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## Question #1

A company produces of products  $P_1$ ,  $P_2$  and  $P_3$  ... Time required

Solution:

Product	Progress	Finishing
$P_1$	12	03
$P_2$	06	08
$P_3$	08	06

Company Capacity      3000      1500

Now convert it into Linear programme -

$$12x_1 + 6x_2 + 8x_3 \leq 3000$$

$$3x_1 + 3x_2 + 6x_3 \leq 1500$$

$$\text{Maximum } Z = 1000x_1 + 800x_2 + 400x_3$$

Now find  $x_1$  intercept

$$\text{Put } x_2 = 0 \text{ and } x_3 = 0$$

$$12x_1 + 6(0) + 8(0) = 3000$$

$$12x_1 + 0 + 0 = 3000$$



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$$12x_1 = 3000$$

$$12x_1 = 3000$$

$$\div \quad \div$$

$$\boxed{x_1 = 250}$$

$$P_1 (250, 0, 0)$$

Now for  $x_2$  intercept put  $x_1 = 0$

and  $x_3 = 0$

$$12x_1 + 6x_2 + 8x_3 = 3000$$

$$12(0) + 6x_2 + 8(0) = 3000$$

$$0 + 6x_2 + 0 = 3000$$

$$6x_2 = 3000$$

$$\underline{6x_2} = \underline{3000}^{500}$$

$$\div \quad \div$$

$$x_2 = 500$$

$$P_2 (0, 500, 0)$$

Now for  $x_3$  intercept

Put  $x_1 = 0$  and  $x_2 = 0$

$$12(0) + 6(0) + 8x_3 = 3000$$

$$8x_3 = 3000$$



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$$\frac{8x_3}{8} = \frac{3960}{8}^{375}$$

$$x_3 = 375$$

Ⓟ  $P_3 (0, 0, 375)$

Put all the points in  $Z$  to find the maximum point value -

$$Z = 1000x_1 + 800x_2 + 400x_3$$

$$Z = 1000(250) + 800(0) + 400(0)$$

$$Z = 250000 + 0 + 0$$

$$Z = 250000$$

Now put another intercept

$$Z = 1000x_1 + 800x_2 + 400x_3$$

$$Z = 1000(0) + 800(500) + 400(0)$$

$$Z = 0 + 400000 + 0$$

$$Z = 400000$$

Now put 3rd intercept

$$Z = 1000x_1 + 800x_2 + 400x_3$$

$$Z = 1000(0) + 800(0) + 400(375)$$

$$Z = 0 + 0 + 150000$$

$$Z = 150,000$$



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$$Z_1 = 1000(500) + 0 + 0 \\ = 500000$$

$$Z_2 = 0 + 800(182.5) + 0 = 150000$$

$$Z_3 = 0 + 0 + 400(350) = 140000$$

Now maximum point is

$$P_4 (500, 0) = 500000 \quad \text{Hr}$$



(5)

## Question # 2

The MD of the Company has the following goals which are arranged in order of priority - .....

Solution :-

\* We are formulating the above as general programming problem and solving it -

\* Goal is the maximization of Sales

$$\text{then } x_1 + \bar{z}_2 = 150$$

and

$$x_2 + \bar{z}_3 = 200$$

Subjected to Constraints

$$x_1 + x_2 + d_1 - d_1 = 500$$

$$x_1 + d_2 = 150$$

$$x_2 + d_3 = 200$$

and  $x_1, x_2, d_1, d_2, d_3, d_4 \geq 0$



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