MATHS

BOOKS - TARGET MATHS (HINGLISH)

LINE

Classical Thinking

1. The equation of X-axis is

A. $x=0, y=0$

B. $y=0, z=0$

C. $x=0, z=0$

D. $y=0$

Answer: B

Watch Video Solution

Watch Video Solution

2. The equation of Y-axis is

A. $x = z = 0$

B. $y = 0$

C. $y = 0, x + z = 0$

D. $z = 0$

Answer: A

View Text Solution

3. A point (x, y, z) moves parallel to xy-plane. Which of the three variables x, y, z remains fixed? (A) x and y (B) y and z (C) z and x (D) none of these

A. x

B. y and z

C. x and y

D. z and x

Answer: B

Watch Video Solution

4. The vector equation of the line passing through $\hat{i} - \hat{j} + 3\hat{k}$ and parallel to $3\hat{i} + 2\hat{j} - 5\hat{k}$ is

A. $\bar{r} = \hat{i} - \hat{j} + 3\hat{k} + \lambda\left(3\hat{i} + 2\hat{j} - 5\hat{k}\right)$

B. $\bar{r} = 3\hat{i} + 2\hat{j} - 5\hat{k} + \lambda\left(\hat{i} - \hat{j} + 3\hat{k}\right)$

C. $\bar{r} = -\hat{i} + \hat{j} - 3\hat{k} + \lambda\left(-3\hat{i} - 2\hat{j} + 5\hat{k}\right)$

D. $\bar{r} = -3\hat{i} - 2\hat{j} + 5\hat{k} + \lambda\left(-\hat{i} + \hat{j} - 3\hat{k}\right)$

Answer: A

View Text Solution

5. The vector equation of the line passing through (2, 1, -1) and parallel to $\hat{i} + 2\hat{j} + \hat{k}$ is

A. $\bar{r} = \hat{i} + 2\hat{j} + \hat{k} + \lambda\left(2\hat{i} + \hat{j} - \hat{k}\right)$

B. $\bar{r} = 2\hat{i} + \hat{j} - \hat{k} + \lambda\left(\hat{i} + 2\hat{j} + \hat{k}\right)$

C. $\bar{r} = -\hat{i} - 2\hat{j} - \hat{k} + \lambda\left(-2\hat{i} - \hat{j} + \hat{k}\right)$

D. $\bar{r} = -2\hat{i} - \hat{j} + \hat{k} + \lambda\left(-\hat{i} - 2\hat{j} - \hat{k}\right)$

Answer: B

View Text Solution

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

A. $\bar{r} = \left(3\hat{i} - 4\hat{j} - 6\hat{k}\right) + \lambda\left(2\hat{i} - 5\hat{j} + 3\hat{k}\right)$

B. $\bar{r} = \left(2\hat{i} + 5\hat{j} + 3\hat{k}\right) + \lambda\left(3\hat{i} - 4\hat{j} + 6\hat{k}\right)$

C. $\bar{r} = \left(3\hat{i} + 4\hat{j} - 6\hat{k}\right) + \lambda\left(2\hat{i} - 5\hat{j} + 6\hat{k}\right)$

D. $\bar{r} = \left(3\hat{i} - 4\hat{j} + 6\hat{k}\right) + \lambda\left(2\hat{i} + 5\hat{j} + 3\hat{k}\right)$

Answer: D

View Text Solution

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

A. $\bar{r} = 3\hat{i} - 7\hat{j} - 2\hat{k} + \lambda\left(5\hat{i} - 4\hat{j} + 6\hat{k}\right)$

B. $\bar{r} = 5\hat{i} + 4\hat{j} + 6\hat{k} + \lambda\left(3\hat{i} - 7\hat{j} + 2\hat{k}\right)$

C. $\bar{r} = 3\hat{i} + 7\hat{j} + 2\hat{k} + \lambda\left(5\hat{i} - 4\hat{j} + 6\hat{k}\right)$

D. $\bar{r} = 5\hat{i} - 4\hat{j} + 6\hat{k} + \lambda\left(3\hat{i} + 7\hat{j} + 2\hat{k}\right)$

Answer: D

Watch Video Solution

8. The vector equation of the line $3x - 2 = 2y + 1 = 3z - 3$ is

A. $\bar{r} = \frac{2}{3}\hat{i} - \frac{1}{2}\hat{j} + \hat{k} + \lambda\left(2\hat{i} + 3\hat{j} + 2\hat{k}\right)$

B. $\bar{r} = \hat{i} + \hat{j} + \hat{k} + \lambda\left(2\hat{i} + 3\hat{j} + \hat{k}\right)$

C. $\bar{r} = \lambda\left(2\hat{i} + 3\hat{j} + 2\hat{k}\right)$

D. $\bar{r} = 2\hat{i} + 3\hat{j} + 2\hat{k} + \lambda\left(\frac{2}{3}\hat{i} - \frac{1}{2}\hat{j} + \hat{k}\right)$

Answer: A

View Text Solution

9. Vector equation of the line $6x - 2 = 3y + 1 = 1 - 2z$ is

A. $\bar{r} = \left(-\frac{1}{3}\hat{i} + \frac{1}{3}\hat{j} - \frac{1}{2}\hat{k}\right) + \lambda\left(\hat{i} + 2\hat{j} - 3\hat{k}\right)$

B. $\bar{r} = \left(\frac{1}{3}\hat{i} - \frac{1}{3}\hat{j} + \frac{1}{2}\hat{k}\right) + \lambda\left(\hat{i} + 2\hat{j} - 3\hat{k}\right)$

C. $\bar{r} = \left(\hat{i} + 2\hat{j} - 3\hat{k}\right) + \lambda\left(\frac{-1}{3}\hat{i} + \frac{1}{3}\hat{j} - \frac{1}{2}\hat{k}\right)$

D. $\bar{r} = \hat{i} + 2\hat{j} - 3\hat{k} + \lambda\left(\frac{1}{3}\hat{i} - \frac{1}{3}\hat{j} + \frac{1}{2}\hat{k}\right)$

Answer: B

View Text Solution

10. If we draw lines of $x = 2$ and $y = 3$ what kind of lines do we get?

Watch Video Solution

11. Cartesian form of the eqution of line $\bar{r} = 3\hat{i} - 5\hat{j} + 7\hat{k} + \lambda\left(2\hat{i} + \hat{j} - 3\hat{k}\right)$ is

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

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

C. $\frac{x-2}{3} = \frac{y-1}{-5} = \frac{z-3}{7}$

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

Answer: B

View Text Solution

12. The vector equation of line passing through $(2, -1, 1)$ and parallel to the line $\bar{r} = 3\hat{i} - \hat{j} + 2\hat{k} + \lambda\left(2\hat{i} + 7\hat{j} - 3\hat{k}\right)$ is

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

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

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

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

Answer: C

View Text Solution

13. The vector equation of line passing through origin and parallel to $\frac{x-2}{3} = \frac{y-3}{-1} = \frac{z+1}{2}$ is

A. $\bar{r} = 2\hat{i} + 3\hat{j} - \hat{k}$

B. $\bar{r} = 3\hat{i} - \hat{j} + 2\hat{k}$

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

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

Answer: D

View Text Solution

14. Equation of a line passing through point (2, -1, 3) and parallel to line $\frac{2x-1}{2} = \frac{1-y}{1} = \frac{z}{3}$ is

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

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

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

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

Answer: C

View Text Solution

15. Find the vector equation of the line that passes through the points $(3, -2, -5)$ and $(3, -2, 6)$

A. $\bar{r} = \hat{i} + 2\hat{j} + 3\hat{k} + \lambda\left(3\hat{i} - 2\hat{j} - 5\hat{k}\right)$

B. $\bar{r} = -3\hat{i} - 2\hat{j} - 6\hat{k} + \lambda\left(11\hat{k}\right)$

C. $\bar{r} = 3\hat{i} - 2\hat{j} - 5\hat{k} + \lambda\left(11\hat{k}\right)$

D. $\bar{r} = \hat{i} - 2\hat{j} + 3\hat{k} + \lambda\left(3\hat{i} - 2\hat{j} + 6\hat{k}\right)$

Answer: C

View Text Solution

16. The vector equation of the line passing through the points (1,-2,5) and (-2,1,3) is

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

B. $\bar{r} = -2\hat{i} - \hat{j} + 3\hat{k} + \lambda\left(\hat{i} + 3\hat{j} - 5\hat{k}\right)$

C. $\bar{r} = -\hat{i} - 2\hat{j} + 5\hat{k} + \lambda\left(-2\hat{i} - \hat{j} + 3\hat{k}\right)$

D. $\bar{r} = -2\hat{i} + \hat{j} + 3\hat{k} + \lambda\left(\hat{i} - 2\hat{j} + 5\hat{k}\right)$

Answer: A

Watch Video Solution

17. The equation to the straight line passing through the points (4,-5,2) and (-1,5,3) is

A. $\frac{x-4}{1} = \frac{y+5}{-2} = \frac{z+2}{-1}$

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

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

D. $\frac{x}{4} = \frac{y}{-5} = \frac{z}{-2}$

Answer: A

Watch Video Solution

18. Equation of a line through the points (0, 0, 0) and (1, 2, 3) is

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

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

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

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

Answer: B

View Text Solution

19. The equation of the line joining the points (-2,4,2) and (7,-2,5) is

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

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

C. $\frac{x+7}{-2}=\frac{y-2}{4}=\frac{z-5}{2}$

D. $\frac{x-7}{-2}=\frac{y+2}{4}=\frac{z-5}{2}$

Answer: A

View Text Solution

20. The equation of line $2x + z - 4 = 0 = 2y + z$ in symmetric form is

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

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

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

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

Answer: A

View Text Solution

21. Cosine of the angle between the lines $\bar{r} = 5\hat{i} - \hat{j} + 4\hat{k} + \lambda\left(\hat{i} + 2\hat{j} + 2\hat{k}\right)$ and $\bar{r} = 7\hat{i} + 2\hat{j} + 2\hat{k} + \mu\left(3\hat{i} + 2\hat{j} + 6\hat{k}\right)$ is

A. 0

B. $\frac{1}{2}$

C. $\frac{19}{21}$

D. $\frac{1}{3}$

Answer: C

Watch Video Solution

22. The angle between two lines $\frac{x+1}{2} = \frac{y+3}{2} = \frac{z-4}{-1}$ and $\frac{x-4}{1} = \frac{y+4}{2} = \frac{z+1}{2}$ is

A. $\cos^{-1}\left(\frac{1}{9}\right)$

B. $\cos^{-1}\left(\frac{2}{9}\right)$

C. $\cos^{-1}\left(\frac{3}{9}\right)$

D. $\cos^{-1}\left(\frac{4}{9}\right)$

Answer: D

View Text Solution

23. The angle between the lines $\frac{x-2}{3}=\frac{y+1}{-2}, z=2$ and $\frac{x-1}{2}=\frac{y+\frac{3}{2}}{3}=\frac{z+5}{4}$ is

