2012 CSE

Q1. For each hour per that Ashok studies maths, it yields him 10 marks and for each hour that he studies physics, it yields him 5 marks. He can study atmost 14 hours a day and he must get atleast 40 marks in each. Determine graphically how many hours a day he should study maths and physics each, in order to maximize his marks? (12)

Let x be no. of hours Ashok studies maths per day and y be no. of hours he studies physics per day.

Hence L.P.P. can be formulated as

$$\text{Max} \quad z = 10x + 5y$$

Subject to

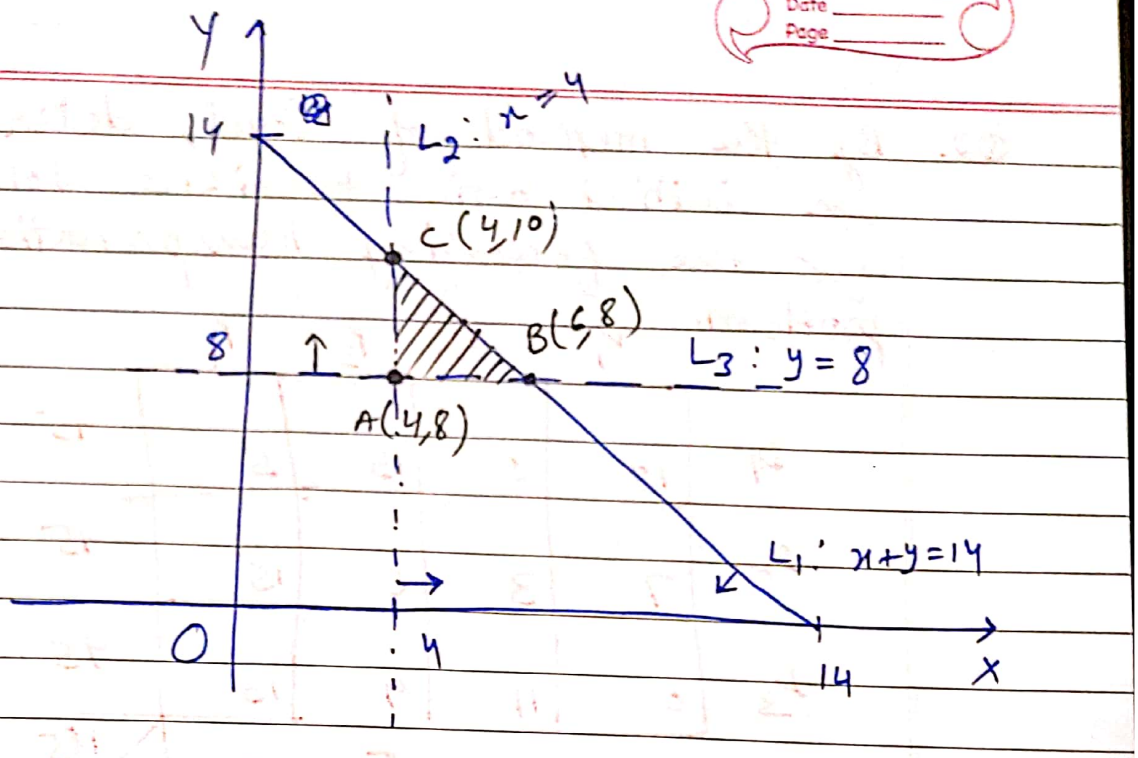
$$x + y \leq 14$$
$$10x \geq 40$$
$$5y \geq 40$$
$$x \geq 0, \quad y \geq 0$$

Let us solve it graphically

$L_1 : x + y = 14$

$L_2 \Rightarrow x = 4$

$L_3 : y = 8$



Value of $Z = 10x + 5y$ at Points Corner.

At $A(4,8) \Rightarrow Z = 40+40 = 80$

At $B(6,8) \Rightarrow Z = 60+40 = 100$

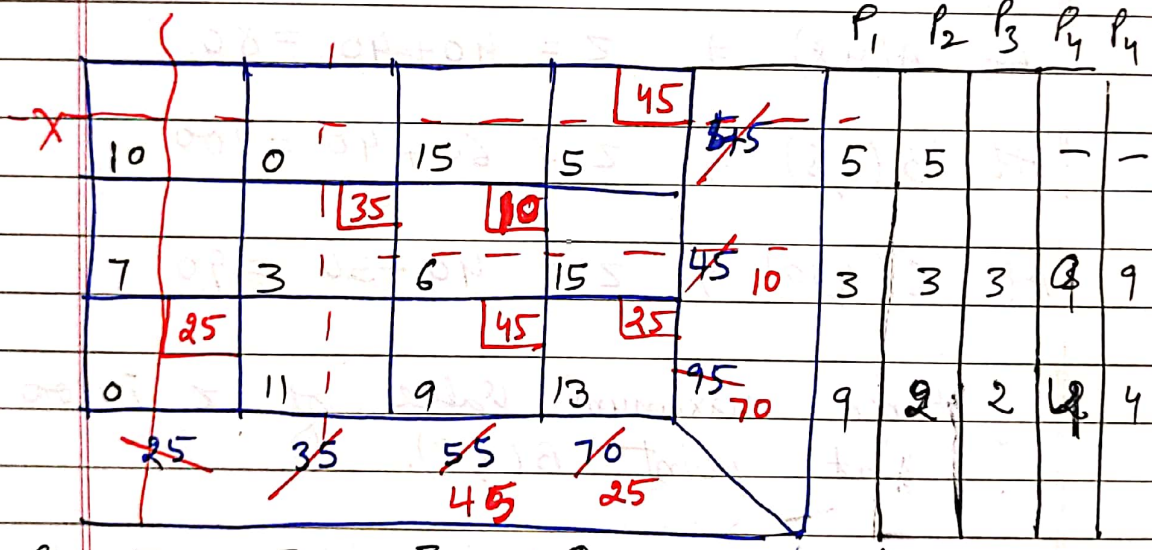
At $C(4,10) \Rightarrow Z = 40+50 = 90$

Hence maximum value of Z is 100 at point B(6,8).

It means, to maximize his marks, if Ashok studies 6 hours maths and 8 hours physics, he will be able to score 100 marks.

Q2. By the method of Vogel, determine an initial basic feasible solution for the following transportation problem.

	P_1	P_2	P_3	P_4	
D_1	10	0	15	5	45
D_2	7	3	6	15	45
D_3	0	11	9	13	95
	25	35	55	70	185



P_1	7	3	3	8
P_2	–	3	3	8
P_3	–	8	3	2
	–	–	3	2

Total cost = $0(25) + 3(35) + 6(10) + 9(45) + 5(45) + 13(25)$

$= 1120.$