13. A company manufactures two types of screws A and B. All the screws have to pass through a threading machine and a slotting machine. A box of Type A screws requires 2 minutes on the threading machine and 3 minutes on the slotting machine. A box of type B screws requires 8 minutes of threading on the threading machine and 2 minutes on the slotting machine. In a week, each machine is available for 60 hours.

On selling these screws, the company gets a profit of Rs 100 per box on type A screws and Rs 170 per box on type B screws.

Formulate this problem as a LPP given that the objective is to maximize profit.

Solution:

Let's consider that the company manufactures x boxes of type A screws and y boxes of type B screws.

From the given information the below table is constructed:

Items	Type A (x)	Type B (y)	Minimum time available on each machine in a week
Time required on threading machine	2	8	60 x 60 = 3600 minutes
Time required on slotting machine	3	2	60 x 60 = 3600 minutes
Profit	Rs 100	Rs 170	

From the data in the above table, the objective function for maximum profit Z = 100x + 170y

Subject to the constraints

$2x + 8y \le 3600 \Rightarrow x + 4y \le 1800$ ... (i)

$3x + 2y \le 3600$ ... (ii)

$x \ge 0, y \ge 0$ (non-negative constraints)

Therefore, the required LPP is

Maximize: Z = 100x + 170y

Subject to constraints,

$x + 4y \le 1800, 3x + 2y \le 3600, x \ge 0, y \ge 0.$