MATHS

BOOKS - TARGET MATHS (HINGLISH)

LINEAR PROGRAMMING

Classical Thinking

1. The function to be maximized or minimized is called the

A. constraints

B. non- negative constraints

C. objective function

D. none of these

Answer: C

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2. Objective function of a linear programming problem is

A. always a non-negative constraint

B. a relation between the variables

C. a function to be optimized

D. only a one to many relation

Answer: C

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3. Which of the folowing cannot be considered as the objective function of a linear programming problem ?

A. Maximize $z = 3x + 2y$

B. Minimize $z = 6x + 7y + 9z$

C. Maximize z = 2x

D. Minimize $z = x^2 + 2xy + y^2$

Answer: D

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4. Let p and q be the statements:

$p: 4x + 5y \leq 20, q: 3x^2 + 2y^2 \leq 6$

A. both p and q can be constraints of LPP

B. p but not q is a constraint of LPP

C. q and not p is a constraint of LPP

D. neither p nor q is a constraint of LPP

Answer: B

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5. A wholesale merchant wants to start the business of cereal with Rs 24000 . Wheat is Rs 400 per quintal and rice is Rs 600 per quintal . He has capacity to stroe 200 quintal of cereal . He earns profit of Rs 25 per quintal on wheat and Rs 40 per quintal on rice . If he stroes x quintal rice and y quintal wheat, then for maximum profit the objective function is

A. $25x + 40y$

B. $40x + 25y$

C. $400x + 600Y$

D. $\frac{400}{40}x + \frac{600}{25}y$

Answer: B

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6. A dietician wishes to mix two types of food in such a way that the vitamin contents of the mixture contain at least 8 units of vitamin A and

10 units of vitamin C . Food I contains 2 units per kg of vitamin A and 1 unit per kg of vitamin C , while food II contains 1 unit per kg of vitamin A and 2 units per kg of vitamin C . It costs Rs 5 per kg to purchase food I and Rs 7 per kg to purchase food II . Identify the objective function so as to minimize the cost of mixture.

A. Maximize $z = 5x + 7y$

B. Minimize $z = 2x + y$

C. Maximize $z = 2x + 2y$

D. Minimize $z = 7x + 2y$

Answer: A

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7. For the data given in table , the constraints are

	$A(x)$	$B(y)$	Maximum availability
Number of labours	5	4	20
Work hours	6	3	12

A. $5x + 6y \leq 20, 4x + 3y \leq 12, x \geq 0, y \geq 0$

B. $5x + 6y \geq 20, 4x + 3y \geq 20, x \geq 0, y \geq 0$

C. $5x + 4y \leq 20, 6x + 3y \leq 12, x \geq 0, y \geq 0$

D. $5x + 4y \geq 20, 6x + 3y \geq 12, x \geq 0, y \geq 0$

Answer: C

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8. For the data given in the table , the constraints are

	Diet1(x_1)	Diet(x_2)	Minimum rquirement
Proteins	2	15	30
Fast	12	6	48
Vitamins	5	10	20

A.

$2x_1 + 15x_2 \geq 30, 12x_1 + 6x_2 \geq 48, 5x_1 + 10x_2 \geq 20, x_1 \leq , x_2 \leq 0$

B.

$2x_1 + 15x_2 \geq 30, 12x_1 + 6x_2 \geq 48, 5x_1 + 10x_2 \geq 20, x_1 \geq , x_2 \geq 0$

C.

$$2x_1 + 15x_2 \le 30,\ 12x_1 + 6x_2 \le 48,\ 5x_1 + 10x_2 \le 20,\ x_1 \le ,\ x_2 \le 0$$

D.

$$2x_1 + 15x_2 \le 30,\ 12x_1 + 6x_2 \le 48,\ 5x_1 + 10x_2 \le 20,\ x_1 \ge ,\ x_2 \ge 0$$

Answer: B

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9. Priya has to stitch table clothes and curtains for a living. She has to put in 1 hour of work for a table cloth and 3 hours for a curtain. She gets ₹ 50 for· every table cloths and ₹ 250 for every curtain. She has to earn a least ₹ 500 per day. Minimize the no of hours of work she has to put in every day.

