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BS(SE) — 4 Section 'A'

~~Paper~~ Assignment operation research

Date:

Q 1:-

A company produces 3 type of products P_1, P_2 and P_3.

	Time required			
Production	progress	Finishing	Total qu
P_1	12	03	1600
P_2	06	08	800
P_3	08	06	400
company capicity	3000	1500	

Now Convert into linear programing

$$12x_1 + 6x_2 + 8x_3 \leq 3000 \quad -(i)$$

$$3x_1 + 8x_2 + 6x_3 \leq 1500 \quad -(ii)$$

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

Now find x_1 intercept to put $x_2 = 0$ and $x_3 = 0$.

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

Put $x_2 = 0$ and $x_3 = 0$

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

$x_1 = \frac{3000}{12} = 250$

$= P_1(250, 0, 0)$

Now for x_2 intercept put $x_1 = 0$ and $x_3 = 0$

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

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

$x_2 = \frac{3000}{6} = 500$

$P_2 = (0, 500, 0)$

Now for x_3 intercept put $x_1 = 0$ and $x_2 = 0$

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

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

$x_3 = \frac{3000}{8}$

$P_3(0, 0, 375)$

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Now for x_3 intercept put $x_1 = 0$, and $x_2 = 0$

$3x_1 + 8x_2 + 6x_3 = 1500$

$3(0) + 8(0) + 6x_3 = 1500$

$x_3 = \frac{1500}{6} = 250$

$P_6 = (0, 0, 250)$

Then all point put in $Z_j(z)$ to find the minimum value.

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

$Z = 1000(250) + 0 + 0 = 250000$

$Z = 1000 + 800(500) + 0 = 400000$

$Z = 0 + 0 + 400(375) = 150000$

$Z = 1000(500) + 0 + 0 = 500000$ ✓

$Z = 0 + 800(187.5) + 0 = 150000$

$Z = 0 + 0 + 400(250) = 100000$

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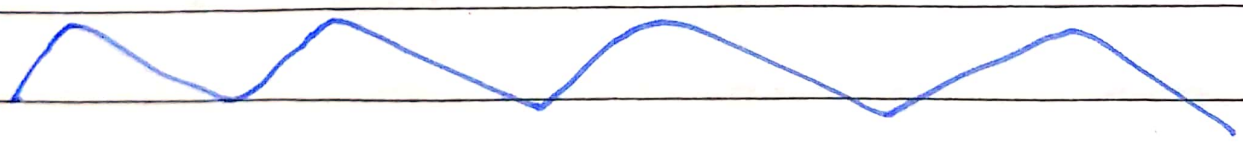
Now the Maximum Point is

$P_4(500, 0, 0) = 500000$

$Z = 500000$



Q2:

* The MD of the Company has the following goals wh are arranged in orderd of priority.

* P_1 No under utilization of plant production capecity.

* P_2 Sells maximum possible number of products. A and B the MD has twice as much desire to sell product 'A' as for product 'B' becuse the not profit from the Sale of product A es ~~for product B~~ the amount

from that of product B.

* P_3 Maximize over time operat of the plant.

* we are formulating the above as gexel programing problem and solving it.

* let x_1 and x_2 be the number of product A and B since.

$$x_1 + x_2 + Z_1^- - Z_1^+ = 500$$

where

Z_i = under is utilization operation capacity veriable

* goal is the maximization of sales.

then

$$x_1 + z_2^- = 150$$

and

$$x_2 + z_3^- = 200$$

where z_2^- - under achivment of sale goals of product A.

z under achievment of the sale goal of product 'B'

minimize.

$$Y = p_1 d_1 + 2p_2 d_2 + p_2 d_3 + p_3 d_1$$

Subjected to constraints.

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

$$x_1 + d_2 = 150$$

$$d_2 + d_3 = 200$$

and

$$x_1, x_2, d_1^-, d_2^-, d_3^-, d_1^+ \geq 0$$