A. $\frac{\pi}{2}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{6}$

D. $\frac{\pi}{4}$

Answer: A

View Text Solution

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

are

A. at right angles

B. skew

C. parallel

D. intersecting

Answer: A

Watch Video Solution

25. The lines $\frac{x-2}{1}=\frac{y-3}{2}=\frac{z-4}{3}$ and $\frac{x-1}{-5}=\frac{y-2}{1}=\frac{z-1}{1}$ are

A. parallel

B. at right angle

C. intersecting

D. skew lines

Answer: B

Watch Video Solution

26. The line $\frac{x-2}{3}=\frac{y-3}{4}=\frac{z-4}{0}$ is parallel to

A. XY-plane

B. YZ-plane

C. ZX-plane

D. X = 3

Answer: A

Watch Video Solution

27. The equation of plane containing the lines $\bar{r}=\left(2\hat{j}-3\hat{k}\right)+\lambda\left(\hat{i}+2\hat{j}+3\hat{k}\right)$
$\bar{r}=\left(2\hat{i}+6\hat{j}+3\hat{k}\right)+\lambda\left(2\hat{i}+3\hat{j}+4\hat{k}\right)$

A. $(2, 6, 3)$

B. $(0, 2, -3)$

C. $(2, 3, 4)$

D. $(2, -6, 4)$

Answer: A

Watch Video Solution

28. v49_newFlow

A. $(1, 1, -1)$

B. $(1, -1, 1)$

C. $(-1, -1, -1)$

D. $(1, 1, 1)$

Answer: C

Watch Video Solution

29. The lines $\frac{x-1}{3}=\frac{y-1}{-1}, z=-1$ and $\frac{x-4}{2}=\frac{z+1}{3}, y=0$

A. do not intersect

B. intersect at $(4, 1, -2)$

C. intersect at $(4, 0, -1)$

D. intersect at $(1, 1, -1)$

Answer: C

Watch Video Solution

30. The foot of the perpendicular from the point (α, β, γ) on Y-axis is

A. $(0, 0, 0)$

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

C. $(0, \beta, 0)$

D. $(\alpha, 0, 0)$

Answer: C

View Text Solution

31. The co-ordinates of the foot of the perpendicular from the point (a, b, c) on Z-axis is

A. $(a, 0, 0)$

B. $(0, b, 0)$

C. $(0, 0, c)$

D. $(a, b, 0)$

Answer: C

View Text Solution

32. The shortest distance of the point (a,b,c) from X-axis is

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

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

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

D. $\sqrt{a^2 + b^2 + c^2}$

Answer: B

Watch Video Solution

33. The distance of the point A(2,3,4) from X-axis is

A. 5

B. $\sqrt{13}$

C. $2\sqrt{5}$

D. $5\sqrt{2}$

Answer: A

View Text Solution

34. Write the distance of the point $P(3, 4, 5)$ from z-axis.

A. 5

B. $\sqrt{41}$

C. $\sqrt{34}$

D. $\sqrt{50}$

Answer: A

Watch Video Solution

35. From which of the following the distance of the point (1,2,3) is $\sqrt{10}$?

A. Origin

B. X-axis

C. Y-axis

D. Z-axis

Answer: C

View Text Solution

36. The distance of the point $2\hat{i} + \hat{j} + \hat{k}$ from the line $\bar{r} = -\hat{i} + 2\hat{j} + 2\hat{k} + \lambda\left(3\hat{i} + \hat{k}\right)$ is

A. 1

B. $\sqrt{\frac{27}{5}}$

C. $\sqrt{\frac{23}{5}}$

D. $\sqrt{\frac{5}{23}}$

Answer: C

View Text Solution

37. Find the distance of a point $(2, 4, -1)$ from the line

$$\frac{x+5}{1} = \frac{y+3}{4} = \frac{z-6}{-9}.$$

A. 3

B. 5

C. 7

D. 9

Answer: C

Watch Video Solution

38. The length of perpendicular from (1,6,3) to the line $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$ is

A. 3

B. $\sqrt{11}$

C. $\sqrt{13}$

D. 5

Answer: C

View Text Solution

39. Skew lines are ....

A. non-coplanar lines

B. coplanar lines

C. perpendicular lines

D. parallel lines

Answer: A

Watch Video Solution

40. The shortest distance between the lines

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

and $\vec{r} = (\hat{i} - \hat{j} + 2\hat{k}) + \mu(2\hat{i} + 4\hat{j} - 5\hat{k})$ is

A. 6

B. $\sqrt{5}$

C. $\frac{6}{\sqrt{5}}$

D. $6\sqrt{5}$

Answer: C

Watch Video Solution

41. The shortest distance between lines $\bar{r} = (\hat{i} - \hat{j}) + \lambda(2\hat{i} + \hat{k})$ and $\bar{r} = (2\hat{i} - \hat{j}) + \mu(\hat{i} - \hat{j} - \hat{k})$ is

A. $\frac{1}{14}$

B. $\frac{1}{\sqrt{14}}$

C. $\frac{3}{\sqrt{14}}$

D. $\frac{5}{\sqrt{14}}$

Answer: B

View Text Solution

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

A. $\sqrt{29}$

B. $2\sqrt{29}$

C. $3\sqrt{29}$

D. $5\sqrt{29}$

Answer: B

Watch Video Solution

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

A. $\frac{1}{6}$

B. $\frac{1}{3}$

C. $\frac{1}{\sqrt{3}}$

D. $\frac{1}{\sqrt{6}}$

Answer: D

Watch Video Solution

44. The shortest distance between the lines $x+a=2y=-12z$ and $x=y+2a=6z-6a$ is

A. a

B. 2a

C. 4a

D. 6a

Answer: B

Watch Video Solution

45. If the two lines $\frac{x-1}{3}=\frac{y-k}{6}=\frac{z+1}{-2}$ and $\frac{x-2}{-1}=\frac{y-2}{4}=\frac{z+1}{-1}$ intersect at a point, then k is

A. $\frac{13}{5}$

B. $\frac{2}{5}$

C. $\frac{12}{5}$

D. $\frac{7}{5}$

Answer: C

View Text Solution

46. The distance between the lines

$$\bar{r} = -\hat{i} + 3\hat{j} + \hat{k} + \lambda\left(5\hat{i} + \hat{j} + 4\hat{k}\right) \text{ and } \bar{r} = 3\hat{i} + \hat{j} + \mu\left(5\hat{i} + \hat{j} + 4\hat{k}\right)$$

is

A. $\frac{7}{\sqrt{3}}$

B. $\frac{14}{\sqrt{3}}$

C. $\sqrt{3}$

D. $\frac{7}{\sqrt{6}}$

Answer: A

View Text Solution

47. The function to be maximized or minimized is called the

A. constraints

B. non- negative constraints

C. objective function

D. none of these

Answer: C

Watch Video Solution

48. Objective function of a linear programming problem is

A. always a non-negative constraint

B. a relation between the variables

C. a function to be optimized

D. only a one to many relation

Answer: C

Watch Video Solution

49. Which of the folowing cannot be considered as the objective function of a linear programming problem ?

A. Maximize $z = 3x + 2y$

B. Minimize $z = 6x + 7y + 9z$

C. Maximize z = 2x

D. Minimize $z = x^2 + 2xy + y^2$

Answer: D

Watch Video Solution

50. Let p and q be the statements:

$p: 4x + 5y \leq 20,\ q: 3x^2 + 2y^2 \leq 6$

A. both p and q can be constraints of LPP

B. p but not q is a constraint of LPP

C. q and not p is a constraint of LPP

D. neither p nor q is a constraint of LPP

Answer: B

Watch Video Solution

51. A wholesale merchant wants to start the business of cereal with Rs 24000 . Wheat is Rs 400 per quintal and rice is Rs 600 per quintal . He has capacity to stroe 200 quintal of cereal . He earns profit of Rs 25 per quintal on wheat and Rs 40 per quintal on rice . If he stroes x quintal rice and y quintal wheat, then for maximum profit the objective function is

A. $25x + 40y$

B. $40x + 25y$

C. $400x + 600Y$

D. $\frac{400}{40}x + \frac{600}{25}y$

Answer: B

Watch Video Solution

52. A dietician wishes to mix two types of food in such a way that the vitamin contents of the mixture contain at least 8 units of vitamin A and 10 units of vitamin C . Food I contains 2 units per kg of vitamin A and 1 unit per kg of vitamin C , while food II contains 1 unit per kg of vitamin A and 2 units per kg of vitamin C . It costs Rs 5 per kg to purchase food I and Rs 7 per kg to purchase food II . Identify the objective function so as to minimize the cost of mixture.

A. Maximize $z = 5x + 7y$

B. Minimize $z = 2x + y$

C. Maximize $z = 2x + 2y$

D. Minimize $z = 7x + 2y$

Answer: A

Watch Video Solution

53. For the data given in table , the constraints are

	$A(x)$	$B(y)$	Maximum availability
Number of labours	5	4	20
Work hours	6	3	12

A. $5x+6y \leq 20, 4x+3y \leq 12, x \geq 0, y \geq 0$

B. $5x+6y \geq 20, 4x+3y \geq 20, x \geq 0, y \geq 0$

C. $5x+4y \leq 20, 6x+3y \leq 12, x \geq 0, y \geq 0$

D. $5x+4y \geq 20, 6x+3y \geq 12, x \geq 0, y \geq 0$

Answer: C

Watch Video Solution

54. For the data given in the table , the constraints are

	Diet1(x_1)	Diet(x_2)	Minimum rquirement
Proteins	2	15	30
Fast	12	6	48
Vitamins	5	10	20

A.

$$2x_1 + 15x_2 \geq 30, 12x_1 + 6x_2 \geq 48, 5x_1 + 10x_2 \geq 20, x_1 \leq , x_2 \leq 0$$

B.

$$2x_1 + 15x_2 \geq 30, 12x_1 + 6x_2 \geq 48, 5x_1 + 10x_2 \geq 20, x_1 \geq , x_2 \geq 0$$

C.

$$2x_1 + 15x_2 \leq 30, 12x_1 + 6x_2 \leq 48, 5x_1 + 10x_2 \leq 20, x_1 \leq , x_2 \leq 0$$

D.

$$2x_1 + 15x_2 \leq 30, 12x_1 + 6x_2 \leq 48, 5x_1 + 10x_2 \leq 20, x_1 \geq , x_2 \geq 0$$

Answer: B

Watch Video Solution

55. Priya has to stitch table clothes and curtains for a living. She has to put in 1 hour of work for a table cloth and 3 hours for a curtain. She gets ₹ 50 for· every table cloths and ₹ 250 for every curtain. She has to earn a least ₹ 500 per day. Minimize the no of hours of work she has to put in every day.

