RK VISION ACADEMY

NEET | IIT – JEE | FOUNDATION

CBSE PRACTICE PAPER(2024)

(Mathematics)

Grade : XII **Marks: 40**
marks
Chapter: LPP Set-1 **Time: 90**
minutes

SECTION A

(This section comprises of Multiple-choice questions (MCQ) of 1 mark each.)

1. 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. 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) none of these

2. Feasible region (shaded) for a LPP is shown in the Fig Minimum of Z = 4x + 3y occurs at the point

(a) (0, 8) (b) (2, 5) (c) (4, 3) (d) (9, 0)

3. 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 store 200 *quintal* cereal. He earns the profit *Rs*. 25 per *quintal* on wheat and *Rs*. 40 per *quintal* on rice. If he stores *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) $\frac{400}{40}x+\frac{600}{25}y$

4. Mohan wants to invest the total amount of *Rs*. 15,000 in saving certificates and national saving bonds. According to rules, he has to invest at least *Rs*. 2000 in saving certificates and *Rs*. 2500 in national saving bonds. The interest rate is 8% on saving certificate and 10% on national saving bonds per annum. He invest *Rs*. *x* in saving certificates and *Rs*. *y* in national saving bonds. Then the objective function for this problem

(a) $0.08x+0.10y$ (b) $\frac{x}{2000}+\frac{y}{2500}$ (c) $2000x+2500y$ (d) $\frac{x}{8}+\frac{y}{10}$

5. The sum of two positive integers is at most 5. The difference between two times of second number and first number is at most 4. If the first number is *x* and second number *y*, then for maximizing the product of these two numbers, the mathematical formulation is

(a) $x+y\geq 5$, $2y-x\geq 4$, $x\geq 0, y\geq 0$ (b) $x+y\geq 5$, $-2x+y\geq 4$, $x\geq 0, y\geq 0$ (c) $x+y\leq 5$, $2y-x\leq 4$, $x\geq 0, y\geq 0$ (d) None of these

6. To maximize the objective function $z=2x+3y$ under the constraints $x+y\leq 30, x-y\geq 0, y\leq 12, x\leq 20, y\geq 3$ and $x, y\geq 0$

(a) $x=12, y=18$ (b) $x=18, y=12$ (c) $x=12, y=12$ (d) $x=20, y=10$

7. The maximum value of $P=6x+8y$ subject to constraints $2x+y\leq 30, x+2y\leq 24$ and $x\geq 0, y\geq 0$ is

(a) 90 (b)120 (c)96 (d)240

8. The maximum value of $P=x+3y$ such that $2x+y\leq 20$, $x+2y\leq 20$, $x\geq 0, y\geq 0$, is

(a)10 (b)60 (c)30 (d)None of these

9. 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)4 (c) 20 (d) None of these

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

(a) 10 (b)26 (c)35 (d)70

SECTION B

(This section comprises of very short answer type-questions (VSA) of 2 marks each.)

11 Determine the maximum value of Z = 11x + 7y subject to the constraints :
$2x + y \leq 6, x \leq 2, x \geq 0, y \geq 0$

12 Maximise Z = 3x + 4y, subject to the constraints: $x + y \leq 1, x \geq 0, y \geq 0$.

13 Maximise the function Z = 11x + 7y, subject to the constraints: $x \leq 3, y \leq 2, x \geq 0, y \geq 0$.

SECTION C

(This section comprises of short answer type questions (SA) of 3 marks each)

