

Linear Programming

Question 1.

$Z = 20x_1 + 20x_2$, subject to $x_1 \geq 0$, $x_2 \geq 0$, $x_1 + 2x_2 \geq 8$, $3x_1 + 2x_2 \geq 15$, $5x_1 + 2x_2 \geq 20$. The minimum value of Z occurs at

- (a) (8, 0)
- (b) $\left(\frac{5}{2}, \frac{15}{4}\right)$
- (c) $\left(\frac{7}{2}, \frac{9}{4}\right)$
- (d) (0, 10)

Answer:

- (c) $\left(\frac{7}{2}, \frac{9}{4}\right)$

Question 2.

$Z = 7x + y$, subject to $5x + y \geq 5$, $x + y \geq 3$, $x \geq 0$, $y \geq 0$. The minimum value of Z occurs at

- (a) (3, 0)
- (b) $\left(\frac{1}{2}, \frac{5}{2}\right)$
- (c) (7, 0)
- (d) (0, 5)

Answer:

- (d) (0, 5)

Question 3.

Minimize $Z = 20x_1 + 9x_2$, subject to $x_1 \geq 0$, $x_2 \geq 0$, $2x_1 + 2x_2 \geq 36$, $6x_1 + x_2 \geq 60$.

- (a) 360 at (18, 0)
- (b) 336 at (6, 4)
- (c) 540 at (0, 60)
- (d) 0 at (0, 0)

Answer:

- (b) 336 at (6, 4)

Question 4.

$Z = 8x + 10y$, subject to $2x + y \geq 1$, $2x + 3y \geq 15$, $y \geq 2$, $x \geq 0$, $y \geq 0$. The minimum value of Z occurs at

- (a) (4.5, 2)
- (b) (1.5, 4)
- (c) (0, 7)
- (d) (7, 0)

Answer:

- (b) (1.5, 4)

Question 5.

$Z = 4x_1 + 5x_2$, subject to $2x_1 + x_2 \geq 7$, $2x_1 + 3x_2 \leq 15$, $x_2 \leq 3$, $x_1, x_2 \geq 0$. The minimum value of Z occurs at

- (a) (3.5, 0)
- (b) (3, 3)
- (c) (7.5, 0)
- (d) (2, 3)

Answer:

- (a) (3.5, 0)

Question 6.

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

- (a) 35
- (b) 36
- (c) 34
- (d) none of these

Answer:

- (d) none of these

Question 7.

Objective function of a L.P.P. is

- (a) a constant
- (b) a function to be optimised
- (c) a relation between the variables
- (d) none of these

Answer:

- (b) a function to be optimised

Question 8.

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

- (a) on X-axis
- (b) on Y-axis
- (c) which are corner points of the feasible region
- (d) none of these

Answer:

- (c) which are corner points of the feasible region

Question 9.

In solving the LPP:

“minimize $f = 6x + 10y$ subject to constraints $x \geq 6, y \geq 2, 2x + y \geq 10, x \geq 0, y \geq 0$ ” redundant constraints are

- (a) $x \geq 6, y \geq 2$
- (b) $2x + y \geq 10, x \geq 0, y \geq 0$
- (c) $x \geq 6$
- (d) none of these

Answer:

- (b) $2x + y \geq 10, x \geq 0, y \geq 0$

Question 10.

Region represented by $x \geq 0, y \geq 0$ is

- (a) first quadrant
- (b) second quadrant
- (c) third quadrant
- (d) fourth quadrant

Answer:

- (a) first quadrant

Question 11.

The region represented by the inequalities

$x \geq 6, y \geq 2, 2x + y \leq 0, x \geq 0, y \geq 0$ is

- (a) unbounded
- (b) a polygon
- (c) exterior of a triangle
- (d) None of these

Answer:

- (d) None of these

Question 12.

The minimum value of $Z = 4x + 3y$ subjected to the constraints $3x + 2y \geq 160, 5 + 2y \geq 200, 2y \geq 80; x, y \geq 0$ is

- (a) 220
- (b) 300
- (c) 230
- (d) none of these

Answer:

- (a) 220

Question 13.

