CHAPTER 12

LINEAR PROGRAMMING

MULTIPLE CHOICE QUESTIONS

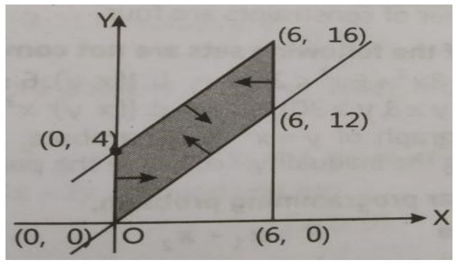
Q No	Question
1	Corner points of the feasible region determined by the system of linear constraints are (0,3),(1,1) and (3,0). Let Z= px+qy, where p, q>0. Condition on p and q so that the minimum of Z occurs at (3,0) and (1,1) is (a) p=2q (b) p=q/2 (c) p=3q (d) p=q
2	The set of all feasible solutions of a LPP is a (a) Concave set (b) Convex set (c) Feasible set (d) None of these
3	Corner points of the feasible region for an LPP are (0,2), (3,0), (6,0), (6,8) and (0,5). Let F=4x+6y be the objective function. Maximum of F – Minimum of F = (a) 60 (b) 48 (c) 42 (d) 18
4	In a LPP, if the objective function Z = ax+by has the same maximum value on two corner points of the feasible region, then every point on the line segment joining these two points give the same……….value. (a) minimum (b) maximum (c) zero (d) none of these
5	In the feasible region for a LPP is ………, then the optimal value of the objective function Z = ax+by may or may not exist. (a) bounded (b) unbounded (c) in circled form (d) in squared form
6	A linear programming problem is one that is concerned with finding the …A … of a linear function called …B… function of several values (say x and y), subject to the conditions that the variables are …C… and satisfy set of linear inequalities called linear constraints. (a) Objective, optimal value, negative (b) Optimal value, objective, negative (c) Optimal value, objective, nonnegative (d) Objective, optimal value, nonnegative
7	Maximum value of the objective function Z = ax+by in a LPP always occurs at only one corner point of the feasible region. (a) true (b) false (c) can't say (d) partially true

8 Region represented by $x \geq 0, y \geq 0$ is:

(a) First quadrant (b) Second quadrant

(c) Third quadrant (d) Fourth quadrant

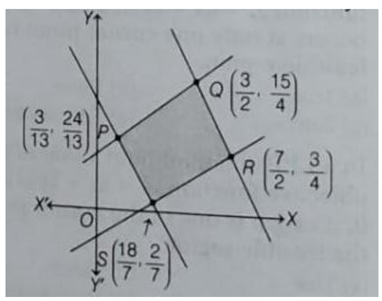
9 The feasible region for an LPP is shown shaded in the figure. Let $Z = 3x-4y$ be objective function. Maximum value of Z is:



(a) 0 (b) 8

(c) 12 (d) -18

10 In the given figure, the feasible region for a LPP is shown. Find the maximum and minimum value of $Z = x+2y$.



(a) 8, 3.2 (b) 9, 3.14

(c) 9, 4 (d) none of these

11 Of all the points of the feasible region for maximum or minimum of objective function the points

(a) Inside the feasible region (b) At the boundary line of the feasible region

(c) Vertex point of the boundary of the feasible region (d) None of these

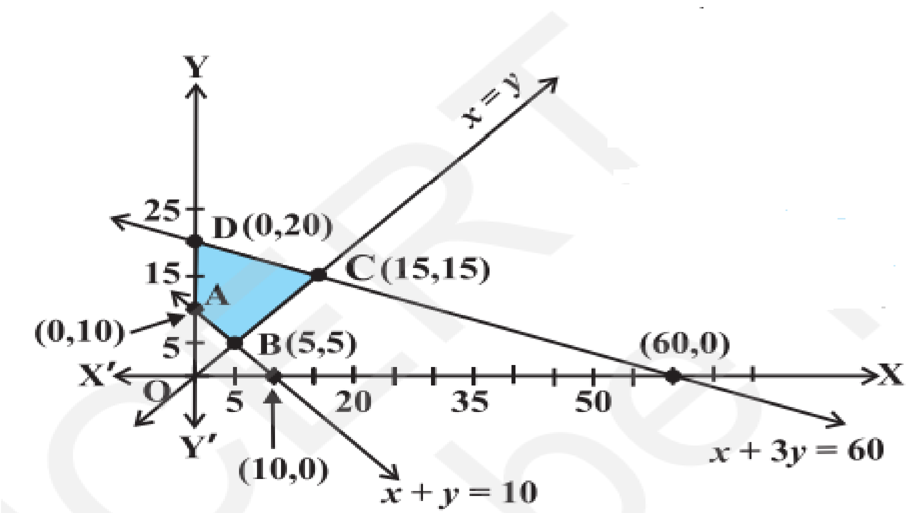
12 The maximum value of the object function $Z = 5x + 10y$ subject to the constraints $x + 2y \leq 120$, $x + y \geq 60$, $x - 2y \geq 0$, $x \geq 0$, $y \geq 0$ is

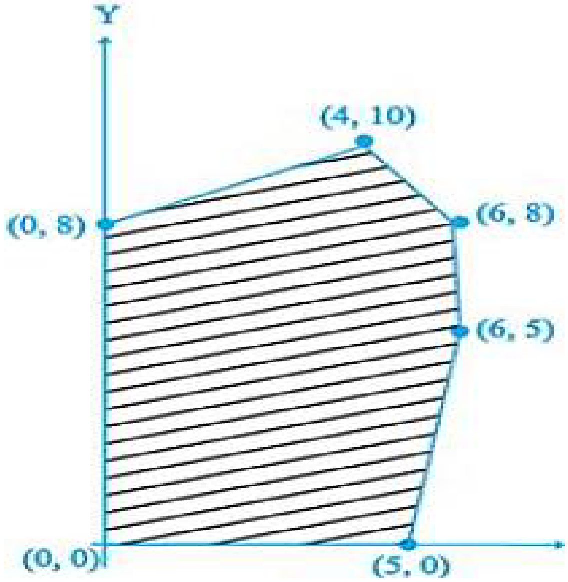
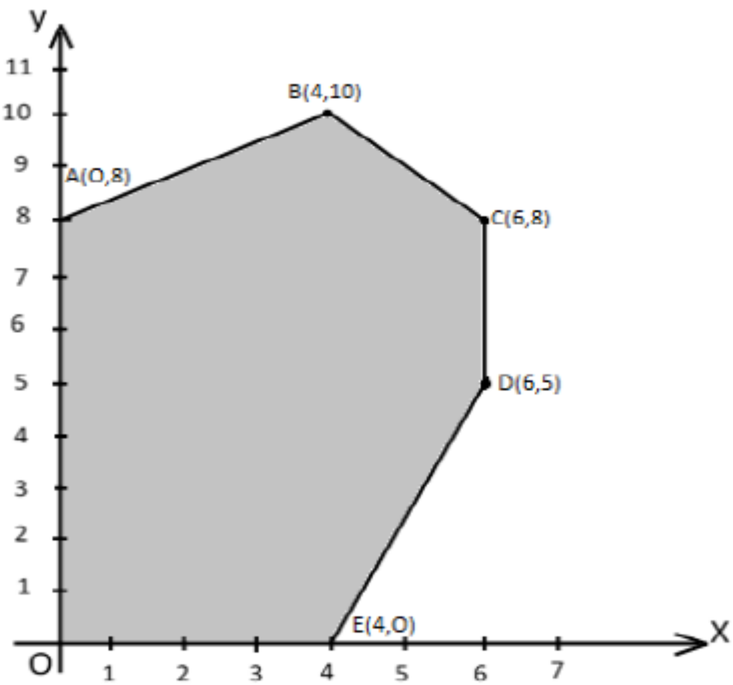
(a) 300 (b) 600

(c) 400 (d) 800

13 $Z = 6x + 21y$, subject to $x + 2y \geq 3$, $x + 4y \leq 4$, $3x + y \geq 3$, $x \geq 0$, $y \geq 0$. The minimum value of Z occurs at