A. Minimize z = x + 3y subject to$250x + 50y \leq 500, x \geq 0, y \geq 0$

B. Minimize z = x+ 3y subject to $50x + 250y \geq 500, x \geq , 0y \geq 0$

C. Minimize z = 3 + 3y subject to $50x + 250y \leq 500, x \geq 0, y \geq 0$

D. Minimize z = x + 3y subject to $250x + 50y \geq 500, x \geq 0, y \geq 0$

Answer: B

Watch Video Solution

56. A set of point represents convex polygon if

A. line joining two points of the set lie completely out of the set.

B. line joining any two points of the set lie completely within the set.

C. line joining two points of the set may lie within or outside the set.

D. its boundaries are curved having convex shape.

Answer: B

Watch Video Solution

57. One of the corner points of the feasible region of inequalities gives

A. Optimal solution of LPP

B. Objective function

C. Constraints

D. Linear assumptions

Answer: A

Watch Video Solution

58. The feasible solution of a LPP belongs to

A. Only first quadrant

B. First and third quadrant

C. Second quadrant

D. Any quadrant

Answer: D

Watch Video Solution

59. The value of objective function is maximum under linear constraints

A. at the centre of feasible region

B. at (0 , 0)

C. at any vertex of feasible region

D. The vertex which is at maximum distance from (0 , 0)

Answer: C

Watch Video Solution

60. The corner points of the feasible region are (800 , 400) , (1050,150) , (600,0) . The objective function is $P = 12x + 6y$. The maximum value of P is

A. 12000

B. 16000

C. 7200

D. 13500

Answer: D

Watch Video Solution

61. The corner points of the feasible region are A (50,50), B(10,50),C(60,0) and D (60,4) . The objective function is $P = \frac{5}{2}x + \frac{3}{2}y + 410$. The minimum value of P is at point

A. (60,0)

B. (50,50)

C. (60,40)

D. (10,50)

Answer: D

Watch Video Solution

62. Chosse the condition under which an optimum solution cannot be obtained

A. Maximize the objective function when the feasible region is unbounded.

B. Maximize the objective function when the feasible region is bounded

C. More than one optimum solution is found

D. All of the above

Answer: A

Watch Video Solution

Critical Thinking

1. The vector and cartesian equations of the line which passes through the point (1,2,3) and is parallel to the vector $\hat{i} - 2\hat{j} + 3\hat{k}$ are

A. $\overrightarrow{r} = \left(\hat{i} + 2\hat{j} + 3\hat{k}\right) + \lambda\left(\hat{i} + 2\hat{j} + 3\hat{k}\right)$,

$\dfrac{x-1}{1} = \dfrac{y-2}{2} = \dfrac{z-3}{3}$

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

$\dfrac{x-1}{1} = \dfrac{y+2}{2} = \dfrac{z-3}{3}$

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

$\dfrac{x-1}{1} = \dfrac{y-2}{-2} = \dfrac{z-3}{3}$

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

$\dfrac{x-1}{1} = \dfrac{y-2}{-2} = \dfrac{z-3}{3}$

Answer: C

View Text Solution

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

A. $\bar{r} = 3\hat{i} + 2\hat{j} - 8\hat{k} + \lambda\left(5\hat{i} + 2\hat{j} + 4\hat{k}\right)$,

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

B. $\bar{r} = 3\hat{i} + 2\hat{j} + 8\hat{k} + \lambda\left(5\hat{i} + 2\hat{j} - 4\hat{k}\right)$,

$$\frac{x-3}{5} = \frac{y-2}{2} = \frac{z-8}{-4}$$

C. $\bar{r} = 5\hat{i} + 2\hat{j} - 4\hat{k} + \lambda\left(3\hat{i} - 2\hat{j} + 8\hat{k}\right)$

$$\frac{x-5}{3} = \frac{y-2}{-2} = \frac{z+4}{-8}$$

D. $\bar{r} = 5\hat{i} + 2\hat{j} - 4\hat{k} + \lambda\left(3\hat{i} + 2\hat{j} - 8\hat{k}\right)$

$$\frac{x-5}{3} = \frac{y-2}{2} = \frac{z+4}{-8}$$

Answer: D

Watch Video Solution

3. Equation of a line passing through the point with position vector $2\hat{i} - 3\hat{j} + 4\hat{k}$ and in the direction of the vector $3\hat{i} + 4\hat{j} - 5\hat{k}$ is

A. $4x + 3y = 17, 5y - 4z = 1$

B. $4x - 3y = 17, 5y + 4z = 1$

C. $4x + 5y = 12, 3y + 4z = 1$

D. $4x + 3z = 17, 5y + 4z = 1$

Answer: B

View Text Solution

4. The vector equation of the line passing through (2,3,4) and parallel to Z-axis is

A. $\bar{r} = \left(2\hat{i} + 3\hat{j} + 4\hat{k}\right) + \lambda\hat{k}$

B. $\bar{r}=2\hat{i}+\lambda\left(\hat{i}+\hat{j}\right)$

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

D. $\bar{r}=\hat{k}+\lambda\left(2\hat{i}+3\hat{j}+4\hat{k}\right)$

Answer: A

View Text Solution

5. Find the vector equation of line passing through point (1,2,-4) and perpendicular to two lines $\frac{x-8}{3}=\frac{y+19}{-16}=\frac{z-10}{7}$ and $\frac{x-15}{3}=\frac{y-25}{8}=\frac{z-5}{-5}$

A. $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z+4}{8}$

B. $\frac{x-2}{2}=\frac{y-3}{3}=\frac{z-6}{8}$

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

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

Answer: C

Watch Video Solution

6. The equation of line passing through the midpoint of the line joining the points $(-1, 3, -2)$ and $(-5, 3, -6)$ and equally inclined to the axes is

A. $x-3=y+3=z-4$

B. $x+3=y-3=z+4$

C. $x+1=y-3=z+2$

D. $x+5=y+3=z+6$

Answer: B

View Text Solution

7. If G be centroid of the triangle with vertices $(1, 2, 0), (0, 0, 2)$ and $(2, 1, 1)$, then equations of line OG are

A. $x = y = z$

B. $\frac{x-1}{1} = \frac{y-1}{1} = \frac{z-1}{0}$

C. $\frac{x-1}{1} = \frac{y}{1} = \frac{z}{1}$

D. $\frac{x-1}{1} = \frac{y-1}{-1} = \frac{z-1}{1}$

Answer: A

Watch Video Solution

8. The equation of line is $\bar{r} = \bar{p} + t(\bar{q} - \bar{p})$, where $P(\bar{p}) \equiv (3, 4, 1)$ and $Q(\bar{q}) \equiv (5, 1, 6)$. The value of t for which the line crosses XY - plane is

A. $t = \frac{-1}{\sqrt{5}}$

B. $t = \frac{-1}{5}$

C. $t = \frac{1}{4}$

D. $t = \frac{1}{6}$

Answer: B

Watch Video Solution

9. If the line joining the points $P(-2, 1, -8)$ and Q(a,b,c) is in the direction of the vector 6i + 2j + 3k, then the respective values of a,b,c are

A. $4, 3, -5$

B. $2, -3, 4$

C. $-1, 0, 9$

D. $-4, 3, -5$

Answer: A

Watch Video Solution

10. If x co-ordinate of a point on the line joining points (2,2,1) and (5,1,-2) is 4, then its z co-ordinate will be

A. 1

B. -1

C. 2

D. -2

Answer: B

Watch Video Solution

11. The line joining points (3,4,1) and (5,1,6) meets XY-plane at the point

A. $\left(\frac{3}{5}, \frac{13}{5}, \frac{23}{5}\right)$

B. $\left(\frac{13}{5}, \frac{23}{5}, \frac{3}{5}\right)$

C. $\left(\frac{13}{5}, \frac{23}{5}, 0\right)$

D. $\left(\frac{13}{5}, 0, 0\right)$

Answer: C

View Text Solution

12. D.c.s of a line segment AB are $\frac{-2}{\sqrt{17}}, \frac{3}{\sqrt{17}}, \frac{-2}{\sqrt{17}}$. If $AB = \sqrt{17}$ and $A \equiv (3, -6, 10)$, then co-ordinates of B will be

A. $(2, 5, 8)$

B. $(1, -2, 4)$

C. $(1, -3, 8)$

D. $(-1, 3, -8)$

Answer: C

View Text Solution

13. The lines

$$\bar{r} = \left(2\hat{i} + \hat{j} - 3\hat{k}\right) + \left(\frac{t}{\sqrt{6}}\right)\left(2\hat{i} - \hat{j} + \hat{k}\right) \text{ and } \bar{r} = \left(\hat{i} + \hat{k}\right) + t\left(4\hat{i} - \hat{j}\right.$$

are perpendicular to each other, then value of λ is

A. 9

B. -9

C. 7

D. -7

Answer: B

Watch Video Solution

14. The lines

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

and $\overrightarrow{r} = \left(\hat{i} + 2\hat{j} + 3\hat{k}\right) + \mu\left(3\hat{i} + p\hat{j} + p\hat{k}\right)$ are perpendicular it $p =$

A. $1, \ -6$

B. $1, 6$

C. $-1, \ -6$

D. $-1, 6$

Answer: D

Watch Video Solution

15. If the lines $\frac{x-1}{2}=\frac{y-1}{\lambda}=\frac{z-3}{0}$ and $\frac{x-2}{1}=\frac{y-3}{3}=\frac{z-4}{1}$ are perpendicular, then λ is

A. $\frac{-2}{3}$

B. $\frac{-3}{2}$

C. $\frac{2}{3}$

D. $\frac{3}{2}$

Answer: A

Watch Video Solution

16. The lines and $\frac{x-1}{3}=\frac{y-2}{4}=\frac{z-3}{5}$ $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-3}{4}$ are intersecting lines?? Also, give the point of intersection.

