

Assignment No. 2

[Formulation & Solution of LPP]

Que.

A hotel owner sells 2-dishes, -chicken & fish. For making 1 plate chicken - 2 masala packets, (2)10 packets salt, (12) garlic pest packet & 0.4 litre water. and for making 1 plate fish - 1 masala packet, (4)10 packet salt, (12) garlic pest & (12) litre water is required. But due to some unfortunate condition he only has 6-masala packets, 2-packets of salt, 2-garlic pest packet, 2 litre water, 1 kg chicken & 0.5 kg fish. Hotel owner makes ₹40 profit on each chicken plate & ₹35 profit on each fish plate. In order to maximize profit, how much quantity of both dishes he should make? [1 plate = 200g]

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Let,

 $x \Rightarrow$ No. of plates of chicken $y \Rightarrow$ No. of plates of fish.

Objective function is,

$$Z = 40x + 35y$$

- (1)

and constraints are

$$2x + y \leq 6$$

- (2)

$$0.2x + 0.4y \leq 2$$

- (3)

$$0.5x + 0.5y \leq 2$$

- (4)

$$0.4x + 0.6y \leq 2$$

- (5)

$$0.2x \leq 1$$

- (6)

$$0.2y \leq 0.5$$

- (7)

$$\& \quad x, y \geq 0$$

$$\text{eqn } ②, \quad 2x + y = 6 \Rightarrow x = 3, y = 6$$

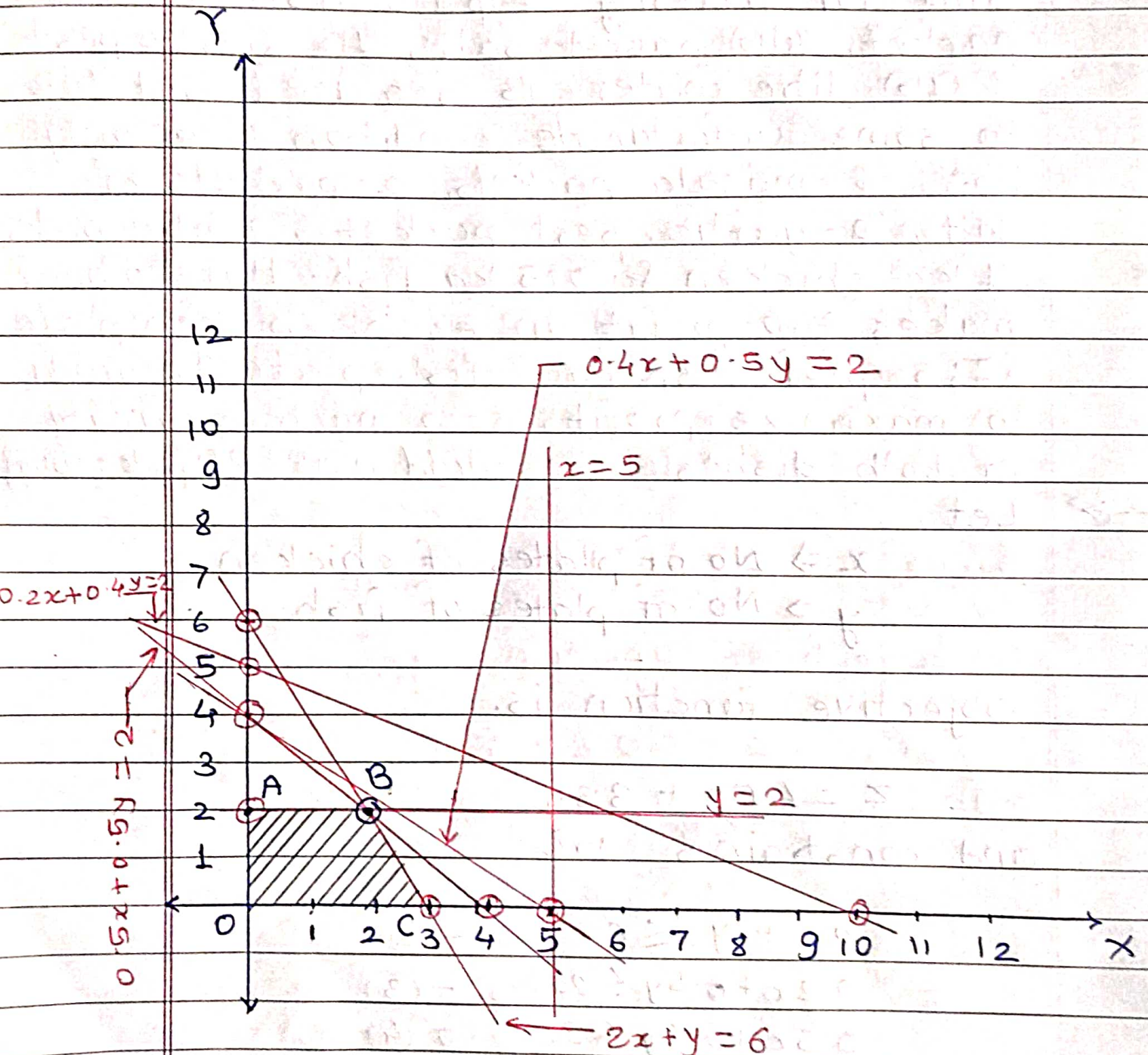
$$\text{eqn } ③, \quad 0.2x + 0.4y = 2 \Rightarrow x = 10, y = 5$$

$$\text{eqn } ④, \quad 0.5x + 0.5y = 2 \Rightarrow x = 4, y = 4$$

$$\text{eqn } ⑤, \quad 0.4x + 0.5y = 2 \Rightarrow x = 5, y = 4$$

$$\text{eqn } ⑥, \quad 0.2x = 1 \Rightarrow x = 5$$

$$\text{eqn } ⑦, \quad 0.2y = 0.5 \Rightarrow y = 2.5$$



To find intersection of lines

$$2x + y = 6 \text{ \& } 0.5x + 0.5y = 2.$$

$$\Rightarrow x + y = 4$$

$$\Rightarrow y = 6 - 2x \Rightarrow x + 6 - 2x = 4$$

$$\Rightarrow x = 2$$

$$\& y = 2$$

\therefore Intersection of $2x + y = 6$ & $0.5x + 0.5y = 2$ is $(2, 2)$ i.e. point B.

From graph, OABC is feasible region.
Finding objective function value at corner points of feasible region.

Points	Co-ordinates	objective function $Z = 40x + 35y$.
A	$(0, 0)$	$Z = 40 \times 0 + 35 \times 0 = 0$
A	$(0, 2)$	$Z = 40 \times 0 + 35 \times 2 = 70$
B	$(2, 2)$	$Z = 40 \times 2 + 35 \times 2 = 150$
C	$(0, 3)$	$Z = 40 \times 0 + 35 \times 3 = 105$

\therefore From table it can be seen that optimum solution is $[x = 2 \text{ \& } y = 2]$ & optimum value is ₹ 150

\therefore Hotel owner should make 2-dishes of ^{plates} chicken & 2-dishes of fish.