A. Minimize z = x + 3y subject to$250x + 50y \le 500,\ x \ge 0,\ y \ge 0$

B. Minimize z = x+ 3y subject to $50x + 250y \ge 500,\ x \ge ,\ 0y \ge 0$

C. Minimize z = 3 + 3y subject to $50x + 250y \le 500,\ x \ge 0,\ y \ge 0$

D. Minimize z = x + 3y subject to $250x + 50y \geq 500, x \geq 0, y \geq 0$

Answer: B

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10. A set of point represents convex polygon if

A. line joining two points of the set lie completely out of the set.

B. line joining any two points of the set lie completely within the set.

C. line joining two points of the set may lie within or outside the set.

D. its boundaries are curved having convex shape.

Answer: B

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11. One of the corner points of the feasible region of inequalities gives

A. Optimal solution of LPP

B. Objective function

C. Constraints

D. Linear assumptions

Answer: A

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12. The feasible solution of a LPP belongs to

A. Only first quadrant

B. First and third quadrant

C. Second quadrant

D. Any quadrant

Answer: D

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13. 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)

Answer: C

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14. The corner points of the feasible region are (800 , 400) , (1050,150) , (600,0) . The objective function is $P = 12x + 6y$. The maximum value of P is

A. 12000

B. 16000

C. 7200

D. 13500

Answer: D

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15. The corner points of the feasible region are A (50,50), B(10,50),C(60,0) and D (60,4) . The objective function is $P = \frac{5}{2}x + \frac{3}{2}y + 410.$ The minimum value of P is at point

A. (60,0)

B. (50,50)

C. (60,40)

D. (10,50)

Answer: D

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16. Chosse the condition under which an optimum solution cannot be obtained

A. Maximize the objective function when the feasible region is unbounded.

B. Maximize the objective function when the feasible region is bounded

C. More than one optimum solution is found

D. All of the above

Answer: A

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Critical Thinking

1. A printing company prints two types of magazines _A and 8. The company earns '10 and '15 on each magazine A and 8 respectively. These are processed on three machines I, II and Ill and total time in hours available per week on each machine is as follows.

Magazine → ↓ Machine	*A* (*x*)	*B* (*y*)	Time available
I	2	3	36
II	5	2	50
III	2	6	60

The number of constraints is

A. 3

B. 4

C. 5

D. 6

Answer: C

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2. A firm makes pants and shirts . A shirt takes 2 hours on machine and 3 hours of man lobour while a pant takes 3 hours on machine and 2 hours of man labour .In a week , there are 70 hours of machine and 75 hous of man lobour available . If the firm dertermines to make x shirts and y pants per week , then for this linear constraints are

A. $x \geq 0, y \geq 0, 2x + 3y \geq 70, 3x + 2y \geq 75$

B. $x \geq 0, y \geq 0, 2x + 3y \leq 70, 3x + 2y \geq 75$

C. $x \geq 0, y \geq 0, 2x + 3y \geq 70, 3x + 2y \leq 75$

D. $x \geq 0, y \geq 0, 2x + 3y \leq 70, 3x + 2y \leq 75$

Answer: D

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3. A factory owner wants to purchase 2types of machines A ,and B for his factory . The machine A requires an area of $1000m^2$ and 12 skilled men for running it ans its daily output is 50 units , whereas the machine B rquires $1200m^2$ area and 8 skilled men and its daily output is 40 units .If an area of $7600m^2$ and 72 skilled men are available to operate the machines . The linear constraints are

A. $1000x + 1200y \leq 7600, 12x + 8y \leq 72, x \geq 0, y \geq 0$

B. $1000x + 1200y \geq 7600, 12x + 8y \leq 72, x \geq 0, y \geq 0$

C. $1000x + 1200y \leq 7600, 12x + 8y \geq 72, x \geq 0, y \geq 0$

D. $1000x + 1200y \geq 7600, 12x + 8y \geq 72, x \geq 0, y \geq 0$

Answer: A

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4. A small firm manufactures necklaces & bracelets . The combined number of necklaces and bracelets that it can handle per day is at most 24 . A bracelet takes 1 hour to make and a necklace takes half an hour . The maximum number of hours available per day is 16 . If the profit on a bracelet is Rs 300 and the profit on a necklace is Rs 100 , then form LPP to maximize the profit.