A. skew lines

B. parallel lines

C. intersecting lines

D. at right angles

Answer: C

View Text Solution

17. Let $\vec{a} = \hat{i} + \hat{j}$ and $\vec{b} = 2\hat{i} - \hat{k}$. Then the point of intersection of the lines $\vec{r} \times \vec{a} = \vec{b} \times \vec{a}$ and $\vec{r} \times \vec{b} = \vec{a} \times \vec{b}$ is (A) $(3, -1, 10$ (B) $(3, 1, -1)$ (C) $(-3, 1, 1)$ (D) $(-3, -1, -10$

A. $(-1, 1, 1)$

B. $(3, -1, 1)$

C. $(3, 1, -1)$

D. $(1, -1, -1)$

Answer: C

Watch Video Solution

18. If the sum of the squares of the distances of a point from the three coordinate axes be 36, then its distance from the origin is :

A. 6

B. $3\sqrt{2}$

C. $2\sqrt{3}$

D. $5\sqrt{3}$

Answer: B

Watch Video Solution

19. The foot of perpendicular from the point (1,2,3) to the line $\frac{x}{2} = \frac{y-1}{3} = \frac{z-1}{3}$ is

A. $\left(1, \frac{5}{2}, \frac{5}{2}\right)$

B. $\left(1, \frac{9}{4}, \frac{11}{4}\right)$

C. $(1, 3, 2)$

D. $(3, 1, 2)$

Answer: A

View Text Solution

20. The co-ordinates of the foot of the perpendicular from the point $(3, -1, 11)$ on the line $\frac{x}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ are

A. $(2, 5, 7)$

B. $(-2, -1, -1)$

C. $(0, 2, 3)$

D. $(2, 3, 4)$

Answer: A

Watch Video Solution

21. 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.

A. $(3, 2, -1)$

B. $(-2, 3, 4)$

C. $(2, -1, 3)$

D. $(2, 3, -1)$

Answer: D

Watch Video Solution

22. The length of perpendicular from the origin to the line $\overrightarrow{r} = \left(4\hat{i} = 2\hat{j} + 4\hat{k}\right) + \lambda\left(3\hat{i} + 4\hat{j} - 5\hat{k}\right)$ is (A) 2 (B) $2\sqrt{3}$ (C) `6 (D) 7

A. $2\sqrt{5}$

B. 2

C. $5\sqrt{2}$

D. 6

Answer: D

Watch Video Solution

23. The length of the perpendicular drawn from the point $(5, 4, -1)$ on the line $\frac{x-1}{2} = \frac{y}{9} = \frac{z}{5}$

A. $\sqrt{\frac{2109}{110}}$

B. $\frac{2109}{110}$

C. $\sqrt{\frac{110}{2109}}$

D. 54

Answer: A

Watch Video Solution

24. The length of perpendicular from (2, -1, 5) to the line $\frac{x-11}{10}=\frac{y+2}{-4}=\frac{z+8}{-11}$ and the co-ordinates of the foot are

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

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

C. $\sqrt{14}, (1, 2, 3)$

D. $\sqrt{14}, (-1, 2, -3)$

Answer: C

View Text Solution

25. The co-ordinates of a point on the line $\frac{x-1}{2}=\frac{y+1}{-3}=z$ at a distance $4\sqrt{14}$ from the point (1,-1,0) nearer to the origin are

A. $(9, -13, 4)$

B. $\left(8\sqrt{14}+1, -12\sqrt{14}-1, 4\sqrt{14}\right)$

C. $(- 7, 11, - 4)$

D. $(- 8\sqrt{14} + 1, 12\sqrt{14} - 1, - 4\sqrt{14})$

Answer: C

View Text Solution

26. A line passes through two points $A(2, - 3, - 1)$ and $B(8, - 1, 2)$.

The coordinates of a point on this lie at distance of 14 units from a are

A. $(14, - 1, 5)$

B. $(- 10, - 7, - 7)$

C. $(10, 7, 7)$

D. $(- 4, - 1, - 5)$

Answer: B

Watch Video Solution

27. Find the equation of the perpendicular drawn from the point $(2, 4, -1)$ to the line $x+5=\frac{1}{4}(y+3)=-\frac{1}{9}(z-6)$ and obtain the co-ordinates of the foot of this perpendicular

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

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

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

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

Answer: A

Watch Video Solution

28. Two lines $\frac{x}{1}=\frac{y}{2}=\frac{z}{3}$ and $\frac{x+1}{1}=\frac{y+2}{2}=\frac{z+3}{3}$ are

A. parallel lines

B. intersecting lines

C. skew lines

D. coinciding lines

Answer: D

Watch Video Solution

29. Find the shortest distance between the following pair of line: $\overrightarrow{r} = (1-t)\hat{i} + (t-2)\hat{j} + (3-2t)\hat{k}$ and $\overrightarrow{r} = (s+1)\hat{i} + (2s-1)\hat{j} - ($

A. $\frac{1}{\sqrt{2}}$

B. $\frac{7}{\sqrt{2}}$

C. $\frac{3}{\sqrt{2}}$

D. $\frac{5}{\sqrt{2}}$

Answer: C

Watch Video Solution

30. The shortest distance between lines $\bar{r} = (\lambda - 1)\hat{i} + (\lambda + 1)\hat{j} - (1 + \lambda)\hat{k}$ and $\bar{r} = (1 - \mu)\hat{i} + (2\mu - 1)\hat{j} + (\mu + 2)\hat{k}$ is

A. $\frac{\sqrt{5}}{2}$

B. $\frac{5}{\sqrt{2}}$

C. 15

D. $5\sqrt{2}$

Answer: B

Watch Video Solution

31. If the lines $\frac{x-1}{k} = \frac{y+1}{3} = \frac{z-1}{4}$ and $\frac{x-3}{1} = \frac{2y-9}{2k} = \frac{z}{1}$ intersect, then find the value of k

A. 2

B. -4

C. 4

D. -2

Answer: A

Watch Video Solution

32. Find the angle between the line: $\overrightarrow{r} = 4\hat{i} - \hat{j} + \lambda\left(\hat{i} + 2\hat{j} - 2\hat{k}\right)$ and $vevr = \hat{i} - \hat{j} + 2\hat{k} - \mu\left(2\hat{i} + 4\hat{j} - 4\hat{k}\right.$

A. -2

B. 10

C. -10

D. 2

Answer: A

Watch Video Solution

33. A line segment has length 63 and direction ratios are $3, \ -2, 6$. The components of the line vector are

A. $27, \ -18, 54$

B. $-27, 18, \ -54$

C. $-27, \ -18, \ -54$

D. $27, \ -18, \ -54$

Answer: B

Watch Video Solution

34. A printing company prints two types of magazines _A and 8. The company earns '10 and '15 on each magazine A and 8 respectively. These are processed on three machines I, II and Ill and total time in hours available per week on each machine is as follows.

Magazine → ↓ Machine	$A\ (x)$	$B\ (y)$	Time available
I	2	3	36
II	5	2	50
III	2	6	60

The number of constraints is

A. 3

B. 4

C. 5

D. 6

Answer: C

Watch Video Solution

35. A firm makes pants and shirts . A shirt takes 2 hours on machine and 3 hours of man lobour while a pant takes 3 hours on machine and 2 hours of man labour .In a week , there are 70 hours of machine and 75 hous of man lobour available . If the firm dertermines to make x shirts and y pants per week , then for this linear constraints are

A. $x \geq 0, y \geq 0, 2x + 3y \geq 70, 3x + 2y \geq 75$

B. $x \geq 0, y \geq 0, 2x + 3y \leq 70, 3x + 2y \geq 75$

C. $x \geq 0, y \geq 0, 2x + 3y \geq 70, 3x + 2y \leq 75$

D. $x \geq 0, y \geq 0, 2x + 3y \leq 70, 3x + 2y \leq 75$

Answer: D

Watch Video Solution

36. A factory owner wants to purchase 2types of machines A ,and B for his factory . The machine A requires an area of $1000m^2$ and 12 skilled men for running it ans its daily output is 50 units , whereas the machine B rquires $1200m^2$ area and 8 skilled men and its daily output is 40 units .If an area of $7600m^2$ and 72 skilled men are available to operate the machines . The linear constraints are

A. $1000x + 1200y \leq 7600, 12x + 8y \leq 72, x \geq 0, y \geq 0$

B. $1000x + 1200y \geq 7600, 12x + 8y \leq 72, x \geq 0, y \geq 0$

C. $1000x + 1200y \leq 7600, 12x + 8y \geq 72, x \geq 0, y \geq 0$

D. $1000x + 1200y \geq 7600, 12x + 8y \geq 72, x \geq 0, y \geq 0$

Answer: A

Watch Video Solution

37. A small firm manufactures necklaces & bracelets . The combined number of necklaces and bracelets that it can handle per day is at most 24 . A bracelet takes 1 hour to make and a necklace takes half an hour . The maximum number of hours available per day is 16 . If the profit on a bracelet is Rs 300 and the profit on a necklace is Rs 100 , then form LPP to maximize the profit.

A. Maximize $z = 100x + 300y$ subject to $x \geq 0, y \geq 0, x + 2y \leq 32, x + y \leq 24.$

B. Maximize $z = 100x + 300y$ subject to

$x \geq 0, y \geq 0, x + 2y \leq 32, x + y \geq 24.$

C. Maximize $z = 100x + 300y$ subject to

$x \geq 0, y \geq 0, x + 2y \geq 32, x + y \geq 24.$

D. Maximize $z = 100x + 300y$ subject to

$x \geq 0, y \geq 0, x + 2y \geq 32, x + y \leq 24.$

Answer: A

Watch Video Solution

38. Food X contains 4 units of vitamin A per gram and 7 units of vitamin B per gram and cost 15 paise per gram . Food Y contains 6 units of vitamin A per gram and 11 units of vitamin B per gram and cost 22 paise per gram . The daily minimum requirement of vitamin A and B are 90 units and 130 units respectively . The formulation of LPP to minimize the cost is

A. z = 15x +22y, subject to constraints

$4x + 6y \geq 90, 7x + 11y \geq 130, x \geq 0y \geq 0$

B. z = 6x +5y, subject to constraints

$4x + 3y \geq 90, 7x + 11y \geq 130, x \geq 0y \geq 0$

C. z = 15x +62y, subject to constraints

$4x + 6y \geq 90, 7x + 11y \geq 450, x \geq 0y \geq 0$

D. z = 15x +22y, subject to constraints

$4x + 6y \geq 90, 7x + 45y \geq 260, x \geq 0y \geq 0$

Answer: A

Watch Video Solution

39. Two different kinds of food A and B are being considered to form a weekly diet . The minimum weekly requirements for fats , carbohydrates and protein are 18, 24 and 16 units respectively . One kg of food A has 4 , 16 , and 8 units respectively of these ingredients and one kg of food B has

12 ,4 and 6 units respectively The price of food A is Rs 6 per kg and that of food B is Rs 5 per kg. How many kg of each type of food should he buy per week to minimize the cost and meet his requirements . Formulate this LPP

