Graphical Method

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PROCEDURE FOR SOLVING LPP BY GRAPHICAL METHOD

- Step1-Consider each inequaliy constraint as an equation.
- Step2-Plot each equation on the graph, as each equation will geometrically represent a straight line.
- Step3-Mark the region . If the inequality constraint corresponding to that line is $\leq$, then the region below the line lying in the first quadrant(due to non-negativity of variables) is shaded. For the inequality constraint $\geq$ sign, the region above the line in the first quadrant is shaded. The points lying in the common region will satisfy all the constraints simultaneously. The common region thus obtained is called as *feasible region*

Step 4-Assign an arbitrary value , say zero, to the objective function.

Step 5-Draw a straight line to represent objective function with the arbitrary value.(i.e a straight line through the origin)

Step 6-Strech the objective function line till the extreme points of the feasible region. In the maximization case,this line will stop farthest from origin, passing through at least one corner of the feasible region. In the minimization case, the line will stop nearest to the origin, passing through at least one corner of the feasible region.

Step 7- Find the coordinates of extreme points selected in the step 6 and find maximum or minimum value of Z.

$\text{Max } Z=5x+8y$

Subject to

$3x+2y\leq 36$

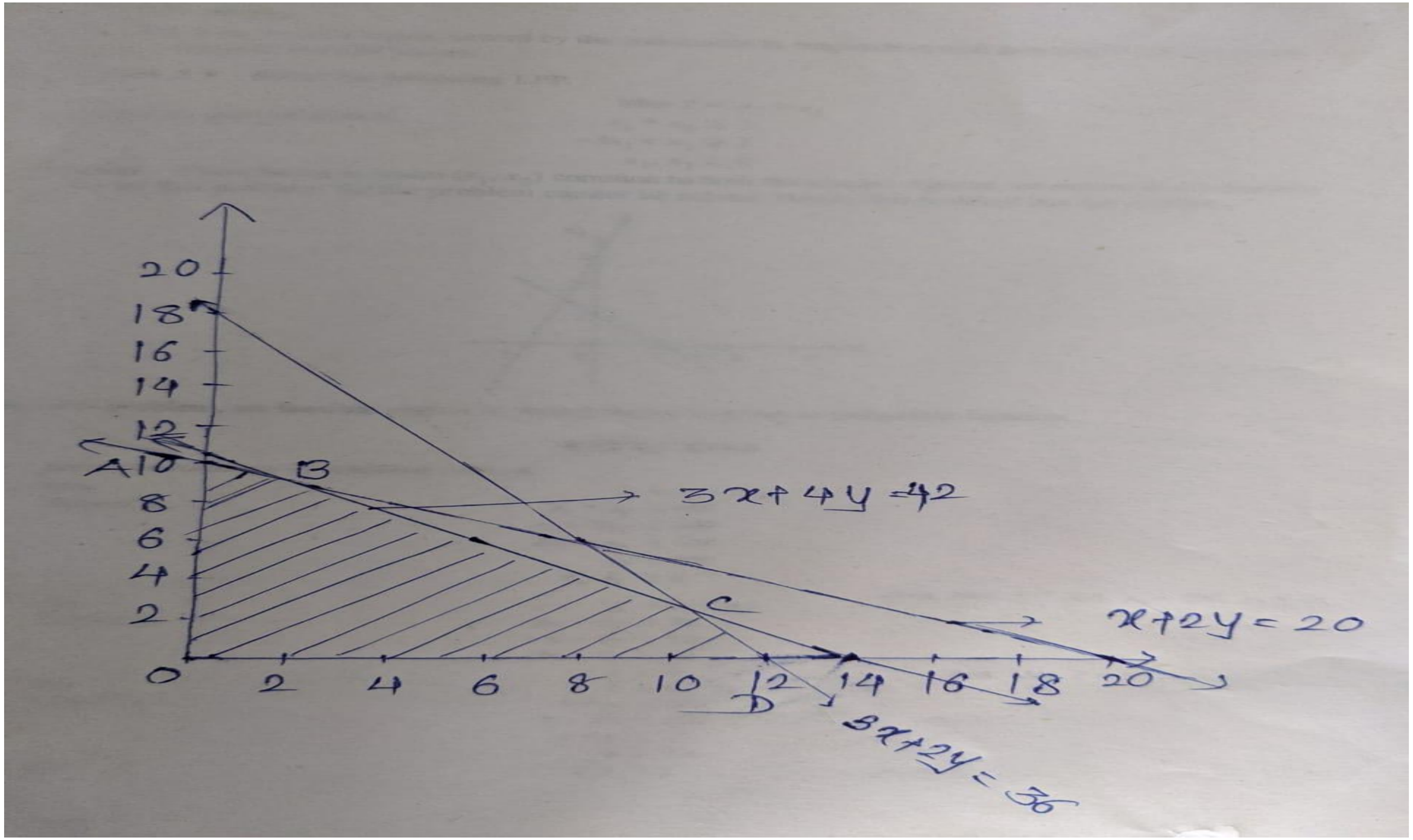
$x+2y\leq 20$

$3x+4y \leq 42$

$x,y\geq 0$

To find the coordinates

	$x=0$		$y=0$
Line $3x+2y=36$ passes through	(0,18)	and	(12,0)
Line $x+2y=20$ passes through	(0,10)		(20,0)
Line $3x+4y= 42$ passes through	(0,10.5)		(14,0)



