A(0,\ -1,\ -1)andB(4, 5, 1)$ intersecrs the line through $C(3, 9, 4)andD(-4, 4, 4)$. Also, find their point of intersection.

Watch Video Solution

40. The points A(4, 5, 10), B(2, 3, 4) and C (1, 2,-1) are three vertices of a parallelogram ABCD. Find the vector equations of the sides AB and BC and also find the coordinates of point D.

Watch Video Solution

41. Find the Cartesian equation of a line passing through the points $A(2, \ -1, \ 3) and \ B(4, \ 2, \ 1)$. Also reduce it to vector form.

Watch Video Solution

42. Show that the points whose position vectors are $5\hat{i}+5\hat{k}, \ 2\hat{i}+\hat{j}+3\hat{k} \ and \ -4\hat{i}+3\hat{j}-\hat{k}$ are collinear.

Watch Video Solution

43. Find the vector and Cartesian equations of the line through the point $(5,\ 2,\ -4)$ and which is pralel to the vector $3\hat{i}+2\hat{j}-8k$.

Watch Video Solution

44. Find the vector equation of the line passing thought the points $(-1,\ 0,\ 2) and\ (3,\ 4,\ 6)$.

Watch Video Solution

45. Find the vector equation of a line which is parallel to the vector $2\hat{i}-\hat{j}+3\hat{k}$ and which passes through the point (5, -2,4). Also reduce it to Cartesian form.

Watch Video Solution

46. A line passes through the point with position vector $2\hat{i}-3\hat{j}+4\hat{k}$ and is in the direction of $3\hat{i}+4\hat{j}-5\hat{k}$. Find equations of the line in

vector and Cartesian form.

Watch Video Solution

47. Find the vector form as well as in Cartesian form, the equation of the line passing through the points $A(1,\ 2,\ -1) and\ B(2,\ 1,\ 1)$.

Watch Video Solution

48. Find the vector equation for the line which passes through the point (1, ,2 3) and parallel to the vector $\hat{i} - 2\hat{j} + 3\hat{k}$. reduce the corresponding equation in the Cartesian from.

Watch Video Solution

49. The Cartesian equations of a line are $\frac{x-5}{3} = \frac{y+4}{7} = \frac{z-6}{2}$. Find a vector equation for the line.

Watch Video Solution

50. Find the Cartesian equation of a line passing through (1, -1, 2) and parallel to the line whose equations are $\frac{x-3}{1}=\frac{y-1}{2}=\frac{z+1}{2}$. Also, reduce the equation obtained in vector form.

Watch Video Solution

51. Find the direction cosines of the line $\frac{4-x}{2}=\frac{y}{6}=\frac{1-z}{3}$. Also, reduce it to vector form.

Watch Video Solution

52. 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 $P(1, 3, 3,)$.

Watch Video Solution

53. Show that the points whose position vectors are $-2\hat{i}+3\hat{j},\ \hat{i}+2\hat{j}+3\hat{k}\ and\ 7\hat{i}+9\hat{k}$ e collinear.

Watch Video Solution

54. Find the Cartesian and vector equations of a line which passes through the pointing (1, 2, 3) and is parallel to the line $\frac{x-z}{1}=\frac{y+3}{7}=\frac{2z-6}{3}$.

Watch Video Solution

55. The Cartesian equations of a line are $3x+1=6y-2=1-z$, finding the fixed point through which it passes, its direction ratios and also its vector equation.

Watch Video Solution

56. Find the equation of a line passing through a point (2, -1, 3) and parallel to the line $\rightarrow r = \left(\hat{i} + \hat{j}\right) + \lambda\left(2\hat{i} + \hat{j} - 2\hat{k}\right)$.

Watch Video Solution

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

Watch Video Solution

58. A line passes through (2, -1, 3) and is perpendicular to the line $\rightarrow r = \left(\hat{i} + \hat{j} - \hat{k}\right) + \lambda\left(2\hat{i} - 2\hat{j} + \hat{k}\right) and \rightarrow r = \left(2\hat{i} - \hat{j} - 3\hat{k}\right) + \mu\left(\hat{i}\right.$ obtaining its equation.

Watch Video Solution

59. Show that the three lines with direction cosines $\frac{12}{13}, \frac{-3}{13}, \frac{-4}{13}; \frac{4}{13}, \frac{12}{13}, \frac{3}{13}; \frac{3}{13}, \frac{-4}{13}, \frac{12}{13}$ are mutually perpendicular.

