(b)   Solve the following problem :

Minimize $f(X) = x_1^2 + x_2^2 + x_3^2$

subject to $g_1(X) = 2x_1 + x_2 - 5 \le 0$

$g_2(X) = x_2 + x_3 - 2 \le 0$

$g_3(X) = 1 - x_1 \le 0$

$g_4(X) = 2 - x_2 \le 0$

$g_5(X) = -x_3 \le 0$

UNIT – II

2   (a)   Find the dual of the following problem :

Maximize : $Z_p = 2x_1 + 3x_2 + x_3$

S.t. $4x_1 + 3x_2 + x_3 = 6$

$x_1 + 2x_2 + 5x_3 = 4$

$x_1, x_2, x_3 \ge 0$

(b)   A company wishes to plan its advertising strategy. There are two media under consideration call them magazine I and magazine II. Magazine I has a reach of 2000 potential customers and Magazine II has a reach of 3000 potential customers. The cost per page of advertising is Rs. 400 and 600 in Magazine I and II respectively. The firm has a monthly budget of Rs. 6000. There is an important requirement that the total reach for the income group under Rs. 20,000 per annum, should not exceed 4000 potential customers. The reach in magazine I and II for this income group is 400 and 200 potential customers respectively. How many pages should be bought in the two magazines to maximise the total reach. Solve the problem graphically.

OR

2   (a)   Solve the following transportation problem :

	D_1	D_2	D_3	D_4	Supply
O_1	13	11	15	40	20
O_2	17	14	12	13	60
O_3	18	18	15	12	70
Demand	30	30	40	50	150

(b)   Solve the following L.P.P. :

Max. $Z = 5x_1 + 3x_2$

s.t. $3x_1 + 5x_2 \le 15$

$5x_1 + 2x_2 \le 10$ and $x_1, x_2 \ge 0$