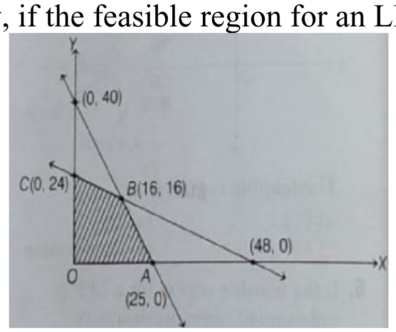
(a) (4, 0) (b) (28, 8)

	(c) (2,2/7) (d) (0, 3)
14	Shape of the feasible region formed by the following constraints $x + y \le 2$, $x + y \ge 5$, $x \ge 0$, $y \ge 0$ (a) No feasible region (b) Triangular region (c) Unbounded solution (d) Trapezium
15	The region represented by the inequalities $x \ge 6$, $y \ge 2$, $2x + y \le 0$, $x \ge 0$, $y \ge 0$ is (a) unbounded (b) a polygon (c) exterior of a triangle (d) None of these
16	Based on the given shaded region as the feasible region in the graph, at which point(s) is the objective function $Z = 3x + 9y$ maximum?  (A) Point B (B) Point C (C) Point D (D) Every point on the line segment CD
17	In the given graph, the feasible region for a LPP is shaded. The objective function $Z = 2x – 3y$, will be minimum at:

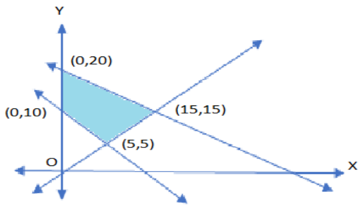
	 (A) (4, 10) (B) (6,8) (C) (0,8) (D) (6,5)
18	The corner points of the feasible region determined by the system of linear constraints are as shown below:  Let $z = 3x - 4y$ be the objective function. Maximum value of Z occurs at (A) (4, 0) (B) (6,5) (C) (0,8) (D)(6, 8)
19	

	The maximum value of $z = 2x + 5y$ Subject to constraints given below $2x + 4y \leq 8$, $3x + y \leq 6$, $x + y \leq 4$, $x, y \geq 0$ is (A) 10 (B) 25 (C) 20 (D) 100
20	The maximum value of $z = 3x + 2y$ subject to constraints $x + 2y \leq 10$, $3x + y \leq 15$, $x, y \geq 0$ is (A) 15 (B) 18 (C) 20 (D) 22
21	Feasible region is the set of points which satisfy (A) The objective function (B) Some of the given constraints (C) All of the given constraints (D) None of these
22	Corner points of the feasible region for an LPP are $(0, 2)$, $(3, 0)$, $(6, 8)$ and $((0, 5)$. Let $Z = 4x + 6y$ be the objective function. The minimum value of Z occurs at (A) $(0, 2)$ only (B)$(3, 0)$ (C) any point on the line segment joining the point (0, 2) and (3,0) (D) (6,8)
23	The corner points of the feasible region of an LPP are (0, 0) (0, 8) , (2, 7), (5,4) and (6,0). The maximum profit $P = 3x + 2y$ occurs at the point (A) (5,4) (B)(0,8) (C)(2,7) (6,0)
24	A Linear function, which is minimized or maximized is called (a) an objective function (b) an optimal function (c) A feasible function (d) None of these
25	The maximum value of Z=3x+4y subject to the constraints: $x + y \leq 4$, $x \geq 0$, $y \geq 0$ is: (a) 0 (b) 12 (c)16 (d) 18
26	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
27	Maximize $Z = 4x + 6y$, subject to $3x + 2y \leq 12$, $x + y \geq 4$, $x, y \geq 0$. (a) 16 at (4, 0) (b) 24 at (0, 4) (c) 24 at (6, 0) (d) 36 at (0, 6)
28	The feasible solution of a LPP belongs to