Watch Video Solution

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

Watch Video Solution

61. Show that the line through the point (4, 7, 8) and (2, 3, 4) is parallel to the line through the points (-1, -2, 1) and (1, 2, 5).

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

64. Find the equation of a line parallel to x-axis and passing through the origin.

Watch Video Solution

65. Find the angle between the following pairs of lines: $\rightarrow r=\left(4\hat{i}-\hat{j}\right)+\lambda\left(\hat{i}+2\hat{j}-2\hat{k}\right) and \rightarrow r=\hat{i}-\hat{j}+2\hat{k}-\mu\left(2\hat{i}+4\hat{j}\right.$

Watch Video Solution

66. Find the angle between the following pairs of lines: $\rightarrow r = \left(3\hat{i} + 2\hat{j} - 4\hat{k}\right) + \lambda\left(\hat{i} + 2\hat{j} + 2\hat{k}\right) and \rightarrow r = \left(5\hat{i} - 2\hat{k}\right) + \mu\left(3\hat{i}\right.$

Watch Video Solution

67. Find the angle between the following pairs of lines: $\rightarrow r = \lambda\left(\hat{i} + \hat{j} + 2\hat{k}\right) and \rightarrow r = 2\hat{j} + \mu\left[\left(\sqrt{3} - 1\right)\hat{i} - \left(\sqrt{3} + 1\right)\hat{j} + 4\hat{k}\right.$

Watch Video Solution

68. Find the angle between the following pairs of line: $\frac{x+4}{3} = \frac{y-1}{5} = \frac{z+3}{4} and \frac{x+1}{1} = \frac{y-4}{1} = \frac{z-5}{2}$

Watch Video Solution

69. Find the angle between the following pairs of line: $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{-3} and \frac{x+3}{-1} = \frac{y-5}{8} = \frac{z-1}{4}$

Watch Video Solution

70. Find the angle between the following pairs of line: $\frac{5-x}{-2}=\frac{y+3}{1}=\frac{1-z}{3}$ and $\frac{x}{3}=\frac{1-y}{-2}=\frac{z+5}{-1}$

Watch Video Solution

71. Find the angle between the following pairs of line: $\frac{x-5}{1}=\frac{2y+6}{-2}=\frac{z-3}{1}and\frac{x-2}{3}=\frac{y+1}{4}=\frac{z-6}{5}$

Watch Video Solution

72. Find the angle between the following pairs of line: $\frac{-x+2}{-2}=\frac{y-1}{7}=\frac{z+3}{-3}and\frac{x+2}{-1}=\frac{2y-8}{4}=\frac{z-5}{4}$

Watch Video Solution

73. Find the angle between the pairs of lines with direction ratio proportional to: 5, -12, 13 and -3, 4, 5

Watch Video Solution

74. Find the angle between the pairs of lines with direction ratio proportional to: 1, 2, -2, and -2, 2, 1

Watch Video Solution

75. Find the angle between the pairs of lines with direction ratio proportional to: 2, 2, 1 and 4, 1, 8

Watch Video Solution

76. Find the angle between the pairs of lines with direction ratio proportional to: $a,\ b,\ c\ and\ b-c,\ c-a,\ a-b$.

Watch Video Solution

77. Find the angle between two lines, one of which was direction ratios 2, 2, 1 while the other one is obtained by joining het points (3, 1, 4) and (7, 2, 12).

Watch Video Solution

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

Watch Video Solution

79. Find the 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 $\frac{x}{-3}=\frac{y}{2}=\frac{z}{5}$

Watch Video Solution

80. 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

81. Determine the equations of the line passing through the point (1, 2, -4) and perpendicular to the two lines $\frac{x-8}{8}=\frac{y+9}{-16}=\frac{z-10}{7} and \frac{x-15}{3}=\frac{y-29}{8}=\frac{z-5}{-5}.$

Watch Video Solution

82. If the coordinates of the points $A,\ B,\ C,\ D\ be\ (1,\ 2,\ 3),\ (4,\ 5,\ 7),\ (-4,\ 3,\ -6)\ and\ (2,\ 9,\ 2)$ respectively then find the angle between the lines $AB\ and\ CD.$

Watch Video Solution

83. Find the direction cosines of the line $\frac{x+2}{2} = \frac{2y-7}{6} = \frac{1-z}{-3}$. Also, find the vector equation of the line through the point $A(-1, 2, 3)$ and parallel to the given line.