The maximum value of $Z = 3x + 2y$, subjected to $x + 2y \leq 2, x + 2y \geq 8; x, y \geq 0$ is

- (a) 32
- (b) 24

- (c) 40
(d) none of these
Answer:
(d) none of these

Question 14.

Maximize $Z = 11x + 8y$, subject to $x \leq 4$, $y \leq 6$, $x \geq 0$, $y \geq 0$.

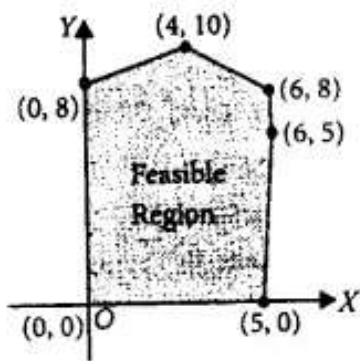
- (a) 44 at (4, 2)
(b) 60 at (4, 2)
(c) 62 at (4, 0)
(d) 48 at (4, 2)

Answer:

- (b) 60 at (4, 2)

Question 15.

The feasible, region for an LPP is shown shaded in the figure. Let $Z = 3x - 4y$ be the objective function. A minimum of Z occurs at



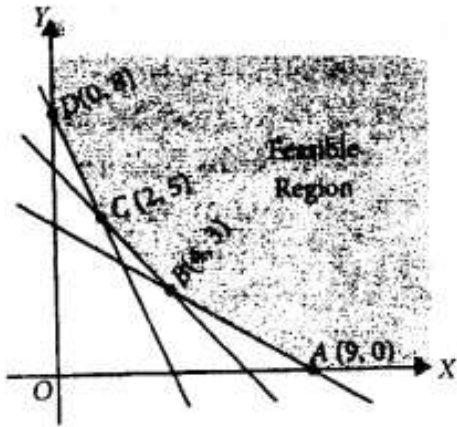
- (a) (0, 0)
(b) (0, 8)
(c) (5, 0)
(d) (4, 10)

Answer:

- (b) (0, 8)

Question 16.

The feasible region for an LPP is shown shaded in the following figure. Minimum of $Z = 4x + 3y$ occurs at the point



- (a) (0, 8)
- (b) (2, 5)
- (c) (4, 3)
- (d) (9, 0)

Answer:

- (b) (2, 5)

Question 17.

Maximize $Z = 3x + 5y$, subject to $x + 4y \leq 24$, $3x + y \leq 21$, $x + y \leq 9$, $x \geq 0$, $y \geq 0$.

- (a) 20 at (1, 0)
- (b) 30 at (0, 6)
- (c) 37 at (4, 5)
- (d) 33 at (6, 3)

Answer:

- (c) 37 at (4, 5)

Question 18.

Maximize $Z = 4x + 6y$, subject to $3x + 2y \leq 12$, $x + y \geq 4$, $x, y \geq 0$.

- (a) 16 at (4, 0)
- (b) 24 at (0, 4)
- (c) 24 at (6, 0)
- (d) 36 at (0, 6)

Answer:

- (d) 36 at (0, 6)

Question 19.

Maximize $Z = 6x + 4y$, subject to $x \leq 2$, $x + y \leq 3$, $-2x + y \leq 1$, $x \geq 0$, $y \geq 0$.

- (a) 12 at (2, 0)
- (b) $\frac{140}{3}$ at $(\frac{2}{3}, \frac{1}{3})$
- (c) 16 at (2, 1)
- (d) 4 at (0, 1)

Answer:

(c) 16 at (2, 1)

Question 20.

Maximize $Z = 10x_1 + 25x_2$, subject to $0 \leq x_1 \leq 3$, $0 \leq x_2 \leq 3$, $x_1 + x_2 \leq 5$.

(a) 80 at (3, 2)

(b) 75 at (0, 3)

(c) 30 at (3, 0)

(d) 95 at (2, 3)

Answer:

(d) 95 at (2, 3)