	(a) First and second quadrants (b) First and third quadrants. (c) Second quadrant (d) Only first quadrant.
29	If the feasible region for a LPP is unbounded, then maximum or minimum or minimum value of the objective function z= ax + by may or may not exit. (a) True (b) False (c) Can't say (d) Partially true
30	In an LPP, I f the objective function has Z =ax + by has the same maximum value on two corner points of the feasible region, then the number of points at which Z_{max} occurs is (a) 0 (b)2 (c) Finite (d) Infinite
31	Which of the term is not used in a linear programming problem : (a) Slack inequation (b) Objective function (c) Concave region (d) Feasible Region
32	The maximum value of Z = 4x + 2y subject to the constraints 2x + 3y ≤ 18, x + y ≥ 10, x, y ≤ 0 is (a) 36 (b) 40 (c) 30 (d) None of these
33	An equation 3x – y ≥ 3 and 4x – 4y > 4 (a) Have solution for positive x and y (b) Have no solution for positive x and y (c) Have solution for all x (d) Have solution for all y
34	The maximum value of Z = 3x + 4y subjected to constraints x + y ≤ 40, x + 2y ≤ 60, x ≥ 0 and y ≥ 0 is (a) 120 (b) 140 (c) 100 (d) 160
35	Maximize Z = 11 x + 8y subject to x ≤ 4, y ≤ 6, x + y ≤ 6, x ≥ 0, y ≥ 0. (a) 44 at (4, 2) (b) 60 at (4, 2) (c) 62 at (4, 0) (d) 48 at (4, 2)
36	Maximize Z = 7x + 11y, subject to 3x + 5y ≤ 26, 5x + 3y ≤ 30, x ≥ 0, y ≥ 0 (a) 59 at (9/2, 5/2) (b) 42 at (6, 0) (c) 49 at (7, 0) (d) 57.2 at (0, 5.2)
37	Maximize Z = 6x + 4y, subject to x ≤ 2, x + y ≤ 3, -2x + y ≤ 1, x ≥ 0, y ≥ 0 (a) 12 at (2, 0)

	(b) 140/3 at (2/3, 1/3) (c) 16 at (2, 1) (d) 4 at (0, 1)
38	The minimum value of $Z = 4x + 3y$ subjected to the constraints $3x + 2y \geq 160$, $5 + 2y \geq 200$, $2y \geq 80$; $x, y \geq 0$ is (a) 220 (b) 300 (c) 230 (d) none of these
39	Maximize $Z = 3x + 5y$, subject to $x + 4y \leq 24$, $3x + y \leq 21$, $x + y \leq 9$, $x \geq 0$, $y \geq 0$. (a) 20 at (1, 0) (b) 30 at (0, 6) (c) 37 at (4, 5) (d) 33 at (6, 3)
40	$Z = 7x + y$, subject to $5x + y \geq 5$, $x + y \geq 3$, $x \geq 0$, $y \geq 0$. The minimum value of Z occurs at (a) (3, 0) (b) (12,52) (c) (7, 0) (d) (0, 5)
41	$Z = 8x + 10y$, subject to $2x + y \geq 1$, $2x + 3y \geq 15$, $y \geq 2$, $x \geq 0$, $y \geq 0$. The minimum value of Z occurs at (a) (4.5, 2) (b) (1.5, 4) (c) (0, 7) (d) (7, 0)
42	The optimal value of the objective function is attained at the points (a) On X-axis (b) On Y-axis (c) Which are comer points of the feasible region (d) None of these
43	Corner points of the feasible region determined by the system of linear constraints are (0,3),(1,1) and (3,0). Let Z= px+qy, where p, q>0. Condition on p and q so that the minimum of Z occurs at (3,0) and (1,1) is (a) p=2q (b) p=q/2 (c) p=3q (d) p=q
44	The maximum value of $Z = 2x + 3y$ subject to the constraints : $x + y \leq 1$, $3x + y \leq 4$, $x, y \geq 0$ is (a) 2 (b) 4 (c) 5 (d) 3
45	The maximum value of $Z = 4x+3y$, if the feasible region for an LPP is as shown below, is  (a) 112 (b) 100 (c) 72 (d) 110

