CUET Mathematics Test - Set 22

Unit V: Linear Programming (Intermediate Level)

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 bounded by the corner points $(0,2), (3,0), (6,0), (6,8)$ and $(0,5)$. If $Z = 4x - 3y$, the minimum value of Z occurs at:
   (A) $(0,5)$
   (B) $(3,0)$
   (C) $(0,2)$
   (D) $(6,8)$

2. If the objective function is $Z = 3x + 2y$ and the constraints are $x + y \geq 1, y - 5x \leq 0, 5y - x \geq 0, x + y \leq 6, x, y \geq 0$, then the maximum value of Z is:
   (A) 13
   (B) 15
   (C) 18
   (D) 17

3. In a LPP, the constraint $x + y \leq 5$ is called a redundant constraint if the other constraints are $x + y \leq 3, x \geq 0, y \geq 0$. This is because:
   (A) It makes the region unbounded
   (B) It does not affect the feasible region
   (C) It changes the optimal solution
   (D) It creates multiple optimal solutions

4. For an unbounded feasible region, which of the following is true for $Z = ax + by$?
   (A) It can only have a minimum value.
   (B) It can only have a maximum value.
   (C) If a maximum exists, it must occur at a corner point.
   (D) It always has both maximum and minimum values.

5. The corner points of a feasible region are $(0,10), (5,5), (15,15)$ and $(0,20)$. The objective function is $Z = px + qy$, where $p, q > 0$. If the maximum value occurs at $(5,5)$ and $(15,15)$, then:
   (A) $p = q$
   (B) $p = 2q$
   (C) $q = 2p$
   (D) $p = -q$

6. A small firm manufactures necklaces and bracelets. The total number of items it can handle per day is at most 24. If x is necklaces and y is bracelets, the constraint is:
   (A) $x + y \geq 24$
   (B) $x + y \leq 24$
   (C) $x \leq 24, y \leq 24$
   (D) $x + y = 24$

7. The maximum value of $Z = 3x + 4y$ subject to $x + y \leq 1, x \geq 0, y \geq 0$ is:
   (A) 3
   (B) 4
   (C) 7
   (D) 1

8. The set of all feasible solutions to a LPP is always a:
   (A) Concave set
   (B) Convex set
   (C) Empty set
   (D) Finite set

9. If the constraints are $x \leq 3, y \leq 3, x + y \geq 5$ and $x, y \geq 0$, then the feasible region is:
   (A) A square
   (B) A triangle
   (C) A quadrilateral
   (D) A pentagon

10. In the inequality $ax + by \leq c$, if $c < 0$ and $(0, 0)$ is tested, the origin:
   (A) Always lies in the half-plane.
   (B) Never lies in the half-plane.
   (C) Lies on the boundary line.
   (D) Makes the region unbounded.

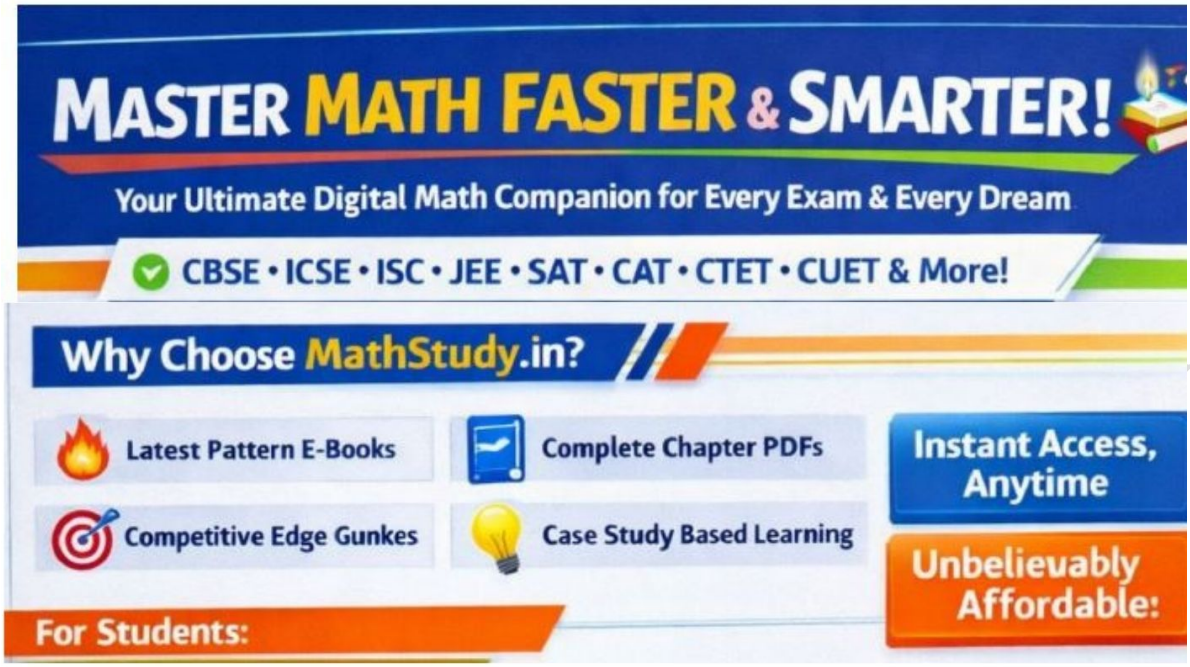
11. If $Z = 3x + 9y$ is to be minimized subject to $x + 3y \geq 60, x + y \geq 10, x, y \geq 0$, the minimum value is:
   (A) 180
   (B) 60
   (C) 120
   (D) 90

12. Which point is NOT a corner point for the region $2x + y \leq 10, x + 2y \leq 10, x, y \geq 0$?
   (A) $(0, 0)$
   (B) $(5, 0)$
   (C) $(0, 5)$
   (D) $(10, 0)$

13. In an LPP, the maximum value of the objective function $Z = ax + by$ is always:
   (A) Unique
   (B) Infinite
   (C) Zero
   (D) Attained at at least one corner point

14. If $x + 2y \leq 10, 3x + y \leq 15, x \geq 0, y \geq 0$, the intersection of the two lines is:
   (A) $(4, 3)$
   (B) $(3, 4)$
   (C) $(2, 4)$
   (D) $(5, 0)$

15. The point $(2, 2)$ is a feasible solution for which constraint?
   (A) $2x + 3y \leq 6$
   (B) $x + y \geq 5$
   (C) $3x - 2y \geq 2$
   (D) $x \leq 1$



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