A. z = 15 x+22y, subject to contraints

$$4x + 12y \geq 18, 16x + 4y \geq 24, 8x + 6y > 16, x \geq 0y \geq 0$$

B. z = 15x +22y, subject to constraints

$$4x + 12y \geq 18, 16x + 4y \geq 24, 8x + 6y > 16, x \geq 0y \geq 0$$

C. z=15x+48y , subject to constraints

$$4x + 12y \geq 18, 17x + 4y \geq 24, 8x + 6y > 160, x \geq 0y \geq 0$$

D. z = 15x +22y, subject to constraints

$$24x + 12y \geq 18, 18x + 4y \geq 24, 8x + 16y > 16, x \geq 0y \geq 0$$

Answer: B

Watch Video Solution

40. The region represented by the inequation system $x, y \geq 0, y \leq 5, x + y \leq 4$ is

A. unbounded in first quadrant

B. unbounded in first and second quadrant

C. bounded in first quadrant

D. bounded in first and second quadrants.

Answer: C

Watch Video Solution

41. The region in the xy plane given by $y - x \leq 1, 2x - 6y \leq 3, x \geq 0, y \geq 0$ is

A. bounded

B. not convex

C. unbounded convex

D. bounded and convex

Answer: C

Watch Video Solution

42. The region represented by $2x + 3y - 5 \geq 0 \text{ and } 4x - 3y + 2 \geq 0$ is

A. Not in first quadrant

B. Bounded in first quadrant

C. Unbounded in first quadrant

D. None of these

Answer: D

Watch Video Solution

43. The contraints $-x+y \leq 1, \ -x+3y \leq 9, x \geq 0, y \geq 0$ of LLP correspond to

A. bounded feasible region

B. unbounded feasible region

C. both bounded and unbounded feasible region

D. neither bounded nor unbounded region

Answer: B

Watch Video Solution

44. The position of points O (0,0) and P $(2, \ -2)$ in the region of graph of inequation $2x-3y < 5$, will be

A. O inside and P outside

B. O and P both inside

C. O outside and P outside

D. O outside and P inside

Answer: A

Watch Video Solution

45. The vertex of common graph of inequalities $2x+y \geq 2$ and $x-y \leq 3$, is

A. (0,0)

B. $\left(\frac{5}{3}, -\frac{4}{3}\right)$

C. $\left(\frac{5}{3}, \frac{4}{3}\right)$

D. $\left(-\frac{4}{3}, \frac{5}{3}\right)$

Answer: B

Watch Video Solution

46. The constraints of an LPP are $x + y \leq 6, 3x + 2y \geq 6, x \geq 0$ and $y \geq 0$ Determine the vertices of the feasible region formed by them

A. $(6, 6), (0, 0), (2, 3), (3, 2)$

B. $(0, 0), (5, 6), (6, 5), (0, 5)$

C. $(0, 0), (5, 0), (3, 2), (6, 6)$

D. $(0, 6), (0, 3), (2, 0), (6, 0)$

Answer: D

Watch Video Solution

47. The constraints of an LPP a $5 \leq x \leq 10, 5 \leq y \leq 10$ Determine the vertices of the feasible region formed by them

A. $(5, 5), (10, 5), (10, 10), (15, 10)$

B. $(5, 5), (10, 10), (10, 15), (5, 10)$

C. $(5, 5), (10, 5), (10, 10), (5, 10)$

D. $(5, 5), (15, 10), (10, 10), (5, 10)$

Answer: C

Watch Video Solution

48. Which of the following is not a vertex of the feasible region bounded by the inequalities $2x + 3y \leq 6, 5x + 3y \leq 15 \text{ and } x, y, \geq 0$

A. $(0, 2)$

B. (0,0)

C. (3,0)

D. (0,5)

Answer: D

Watch Video Solution

49. Maximum value of $p = 6x + 8y$

subject to $2x + y \leq 30, x + 2y \leq 24, x \geq 0, y \geq 0$ is

A. 90

B. 120

C. 96

D. 240

Answer: B

Watch Video Solution

50. Maximum value of 12x+ 3y subjected to the constraints $x \geq 0, y \geq 0, x + y \leq 5 \text{ and } 3x + y \leq 9$ is

A. 15

B. 36

C. 60

D. 40

Answer: B

Watch Video Solution

51. Maximise $Z = 5x + 3y$

Subject to $3x + 5y \le 15, 5x + 2y \le 10, x \ge 0, y \ge 0.$

A. $\frac{235}{9}$

B. $\frac{325}{19}$

C. $\frac{523}{19}$

D. $\frac{532}{19}$

Answer: A

Watch Video Solution

52. For the function z = 4x+ 9y to be maximum under the constraints $x + 5y \leq 200, 2x + 3y \leq 134, x \geq 0, y \geq 0$ the values of x and y are

A. 10,38

B. 28,10

C. 13,36

D. 30,34

Answer: A

Watch Video Solution

53. The corner points of the feasible region determined by the system of linear constraints are (0, 10), (5, 5) (15, 15), (0, 20). Let Z = px + qy , where $p, q > 0$. Then, the condition on p and q so that the maximum of Z occurs at both the points (15, 15) and (0, 20), is

A. p = q

B. p = 2q

C. q = 2p

D. q = 3p

Answer: D

Watch Video Solution

54. A manufacturer produces two types of soaps using two machines A and B . A is operated for 2 minutes and B for 3 minutes to manufacture first type , while it takes 3 minutes on machine A and 5 minutes on machine B to manufature second type . Each machine can be operated at the most for 8 hours per day . The two types of soap are sold at a profit of Rs 0.25 and Rs 0.05 each respectively . Assuming that the manufactured can sell all the soaps he can manufacture , how many soaps of each type should be manufature per day so as to maximize his profit .

A. 50 soaps of type I , 20 soaps of types II

B. 96 soaps of type II

C. 45 soaps of type I

D. 55 soaps of type I

Answer: B

Watch Video Solution

55. The minimum value of z = 4x+5y subject to the constraints $x \geq 30, y \geq 40$ and $x \geq , y \geq 0$ is

A. 320

B. 200

C. 120

D. 0

Answer: D

Watch Video Solution

56. The minimum value of z = 3x + y subject to constraints $2x + 3y \leq 6, x + y \geq 1, x \geq 1, x \geq 0, y \geq 0$ is

A. 0

B. 3

C. 2

D. 1

Answer: D

Watch Video Solution

57. The minimum value of z = 6x + 7y subject to $5x + 8y \leq 40, 3x + y \leq 6, x \geq 0, y \geq 2$ is

A. 12

B. 14

C. 9

D. 16

Answer: B

Watch Video Solution

58. Which of the following statements is correct ?

A. Every LPP has an optimal solution

B. Every LPP has a unique solution

C. If a LPP has two optimal solutions , then it has an infinite number of optimal solutions

D. Every LPP has two optimal solutions

Answer: C

Watch Video Solution

59. The solution for minimizing the function z = x+ y under a LPP with constraints $x+y \geq 1, x+2y \leq 10, y \leq 4$ and $x, y, \geq 0$ is

A. x = 0 , y = 0 , z=0

B. x = 3 , y = 3 , z = 6

C. There are infinitely solutions

D. None of these

Answer: C

Watch Video Solution

60. For the constraint of a linear optimizing function $z=x_1+x_2,$ given by $x_1+x_2 \leq 1, 3x_1+x_2 \geq 3$ and $x_1, x_2 \geq 0$

A. There are two feasible regions

B. There are infinite feasible regions

C. There is no feasible region

D. None of these

Answer: C

Watch Video Solution

61. The maximum value of F = 4x + 3y subject to constraints $x \geq 0, y \geq 2, 2x + 3y \leq 18, x + y \geq 10$ is

A. 35

B. 36

C. 34

D. No optimum value

Answer: D

Watch Video Solution

Competitive Thinking

1. The vector equation

$\bar{r} = \hat{i} - 2\hat{j} - \hat{k} + t\left(6\hat{j} - \hat{k}\right)$, represents a line passing through points

A. $(1, -2, -1)$ and $(1, 4, -2)$

B. $(1, -2, -1)$ and $(0, -6, 1)$

C. $(0, -6, 1)$ and $(1, 2, -1)$

D. $(0, -6, 1)$ and $(-1, 2, 1)$

Answer: A

Watch Video Solution

2. The equation of straight line passing through the point (a, b, c) and parallel to Z-axis, is:

A. $\dfrac{x-a}{1} = \dfrac{y-b}{1} = \dfrac{z-c}{0}$

B. $\dfrac{x-a}{0} = \dfrac{y-b}{1} = \dfrac{z-c}{1}$

C. $\dfrac{x-a}{1} = \dfrac{y-b}{0} = \dfrac{z-c}{0}$

D. $\frac{x-a}{0}=\frac{y-b}{0}=\frac{z-c}{1}$

Answer: D

Watch Video Solution

3. The equation of line passing through (3,-1,2) and perpendicular to the lines

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

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

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

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

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

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

Answer: C

Watch Video Solution

4. Direction cosines of the line $\frac{x+2}{2} = \frac{2y-5}{3}, z = -1$ are

A. $\frac{4}{5}, \frac{3}{5}, 0$

B. $\frac{3}{5}, \frac{4}{5}, \frac{1}{5}$

C. $-\frac{3}{5}, \frac{4}{5}, 0$

D. $\frac{4}{5}, -\frac{2}{5}, \frac{1}{5}$

Answer: A

Watch Video Solution

5. The direction cosines of the line x = y = z are

A. $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$

B. $\frac{1}{3}, \frac{1}{3}, \frac{1}{3}$

C. $1, 1, 1$

D. $\frac{2}{\sqrt{3}}, \frac{2}{\sqrt{3}}, \frac{2}{\sqrt{3}}$

Answer: A

Watch Video Solution

6. The direction angles of the line $x = 4z + 3, y = 2 - 3z$ are α, β and $\gamma,$ then $\cos\alpha + \cos\beta + \cos\gamma$ =_____.