14 Minimise Z = 13x – 15y subject to the constraints : $x + y \leq 7, 2x – 3y + 6 \geq 0, x \geq 0, y \geq 0$.

15 Solve the following LPP graphically: Maximise Z = 2x + 3y, subject to $x + y \leq 4, x \geq 0, y \geq 0$

16 Determine the maximum value of Z = 3x + 4y if the feasible region (shaded) for a LPP is shown in Fig.

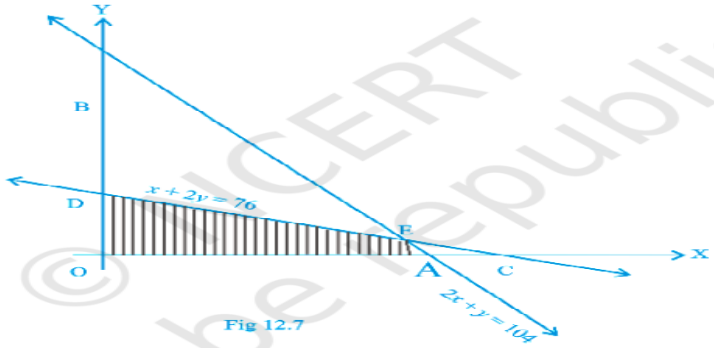

Fig 12.7

SECTION D

(This section comprises of long answer-type questions (LA) of 5 marks each)

17 A manufacturing company makes two types of television sets; one is black and white and the other is colour. The company has resources to make at most 300 sets a week. It takes Rs 1800 to make a black and white set and Rs 2700 to make a coloured set. The company can spend not more than Rs 648000 a week to make television sets. If it makes a profit of Rs 510 per black and white set and Rs 675 per coloured set, how many sets of each type should be produced so that the company has maximum profit? Formulate this problem as a LPP given that the objective is to maximise the profit.

18 Minimise Z = 3x + 5y subject to the constraints :
$x+y \geq 10, x + y \geq 6, 3x + y \geq 8, x, y \geq 0$

SECTION E

(This section comprises of 3 case-study/passage-based questions of 4 marks each with two sub-questions. First two case study questions have three sub questions of marks 1, 1, 1,1 respectively. The third case study question has two sub questions of 2 marks each.)

19. the feasible region (shaded) for a LPP is shown. Determine the maximum and minimum value of Z = x + 2

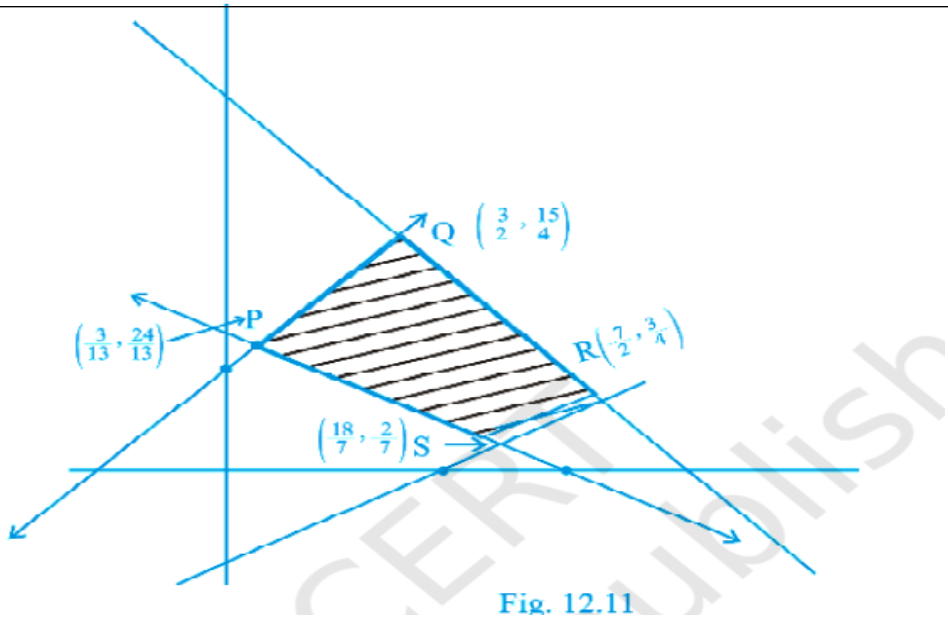
Q $\left(\frac{3}{2}, \frac{15}{4}\right)$
P
$\left(\frac{3}{13}, \frac{24}{13}\right)$
R$\left(\frac{7}{2}, \frac{3}{4}\right)$
$\left(\frac{18}{7}, -\frac{2}{7}\right)$S

Fig. 12.11