Watch Video Solution

84. Determine whether the following pair of lines intersect or not.

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

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

Watch Video Solution

85. Show that the lines $\frac{x-1}{3} = \frac{y+1}{2} = \frac{z-1}{5} and \frac{x+2}{4} = \frac{y-1}{3} = \frac{z+1}{-2}$ do not intersect.

Watch Video Solution

86. Show that the lines $\frac{x+1}{3}=\frac{y+3}{5}=\frac{z+5}{7}$ and $\frac{x-2}{1}=\frac{y-4}{3}=\frac{z-6}{5}$ intersect. Also find the their point of intersection.

Watch Video Solution

87. Determine whether the following pair of lines intersect or not.

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

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

Watch Video Solution

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

Watch Video Solution

89. Find the perpendicular distasnce of the point (1,0,0) from the lines (x-1)/2=(y+1)/(-3)=(z+10)/8`

Watch Video Solution

90. Find the coordinates of the foot of the perpendicular drawn from point $A(1, 0, 3)$ to the join of points $B(4, 7, 1) and C(3, 5, 3)$.

Watch Video Solution

91. find the foot of perpendicular form (0,2,7) to lien $\frac{x+2}{-1} = \frac{y-1}{3} = \frac{z-3}{-2}$

Watch Video Solution

92. Find the equation of line passing through points $A(0, 6, -9)$ and $B(-3, -6, 3)$. If D is the foot of perpendicular

drawn from the point $C(7, 4, -1)$ on the line AB, then find the coordinates of point D and equation of line CD.

Watch Video Solution

93. Find the shortest distance between the lines whose vector equations are $\vec{r} = \hat{i} + \hat{j} + \lambda\left(2\hat{i} - \hat{j} + \hat{k}\right)$ and $\vec{r} = 2\hat{i} + \hat{j} - \hat{k} + \mu\left(3\hat{i} - 5\hat{j} + 2\hat{k}\right)$.

Watch Video Solution

94. Find the shortest distance between the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4} and \frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}$.

Watch Video Solution

95. Find the shortest distance between the following pair of lines and hence write whether the lines are intersecting or not :

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

Watch Video Solution

96. Find the shortest distance between the following lines: $\frac{x-3}{1} = \frac{y-5}{-2} = \frac{z-7}{1}$ and $\frac{x+1}{7} = \frac{y+1}{-6} = \frac{z+1}{1}$

Watch Video Solution

97. By computing the shortest distance determine whether the following pairs of lines intersect or not : $\rightarrow r = \left(\hat{i} - \hat{j}\right) + \lambda\left(2\hat{i} + \hat{k}\right) and \rightarrow r = \left(2\hat{i} - \hat{j}\right) + \mu\left(\hat{i} + \hat{j} - \hat{k}\right).$

Watch Video Solution

98. By computing the shortest distance determine whether the following pairs of lines intersect or not : $\rightarrow r = \left(\hat{i} + \hat{j} - \hat{k}\right) + \lambda\left(3\hat{i} - \hat{j}\right) and \rightarrow r = \left(2\hat{i} - \hat{k}\right) + \mu\left(2\hat{i} + 2\hat{k}\right).$

Watch Video Solution

99. Find the shortest distance between the following pair of lines and hence write whether the lines are intersecting or not : $\frac{x-1}{2}=\frac{y+1}{3}=z; \frac{x+1}{5}=\frac{y-2}{1}; z=2$

Watch Video Solution

100. Show that the lines $\frac{x5}{4}, \frac{y-7}{4}=\frac{z+3}{-5}$ and $)x-8\frac{)}{7}=\frac{y-4}{1}=\frac{z-5}{3}$ intersect each other

Watch Video Solution

101. Find the shortest distance between the following pairs of parallel lines whose equation are: $\rightarrow r=\left(\hat{i}+2\hat{j}+3\hat{k}\right)+\lambda\left(\hat{i}-\hat{j}+\hat{k}\right) and \rightarrow r=\left(2\hat{i}-\hat{j}-\hat{k}\right)+\mu($

.

Watch Video Solution

102. Find the shortest distance between the following pairs of parallel lines whose equation are:

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

.