A. Maximize $z = 100x + 300y$ subject to $x \geq 0, y \geq 0, x + 2y \leq 32, x + y \leq 24.$

B. Maximize $z = 100x + 300y$ subject to $x \geq 0, y \geq 0, x + 2y \leq 32, x + y \geq 24.$

C. Maximize $z = 100x + 300y$ subject to $x \geq 0, y \geq 0, x + 2y \geq 32, x + y \geq 24.$

D. Maximize $z = 100x + 300y$ subject to $x \geq 0, y \geq 0, x + 2y \geq 32, x + y \leq 24.$

Answer: A

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5. Food X contains 4 units of vitamin A per gram and 7 units of vitamin B per gram and cost 15 paise per gram . Food Y contains 6 units of vitamin A per gram and 11 units of vitamin B per gram and cost 22 paise per gram . The daily minimum requirement of vitamin A and B are 90 units and 130 units respectively . The formulation of LPP to minimize the cost is

A. z = 15x +22y, subject to constraints

$$4x+6y \geq 90, 7x+11y \geq 130, x \geq 0 y \geq 0$$

B. z = 6x +5y, subject to constraints

$$4x+3y \geq 90, 7x+11y \geq 130, x \geq 0 y \geq 0$$

C. z = 15x +62y, subject to constraints

$$4x+6y \geq 90, 7x+11y \geq 450, x \geq 0 y \geq 0$$

D. z = 15x +22y, subject to constraints

$$4x+6y \geq 90, 7x+45y \geq 260, x \geq 0 y \geq 0$$

Answer: A

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6. Two different kinds of food A and B are being considered to form a weekly diet . The minimum weekly requirements for fats , carbohydrates and protein are 18, 24 and 16 units respectively . One kg of food A has 4 , 16 , and 8 units respectively of these ingredients and one kg of food B has 12 ,4 and 6 units respectively The price of food A is Rs 6 per kg and that of food B is Rs 5 per kg. How many kg of each type of food should he buy per week to minimize the cost and meet his requirements . Formulate this LPP

A. z = 15 x+22y, subject to contraints

$$4x + 12y \geq 18, 16x + 4y \geq 24, 8x + 6y > 16, x \geq 0y \geq 0$$

B. z = 15x +22y, subject to constraints

$$4x + 12y \geq 18, 16x + 4y \geq 24, 8x + 6y > 16, x \geq 0y \geq 0$$

C. z=15x+48y , subject to constraints

$$4x + 12y \geq 18, 17x + 4y \geq 24, 8x + 6y > 160, x \geq 0y \geq 0$$

D. z = 15x +22y, subject to constraints

$$24x + 12y \geq 18, 18x + 4y \geq 24, 8x + 16y > 16, x \geq 0y \geq 0$$

Answer: B

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7. The region represented by the inequation system $x, y \geq 0, y \leq 5, x + y \leq 4$ is

A. unbounded in first quadrant

B. unbounded in first and second quadrant

C. bounded in first quadrant

D. bounded in first and second quadrants.

Answer: C

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8. The region in the xy plane given by $y - x \leq 1, 2x - 6y \leq 3, x \geq 0, y \geq 0$ is

A. bounded

B. not convex

C. unbounded convex

D. bounded and convex

Answer: C

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9. The region represented by $2x + 3y - 5 \geq 0$ and $4x - 3y + 2 \geq 0$ is

A. Not in first quadrant

B. Bounded in first quadrant

C. Unbounded in first quadrant

D. None of these

Answer: D

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10. The contraints $-x+y \leq 1, \ -x+3y \leq 9, x \geq 0, y \geq 0$ of LLP correspond to

A. bounded feasible region

B. unbounded feasible region

C. both bounded and unbounded feasible region

D. neither bounded nor unbounded region

Answer: B

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11. The position of 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 outside and P outside

D. O outside and P inside

Answer: A

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12. The vertex of common graph of inequalities $2x + y \geq 2$ and $x - y \leq 3$, is

A. (0,0)

B. $\left(\frac{5}{3}, -\frac{4}{3}\right)$

C. $\left(\frac{5}{3}, \frac{4}{3}\right)$

D. $\left(-\frac{4}{3}, \frac{5}{3}\right)$

Answer: B

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13. The constraints of an LPP are $x+y \leq 6, 3x+2y \geq 6, x \geq 0$ and $y \geq 0$ Determine the vertices of the feasible region formed by them

A. $(6, 6), (0, 0), (2, 3), (3, 2)$

B. $(0, 0), (5, 6), (6, 5), (0, 5)$

C. $(0, 0), (5, 0), (3, 2), (6, 6)$

D. $(0, 6), (0, 3), (2, 0), (6, 0)$

Answer: D

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14. The constraints of an LPP a $5 \leq x \leq 10, 5 \leq y \leq 10$ Determine the vertices of the feasible region formed by them

