CUET Mathematics Test

Unit VIII: 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. If the objective function $Z = ax + by$ has its maximum value at more than one point in a bounded feasible region, then the number of points where the maximum occurs is:
   (A) Exactly 2
   (B) Exactly 3
   (C) Infinite
   (D) Finite but more than 2

2. A constraint $5x + 2y \leq 10$ is added to an LPP where existing constraints already limit the feasible region to a small area near the origin. If the new constraint does not change the feasible region, it is called:
   (A) An active constraint
   (B) A redundant constraint
   (C) An infeasible constraint
   (D) An optimal constraint

3. The feasible region for an LPP is shown to be a triangle with vertices $(0, 0), (4, 0)$, and $(0, 6)$. The maximum value of $Z = 3x - 2y$ occurs at:
   (A) $(0, 0)$
   (B) $(4, 0)$
   (C) $(0, 6)$
   (D) The midpoint of the hypotenuse

4. Consider the constraints $x + y \geq 2$ and $x + y \leq 1$. The feasible region is:
   (A) A strip between the lines
   (B) Only the origin
   (C) Empty
   (D) A single line

5. If the feasible region of an LPP is unbounded in the first quadrant and the objective function is $Z = 2x + 5y$, then:
   (A) A maximum value may not exist.
   (B) A minimum value cannot exist.
   (C) The solution must be at the origin.
   (D) The region is always a triangle.

6. Which of the following points satisfies the inequalities $2x+y \leq 10, x+3y \leq 15, x \geq 0, y \geq 0$?
   (A) $(4, 4)$
   (B) $(3, 5)$
   (C) $(6, 0)$
   (D) $(2, 3)$

7. In a maximization problem, if the feasible region is bounded, the maximum value of Z:
   (A) Must be positive
   (B) Must exist
   (C) Is always at the y-intercept
   (D) Is always at the x-intercept

8. The corner points of a feasible region are $(0, 2), (3, 0), (6, 0), (6, 8)$, and $(0, 5)$. Which point provides the minimum value for $Z = 4x + 6y$?
   (A) $(0, 2)$
   (B) $(3, 0)$
   (C) $(0, 5)$
   (D) $(6, 0)$

9. The intersection point of the lines $x + y = 10$ and $2x - y = 8$ is a corner point of a region. Its coordinates are:
   (A) $(6, 4)$
   (B) $(4, 6)$
   (C) $(7, 3)$
   (D) $(8, 2)$

10. A region is defined by $x \geq 0, y \geq 0, y \leq 4, x \leq 3$. This feasible region is a:
   (A) Triangle
   (B) Trapezium
   (C) Rectangle
   (D) Unbounded strip

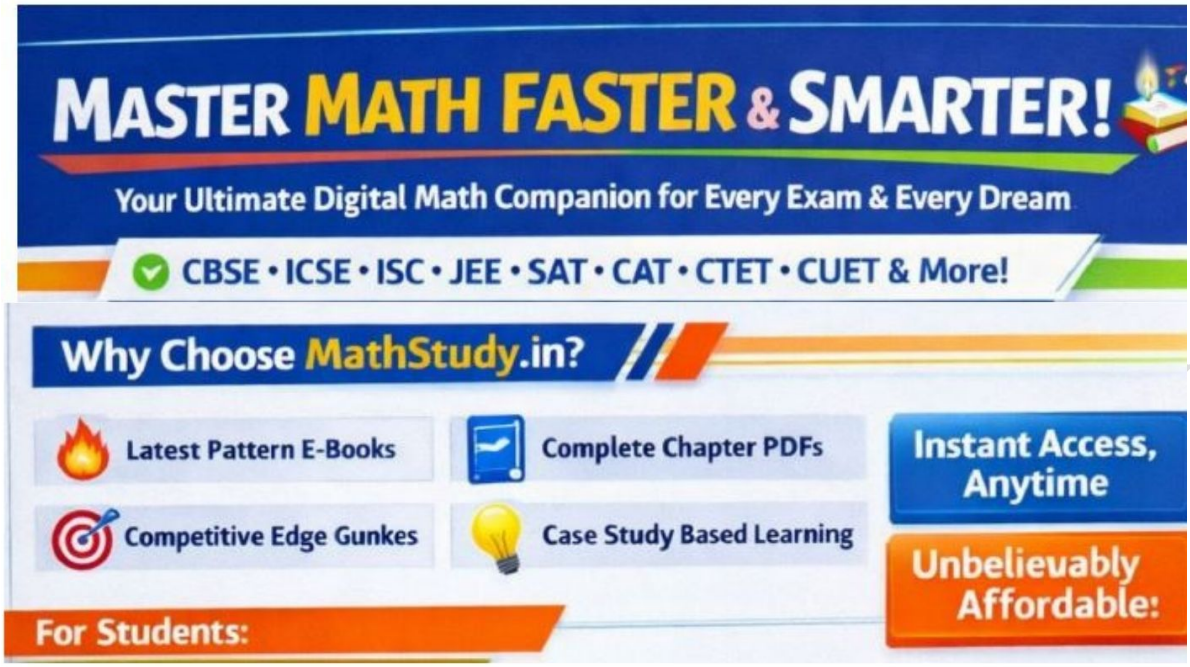
11. If $Z = 3x + 9y$, and the corner points are $(0, 20), (15, 15), (5, 5), (0, 10)$, the maximum value of Z is:
   (A) 180
   (B) 210
   (C) 60
   (D) 90

12. For a minimization problem $Z = 2x + 3y$, if the feasible region is unbounded with corner points $(0, 10), (2, 4)$, and $(8, 0)$, the minimum value is:
   (A) 16
   (B) 10
   (C) 30
   (D) 24

13. In LPP, the "Iso-profit" line method refers to:
   (A) Drawing lines parallel to the objective function
   (B) Solving simultaneous equations
   (C) Testing every point in the region
   (D) Finding the intersection of the axes

14. Every point in the feasible region of an LPP represents:
   (A) An optimal solution
   (B) A feasible solution
   (C) A redundant solution
   (D) An infeasible solution

15. If the objective function $Z = x + y$ is to be maximized subject to $x + y \leq 1, x \geq 0, y \geq 0$, how many optimal solutions exist?
   (A) 1
   (B) 2
   (C) Infinite
   (D) 0



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