Previous Year CBSE Problems with Solutions

Problem 1:

1. Find graphically, the maximum value of $z = 2x + 5y$, subject to constraints given below:

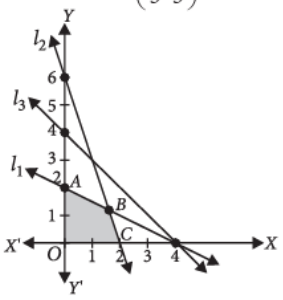
$2x + 4y \le 8,\ 3x + y \le 6,\ x + y \le 4;\ x \ge 0,\ y \ge 0$

(Delhi 2015) (6 marks)

Solution:

1. Let $l_1 : 2x + 4y = 8$, $l_2 : 3x + y = 6$, $l_3 : x + y = 4$; $x = 0$, $y = 0$

Solving l_1 and l_2 we get $B\left(\frac{8}{5}, \frac{6}{5}\right)$



Shaded portion $OABC$ is the feasible region, where coordinates of the corner points are $O(0, 0)$, $A(0, 2)$, $B\left(\frac{8}{5}, \frac{6}{5}\right)$, $C(2, 0)$

The value of objective function at these points are :

Corner Points	Value of the objective function $z = 2x + 5y$
$O(0, 0)$	$2 \times 0 + 5 \times 0 = 0$
$A(0, 2)$	$2 \times 0 + 5 \times 2 = 10$ (Maximum)
$B\left(\frac{8}{5}, \frac{6}{5}\right)$	$2\times\frac{8}{5} + 5\times\frac{6}{5} = 9.2$
$C(2, 0)$	$2 \times 2 + 5 \times 0 = 4$

$\therefore$ The maximum value of z is 10, which is at $A(0, 2)$.