A. $(5, 5), (10, 5), (10, 10), (15, 10)$

B. $(5, 5), (10, 10), (10, 15), (5, 10)$

C. $(5, 5), (10, 5), (10, 10), (5, 10)$

D. $(5, 5), (15, 10), (10, 10), (5, 10)$

Answer: C

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15. Which of the following is not a vertex of the feasible region bounded by the inequalities $2x + 3y \leq 6, 5x + 3y \leq 15 \text{ and } x, y, \geq 0$

A. $(0, 2)$

B. (0,0)

C. (3,0)

D. (0,5)

Answer: D

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16. Maximum value of $p = 6x + 8y$

subject to $2x + y \leq 30, x + 2y \leq 24, x \geq 0, y \geq 0$ is

A. 90

B. 120

C. 96

D. 240

Answer: B

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17. Maximum value of 12x+ 3y subjected to the constraints $x \geq 0, y \geq 0, x + y \leq 5 \text{ and } 3x + y \leq 9$ is

A. 15

B. 36

C. 60

D. 40

Answer: B

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18. Maximise $Z = 5x + 3y$

Subject to $3x + 5y \leq 15, 5x + 2y \leq 10, x \geq 0, y \geq 0.$

A. $\frac{235}{9}$

B. $\frac{325}{19}$

C. $\frac{523}{19}$

D. $\frac{532}{19}$

Answer: A

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19. For the function z = 4x+ 9y to be maximum under the constraints $x + 5y \leq 200, 2x + 3y \leq 134, x \geq 0, y \geq 0$ the values of x and y are

A. 10,38

B. 28,10

C. 13,36

D. 30,34

Answer: A

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20. The corner points of the feasible region determined by the system of linear constraints are (0, 10), (5, 5) (15, 15), (0, 20). Let Z = px + qy , where $p, q > 0$. Then, the condition on p and q so that the maximum of Z occurs at both the points (15, 15) and (0, 20), is

A. p = q

B. p = 2q

C. q = 2p

D. q = 3p

Answer: D

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21. A manufacturer produces two types of soaps using two machines A and B . A is operated for 2 minutes and B for 3 minutes to manufacture first type , while it takes 3 minutes on machine A and 5 minutes on machine B to manufature second type . Each machine can be operated at the most for 8 hours per day . The two types of soap are sold at a profit of Rs 0.25 and Rs 0.05 each respectively . Assuming that the manufactured can sell all the soaps he can manufacture , how many soaps of each type should be manufature per day so as to maximize his profit .

A. 50 soaps of type I , 20 soaps of types II

B. 96 soaps of type II

C. 45 soaps of type I

D. 55 soaps of type I

Answer: B

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22. The minimum value of z = 4x+5y subject to the constraints $x \geq 30, y \geq 40 \text{ and } x \geq , y \geq 0$ is

A. 320

B. 200

C. 120

D. 0

Answer: D

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23. The minimum value of z = 3x + y subject to constraints $2x + 3y \leq 6, x + y \geq 1, x \geq 1, x \geq 0, y \geq 0$ is

A. 0

B. 3

C. 2

D. 1

Answer: D

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24. The minimum value of z = 6x + 7y subject to $5x + 8y \leq 40, 3x + y \leq 6, x \geq 0, y \geq 2$ is

A. 12

B. 14

C. 9

D. 16

Answer: B

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25. Which of the following statements is correct ?

A. Every LPP has an optimal solution

B. Every LPP has a unique solution

C. If a LPP has two optimal solutions , then it has an infinite number of optimal solutions

D. Every LPP has two optimal solutions

Answer: C

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26. The solution for minimizing the function z = x+ y under a LPP with constraints $x+y\geq 1, x+2y\leq 10, y\leq 4$ and $x, y, \geq 0$ is

A. x = 0 , y = 0 , z=0

B. x = 3 , y = 3 , z = 6

C. There are infinitely solutions

D. None of these

Answer: C

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27. For the constraint of a linear optimizing function $z = x_1 + x_2$, given by $x_1 + x_2 \leq 1, 3x_1 + x_2 \geq 3$ and $x_1, x_2 \geq 0$

A. There are two feasible regions

B. There are infinite feasible regions

C. There is no feasible region

D. None of these

Answer: C

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28. The maximum value of F = 4x + 3y subject to constraints $x \geq 0, y \geq 2, 2x + 3y \leq 18, x + y \geq 10$ is