Watch Video Solution

103. Write the vector equations of the following lines and hence determine the distance between them

$\frac{x-1}{2} = \frac{y-2}{3} = \frac{z+4}{6} and \frac{x-3}{4} = \frac{y-3}{6} = \frac{z+5}{12}$

Watch Video Solution

104. Find the shortest distance between the lines

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

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

Watch Video Solution

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

Watch Video Solution

106. Find the shortest distance between the lines:

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

Watch Video Solution

107. Find the distance between the lines $l_1 and\, l_2$ given by

$\rightarrow r = \hat{i} + 2\hat{j} - 4\hat{k} + \lambda\left(2\hat{i} + 3\hat{j} + 6\hat{k}\right) and\,, \rightarrow r = 3\hat{i} + 3\hat{j} - 5\hat{k} + \mu\left($

Watch Video Solution

108. Write the Cartesian and vector equation of X-axis.

Watch Video Solution

109. Write the Cartesian and vector equations of Y-axis.

Watch Video Solution

110. Write the Cartesian and vector equations of Z-axis.

Watch Video Solution

111. Cartesian equation of a line AB are $\frac{2x-1}{2} = \frac{4-y}{7} = \frac{z+1}{2}$. write the direction ratios of a line parallel to AB.

Watch Video Solution

112. Write the direction cosines of the line $\frac{x-2}{2} = \frac{2y-5}{-3}, z = 2.$

Watch Video Solution

113. Write the direction cosine of the line whose Cartesian equations are $2x = 3y = -z.$

Watch Video Solution

114. Write the angle between the lines $2x = 3y = z \; and \; 6x = -y = -4z.$

Watch Video Solution

115. Write the value of λ for which the lines $\frac{x-3}{-3} = \frac{y+2}{2\lambda} = \frac{z+4}{2} and \frac{x+1}{3\lambda} = \frac{y-2}{1} = \frac{z+6}{-5}$ are perpendicular to each other.

Watch Video Solution

116. Write the formula for the shortest distance between the lines $\rightarrow r = \rightarrow a_1 + \lambda \rightarrow b \, and \, \rightarrow r = \rightarrow a_2 + \mu \rightarrow b$.

Watch Video Solution

117. The Cartesian equations of a line AB are $\frac{2x-1}{\sqrt{3}} = \frac{y+2}{2} = \frac{z-3}{3}$.

Find the direction cosines of a line parallel to AB.

Watch Video Solution

118. If the equation of a line $\mathrm{A\,B}$ is $\frac{\mathrm{x}-3}{1} = \frac{\mathrm{y}+2}{-2} = \frac{\mathrm{z}-5}{4}$, find the direction ratios of a line parallel to $\mathrm{A\,B}$

Watch Video Solution

119. Write the vector equation of a line given by $\frac{x-5}{3}=\frac{y+4}{7}=\frac{z-6}{2}$

Watch Video Solution

120. The equation of a line given by $\frac{4-x}{3}=\frac{y+3}{3}=\frac{z+2}{6}$. Write the direction cosines of a line parallel to this line.

Watch Video Solution

121. Find the cartesian equation of the line which passes through the point $(-2, 4, -5)$ and parallel and line are $(3, 5, 6)$. So, the equation of line is,

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

Watch Video Solution

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

Watch Video Solution

123. Find the angle between the lines $\rightarrow r = \left(2\hat{i} - 5\hat{j} + \hat{k}\right) + \lambda\left(3\hat{i} + 2\hat{j} + 6\hat{k}\right) and \rightarrow r = 7\hat{i} - 6\hat{k} + \mu\left(\hat{i} +$

Watch Video Solution

124. Find the angel between the lines $2x = 3y = -zand6x = -y = -4z.$

Watch Video Solution

125. The angle between the straight lines $\frac{x+1}{2} = \frac{y-2}{5} = \frac{z+3}{4} and \frac{x-1}{1} = \frac{y+2}{2} = \frac{z-3}{-3}$ is 45^0 b. 30^0 c.