A. $\dfrac{2}{\sqrt{26}}$

B. $\dfrac{8}{\sqrt{26}}$

C. 1

D. 2

Answer: A

Watch Video Solution

7. 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

A. Parallel to X-axis

B. Parallel to Y-axis

C. Parallel to Z-axis

D. Perpendicular to Z-axis

Answer: D

Watch Video Solution

8. The direction ratio's of the line $x-y+z-5=0=x-3y-6$ are

A. $3, 1, \; -2$

B. $2, \; -4, 1$

C. $\frac{3}{\sqrt{14}}, \frac{1}{\sqrt{14}}, \frac{-2}{\sqrt{14}}$

D. $\frac{2}{\sqrt{41}}, \frac{-4}{\sqrt{41}}, \frac{1}{\sqrt{41}}$

Answer: A

Watch Video Solution

9. The equation of line equally inclined to co -ordinate axes and passing through (3,2,-5) is

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

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

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

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

Answer: A

Watch Video Solution

10. The equation of a line passing through the points (a,b,c) and(a-b,b-c, c-a) is

A. $\frac{x-a}{a-b}=\frac{y-b}{b-c}=\frac{z-c}{c-a}$

B. $\frac{x-a}{b}=\frac{y-b}{c}=\frac{z-c}{a}$

C. $\frac{x-a}{a}=\frac{y-b}{b}=\frac{z-c}{c}$

D. $\frac{x-a}{2a-b}=\frac{y-b}{2b-c}=\frac{z-c}{2c-a}$

Answer: B

Watch Video Solution

11. If $\frac{x-1}{l}=\frac{y-2}{m}=\frac{z+1}{n}$ is the equation of the line through $(1, 2, -1)$ and $(-1, 0, 1)$, then (l, m, n)

A. $(-1, 0, 1)$

B. $(1, 1, -1)$

C. $(1, 2, -1)$

D. $(0, 1, 0)$

Answer: B

Watch Video Solution

12. If line joining points A and B having position vectors $6\bar{a} - 4\bar{b} + 4\bar{c}$ and $-4\bar{c}$ respectively, and the line joining the points C and D having position vectors $-\bar{a} - 2\bar{b} - 3\bar{c}$ and $\bar{a} + 2\bar{b} - 5\bar{c}$ intersect, then their point of intersection is (A) B (B) C (C) D (D) A

A. B

B. C

C. D

D. A

Answer: A

Watch Video Solution

13. The co-ordinate of the point in which the line joining the points (3, 5, -7) and (-2, 1, 8) is inscribed by YZ-plane are

A. $\left(0, \frac{13}{5}, 2\right)$

B. $\left(0, -\frac{13}{5}, -2\right)$

C. $\left(0, -\frac{13}{5}, \frac{2}{5}\right)$

D. $\left(0, \frac{13}{5}, \frac{2}{5}\right)$

Answer: A

Watch Video Solution

14. Angle between lines

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

$\bar{r} = (1 - t)\left(4\hat{i} - \hat{j}\right) + t\left(2\hat{i} + \hat{j} - 3\hat{k}\right)$ is

A. 0

B. $\frac{\pi}{2}$

C. $\cos^{-1}\left(\frac{18}{5\sqrt{14}}\right)$

D. $\cos^{-1}\left(\frac{6}{5\sqrt{17}}\right)$

Answer: D

Watch Video Solution

15. Find the angle between the following pair of lines: (i) $\frac{x-2}{2}=\frac{y-1}{5}=\frac{z+3}{-3}$ and $\frac{x+2}{-1}=\frac{y-4}{8}=\frac{z-5}{4}$ (ii) $\frac{x}{2}=\frac{y}{2}=\frac{z}{1}$ and $\frac{x-5}{4}=\frac{y-2}{1}=\frac{z-3}{8}$

A. $\cos^{-1}\left(\frac{21}{9\sqrt{38}}\right)$

B. $\cos^{-1}\left(\frac{23}{9\sqrt{38}}\right)$

C. $\cos^{-1}\left(\frac{24}{9\sqrt{38}}\right)$

D. $\cos^{-1}\left(\frac{26}{9\sqrt{38}}\right)$

Answer: D

Watch Video Solution

16. The angle between the lines $\frac{x}{1}=\frac{y}{0}=\frac{z}{-1}$ and $\frac{x}{3}=\frac{y}{4}=\frac{z}{5}$ is

A. $\cos^{-1}\left(\frac{1}{5}\right)$

B. $\cos^{-1}\left(\frac{1}{3}\right)$

C. $\cos^{-1}\left(\frac{1}{2}\right)$

D. $\cos^{-1}\left(\frac{1}{4}\right)$

Answer: A

Watch Video Solution

17. The angle between two lines $\frac{x}{2}=\frac{y}{2}=\frac{z}{-1}$ and $\frac{x-1}{1}=\frac{y-1}{2}=\frac{z-1}{2}$ is

A. $\cos^{-1}\left(\frac{4}{9}\right)$

B. $\cos^{-1}\left(\frac{1}{3}\right)$

C. $\cos^{-1}\left(\frac{2}{9}\right)$

D. $\cos^{-1}\left(\frac{5}{9}\right)$

Answer: A

Watch Video Solution

18. The acute angle between the line joining the points (2,1,-3) and (-3,1,7)and a line parallel to $\frac{x-1}{3}=\frac{y}{4}=\frac{z+3}{5}$ through the point (-1,0,4) is

A. $\cos^{-1}\left(\frac{7}{5\sqrt{10}}\right)$

B. $\cos^{-1}\left(\frac{1}{\sqrt{10}}\right)$

C. $\cos^{-1}\left(\frac{3}{5\sqrt{10}}\right)$

D. $\cos^{-1}\left(\frac{1}{5\sqrt{10}}\right)$

Answer: A

Watch Video Solution

19. 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

A. 45°

B. 30°

C. 60°

D. 90°

Answer: D

Watch Video Solution

20. The angle between the lines $2x=3y=-z$ and $6x=-y=-4z$ is

A. 0°

B. 45°

C. 90°

D. 30°

Answer: C

Watch Video Solution

21. The angle between the lines x=1, y=2 and y=-1, z=0 is

A. 0°

B. $\frac{\pi}{3}$

C. $\frac{\pi}{6}$

D. $\frac{\pi}{2}$

Answer: D

Watch Video Solution

22. Direction rations of the line which is perpendicular to the lines with direction ratios $-1, 2, 2 \text{ and } 0, 2, 1$ are

A. $1, 1, 2$

B. $2, \ -1, 2$

C. $-2, 1, 2$

D. $2, 1, \ -2$

Answer: B

Watch Video Solution

23. If the lines $\frac{x-1}{-3} = \frac{y-2}{2\lambda} = \frac{z-3}{2}$ and $\frac{x-1}{3\lambda} = \frac{y-1}{1} = \frac{6-z}{5}$ are perpendicular to each other then find the value of λ

A. $\frac{5}{7}$

B. $\frac{7}{5}$

C. $\frac{-7}{10}$

D. $\frac{-10}{7}$

Answer: D

Watch Video Solution

24. The two lines $x = ay + b, z = cy + d$ and $x = a'y + b', z = c'y + d'$ are perpendicular to each other, if

A. $aa' + cc' = 1$

B. $aa' + cc' = -1$

C. $ac + a'c' = 1$

D. $ac + a'c' = -1$

Answer: B

Watch Video Solution

25. ΔABC is formed by $A(1, 8, 4)$, $B(0, -11, 4)$ and $C(2, -3, 1)$. If D is the foot of the perpendicular from A to BC, then the coordinates of D are

A. $(4, 5, -2)$

B. $(4, -5, 2)$

C. $(-4, 5, 2)$

D. $(4, -5, -2)$

Answer: A

Watch Video Solution

26. Lines $\vec{r} = (3+t)\hat{i} + (1-t)\hat{j} + (-2-2t)\hat{k}, t \in R$ and $x = 3+k, y = 1-k, z = -2-2k, k \in R$, then the relation between the lines is _______.

A. perpendicular

B. coincident

C. skew

D. parallel

Answer: B

Watch Video Solution

27. The point of intersection of the lines $\frac{x-5}{3}=\frac{y-7}{-1}=\frac{z+2}{1} and =\frac{x+3}{-36}=\frac{y-3}{2}=\frac{z-6}{4}$ is a. $\left(21, \frac{5}{3}, \frac{10}{3}\right)$ b. $(2, 10, 4)$ c. $(-3, 3, 6)$ d. $(5, 7, -2)$

A. $\left(21, \frac{5}{3}, \frac{10}{3}\right)$

B. $(2, 10, 4)$

C. $(-3, 3, 6)$

D. $(5, 7, -2)$

Answer: A

Watch Video Solution

28. The lines $\frac{x-1}{2}=\frac{y+1}{2}=\frac{z-1}{4}$ and $\frac{x-3}{1}=\frac{y-k}{2}=\frac{z}{1}$ intersect each other at point

A. $(-2, -4, 5)$

B. $(-2, -4, -5)$

C. $(2, 4, -5)$

D. $(2, -4, -5)$

Answer: B

Watch Video Solution

29. The line $\frac{x+1}{-10}=\frac{y+3}{-1}=\frac{z-4}{1}$ and $\frac{x+10}{-1}=\frac{y+1}{-3}=\frac{z-1}{4}$ interest at the point.

A. $(11, -4, 5)$

B. $(-11, -4, 5)$

C. $(11, 4, -5)$

D. $(-11, -4, -5)$

Answer: B

Watch Video Solution

30. The lines $\frac{x-1}{1}=\frac{y-1}{2}=\frac{z-1}{3}$ and $\frac{x-4}{2}=\frac{y-6}{3}=\frac{z-7}{3}$ are coplanar. Their point of intersection is

A. $(4, 6, 7)$

B. $(2, 3, 4)$

C. $(1, 1, 1)$

D. $(4, 7, 10)$

Answer: B

Watch Video Solution

31. A line with direction cosines proportional to 2,1,2 meet each of the lines $x = y + a = zndx + a = 2y = 2z$. The coordinastes of each of the points of intersection are given by (A) $(3a, 2a, 3a), (a, a, 2a)$ (B) $(3a, 2a, 3a), (a, a, a0$ (C) $(3a, 3a, 3a), (a, a, a)$ (D) $92a, 3a, 3a), (2a, a, a0$

A. $(2a, a, 3a), (2a, a, a)$

B. $(3a, 2a, 3a), (a, a, a)$

C. $(3a, 2a, 3a), (a, a, 2a)$

D. $(3a, 3a, 3a), (a, a, a)$

Answer: B

Watch Video Solution

32. The foot of the perpendicular drawn from the point (1,8,4) on the line joining the points (0,-11,4) and (2,-3,1) is

A. $(4, 5, 2)$

B. $(-4, 5, 2)$

C. $(4, -5, 2)$

D. $(4, 5, -2)$

Answer: D

Watch Video Solution

33. The shortest distance between A(1,0,2) and the line $\frac{x+1}{3} = \frac{y-2}{-2} = \frac{z+1}{-1}$ is given by line joining A and B, then B in the line is

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

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

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

D. $(1, -2, -1)$

Answer: A

Watch Video Solution

34. Perpenficular distance of the point (1, 2, 3) from the line $\frac{x-6}{3}=\frac{y-7}{2}=\frac{z-7}{-2}$ is

A. 8

B. 6

C. 7

D. 5

Answer: C

Watch Video Solution

35. The distance of the point (-2,4,-5) from the line $\frac{x+3}{3}=\frac{y-4}{5}=\frac{z+8}{6}$ is

A. $\frac{\sqrt{37}}{10}$

B. $\sqrt{\frac{37}{10}}$

C. $\frac{37}{\sqrt{10}}$

D. $\frac{37}{10}$

Answer: B

Watch Video Solution

36. the distance of the point $(2, 3, 4)$ from the line $(1-x)=\frac{y}{2}=\frac{1}{3}(1+z)$

