# Assignment - (1)

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* Linear Programming

① $F(A,B) = 32A + 24B$

F = Total Profit as a function,
A = number of bags Collegiate
B = number of bags minis

$0 \leq A \leq 1000, \quad 0 \leq B \leq 1200$

Total nylon = 5000 Sqft
Total labour hours = $35 \times 40 = 1400$ hr

35 → number of available labors
40 → number of hours each labor work

A → need 3 Sqft nylon
B → need 2 Sqft nylon

$$3A + 2B \leq 5000$$

A → each unit it consumes 45 min $\Rightarrow \frac{45}{60} = \frac{3}{4}$

B → each unit it consumes 40 min $\Rightarrow \frac{40}{60} = \frac{2}{3}$

$$\frac{3}{4}A + \frac{2}{3}B \leq 1400$$

## Constraints:

$$3A + 2B \leq 5000$$

$$\frac{3}{4}A + \frac{2}{3}B \leq 1400$$

The amount of material that has to be work with each week and how many labor hours each week

## Decision Variables:-

F = Total Profit

A = Number of Collegiate bags

B = Number of bags minis

## Objective functions:-

⇒ Maximize Profit

$$F(A,B) = 32A + 24B$$

Where A, B are Variables Since we Can't make negative backpack both A, B are greater than 0.

* Sales Unit $0 \leq A \leq 1000$

$0 \leq B \leq 1200$

(2) **Decision Variables :-**

let NAB be no of Units of Size

N = no of Unit

A = no of Plant (1, 2, 3)

B = It holds the Plant of Large, medium, Small

K = It has to be maximized

**Objective function :-**

$$K = 420(N_{2L} + N_{3L} + N_{1L}) + 360(N_{2M} + N_{3M} + N_{1M}) + 300(N_{2S} + N_{3S} + N_{1S})$$

**Constraints :-**

Capacity Limits : $N_{1L} + N_{1M} + N_{1S} \leq 750 \rightarrow$ Plant 1

$N_{2L} + N_{2M} + N_{2S} \leq 900 \rightarrow$ Plant 2

$N_{3L} + N_{3M} + N_{3S} \leq 450 \rightarrow$ Plant 3

**Storage Limits:** $20N_1L + 15N_1M + 12N_1S \leq 13000$

$20N_2L + 15N_2M + 12N_2S \leq 12000$

$20N_3L + 15N_3M + 12N_3S \leq 5000$

**Sales forcast:** $N_1L + N_1M + N_1S \leq 900$

$N_2L + N_2M + N_2S \leq 1200$

$N_3L + N_3M + N_3S \leq 750$

**Percentage to avoid layoff:** $\frac{N_1L + N_1M + N_1S}{750} \times 100$

$= \frac{N_2L + N_2M + N_2S}{900} \times 100$

$= \frac{N_3L + N_3M + N_3S}{450} \times 100$