20
18
16
14
12
A 10
B
8
6
4
2
0
2
4
6
8
10
12
14
16
18
20
C
D
3x+4y=42
x+2y=20
3x+2y=36

Corner points	Z=5x+8y
O(0,0)	0
A(0,10)	80
B(8,6)	88
C(10,3)	74
D(12,0)	60

Max z= 88 at the point (8,6)
Therefore the soln to given LPP is x=8 ,y=6
Max value of Z= 88

$\text{Max } Z=20x_1+10x_2$

Subject to

$x_1+2x_2 \leq 40$

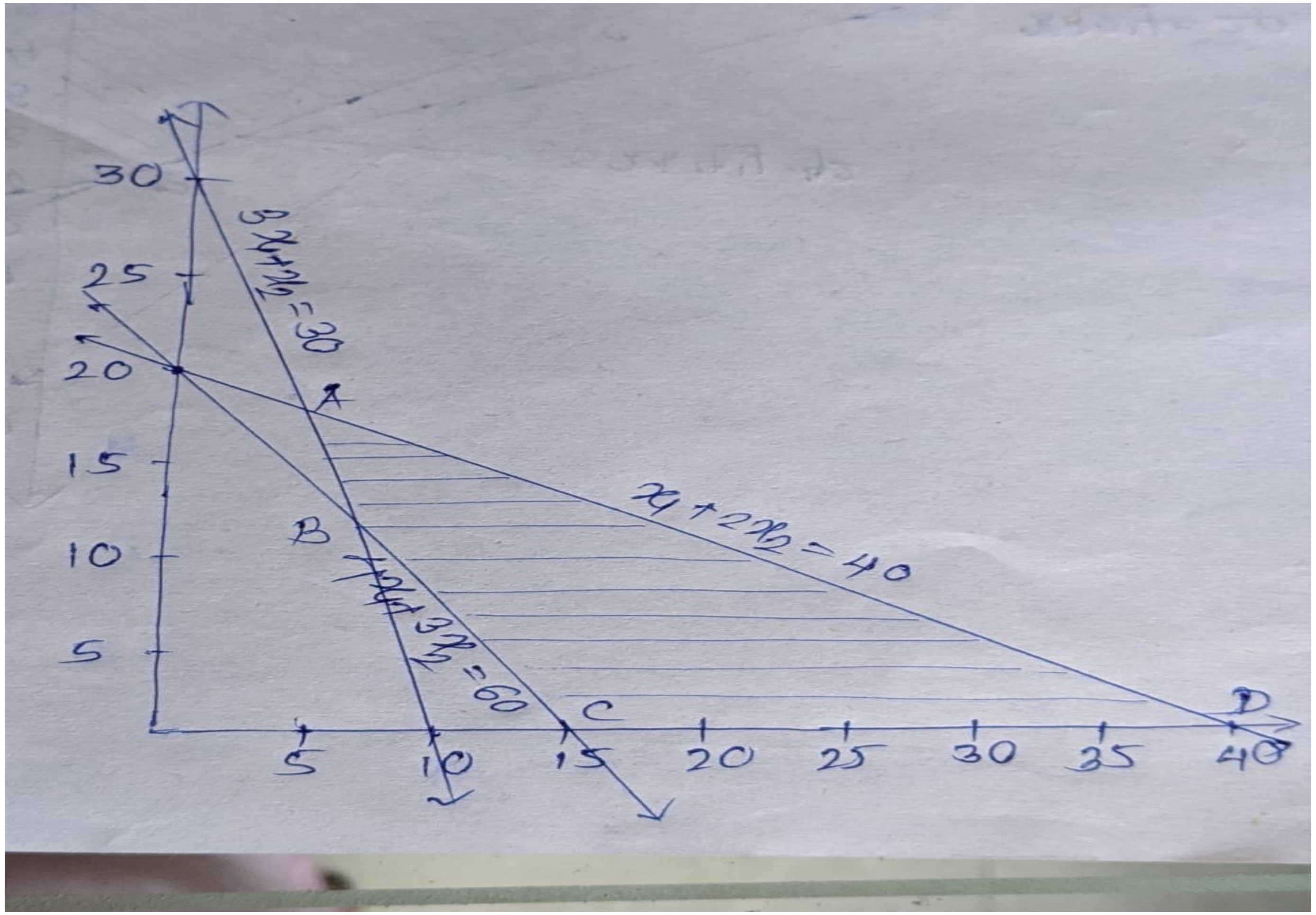
$3x_1+x_2 \geq 30$

$4x_1+3x_2 \geq 60$

$x_1, x_2 \geq 0$

To find the coordinates

Line $x_1+2x_2 = 40$ passes through	x1=0		x2=0
	(0,20)	and	(40,0)
Line $3x_1+x_2 = 30$ passes through	(0,30)		(10,0)
Line $4x_1+3x_2 = 60$ passes through	(0,20)		(15,0)



$3x_1+x_2=30$
$x_1+2x_2=40$
$2x_1+3x_2=60$
A
B
C
D
5
10
15
20
25
30
35
40

Corner points	Z=20x+10y
A(4,8)	160
B(6,12)	240
C(15,0)	300
D(40,0)	800

Max z= 800 at the point (40,0)
Therefore the soln to given LPP is x=40 ,y=0
Max value of Z= 400

Solve

$$\text{Min } Z=3x_1 - 2x_2$$

Subject to

$$-2x_1+3x_2 \leq 9$$

$$X_1-5x_2 \geq -20$$

$$x_1, x_2 \geq 0$$

Thank You…!