CUET Mathematics Test

Chapter: Unit VIII: Linear Programming

General Instructions

1. Total Questions: **20**
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.

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1. In a Linear Programming Problem, the objective function $Z = ax + by$ is always:
   (A) A quadratic function
   (B) A linear function to be optimized
   (C) A constant function
   (D) An exponential function

2. Which of the following is not a characteristic of a feasible region in an LPP?
   (A) It is always a convex set
   (B) It is the set of all points satisfying all constraints
   (C) It must always be bounded
   (D) It may be empty (infeasible)

3. If the constraints are $x + y \leq 4, 3x + 3y \geq 18, x \geq 0, y \geq 0$, the feasible region is:
   (A) A triangle
   (B) A square
   (C) Non-existent (Empty)
   (D) An unbounded region

4. The corner points of the feasible region for an LPP are $(0, 0), (5, 0), (3, 4)$, and $(0, 5)$. If the objective function is $Z = 4x + 3y$, the maximum value of Z is:
   (A) 20
   (B) 24
   (C) 15
   (D) 25

5. In a graphical solution of an LPP, if the objective function line is parallel to one of the constraint lines that forms a boundary of the feasible region, then:
   (A) There is no solution
   (B) There is a unique solution
   (C) There are infinite optimal solutions
   (D) The solution is at the origin

6. The condition $x \geq 0, y \geq 0$ in an LPP represents:
   (A) Mathematical constraints
   (B) Non-negativity restrictions
   (C) Objective function limits
   (D) Infeasible region boundaries

7. For the constraint $2x + 3y \leq 12$, which of the following points lies in the half-plane including the origin?
   (A) $(4, 2)$
   (B) $(5, 1)$
   (C) $(1, 1)$
   (D) $(6, 1)$

8. If the feasible region for an LPP is unbounded, then the maximum value of the objective function:
   (A) Always exists
   (B) Never exists
   (C) May or may not exist
   (D) Is always zero

9. The optimal value of the objective function in an LPP occurs at:
   (A) Any point in the feasible region

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(B) The origin only
(C) At least one of the corner points
(D) The centroid of the region

10. A furniture maker has 6 units of wood and 8 hours of time. Table A requires 1 unit wood and 2 hours. Table B requires 1 unit wood and 1 hour. If x and y are the number of Table A and B respectively, the constraints are:
(A) $x + y \leq 6, 2x + y \leq 8$
(B) $x + y \geq 6, 2x + y \geq 8$
(C) $x + 2y \leq 6, x + y \leq 8$
(D) $x + y \leq 8, 2x + y \leq 6$

11. If the feasible region is bounded by $(0, 2), (1, 1)$, and $(3, 3)$, which point minimizes $Z = x - 2y$?
(A) $(0, 2)$
(B) $(1, 1)$
(C) $(3, 3)$
(D) $(0, 0)$

12. A set is called a convex set if:
(A) It is a circle
(B) The line segment joining any two points in the set lies entirely within the set
(C) It has no corners
(D) It is only in the first quadrant

13. In the formulation of a diet problem, if x units of food 1 contain 2 units of Vitamin A and y units of food 2 contain 3 units of Vitamin A, and the minimum requirement is 12 units, the constraint is:
(A) $2x + 3y \leq 12$
(B) $2x + 3y \geq 12$
(C) $3x + 2y \geq 12$
(D) $x + y \geq 12$

14. Which of the following is a "Linear" constraint?
(A) $xy \leq 10$
(B) $x^2 + y \leq 5$
(C) $3x + 4y \leq 12$
(D) $\log x + y \leq 2$

15. If the objective function $Z = 3x + 2y$ has the same value at two corner points $(2, 3)$ and $(4, 0)$, then it also has that same value at:
(A) $(3, 1.5)$
(B) $(0, 0)$
(C) $(5, 5)$
(D) $(1, 1)$