A. $\frac{1}{7}\sqrt{35}$

B. $\frac{4}{7}\sqrt{35}$

C. $\frac{2}{7}\sqrt{35}$

D. $\frac{3}{7}\sqrt{35}$

Answer: D

Watch Video Solution

37. The point in which the join of $(-9, 4, 5)$ and $(11, 0, -1)$ is met by the perpendicular from the origin is-

A. $(-2, 1, 2)$

B. $(-2, -2, 1)$

C. $(1, 2, 2)$

D. $(1, -2, 2)$

Answer: C

Watch Video Solution

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

A. $(1, 0, 7)$

B. $(7, 0, 1)$

C. $(2, 7, 0)$

D. $(-1, -6, -3)$

Answer: A

Watch Video Solution

39. The equation of line is $\frac{x-1}{2}=\frac{y+1}{-2}=\frac{z+1}{1}$. The co-ordinates of the point on the line at a distance of 3 units from the point $(1, -1, -1)$ is

A. $(7, -7, 2)$

B. $(3, -3, 0)$

C. $(6, 7, -2)$

D. $(-3, 3, 0)$

Answer: B

Watch Video Solution

40. 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. $3\sqrt{30}$

A. $\sqrt{30}$

B. $2\sqrt{30}$

C. $5\sqrt{30}$

D. $3\sqrt{30}$

Answer: D

Watch Video Solution

41. The shortest distance between lines

$L_1: \frac{x+1}{3}=\frac{y+2}{1}=\frac{z+1}{2}$,

$L_2: \frac{x-2}{1}=\frac{y+2}{2}=\frac{z-3}{3}$ is

A. 0

B. $\frac{17}{\sqrt{3}}$

C. $\frac{41}{5\sqrt{3}}$

D. $\frac{17}{5\sqrt{3}}$

Answer: D

Watch Video Solution

42. If the line $\frac{x-1}{2}=\frac{y+1}{3}=\frac{z-1}{4}$ and $\frac{x-3}{1}=\frac{y-k}{2}=\frac{z}{1}$ intersect, then k is equal to

A. $\frac{9}{2}$

B. $\frac{1}{2}$

C. $\frac{5}{2}$

D. $\frac{7}{2}$

Answer: A

Watch Video Solution

43. If the straight lines $\frac{x-1}{k}=\frac{y-2}{2}=\frac{z-3}{3}$ and $\frac{x-2}{3}=\frac{y-3}{k}=\frac{z-1}{2}$ intersect at a point, then the integer k is equal to (1) -5 (2) 5 (3) 2 (4) -2

A. 5

B. 2

C. -2

D. -5

Answer: D

Watch Video Solution

44. A line from the origin meets the lines $\frac{x-2}{1}=\frac{y-1}{-2}=\frac{z+1}{1}$ and $\frac{x-\frac{8}{3}}{2}=\frac{y+3}{-1}=\frac{z-1}{1}$ at P and Q respectively. If length $PQ=d$, then d^2 is

A. 3

B. 4

C. 5

D. 6

Answer: D

Watch Video Solution

45. Read the following passage and answer the questions. Consider the lines

$$L_1 : \frac{x+1}{3} = \frac{y+2}{1} = \frac{z+1}{2}, L_2 : \frac{x-2}{1} = \frac{y+2}{2} = \frac{z-3}{3}$$

The unit vector perpendicualr to both L_1 and L_2 is

A. $\frac{1}{\sqrt{99}}\left(-\hat{i}+7\hat{j}+7\hat{k}\right)$

B. $\frac{1}{5\sqrt{3}}\left(-\hat{i}-7\hat{j}+5\hat{k}\right)$

C. $\frac{1}{5\sqrt{3}}\left(-\hat{i}+7\hat{j}+5\hat{k}\right)$

D. $\frac{1}{\sqrt{99}}\left(7\hat{i}-7\hat{j}-\hat{k}\right)$

Answer: B

Watch Video Solution

46. A linear programming of linear functions deals with

A. Minimizing

B. Optimizing

C. Maximizing

D. None of these

Answer: B

Watch Video Solution

47. Variables of the objective function of the linear programming problem are

A. Zero

B. Zero or positive

C. Negative

D. Zero or negative

Answer: B

Watch Video Solution

48. Non - negative constraints for an LPP should be

A. $= 0$

B. > 0

C. ≥ 0

D. neither $> 0, \quad \text{nor} < 0$

Answer: C

Watch Video Solution

49. LPP includes

A. both objective functions and constraints which are linear.

B. objective function which are linear

C. constraints which are linear

D. none of these

Answer: A

Watch Video Solution

50. Minimize $z = \sum_{j=1}^{n} \sum_{i=1}^{m} c_{ij} \, x_{ij}$

Subject to : $\sum_{j=1}^{n} x_{ij} = a_i, i = 1, \ldots\ldots\ldots, m$

$\sum_{i=1}^{n} x_{ij} = b_i, j = 1, \ldots\ldots\ldots, n$

is a LPP with number of constraints

A. $m + n$

B. $m - n$

C. mn

D. $\frac{m}{n}$

Answer: A

View Text Solution

51. The optimal value of the objective function is attained at the points

A. Given by intersection of inequations with axes only

B. Given by intersection of inequations with X- axis only

C. Given by corner points of the feasible region

D. None of these

Answer: C

Watch Video Solution

52. Which of the terms is not used in a linear programming problem

A. Slack variables

B. Objective function

C. Concave region

D. Feasible solution

Answer: C

Watch Video Solution

53. The area of the feasible region for the following constraints $3y + x \geq 3, x \geq 0, y \geq 0$ will be

A. Bounded

B. Unbounded

C. Convex

D. Concave

Answer: B

Watch Video Solution

54. The constraints $-x_1 + x_2 < 1, \ -x_1 + 3x_2 \leq 9, x_1, x_2 >$, 0 difines on

A. Bounded feasible space

B. Unbounded feasible space

C. Both bounded and unbounded feasible space

D. None of these

Answer: B

Watch Video Solution

55. Inequations $3x - y \geq 3$ and $4x - y > 4$

A. have solution for positive x and y

B. have no solution for positive x and y

C. have solution for all x

D. have solution for all y

Answer: A

Watch Video Solution

56. The objective function of LLP defined over the convex set attains its optimum value at

A. At least two of the corner points

B. All the corner points

C. At least one of the corner points

D. None of the corner points

Answer: C

Watch Video Solution

57. If an LPP admits optimal solution at two consecutive vertices of a joining two points

A. the required optimal solution is at the midpoint of the line joining two points

B. the optimal solution occurs at every point on the line joining these two points

C. the LPP under consideration is not solvable

D. the LPP under consideration must be reconstruted

Answer: B

Watch Video Solution

58. The maximum value of P = 3x +4y subject to the constraints $x+y\leq 40, 2y\leq 60, x\geq 0$ and $y\geq 0$ is

A. 120

B. 140

C. 100

D. 160

Answer: B

Watch Video Solution

59. If $4x+5y\leq 20, x+y\geq 3, x\geq 0, y\geq 0$ maximum 2x + 3y is

A. 12

B. 5

C. 0

D. 20

Answer: A

Watch Video Solution

60. The maximum of z = 5x+2y , subject to the constrainsts $x+y \leq 7, x+2y \leq 10, x, y \geq 0$ is

A. 10

B. 26

C. 35

D. 70

Answer: C

Watch Video Solution

61. The maximum value of $2x+y$ subject to

$3x+5y \leq 26$ and $5x+3y \leq 30, x \geq 0, y \geq 0$ is

A. 12

B. 11.5

C. 10

D. 17.33

Answer: A

Watch Video Solution

62. By graphical method, the solutions of linear programming problem maximise $Z = 3x_1 + 5x_2$ subject to constraints $3x_1 + 2x_2 \leq 18$, $x_1 \leq 4$, $x_2 \leq 6x_1 \geq 0$, $x_2 \geq 0$ are

A. $x_1 = 2$, $x_2 = 0$, $z = 6$

B. $x_1 = 2$, $x_2 = 6$, $z = 36$

C. $x_1 = 4$, $x_2 = 3$, $z = 27$

D. $x_1 = 4$, $x_2 = 6$, $z = 42$

Answer: B

Watch Video Solution

63. The maximum value of 4x +5y subject to the constraints $x + y \leq 20, x + 2y \leq 35, x - 3y \leq 12$ is

A. 84

B. 95

C. 100

D. 96

Answer: B

Watch Video Solution

64. Max value of z equal 3x + 2y subject to $x + y \leq 3, x \leq 2, -2x + y \leq 1, x \geq 0, y \geq 0$ is

A. 6

B. 8

C. 2

D. 10

Answer: B

Watch Video Solution

65. The point at which , the maximum value of (3x+2y) subject to the constraints $x+y \leq 2, x \geq 0, y \geq 0$ obtained , is

A. (0 ,0)

B. $(1.5, 1.5)$

C. (2,0)

D. (0,2)

Answer: C

Watch Video Solution

66. The point which provides the solution of the linear programming problem, maximise Z = 45x + 55y. Subject to constraints Subject to constraints $x, y \geq 0, 6x + 4y \leq 120$ and $3x + 10y \leq 180$ is

A. (15,10)

B. (10,15)

C. (0,18)

D. (20,0)

Answer: B

Watch Video Solution

67. The points which provides the solution to the linear programming problem max $(2x + 3y)$ subject to constraints $x \geq 0, y \geq 0, 2x + 2y \leq 9, 2x + y \leq 6, x + 2y \leq 8$ is

A. (3,2,5)

B. (2,3,5)

C. (2,2 5)

D. (1 ,3 ,5)

Answer: D

Watch Video Solution

68. The corner points of the feasible region determined by the system of linear constraints are (0, 10), (5, 5) (15, 15), (0, 20). Let Z = px + qy , where $p, q > 0$. Then, the condition on p and q so that the maximum of Z occurs at both the points (15, 15) and (0, 20), is

A. q = 3p

B. p = 2q

C. q = 2p

D. p = q

Answer: A

Watch Video Solution

69. The corner points of the feasible region determined by the system of linear constraints are (0,10) , (5,5) (25,20),(0,30) Let z = px + qy , where $p, q > 0$ Condition on p and q so that te maximum of z occurs at both the points (25,20) and (0,30) is ....