46	Any feasible solution which maximizes or minimizes the objective function is Called: (a) A regional feasible solution (b)An optimal feasible solution (c)An objective feasible solution (d) None of these
47	The solution set of the in equation $2x + y > 5$ 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
48	The optimal value of the objective function is attained at the points : (a) Given the 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.
49	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 change in constraints is ignored
50	Which of the following statements is correct? (a) Every L P P admits an optimal solution (b)A L P P admits unique optimal solution (c) If a L P P admits two optimal solution solutions, it has an infinite number of optimal solutions (d) The set of all feasible solutions of a LPP is a finite set.
51	The value of objective function is maximum under linear constraints (a) At the centre of feasible region (b) At (0,0) (c) At any vertex of feasible region (d)The vertex which is at maximum distance from (0,0)
52	A linear programming of linear functions deals with: (a) Minimizing (b) Optimizing (c) Maximizing (d) None
53	The solution of inequation x + y $\leq$ 5 is (a) Open half plane that contains the origin (b) Closed half plane that contains the origin (c) Open half plane that does not contains the origin (d) Only points lying on the line x + y = 5
54	Corner points of the feasible region determined by the system of linear constraints are (0, 3), (1, 1) and (-3, 0). Let Z =2px - qy, where p, q>0. Condition on p and q so that the minimum of Z occurs at (-3, 0) and (1,1) is (a) p = 2q (b) p = q^2 (c) p = 3q (d) 8p = q
55	If two corner points of a feasible region in LPP have minimum value then

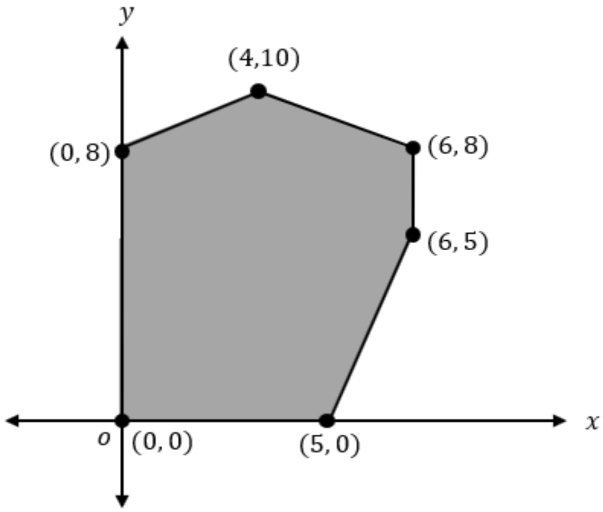
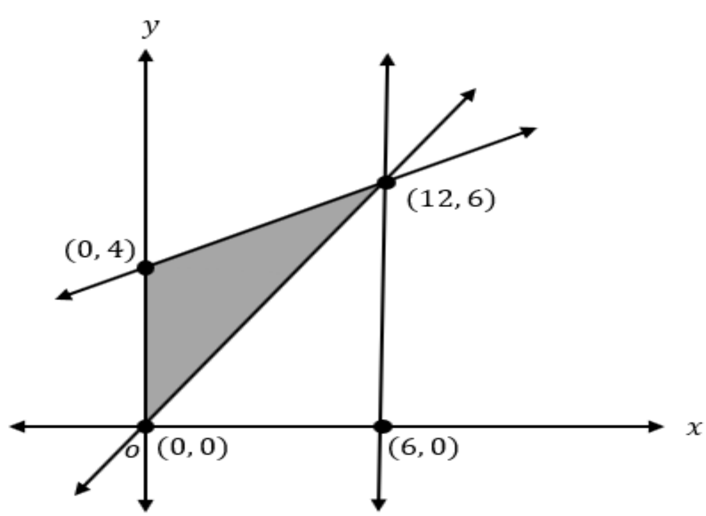
	(a) All the points in between these corner points have same minimum value (b) All the points in between these corner points have maximum value (c) Solution cannot be determined (d) The question contains insufficient data
56	The feasible region of an LPP is shown in figure. If $Z = 3x + 9y$, then the minimum value of Z occurs at  (a) (5,5) (b) (0,5) (c) (0,20) (d) (15,15)
57	For the given LPP max $Z = 5x + y$ subject to constraints $2x + y \geq 12$, $3x + 2y \geq 20$, $x \geq 0$, $y \geq 0$ the optimal solution set is (a) (0, 0) (b) (6, 0) (c) (4, 4) (d) (0, 10)
58	Comer points of the feasible region for an LPP are (0, 2), (3, 0), (6,0), (6, 8) and (0,5).Let $Z = 4x + 6y$ be the objective function. The Minimum value of Zoccurs at (a) (0,2) only (b) (3,0) only (c) the midpoint of the line segment joining the points (0,2) and(3,0) only (d) any point on the line segment joining the points (0,2) and (3, 0).
59	**In a LPP, the objective function is always** **(a) Linear** **(b) Never a linear** **(c) Can be both** **(d) constant**
60	The feasible region for an LPP is always a **(a)** closed polygon **(b)** open **(c)** Can be both closed or open **(d)** Is never open
61	The maximum value of $Z = 2x + 3y$ subject to $3x + 2y \leq 6$, $x + y \geq 2$, **$x \geq 0$, $y \geq 0$is** (a) 9 (b) 8 (c) 7 (d) 10
62	

