⇒ Unbounded Solution

If the value of the objectives function can be increased or decreased indefinitely, then such solutions are called unbounded solution.

⇒ Alternative Optima

When the objective function is parallel to a binding constraints function (i.e. a constraint that is satisfied as an equation by the optimal solution) the objective function will assume the same optimum value at more than one solution points.

⇒ Infeasible solution

When the constraints are not satisfied simultaneously, the LPP has no feasible solution. This situation can never occur if all the constraints are of the $\leq$ type.

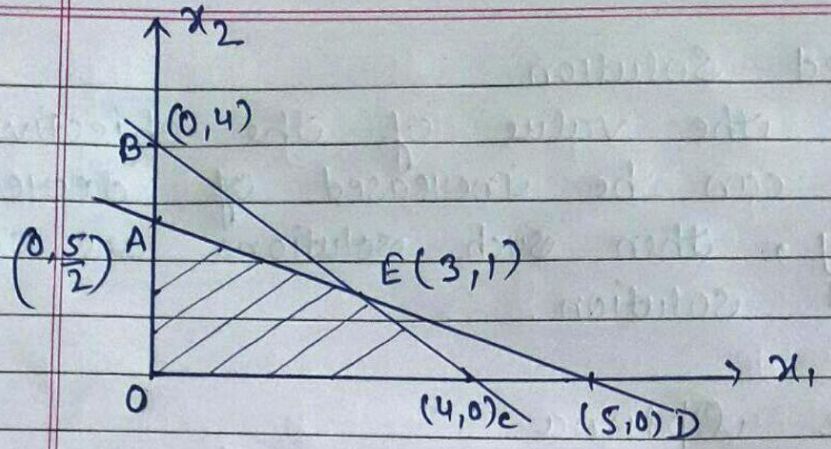
Ques Use graphical method to solve the LPP

Max $Z = 2x_1 + 4x_2$ subject to constant

$x_1 + 2x_2 \leq 5$

$x_1 + x_2 \leq 4$

$x_1, x_2 \geq 0$



Extreme point

O	(0, 0)	0
A	(0, 5/2)	10
E	(3, 1)	10
C	(4, 0)	8

Since, any point on the line segment AE gives the maximum value of z is 10. Hence, in this case there exist an alternative optima

Ques Use graphical method to solve the following linear programming problem

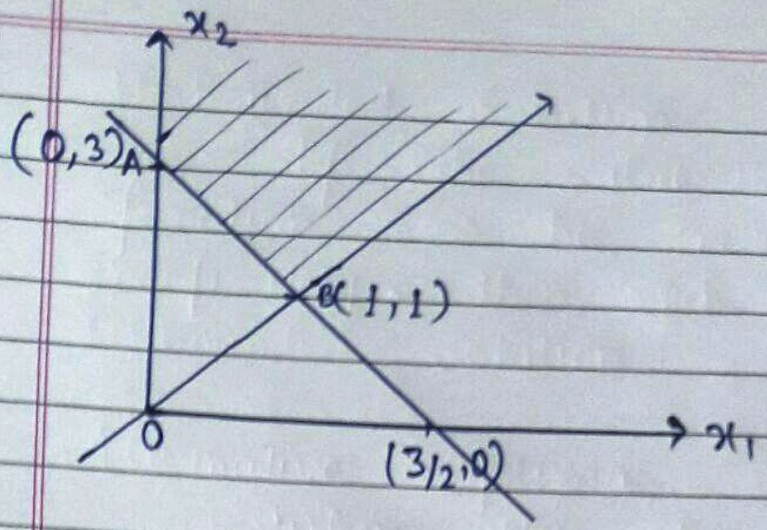
Max $z = 6x_1 + x_2$,

Subject to constant

$2x_1 + x_2 \geq 3$

$x_2 - x_1 \geq 0 \Rightarrow x_2 \geq x_1$

$x_1, x_2 \geq 0$



Extreme point

B (1, 1)	7
A (0, 3)	3

Since, the feasible reason is unbounded and we get the arbitrary number of points in the feasible reason for which the objective function gives the maximum value more then 7. Hence, the problem has unbounded solution.