A. 5p = 2q

B. 2p=5q

C. p = 2q

D. q = 3p

Answer: A

Watch Video Solution

70. The minimum value of $z = 2z_1 + 3x - (2)$ subjected to the constraints $2x_1 + 7x_2 \geq 22, x_1 + x_2 \geq 6, 5x_1 + x_2 \geq 10$ and $x_1, x_2 \geq 0$, is

A. 14

B. 20

C. 10

D. 16

Answer: A

Watch Video Solution

71. The minimum value of the objective function Z=2x+10y for linear constraints $x \geq 0, y \geq 0, x - y \geq 0, x - 5y \leq -5$ is

A. 10

B. 15

C. 12

D. 8

Answer: B

Watch Video Solution

72. For the following linear programming problem minimize $Z = 4x + 6y$ subject to the constraints $2x + 3y \geq 6, x + y \leq 8, y \geq 1, x \geq 0,$ the solution is

A. (0,2) and (1,1)

B. $(0, 2)$ and $\left(\frac{3}{2}, 1\right)$

C. (0,2) and (1,6)

D. (0,2) and (1,5)

Answer: B

Watch Video Solution

73. The co-ordinates of the point for minimum value z = 7x - 8y subject to the conditons $x+y-20 \le 0, y \ge 5, x \ge 0,$ is

A. (20,0)

B. (15,5)

C. (0,5)

D. (0,20)

Answer: D

Watch Video Solution

74. Minimise and Maximise $Z=5x+10y$

Subject to $x+2y \le 120, x+y \ge 60, x-2y \ge 0, y \ge 0.$

A. x = 60 , y = 0

B. x = 0 , y = 60

C. x = 60 , y = 30

D. x = 60 , y = 20

Answer: A

Watch Video Solution

75. The objective function, $z = 4x_1 + 5x_2$, subject to $2x_1 + x_2 \geq 7, 2x_1 + 3x_2 \leq 15, x_2 \leq 3, x_1, x_2 \geq 0$ has minimum value at the point

A. On X - axis

B. On Y - axis

C. At the origin

D. On the line parallel to X - axis

Answer: A

Watch Video Solution

76. The objective function $z = x_1 + x_2$, subject to $x_1 + x_2 \leq 10, \ -2x_1 + 3x_2 \leq 15, x_1 \leq 6, x_1, x_2 \leq 0$ has maximum value of the feasible region.

A. at only one point

B. at only two point

C. at every point of the segment joining two points

D. at every point of the line joining two points

Answer: C

Watch Video Solution

77. Minimize z = 30x+20y subject to $x + y \leq 8, x + 2y \geq 4, 6x + 4y \geq 12, x \geq , y \geq 0$

A. Infinite solution

B. Unique solution

C. Two solutions

D. None of these

Answer: A

Watch Video Solution

78. The maximum value of z = 4x +3y subject to the constraints $3x + 2y \geq 160, 5x + 2y \geq 200, x + 2y \geq 80, x, y \geq 0$ is

A. 320

B. 300

C. 230

D. None of these

Answer: D

Watch Video Solution

79. For the LPP , maximize z = x + 4y subject to the constraints $x + 2y \leq 2, x + 2y \geq 8, x, y \geq 0$

A. $z_{\max} = 4$

B. $z_{\max} = 8$

C. $z_{\max} = 16$

D. has no feasible solution

Answer: D

Watch Video Solution

80. The maximum value of z = 4x +2y subject to the constraints $2x + 3y \leq 18, x + y \geq 10, x, y \geq 0$ is

A. 36

B. 40

C. 20

D. None of these

Answer: D

Watch Video Solution

Evaluation Test

1. Find the point in which the line $\frac{x+1}{-1} = \frac{y-12}{5} = \frac{z-7}{2}$ cuts the surface $11x^2 - 5y^2 + z^2 = 0$.

A. $(2, -3, 1)$

B. $(2, 3, -1)$

C. $(1, -2, 3)$

D. $(1, 2, -3)$

Answer: A

Watch Video Solution

2. A industry produces two types of models M_1, M_2 Each M_1 model needs 4 hours for grinding and 2 hours for polishing , whereas each M_2 model needs 2 hours for grinding and 5 hours for polishing . Each grinder can work for 80 hours a week while each polisher can work for 180 hours a week . Each M_1 model earns a profit of Rs.3 and M_2 model earns Rs 4 profit . To ensure the maximum profit the profuction capacity allocated to two types of models in a week is

A. (0,36)

B. (20,0)

C. (0,40)

D. $(2.5, 35)$

Answer: D

View Text Solution

3. The common region determined by all the constraints and non-negativity restrictions of the LPP is called

A. infeasible region

B. feasible region

C. unbounded region

D. bounded region

Answer: B

Watch Video Solution

4. The objective function P (x,y) = 2x+3y is maximized subject to the constraints $x+y \leq 30, x-y \geq 0, 3 \leq y \leq 12, 0 \leq x \leq 20$ The function attains the maximum value at the points

A. (12,18)

B. (18,12)

C. (15,15)

D. None of these

Answer: B

Watch Video Solution

5. All points lying inside the triangle formed by the points (1,3) ,(5,0) and $(-1, 2)$ satisfy

A. $3x+2y \geq 0$

B. $2x+y-13 \leq 0$

C. $2x-3y-12 \leq 0$

D. All the above

Answer: D

Watch Video Solution

6. The linear programming problem : Maximize $z = z = x_1 + x_2$ subject to constraints $x_1 + 2x_2 \leq 2000, x_1 + x_2 \leq 1500, x_2 \leq 600, x_1 \geq 0$ has

A. No feasible solution

B. Unique optimal solution

C. A finite number of optomal solutions

D. Infinite number of optimal solutions

Answer: D

Watch Video Solution

7. The solution of set of constraints $x + 2y \geq 11, 3x + 4y \leq 30, 2x + 5y \leq 30, x \geq 0, y \geq 0$ includes the point

A. (2,3)

B. (3,2)

C. (3,4)

D. None of these

Answer: D

Watch Video Solution

8. A manufacturer is preparing a production plan on medicines A and B . There are sufficient ingredients availabe to make 20,000 bottles of A and 40 ,000 bottles of B but there are only 45,000 bottles into which either of the medicines can be put . Further it takes 3 hours to perpare enough material to fill 1000 bottles of A . It takes one hour to perpare enough material to fill 1000 bottles of B and there are 66 hours available for this operation . The number of constraints the manufacturer has is

A. 4

B. 5

C. 6

D. 7

Answer: C

View Text Solution

9. A company manufactures two types of telephone sets A and B . The A type telephone requires 2 hour and B type telephone requires 2 hour and B type telephone requires 4 hours to make . The company has 800 work hours per day . 300 telephones can pack in a day . The selling prices of A and B type telephones are Rs.300 and 400 respectively . For maximum profits company produces x telephones of a type and y telephones of B types . Then except $x \geq 0$ and $y \geq 0$, linear constraints and the probable region of the LPP is of the type .

A. $x + 2y \leq 400, x + y \leq 300,$

Max z = 300x +400y, bounded

B. $2x + y \leq 400, x + y \geq 300,$

Max z = 400x +300y, unbounded

C. $2x + y \geq 400, x + y \geq 300,$

Max z = 300x +400y, parallelogram

D. $2x + y \leq 400, x + y \geq 300,$

Max z = 300x +400y, square

Answer: A

View Text Solution

10. The feasible region of the constraints $4x + 2y \leq 8, 2x + 5y \leq 10 \text{ and } x, y \geq 0$ is

A.

B.

C.

D.

Answer: C

Watch Video Solution

11. The LPP problem Max $z = x_1 + x_2$ such that $-2x_1 + x_2 \leq 1, x_1 \leq 2, x_1 + x_2 \leq 3$ and $x_1, x_2 \geq 0$ has

A. One solution

B. Three solutions

C. Infinite number of solutions

D. No solution

Answer: C

Watch Video Solution

12. For the LPP problem Max . z=3x+2y subject to $x + y \geq 1, y - 5x \leq 0, x - y \geq -1,$

A. x = 3

B. y = 3

C. z = 15

D. All the above

Answer: D

Watch Video Solution

Others

1. The co-ordinates of a point on the line $x = 4y + 5, z = 3y - 6$ at a distance $3\sqrt{26}$ from the point (5,0,-6) are

A. $(17, 3, 3)$

B. $(-7, 3, -15)$

C. $(-17, -3, -3)$

D. $(7, -3, 15)$

Answer: A

Watch Video Solution

2. A line segment has length 63 and direction ratios are $3, -2, 6.$ The components of the line vector are

A. $27, -18, 54$

B. $27, 18, -54$

C. $-27, 18, -54$

D. $27, -18, -54$

Answer: C

Watch Video Solution

3. The length of the perpendicular drawn from the point $(3, -1, 11)$ to the line $\frac{x}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ is

A. $\sqrt{33}$

B. $\sqrt{53}$

C. $\sqrt{66}$

D. $\sqrt{29}$

Answer: B

Watch Video Solution

4. A square ABCD of diagonal length 2a, is folded along the diagonal AC so that the planes DAC, BAC are at right angles. The shortest distance between DC and AB is

A. $\sqrt{2}a$

B. $2a / \sqrt{3}$

C. $2a / \sqrt{5}$

D. $(\sqrt{3} / 2)a$

Answer: B

Watch Video Solution

5. The equation of motion of rockets are $x = 2t, y = -4t, z = 4t$ where the time 't' is given in second and the coordinate of a moving point in kilometres. What is the path of the rockets? At what distance will the rocket be from the starting point $O(0, 0, 0)$ in 10s.

A. Straight line, 60 km

B. Straight line, 30 km

C. Parabola, 60 km

D. Ellipse, 60 km

Answer: A

Watch Video Solution

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

A. $\frac{-\hat{i} + 7\hat{j} + 7\hat{k}}{\sqrt{99}}$

B. $\frac{-\hat{i} - 7\hat{j} + 5\hat{k}}{5\sqrt{3}}$

C. $\frac{-\hat{i} + 7\hat{j} + 5\hat{k}}{5\sqrt{3}}$

D. $\frac{-7\hat{i} - 7\hat{j} - \hat{k}}{\sqrt{99}}$

Answer: B

Watch Video Solution

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

A. $(5, 7, 1)$

B. $\left(\frac{5}{3}, \frac{7}{3}, \frac{17}{3}\right)$

C. $\left(\frac{2}{3}, \frac{5}{3}, \frac{7}{3}\right)$

D. $\left(\frac{5}{3}, \frac{2}{3}, \frac{7}{3}\right)$

Answer: B

Watch Video Solution

8. The line passing through the points $(5, 1, a)$ and $(3, b, 1)$ crosses the YZ-plane at the point $\left(0, \frac{17}{2}, -\frac{13}{2}\right)$. Then,

A. $a = 2, b = 8$

B. $a = 4, b = 6$

C. $a = 6, b = 4$

D. $a = 8, b = 2$

Answer: C

Watch Video Solution