1.8.4. Objective of the Problem

To maximise the profit how much of X and Y are to be manufactured? That is maximization of the profit or maximization of the returns is the objective of the problem. For this in the statement it is given that the profit contribution of X is 8.5 -per unit and that of product Y is Rs. 7-p re unit.

1.8.5. To establish relationship between variables and constraints and build up a model

Let us say that company manufactures x units of X and y units of Y. Then as one unit of x consumes one hour on machine A and one unit of y consumes one hour on machine A and one unit of y consumes one hour on machine A, the total consumption by manufacturing r units of X and y units of Y is. It + Iy and this should not exceed available capacity of 40 hours. Hence the mathematical relationship in the form of mathematical model is Ix + Iy ≤ 40. This is for resource machine A. Similarly for machine B and machine C we can formulate the mathematical models. They appear as shown below:

1x + 8y ≤ 240 for machine B and I0x + 7y ≤ 350 for machine C. Therefore, the mathematical model for these resources are:

1x + 1y ≤ 40

3x + 8y ≤ 240 and

10x + 7y ≤ 350.

Similarly for objective function as the company manufacturing x units of X and Y units of Y and the pnofit contribution of X and Y are Rs.7-A and Rs.7-by er unit of X and Y respectively, the total profit camed by the company by manufacturing x and y units is 5x + 7y. This we have to maximise. Therefore objective function is Maximise Sr + 7y. At the same time, we have to remember on thing that the company can manufacture any number of units or it may not manufacture a particular product, for example say x = 0. But it cannot manufacture negative units of x and y. Hence one more constraint is to be introduced in the model i.e. anon -negativity constraint. Hence the mathematical representation of the contents of the statement is as given below:

Maximise Z = 5x + 7y Subject to a condition (written as s.t.) → ORJECTIVE FUNCTION.

1x + y ≤ 240

3x + 8y ≤ 240

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