

SBOA SCHOOL & JUNIOR COLLEGE

Std XII MATHEMATICS LINEAR PROGRAMING

Assignment (3)

I Maximise  $Z = 3x + 2y$  Subject to  $x + 2y \leq 10$   
 $3x + y \leq 15$   
 $x, y \geq 0$ .

$x + 2y = 10$

$x \quad 0 \quad 10$

$y \quad 5 \quad 0$

$3x + y = 15$

$x \quad 0 \quad 5$

$y \quad 15 \quad 0$

Scale  
x-axis 1cm = 5 units  
y-axis 1cm = 5 units

Cornerpoints

$O(0, 0)$

$A(5, 0)$

$B(4, 3)$

$C(0, 5)$

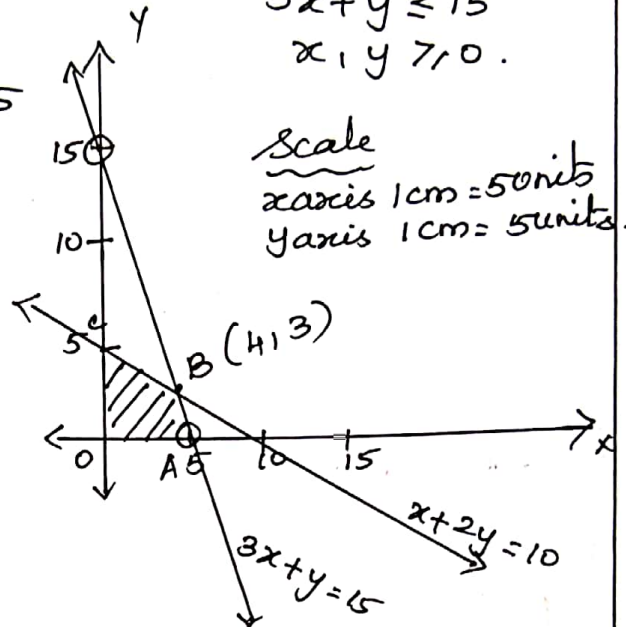
$Z = 3x + 2y$

0

15

18  $\rightarrow$  Maximum

10



$\therefore Z = 18$  Maximum at  $x = 4$ ;  $y = 3$

Solve the following LPP by graphically.

1) Maximise  $Z = 17.50x + 7y$  Subject to  
 $x + 3y \leq 12$ ;  $3x + y \leq 12$ ;  $x, y \geq 0$

2) Maximise  $Z = x + y$  Subject to  
 $1.5x + 3y \leq 42$ ;  $3x + y \leq 24$ ;  $x, y \geq 0$

3) Maximise  $Z = x + y$  Subject to  
 $2x + y \leq 50$ ;  $x + 2y \leq 40$ ;  $x, y \geq 0$

4) Maximise  $Z = 7x + 10y$  Subject to  
 $2x + 3y \leq 120$ ;  $2x + y \leq 80$ ;  $x, y \geq 0$

5) Maximise  $Z = 5x + 6y$  Subject to  
 $5x + 8y \leq 200$ ;  $10x + 8y \leq 240$ ;  $x, y \geq 0$

II ① Minimise  $Z = 200x + 500y$  Subject to  
 $x + 2y \geq 10$  ;  $3x + 4y \leq 24$  ;  $x, y \geq 0$

Ans ( $Z = 2300$  at  $x = 4$  ;  $y = 3$ )

② Minimise  $Z = 3x + 3.5y$  Subject to  
 $x + 2y \geq 240$  ;  $3x + 1.5y \geq 270$  ;  
 $1.5x + 2y \leq 210$  ;  $x, y \geq 0$

(Ans  $Z = 470$  at  $x = 40$   $y = 100$ )

③ Minimise and Maximise :  
 $Z = 5x + 10y$  Subject to

$$x + 2y \leq 120 \quad ; \quad x + y \geq 60 ;$$

$$x - 2y \geq 0 \quad ; \quad x, y \geq 0$$

Ans  $Z = 600$  Maximum at all the points  
on the line joining  $(120, 0)$  &  $(60, 30)$

④ Minimise and Maximise :

$$Z = x + 2y \quad \text{Subject to}$$

$$x + 2y \geq 100 \quad ; \quad 2x - y \leq 0 \quad ; \quad 2x + y \leq 200 \quad ; \quad x, y \geq 0$$

(Minimum - 100 ; Maximum - 400)