A. 35

B. 36

C. 34

D. No optimum value

Answer: D

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Competitive Thinking

1. A linear programming of linear functions deals with

A. Minimizing

B. Optimizing

C. Maximizing

D. None of these

Answer: B

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2. Variables of the objective function of the linear programming problem are

A. Zero

B. Zero or positive

C. Negative

D. Zero or negative

Answer: B

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3. Non - negative constraints for an LPP should be

A. $= 0$

B. > 0

C. ≥ 0

D. $\text{neither } > 0, \quad \text{nor } < 0$

Answer: C

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4. LPP includes

A. both objective functions and constraints which are linear.

B. objective function which are linear

C. constraints which are linear

D. none of these

Answer: A

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5. Minimize $z = \sum_{j=1}^{n} \sum_{i=1}^{m} c_{\text{ij}}\ x_{\text{ij}}$

Subject to : $\sum_{j=1}^{n} x_{\text{ij}} = a_i, i = 1, \ldots\ldots\ldots, m$

$\sum_{i=1}^{n} x_{\text{ij}} = b_i, j = 1, \ldots\ldots\ldots, n$

is a LPP with number of constraints

A. m + n

B. $m - n$

C. mn

D. $\frac{m}{n}$

Answer: A

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6. The optimal value of the objective function is attained at the points

A. Given by intersection of inequations with 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

Answer: C

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7. Which of the terms is not used in a linear programming problem

A. Slack variables

B. Objective function

C. Concave region

D. Feasible solution

Answer: C

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8. The area of the feasible region for the following constraints $3y + x \geq 3, x \geq 0, y \geq 0$ will be

A. Bounded

B. Unbounded

C. Convex

D. Concave

Answer: B

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9. The constraints $-x_1 + x_2 < 1, \ - x_1 + 3x_2 \leq 9, x_1, x_2 >$, 0 difines on

A. Bounded feasible space

B. Unbounded feasible space

C. Both bounded and unbounded feasible space

D. None of these

Answer: B

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10. Inequations $3x - y \geq 3$ and $4x - y > 4$

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

Answer: A

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11. The objective function of LLP defined over the convex set attains its optimum value at

A. At least two of the corner points

B. All the corner points

C. At least one of the corner points

D. None of the corner points

Answer: C

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12. If an LPP admits optimal solution at two consecutive vertices of a joining two points

A. the required optimal solution is at the midpoint of the line joining two points

B. the optimal solution occurs at every point on the line joining these two points

C. the LPP under consideration is not solvable

D. the LPP under consideration must be reconstruted

Answer: B

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13. The maximum value of P = 3x +4y subject to the constraints $x+y \leq 40, 2y \leq 60, x \geq 0 \text{ and } y \geq 0$ is

A. 120

B. 140

C. 100

D. 160

Answer: B

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14. If $4x + 5y \leq 20, x + y \geq 3, x \geq 0, y \geq 0$ maximum 2x + 3y is

A. 12

B. 5

C. 0

D. 20

Answer: A

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15. The maximum of z = 5x+2y , subject to the constrainsts $x + y \leq 7, x + 2y \leq 10, x, y \geq 0$ is

A. 10

B. 26

C. 35

D. 70

Answer: C

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16. The maximum value of $2x + y$ subject to

$3x + 5y \leq 26 \text{ and } 5x + 3y \leq 30, x \geq 0, y \geq 0$ is

A. 12

B. 11.5

C. 10

D. 17.33

Answer: A

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17. By graphical method, the solutions of linear programming problem maximise $Z = 3x_1 + 5x_2$ subject to constraints $3x_1 + 2x_2 \leq 18, x_1 \leq 4, x_2 \leq 6x_1 \geq 0, x_2 \geq 0$ are

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. $x_1 = 4, x_2 = 6, z = 42$

Answer: B

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18. The maximum value of 4x +5y subject to the constraints $x + y \leq 20, x + 2y \leq 35, x - 3y \leq 12$ is

A. 84

B. 95

C. 100

D. 96

Answer: B

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19. Max value of z equal 3x + 2y subject to $x+y \leq 3, x \leq 2, -2x+y \leq 1, x \geq 0, y \geq 0$ is

A. 6

B. 8

C. 2

D. 10

Answer: B

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20. The point at which , the maximum value of (3x+2y) subject to the constraints $x+y \leq 2, x \geq 0, y \geq 0$ obtained , is