16. A diet is to contain at least 80 units of Vitamin A and 100 units of Vitamin B. Two foods F_1 and F_2 are available. F_1 costs 4 per unit and F_2 costs 6 per unit. The objective function to minimize cost is:
(A) $Z = 80x + 100y$
(B) $Z = 4x + 6y$
(C) $Z = 6x + 4y$
(D) $Z = x + y$

17. In an LPP, if the constraints are $x + 2y \leq 10, x + y \leq 6, x \geq 0, y \geq 0$, the corner point obtained by the intersection of the two lines is:

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(A) $(2, 4)$
(B) $(4, 2)$
(C) $(3, 3)$
(D) $(5, 0)$

18. If the feasible region of an LPP is a polygon with vertices $(0, 0), (4, 0), (2, 3), (0, 5)$, the point $(1, 1)$ is:
(A) A corner point
(B) An infeasible point
(C) An interior feasible point
(D) The optimal point

19. The process of finding the maximum or minimum value of a linear function under linear constraints is known as:
(A) Differentiation
(B) Linear Programming
(C) Integration
(D) Probability distribution

20. For the LPP: Maximize $Z = 2x + y$ subject to $x + y \leq 1, x \geq 0, y \geq 0$, the maximum value is:
(A) 1
(B) 2
(C) 0
(D) 0.5

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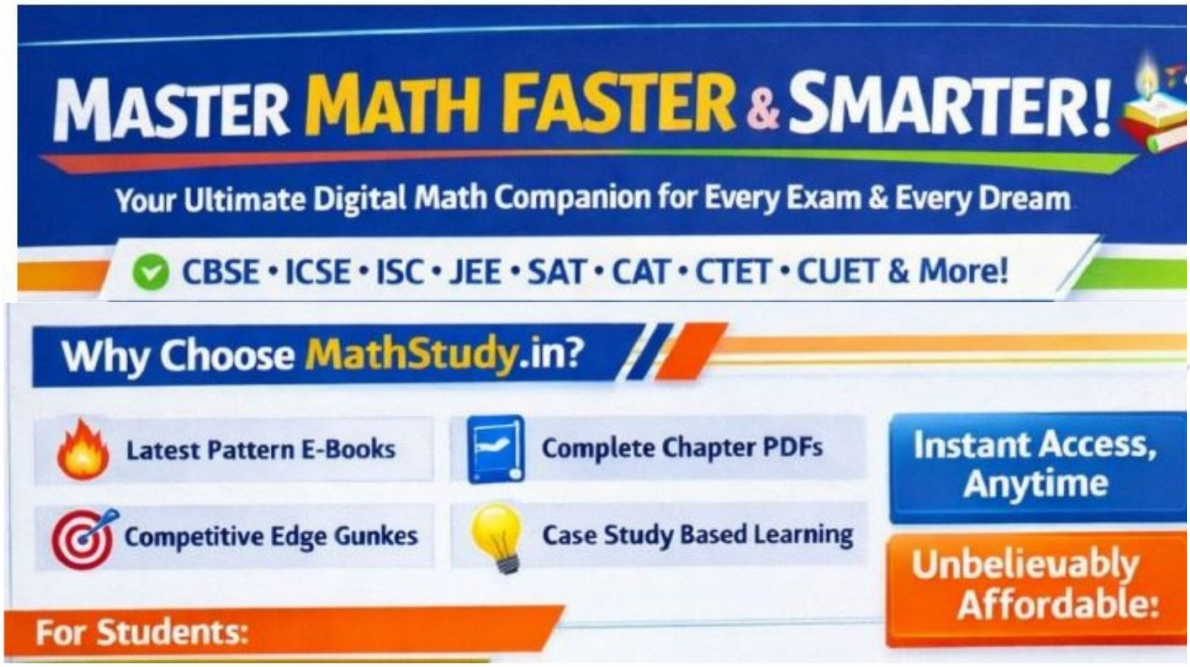

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