

THE O.P. GUPTA

ADVANCED MATH CLASSES

Class XII - Mathematics (041)

Topics - Linear Programming

Alpha Test Series-12
(For Academic session 2025-26)

Max. Marks - 20

Time - 60 Minutes

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Followings are of 3 Marks each (Q01 & 02).

Q01. Solve the following Linear Programming Problem using graphical method :

Maximize $Z = 3x + 4y$, Subject to $x + y \leq 4$, $x \geq 0$ and $y \geq 0$.

Q02. A linear programming problem is as follows :

Minimize $z = 2x + y$

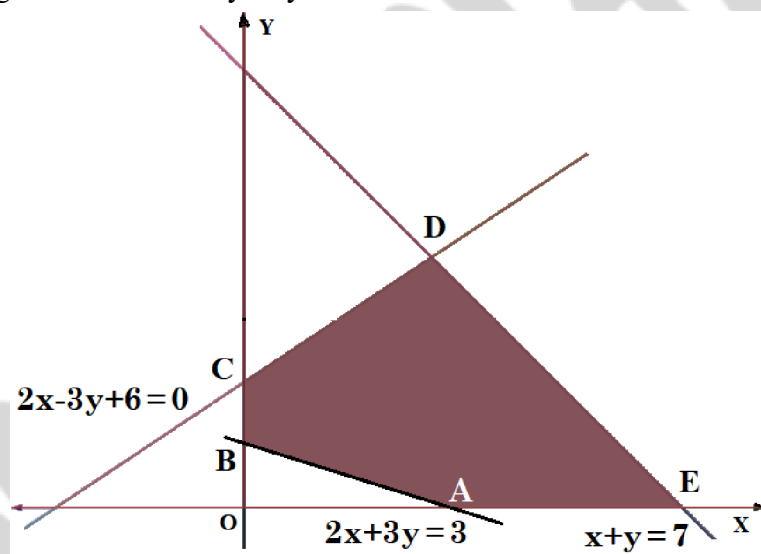
Subject to the constraints $x \geq 3$, $x \leq 9$, $y \geq 0$, $x - y \geq 0$, $x + y \leq 14$.

Then determine the total number of corner points of the feasible region.

$[3 \times 2 = 6]$

Following is of 4 Marks (Q03).

Q03. PASSAGE BASED QUESTION : The corner points $A\left(\frac{3}{2}, 0\right)$, $B(0, 1)$, $C(0, 2)$, $D(3, 4)$ and $E(7, 0)$ of the feasible region determined by a system of linear constraints are as shown below.



Answer each of the following :

- (i) If $Z = 4x + 5y$ represents the objective function, then find the minimum value of Z .
- (ii) Write the point at which the minimum value of Z is obtained.
- (iii) Find the point at which the maximum value of Z is obtained.
- (iv) Let $\frac{Z_C}{Z_E} = \frac{m}{n}$. Then find a linear relation in m and n .

$[2 \times 2 = 4]$

Followings are of 5 Marks each (Q04-05).

Q04. Solve the following linear programming problem (L.P.P.) graphically.

Maximize $Z = x + 2y$.

Subject to constraints $x + 2y \geq 100$, $2x - y \leq 0$, $2x + y \leq 200$; $x, y \geq 0$.

Q05. For a linear programming, the corner points of the feasible region of LPP are given by the points $(0, 2)$, $(3, 0)$, $(6, 0)$, $(6, 8)$ and $(0, 5)$.

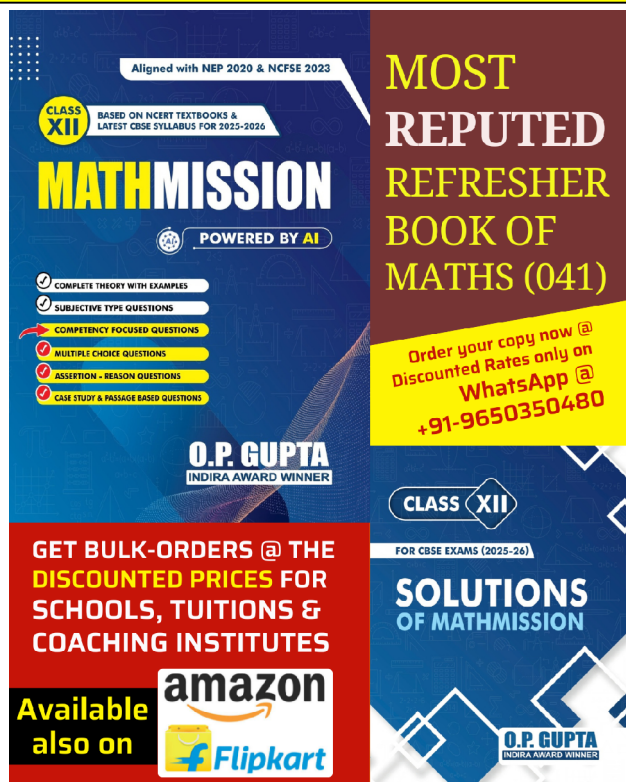
Keeping the above information in mind, answer the followings :

- (i) Let $F = 4x + 6y$ be the objective function. Then find the point (s) at which the Minimum and Maximum value of F occurs. What is the difference between Maximum and Minimum values of F ? Also, write the x and y coordinates of the corner point, where maximum value of F occurs.
- (ii) Let $S = mx + ny$, where $m, n > 0$ be the objective function. Find the condition on m and n so that the value of S at $(6, 0)$ is twice the value of S at $(0, 5)$. $[5 \times 2 = 10]$

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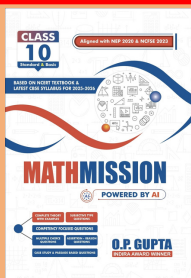
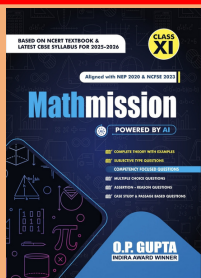
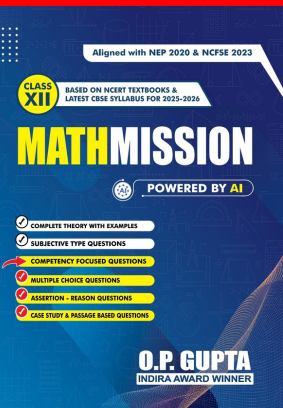
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