	If $x + y \leq 2$, $x \geq 0$, $y \geq 0$, the point at which the maximum value of $3x + 2y$ is attained will be (a) **(0,0)** (b) $\left(\frac{1}{2}, \frac{1}{2}\right)$ (c) **(0, 2)** (d) **(2, 0)**
63	**The solution of the following linear inequations $x - 2y \leq 0$,** $2x - y \leq -2$, $x \geq 0$, $y \geq 0$ is given by (a) **[1,2]** (b) **Null set** (c) $x \geq 1$ (d) Set of all real numbers
64	**Maximize $Z = 10x + 20y$ subject to $2x + 3y \leq 180$,** $x + 4y \leq 160$, **$x \geq 0$, $y \geq 0$ is** (a) **1020** (b) **1040** (c) **1030** (d) **1000**
65	**The minimum value of $Z = 6x + 16y$, subject to the constraints** $x \leq 40$, $y \geq$ **20 and $x, y \geq 0$ is** (a) **240** (b) **320** (c) **0** (d) **100**
66	Which of the following points is not in the feasible region of the constraints : $x + 2y \leq 8$, $3x + 2y \leq 12$, $x \geq 0$, $y \geq 0$ a) (0 , -1) b) (0 ,1) c) (2 , 2) d) (4 , 0)
67	Maximum value of $Z = 3x - 4y$ + Minimum value of $Z = 3x - 4y$, Where corner points of the feasible region determined by the system of linear constraints are (0,0) , (0 , 8) , (4 , 10) , (6 , 8) , (6 , 5) , (5,0) is a) 17 b) 23 c) 46 d) -17

68	Solution of LPP Maximize Z = $x + y$ Subject to the constraints $x \leq 2$, $y \leq 2$, $x \geq 0$, $y \geq 0$ is a) 4 | b) 2 C) 1 | d) no solution
69	The feasible region for an L.P.P is always a a) type of polygon | b) Concave polygon c) Convex polygon | d) Not a polygon
70	Infeasibility means that the number of solutions to the linear programming model that satisfies all constraints is a) At least 3 | b) An infinite number c) Zero | d) At least 2
71	The position of the points O(0,0) and P(2 , -2) in the region of graph of inequation $2x - 3y < 5$,*will be* a) O inside and P outside | b) O and P both inside c) O and P both outside | d) P inside and O outside
72	In an LPP , if the objective function $z = ax + by$ *has the same* Maximum value on two corner points of the feasible region ,then the number of points at which Z_{max} *occurs is* a) 0 | b) 2 C) finite | c) infinite