60^0 d. 90^0

Watch Video Solution

126. The angle between the lines $\frac{x-1}{1}=\frac{y-1}{1}=\frac{z-1}{2} and \frac{x-1}{-\sqrt{3}-1}=\frac{y-1}{\sqrt{3}-1}=\frac{z-1}{4}$ is $\cos^{-1}\left(\frac{1}{65}\right)$ b. $\frac{\pi}{6}$ c. $\frac{\pi}{3}$ d. $\frac{\pi}{4}$

Watch Video Solution

127. The length of the perpendicular drawn from $(1, 2, 3)$ to the line $\frac{x-6}{3}=\frac{y-7}{2}=\frac{z-7}{-2}$ is a. 4 b. 5 c. 6 d. 7

Watch Video Solution

128. The equation of the line passing through the points $a_1\hat{i}+a_2\hat{j}+a_3\hat{k}$ and $b_1\hat{i}+b_2\hat{j}+b_3\hat{k}$ is

$\rightarrow r=\left(a_1\hat{i}+a_2\hat{j}+a_3\hat{k}\right)+\lambda\left(b_1\hat{i}+b_2\hat{j}+b_3\hat{k}\right)$

$\rightarrow r = \left(a_1\hat{i} + a_2\hat{j} + a_3\hat{k}\right) - t\left(b_1\hat{i} + b_2\hat{j} + b_3\hat{k}\right)$

$\rightarrow r = a_1(1-t)\hat{i} +_2 (1-t)\hat{j} + a_3(1-t)\hat{k} + t\left(b_1\hat{i} + b_2\hat{j} + b_3\hat{k}\right).$

None of these

Watch Video Solution

129. If a line makes angles α, β, γ with the axes respectively tehn $\cos 2\alpha + \cos 2\beta + \cos 2\gamma =$ -2 b. -1 c. 1 d. 2

Watch Video Solution

130. If the direction ratios of a line are proportional to 1, -3, 2 then its direction cosines are $\frac{1}{\sqrt{14}}, -\frac{3}{\sqrt{14}}, \frac{2}{\sqrt{14}}$ b. $\frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}}$ c. $-\frac{1}{\sqrt{14}}, \frac{3}{\sqrt{14}}, \frac{2}{\sqrt{14}}$ d. $-\frac{1}{\sqrt{14}}, -\frac{2}{\sqrt{14}}, -\frac{3}{\sqrt{14}}$

Watch Video Solution

131. If a line makes angle $\frac{\pi}{3}$ and $\frac{\pi}{4}$ with x-axis and y-axis respectively, then the angle made by the line with z-axis is $\pi/2$ b. $\pi/3$ c. $\pi/4$ d. $5\pi/12$

Watch Video Solution

132. The lines $6x = 3y = 2z$ and $\frac{x-1}{-2} = \frac{y-2}{-4} = \frac{z-3}{-6}$ re (A) parallel (B) skew (C) intersecting (D) coincident

Watch Video Solution

133. The straight line $\frac{x-3}{3} = \frac{y-2}{1} = \frac{z-1}{0}$ is Parallel to x-axis Parallel to the y-axis Parallel to the z-axis Perpendicular to the z-axis

Watch Video Solution

134. The shortest distance between the lines $\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1} and \frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$ is a. $\sqrt{30}$ b.

$2\sqrt{30}$ c. $5\sqrt{30}$ d. $3\sqrt{30}$

Watch Video Solution

Others

1. Write the vector equation of a line passing through a point having position vector $\rightarrow \alpha \, and$ parallel to AB.

View Text Solution

2. Write the coordinate axis to which the line $\frac{x-2}{3} = \frac{y+1}{4} = \frac{z-1}{0}$ is perpendicular.

Watch Video Solution

3. Write the condition for the lines $\rightarrow r = \rightarrow a_1 + \lambda \rightarrow b_1 and \rightarrow r = \rightarrow a_2 + \mu \rightarrow b_2$ to be

intersecting.

View Text Solution

4. The lines $\frac{x}{1}=\frac{y}{2}=\frac{z}{3}$ and $\frac{x-1}{-2}=\frac{y-2}{-4}=\frac{z-3}{-6}$ are

Watch Video Solution

5. The direction ratios of the line $x=y+z-5=0=x-3y-6$ are proportional to $3,\ 1,\ -2$ b. $2,\ -4,\ 1$ c. $\frac{3}{\sqrt{14}},\frac{1}{\sqrt{14}},\frac{-2}{\sqrt{14}}$ d. $\frac{2}{\sqrt{41}},\frac{-4}{\sqrt{41}},\frac{1}{\sqrt{41}}$

View Text Solution

6. The projections of a line segment on X, Y and Z axes are 12,4 and 3 respectively. The length and direction cosines of the line segment are $13,\frac{12}{13},\frac{4}{13},\frac{3}{13}$ b. $19;\frac{12}{19},\frac{4}{19},\frac{9}{19}$ c. $1;\frac{12}{11},\frac{14}{11},\frac{3}{12}$ d. none of these

View Text Solution