A. (0 ,0)

B. $(1.5, 1.5)$

C. (2,0)

D. (0,2)

Answer: C

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21. The point which provides the solution of the linear programming problem, maximise Z = 45x + 55y. Subject to constraints Subject to constraints $x, y \geq 0, 6x+4y \leq 120$ and $3x+10y \leq 180$ is

A. (15,10)

B. (10,15)

C. (0,18)

D. (20,0)

Answer: B

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22. The points which provides the solution to the linear programming problem max $(2x + 3y)$ subject to constraints $x \geq 0, y \geq 0, 2x + 2y \leq 9, 2x + y \leq 6, x + 2y \leq 8$ is

A. (3,2,5)

B. (2,3,5)

C. (2,2 5)

D. (1 ,3 ,5)

Answer: D

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23. The corner points of the feasible region determined by the system of linear constraints are (0, 10), (5, 5) (15, 15), (0, 20). Let Z = px + qy , where $p, q > 0$. Then, the condition on p and q so that the maximum of Z occurs at both the points (15, 15) and (0, 20), is

A. q = 3p

B. p = 2q

C. q = 2p

D. p = q

Answer: A

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24. The corner points of the feasible region determined by the system of linear constraints are (0,10) , (5,5) (25,20),(0,30) Let z = px + qy , where

$p, q > 0$ Condition on p and q so that te maximum of z occurs at both the points (25,20) and (0,30) is ....

A. 5p = 2q

B. 2p=5q

C. p = 2q

D. q = 3p

Answer: A

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25. The minimum value of $z = 2z_1 + 3x - (2)$ subjected to the constraints $2x_1 + 7x_2 \geq 22, x_1 + x_2 \geq 6, 5x_1 + x_2 \geq 10$ and $x_1, x_2 \geq 0$, is

A. 14

B. 20

C. 10

D. 16

Answer: A

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26. The minimum value of the objective function Z=2x+10y for linear constraints $x \geq 0, y \geq 0, x - y \geq 0, x - 5y \leq \ -5$ is

A. 10

B. 15

C. 12

D. 8

Answer: B

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27. For the following linear programming problem minimize $Z = 4x + 6y$ subject to the constraints $2x + 3y \geq 6, x + y \leq 8, y \geq 1, x \geq 0$, the solution is

A. (0,2) and (1,1)

B. $(0, 2)$ and $\left(\frac{3}{2}, 1\right)$

C. (0,2) and (1,6)

D. (0,2) and (1,5)

Answer: B

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28. The co-ordinates of the point for minimum value z = 7x - 8y subject to the conditons $x + y - 20 \leq 0, y \geq 5, x \geq 0,$ is

A. (20,0)

B. (15,5)

C. (0,5)

D. (0,20)

Answer: D

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29. Minimise and Maximise $Z = 5x + 10y$

Subject to $x + 2y \leq 120, x + y \geq 60, x - 2y \geq 0, y \geq 0.$

A. x = 60 , y = 0

B. x = 0 , y = 60

C. x = 60 , y = 30

D. x = 60 , y = 20

Answer: A

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30. The objective function, $z = 4x_1 + 5x_2$, subject to $2x_1 + x_2 \geq 7, 2x_1 + 3x_2 \leq 15, x_2 \leq 3, x_1, x_2 \geq 0$ has minimum value at the point

A. On X - axis

B. On Y - axis

C. At the origin

D. On the line parallel to X - axis

Answer: A

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31. The objective function $z = x_1 + x_2$, subject to $x_1 + x_2 \leq 10, \ -2x_1 + 3x_2 \leq 15, x_1 \leq 6, x_1, x_2 \leq 0$ has maximum value of the feasible region.

A. at only one point

B. at only two point

C. at every point of the segment joining two points

D. at every point of the line joining two points

Answer: C

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32. Minimize z = 30x+20y subject to $x + y \leq 8, x + 2y \geq 4, 6x + 4y \geq 12, x \geq , y \geq 0$

A. Infinite solution

B. Unique solution

C. Two solutions

D. None of these

Answer: A

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33. The maximum value of z = 4x +3y subject to the constraints $3x + 2y \geq 160, 5x + 2y \geq 200, x + 2y \geq 80, x, y \geq 0$ is

A. 320

B. 300

C. 230

D. None of these

Answer: D

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34. For the LPP , maximize z = x + 4y subject to the constraints $x + 2y \leq 2, x + 2y \geq 8, x, y \geq 0$

