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) (1/2, 5/2)
(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 optimized

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 comer points of the feascible region
(d) none of these

Answer: (c) which are comer points of the feascible 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

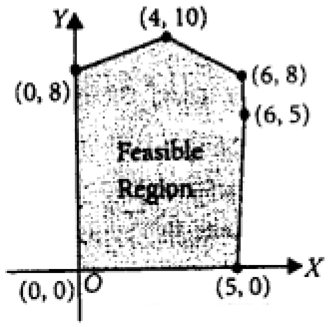
Answer: (d) none of these

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)

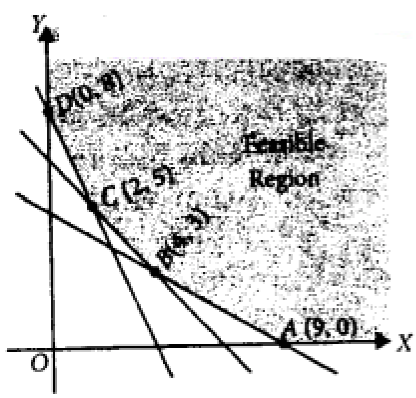
Question 15. The feasible, region for an LPP is shown shaded in the figure. Let Z = 3x – 4y be the objective function. A minimum of Z occurs at



(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 ≤ 24, 3x + y ≤ 21, x + y ≤ 9, x ≥ 0, y ≥ 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) 140/3 at (2/3, 1/3)
(c) 16 at (2, 1)
(d) 4 at (0, 1)

Answer: (c) 16 at (2, 1)

Question 20. Maximize $Z = 10\times1 + 25\times2$, subject to $0 \leq x1 \leq 3$, $0 \leq x2 \leq 3$, $x1 + x2 \leq 5$.

(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)