# THINK ACADEMY
## MATH CLASSES By O.P. GUPTA
**Class XII - Mathematics (041)**
**Topics - Linear Programming**

**Alpha Test Series-12**
**(For Academic session 2023-24)**

**Max. Marks - 20**
**Time - 60 Minutes**

**Followings are of 3 Marks each (Q01-02).**

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

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

Q02. A linear programming problem is as follows :

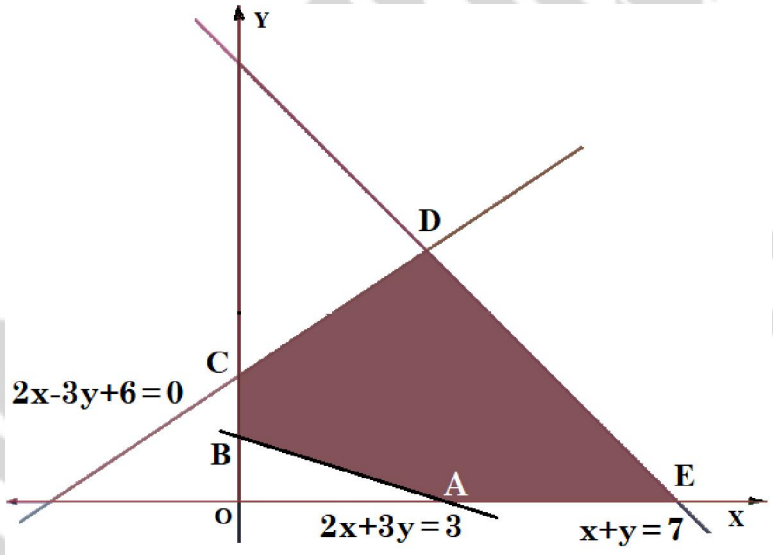
Minimize $z = 2x + y$

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

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 $x + 2y \ge 100,\ 2x - y \le 0,\ 2x + y \le 200;\ x, y \ge 0$.

Q05. For a linear programming, the corner points of the feasible region are given by (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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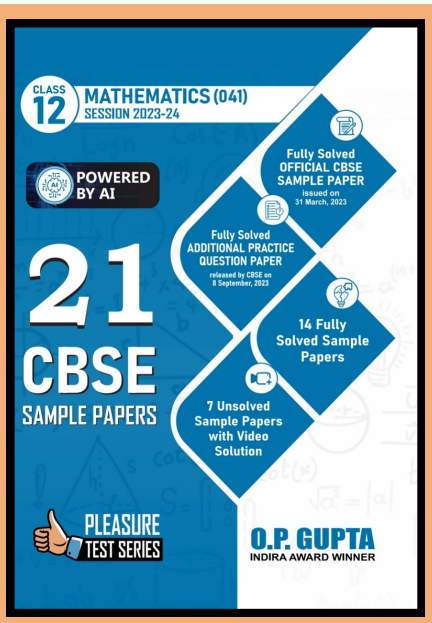


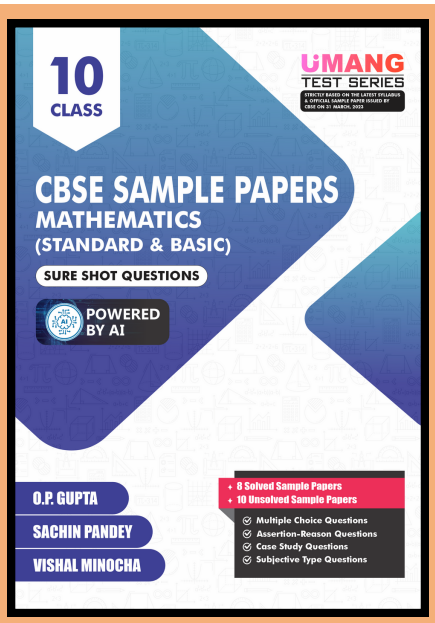


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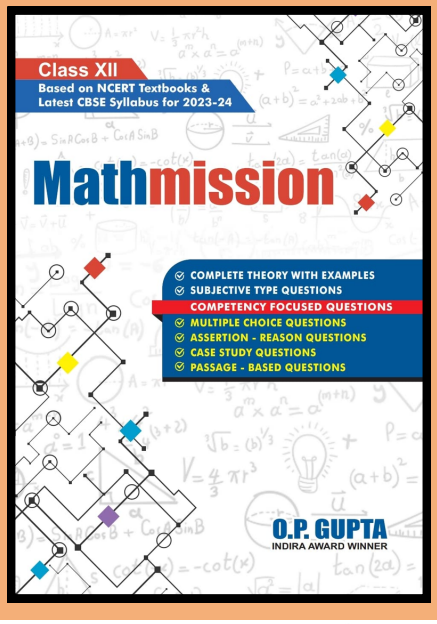


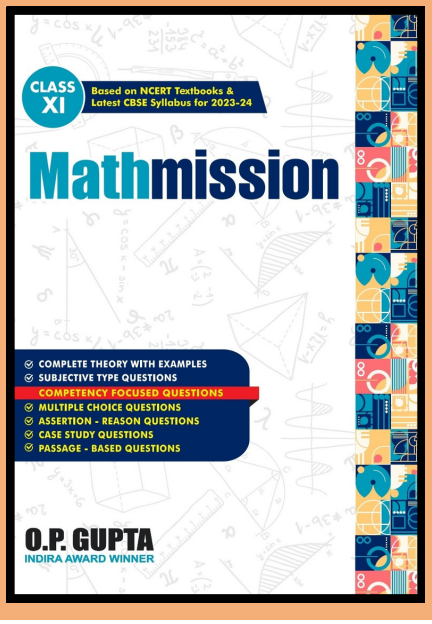


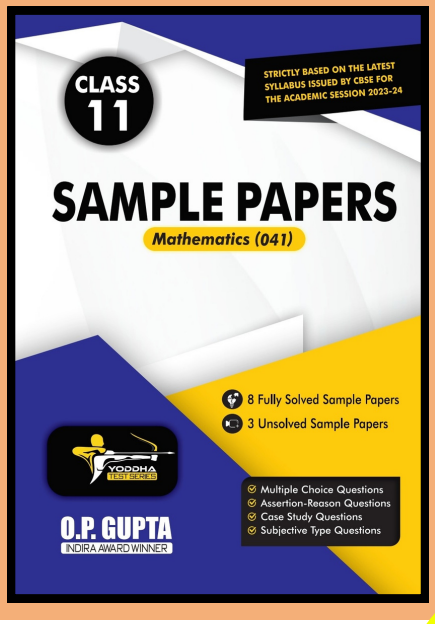


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