A. $z_{\max} = 4$

B. $z_{\max} = 8$

C. $z_{\max} = 16$

D. has no feasible solution

Answer: D

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35. The maximum value of z = 4x +2y subject 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

Answer: D

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1. A industry produces two types of models M_1, M_2 Each M_1 model needs 4 hours for grinding and 2 hours for polishing , whereas each M_2 model needs 2 hours for grinding and 5 hours for polishing . Each grinder can work for 80 hours a week while each polisher can work for 180 hours a week . Each M_1 model earns a profit of Rs.3 and M_2 model earns Rs 4 profit . To ensure the maximum profit the profuction capacity allocated to two types of models in a week is

A. (0,36)

B. (20,0)

C. (0,40)

D. $(2.5, 35)$

Answer: D

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2. The common region determined by all the constraints and non-negativity restrictions of the LPP is called

A. infeasible region

B. feasible region

C. unbounded region

D. bounded region

Answer: B

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3. The objective function P (x,y) = 2x+3y is maximized subject to the constraints $x+y \leq 30, x-y \geq 0, 3 \leq y \leq 12, 0 \leq x \leq 20$ The function attains the maximum value at the points

A. (12,18)

B. (18,12)

C. (15,15)

D. None of these

Answer: B

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4. All points lying inside the triangle formed by the points (1,3) ,(5,0) and $(-1, 2)$ satisfy

A. $3x + 2y \geq 0$

B. $2x + y - 13 \leq 0$

C. $2x - 3y - 12 \leq 0$

D. All the above

Answer: D

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5. The linear programming problem : Maximize $z = z = x_1 + x_2$ subject to constraints $x_1 + 2x_2 \leq 2000, x_1 + x_2 \leq 1500, x_2 \leq 600, x_1 \geq 0$ has

A. No feasible solution

B. Unique optimal solution

C. A finite number of optomal solutions

D. Infinite number of optimal solutions

Answer: D

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6. The solution of set of constraints $x + 2y \geq 11, 3x + 4y \leq 30, 2x + 5y \leq 30, x \geq 0, y \geq 0$ includes the point

A. (2,3)

B. (3,2)

C. (3,4)

D. None of these

Answer: D

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7. A manufacturer is preparing a production plan on medicines A and B . There are sufficient ingredients availabe to make 20,000 bottles of A and 40 ,000 bottles of B but there are only 45,000 bottles into which either of the medicines can be put . Further it takes 3 hours to perpare enough material to fill 1000 bottles of A . It takes one hour to perpare enough material to fill 1000 bottles of B and there are 66 hours available for this operation . The number of constraints the manufacturer has is

A. 4

B. 5

C. 6

D. 7

Answer: C

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8. A company manufactures two types of telephone sets A and B . The A type telephone requires 2 hour and B type telephone requires 2 hour and B type telephone requires 4 hours to make . The company has 800 work hours per day . 300 telephones can pack in a day . The selling prices of A and B type telephones are Rs.300 and 400 respectively . For maximum profits company produces x telephones of a type and y telephones of B types . Then except $x \geq 0$ and $y \geq 0$, linear constraints and the probable region of the LPP is of the type .

A. $x + 2y \leq 400, x + y \leq 300,$

Max z = 300x +400y, bounded

B. $2x + y \leq 400,\ x + y \geq 300,$

Max z = 400x +300y, unbounded

C. $2x + y \geq 400,\ x + y \geq 300,$

Max z = 300x +400y, parallelogram

D. $2x + y \leq 400,\ x + y \geq 300,$

Max z = 300x +400y, square

Answer: A

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9. The feasible region of the constraints $4x + 2y \leq 8,\ 2x + 5y \leq 10$ and $x, y \geq 0$ is

A.

B.

C.

D.

Answer: C

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10. The LPP problem Max $z = x_1 + x_2$ such that $-2x_1 + x_2 \leq 1, x_1 \leq 2, x_1 + x_2 \leq 3 \text{ and } x_1, x_2 \geq 0$ has

A. One solution

B. Three solutions

C. Infinite number of solutions

D. No solution

Answer: C

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11. For the LPP problem Max . z=3x+2y subject to $x+y \geq 1, y-5x \leq 0, x-y \geq -1,$

A. x = 3

B. y = 3

C. z = 15

D. All the above

Answer: D

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