73	The condition $x \geq 0, y \geq 0$ *are called* a) restrictions only / b) negative restrictions c) non-negative restrictions / d) constraints
74	Which type of problem cannot solved by LPP methods. a) Transportation problem / b) Manufacturing problems c) Traffic signal problem / d) Diet problem
75	Maximize Z = 11x + 8y, subject to $x \leq 4, y \leq 2, x \geq 0, y \geq 0$. (a) 44 at (4, 2) / (b) 60 at (4, 2) (c) 62 at (4, 0) / (d) 48 at (4, 2)
76	How many of the following points satisfy the inequality $2x - 3y > -5$? (1, 1), (-1, 1), (1, -1), (-1, -1), (-2, 1), (2, -1), (-1, 2) and (-2, -1) (a) 2 / (b) 4 (c) 6 / (d) 5
77	A toy company manufactures two types of toys A and B. Demand for toy B is at most half of that if type A. Write the corresponding constraint if x toys of type A and y toys of type B are manufactured. (a) $x/2 \leq y$ / (b) $2y - x \geq 0$ (c) $x - 2y \geq 0$ / (d) $x < 2y$
78	

	The solution set of the inequation $x + 2y > 3$ is ….. A. half plane containing the origin. B. open half plane not containing the origin. C. first quadrant D. none of these.
79	If the feasible region for an LPP is ___________, then the optimal value of the objective function $Z = ax + by$ may or may not exist. A. bounded. B. unbounded. C. in circle form. D. in pentagon form
80	The corner points of the feasible region determined by the system of linear constraints are $(0, 0)$, $(0, 40)$, $(20, 40)$, $(60, 20)$ and $(60, 0)$. The objective function is $Z = 4x + 3y$. Compare the quantity in column A and column B. <table><tr><th>Column A</th><th>Column B</th></tr><tr><td>Maximum of Z</td><td>325</td></tr></table>A. The quantity in column A is greater. B. The quantity in column B is greater. C. Two quantities are equal. D. The relationship cannot be determined on the basis of the information supplied.
81	The feasible solution for an LPP is shown in given figure. Let, $Z = 3x - 4y$ be the objective function. Minimum of Z occurs at

	 A. (0, 0) B. (0, 8) C. (5, 0) D. (4, 10)
82	The feasible region for an LPP is shown in the given figure. Let, $F = 3x - 4y$ be the objective function. Maximum value of F is  A. 0 B. 8 C. 12

	D. -18
83	Refer to Q 82, minimum value of F is A. 0 B. -16 C. 12 D. does not exist.
84	The corner points of the feasible region determined by the system of linear constraints are $(0, 2)$, $(3, 0)$, $(6, 0)$, $(6, 8)$ and $(0, 5)$. The objective function is $F = 4x + 6y$. The minimum value of F occurs at A. $(0, 2)$ only B. $(3, 0)$ only C. the mid-point of the line segment joining the points $(0, 2)$ and $(3, 0)$ D. any point on the line segment joining the points $(0, 2)$ and $(3, 0)$

KEY/ANSWERS

QUESTION NUMBER	ANSWER
1	b
2	a
3	a
4	b
5	b
6	c
7	b
8	a
9	a
10	b
11	c
12	b
13	c

14	a
15	D
16	D
17	C
18	A
19	A
20	B
21	C
22	C
23	A
24	A
25	C
26	B
27	D
28	D
29	B
30	D
31	A
32.	D
33	A
34	B
35	B

36	A
37	C
38	A
39	C
40	D
41	B
42	C
43	B
44	C
45	A
46	B
47	B
48	C
49	A
50	C
51	C
52	B
53	b
54	d
55	a
56	a
57	b
58	d

59	a
60	c
61	a
62	d
63	b
64	b
65	C
66	(a)
67	(d)
68	(c)
69	(c)
70	(c)
71	(a)
72	(d)
73	(c)
74	(c)
75	(b)
76	(d)
77	(c)
78	B
79	B
80	B
81	B
82	C

83	B
84	D

Prepared by : PGT(Maths) of BHUBANESWAR REGION, GUWAHATI REGION, KOLKATA REGION, SILCHAR REGION, RANCHI REGION & TINSUKIA REGION

Vetted by : TINSUKIA REGION