Mathematics Practice Test - Set 9

Chapter: Linear Programming (Intermediate to Difficult)

General Instructions

1. Total Questions: **15**
2. Duration: **60 Minutes**
3. All questions are compulsory.
4. Each question carries **5 marks**.
5. For each correct answer: **+5 marks**.
6. For each incorrect answer: **-1 mark**.
7. No negative marking for unanswered questions.
8. Use of calculator or electronic devices is strictly prohibited.
9. Choose the most appropriate answer from the given options.

1. The feasible region for an LPP is determined by the constraints: $x + y \leq 4, 3x + 3y \geq 18, x, y \geq 0$. The number of points in the feasible region is:
   (A) 0
   (B) 1
   (C) 10
   (D) Infinite

2. If the objective function $Z = px + qy$ (where $p, q > 0$) has its maximum value at both $(2, 4)$ and $(5, 2)$, then the relationship between p and q is:
   (A) $p = q$
   (B) $2p = 3q$
   (C) $3p = 2q$
   (D) $p = 2q$

3. The corner points of a feasible region are $(0, 2), (3, 0), (6, 0), (6, 8)$ and $(0, 5)$. If $Z = 4x - 3y$ is the objective function, the difference between the maximum and minimum values of Z is:
   (A) 24
   (B) 39
   (C) 15
   (D) 30

4. In an LPP, the region of feasible solutions is always a:
   (A) Concave set
   (B) Convex set
   (C) Circular set
   (D) Disjoint set

5. Which of the following points satisfies the constraints $x+2y \leq 10, 3x+y \leq 15, x \geq 2, y \geq 2$?
   (A) $(4, 3)$
   (B) $(2, 1)$
   (C) $(3, 3)$
   (D) $(5, 2)$

6. The maximum value of $Z = 11x + 7y$ subject to $2x + y \leq 6, x \leq 2, x, y \geq 0$ is:
   (A) 42
   (B) 44
   (C) 38
   (D) 43

7. If the feasible region for an LPP is bounded by the lines $y = 0, x = 0, x + y = 1$ and $2x + 3y = 6$, the corner points are:
   (A) $(0, 0), (1, 0), (0, 1)$
   (B) $(0, 0), (3, 0), (0, 2)$
   (C) $(0, 0), (1, 0), (0, 2)$
   (D) $(0, 0), (1, 0), (3, 0), (0, 2)$

8. The objective function $Z = x_1 + x_2$ subject to $x_1 + x_2 \leq 1, -3x_1 + x_2 \geq 3, x_1, x_2 \geq 0$ has:
   (A) A unique optimal solution
   (B) Infinite optimal solutions
   (C) No feasible solution
   (D) An unbounded solution

9. If a corner point (x, y) is the intersection of $2x + y = 10$ and $x + 2y = 8$, the coordinates are:

(A) $(4, 2)$
(B) $(2, 4)$
(C) $(3, 4)$
(D) $(4, 1)$

10. A constraint $x + y \leq 0$ with $x, y \geq 0$ represents:
    (A) A triangular region
    (B) The entire first quadrant
    (C) Only the point $(0, 0)$
    (D) No points at all

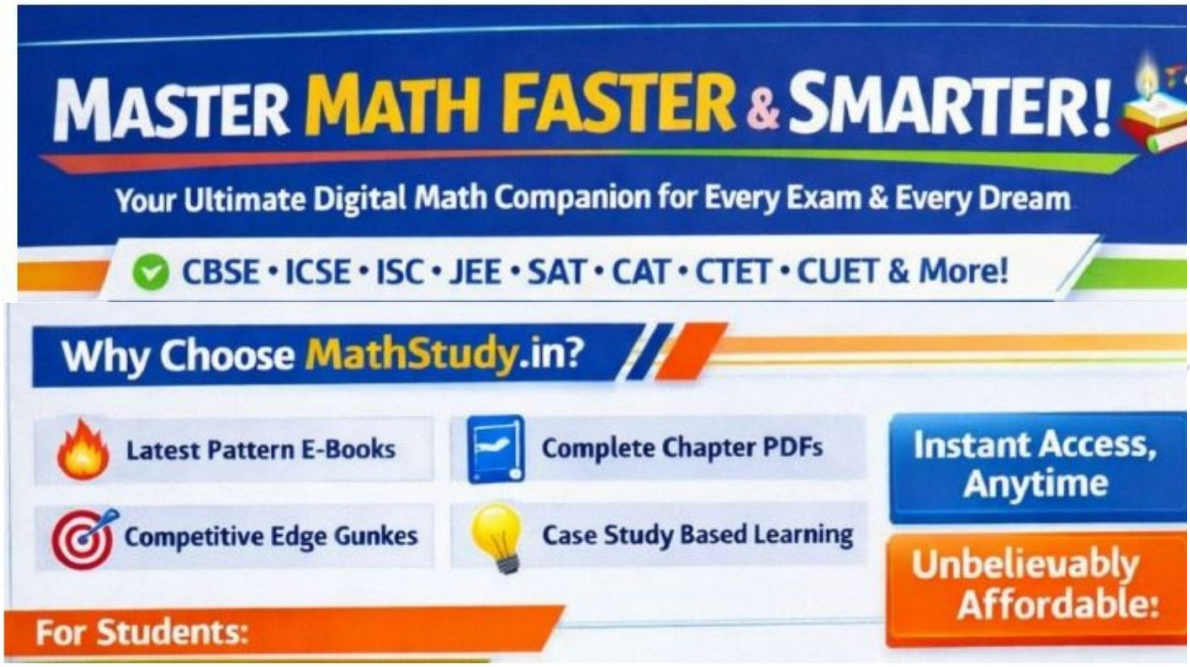
11. Let $Z = 3x + 9y$. If the constraints are $x + 3y \leq 60, x + y \geq 10, x \leq y, x, y \geq 0$, then the minimum value of Z occurs at:
    (A) $(5, 5)$
    (B) $(0, 10)$
    (C) $(0, 20)$
    (D) $(15, 15)$

12. For the constraints $x + y \leq 4, x \geq 1, y \geq 1$, the feasible region is a:
    (A) Square
    (B) Triangle
    (C) Quadrilateral
    (D) Trapezium

13. If $Z = x - 2y$, and the corner points are $(0, 0), (2, 0), (2, 2), (0, 1)$, the minimum value of Z is:
    (A) 0
    (B) -2
    (C) -4
    (D) 2

14. The linear inequality $x - y \geq 0$ represents the half-plane:
    (A) Above the line $y = x$
    (B) Below the line $y = x$
    (C) Containing the y-axis
    (D) In the second quadrant only

15. In an LPP, the constraints $x + y \leq 5$ and $x + y \geq 5$ together imply:
    (A) The region is the line $x + y = 5$
    (B) There is no feasible region
    (C) The entire first quadrant
    (D) The origin only



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