

NAME :- SULMAN KHAN

ID :- 14518

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INSTRUCTOR :- SAIF ULLAH JAN

(2)

## QUESTION No 2

A manufacturer produce two types of products A and B

### ANSWER:-

Sol:-

#### Types of Product

Type of product	number sold in month	Net Profit
A	150	
B	200	

The MD of the Company has set the following goal which are arrange in order of priority  
P<sub>1</sub> No under utilization of plant production capacity.

$P_2$  Sell maximum possible number of product A and B. The MD has twice as much desire to sell product A as for product B, because the net profit from the sale of product A is a twice the amount from that of product B

$P_3$  Minimise overtime operation of the plant. formulate the above as a goal programming problem and solve it

So - let  $x_1$  and  $x_2$  be the number of product A and B. Since overtime operation are not allowed

$$x_1 + x_2 + d_1^- - d_1^+ = 500 \text{ (Plant capacity)}$$

where  $d_1^-$  = under utilisation of production capacity variable.  
 $d_1^+$  = overtime production operation capacity variable.

Since goal is the maximum of sales, hence positive deviation will not appear in constraints related with sales.

Then  $x_1 + d_2^- = 150$

and  $x_2 + d_3^- = 200$

$d_2^-$  = under achievement of sale goal for (A)

$d_3^-$  = under achievement of sale goal for (B)

Now the goal programming mathematically model can be written as minimize

$$z = p_1 d_1^- + 2p_2 d_2^- + p_2 d_3^- + p_3 d_1^+$$

Subject to the constraints.

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

$$x_1 + d_2^- = 150$$

$$x_2 + d_3^- = 200$$

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

All the goal constraints can be plotted on the graph.

