

OPERATIONAL RESEARCH MINI PROJECT

A company manufactures three products namely

X, Y and Z. Each of the products require

processing on three machines, Turning, Milling

and Grinding. Product X requires to hours of

turning, 5 hours of milling and I hour of grinding.

Product Y requires 5 hours of turning, 10 hours

of milling and I hour of grinding and Product Z.

requires 2 hours of turning, 4 hours of milling

and 2 hours of grinding. To the coming planning

period, 2700 hours of turning, 2200 hours of

milling and 500 hours of grinding are available.

The profit committee of X, Y and Z are Rsi 10,

Rs. 15 and Rs. 20 per unit respectively. Find the

optimal product mix to maximize the profit.

Solution:

Maximize Z = 10x + 15y + 20z
Subject to

10x + 5y + 2z < 2700 5x + 10y + 4z < 22001x + 1y + 2z < 500

Let S1, S2, S3 be three slack variables

Maximize Z = 10x + 15y + 20z + 051 + 052 + 053 10x + 5y + 2z + 151 + 052 + 053 = 2700 5x + 10y + 4z + 051 + 152 + 053 = 22001x + 1y + 2z + 051 + 052 + 153 = 500

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; $R_2 \rightarrow R_2 - 4R_3$; $R_1 \rightarrow R_1 - 2R_3$

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distance in	У	15	150	3/8	1	0	0	
1	2	20	175	5/16	0		0	
			Dj	3%6	0	0	0	

As all the elements of Di is o or positive, the solution is optimal.

The firm has to produce 150 units of 4 and 175 units of Z.

The optimal profit will be

 $\max Z = 10 x + 15y + 20z$ = 10(0) + 15(150) + 20(175) = 2250 + 3500

= 5750

The optimal profit is 5750.