ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

FOR GOD AND COUNTRY

Worksheet-25

SUBJECT – MATHEMATICS

2nd-term

Chapter: Calculus **Class: XII**

Topic : LPP **Date: 14.11.2020**

Choose the correct option (1 X 15= 15)

1. The solution set of the inequation $2x + y > 5$ is
   (a) half plane that contains the origin
   (b) open half plane not containing the origin
   (c) whole xy-plane except the points lying on the line $2x + y = 5$
   (d) none of these

2. Objective function of a LPP is
   (a) a constraint (b) a function to be optimized
   (c) a relation between the variables (d) none of these

3. Which of the following sets are convex?
   (a) $\{(x, y) : x^2 + y^2 \geq 1\}$ (b) $\{(x, y) : y^2 \geq x\}$ (c) $\{(x, y) : 3x^2 + 4y^2 \geq 5\}$ (d) $\{(x, y) : y \geq 2, y \leq 4\}$

4. Let X_1 and X_2 are optimal solutions of a LPP, then
   (a) $X = \lambda X_1 + (1 - \lambda) X_2$, $\lambda \in R$ is also an optimal solution
   (b) $X = \lambda X_1 + (1 - \lambda) X_2$, $0 \leq \lambda \leq 1$ gives an optimal solution
   (c) $X = \lambda X_1 + (1 + \lambda) X_2$, $0 \leq \lambda \leq 1$ give an optimal solution
   (d) $X = \lambda X_1 + (1 + \lambda) X_2$, $\lambda \in R$ gives an optimal solution

5. The maximum value of $Z = 4x + 2y$ subjected to the constraints $2x + 3y \leq 18, x + y \geq 10; x, y \geq 0$ is
   (a) 36 (b) 40 (c) 20 (d) none of these

6. The optimal value of the objective function is attained at the points
   (a) given by intersection of inequations with the axes only
   (b) given by intersection of inequations with x-axis only
   (c) given by corner points of the feasible region
   (d) none of these

7. The maximum value of $Z = 4x + 3y$ subjected to the constraints $3x + 2y \geq 160, 5x + 2y \geq 200, x + 2y \geq 80; x, y \geq 0$ is
   (a) 320 (d) 300 (c) 230 (d) none of these

8. Consider a LPP given by
   Minimum $Z = 6x + 10y$
   Subjected to $x \geq 6;\ y \geq 2;\ 2x + y \geq 10;\ x, y \geq 0$
   Redundant constraints in this LPP are
   (a) $x \geq 0, y \geq 0$ (b) $x \geq 6, 2x + y \geq 10$ (c) $2x + y \geq 10$ (d) none of these

9. The objective function $Z = 4x + 3y$ can be maximised subjected to the constraints $3x + 4y \le 24$, $8x + 6y \le 48, x \le 5, y \le 6; x, y \ge 0$
   (a) at only one point
   (b) at two points only
   (c) at an infinite number of points
   (d) none of these

10. If the constraints in a linear programming problem are changed
   (a) the problem is to be re-evaluated
   (b) solution is not defined
   (c) the objective function has to be modified
   (d) the changein constraints is ignored

11. Which of the following statements is correct?
   (a) Every LPP admits an optimal solution
   (b) A LPP admits unique optimal solution
   (c) If a LPP admits two optimal solutions it has an infinite number of optimal solutions
   (d) The set of all feasible solutions of a LPP is not a converse set

12. Which of the following is not a convex set?
   (a) $\{(x, y) : 2x + 5y < 7\}$ (b) $\{(x, y) : x^2 + y^2 \le 4\}$ (c) $\{x : |x| = 5\}$ (d) $\{(x, y) : 3x^2 + 2y^2 \le 6\}$

13. By graphical method, the solution of linear programming problem

   Maximize $Z = 3x_1 + 5x_2$

   Subject to $3x_1 + 2x_2 \le 18$

   $x_1 \le 4$

   $x_2 \le 6$

   $x_1 \ge 0, x_2 \ge 0$, is

   (a) $x_1 = 2, x_2 = 0, Z = 6$
   (b) $x_1 = 2, x_2 = 6, Z = 36$
   (c) $x_1 = 4, x_2 = 3, Z = 27$
   (d) $x_1 = 4, x_2 = 6, Z = 42$

14. The region represented by the inequation system $x, y \ge 0, y \le 6, x + y \le 3$ is
   (a) unbounded in first quadrant
   (b) unbounded in first and second quadrants
   (c) bounded in first quadrant
   (d) none of these

15. The point at which the maximum value of $x + y$, subject to the constraints $x + 2y \le 70$, $2x + y \le 95, x, y \ge 0$ is obtained, is
   (a) (30, 25) (b) (20, 35) (c) (35, 20) (d) (40, 15)

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