Replacement Model

- During maintenance
- Old items has failed to accident
- Individual Replacement
- Group Replacement

Notations:

n – Year

C – Capital Cost (or) Initial Cost

S – Scrap Value (or) Resale Value (or) Trade in value

R_n – Maintenance cost (or) Running cost

$f(n)$ – Operating cost + Maintenance cost

$P(n)$ – Total cost $\left[\text{Total maintaining cost} + (C-S)\right]$

$\Sigma R_n + C - S$

① A machine owner finds from his past records that the costs per year of maintaining a machine whose purchase price is Rs. 6000 are given below:

Year	1	2	3	4	5	6
Maintenance cost (Rs)	1000	1200	1400	1800	2300	2800
Resale value (Rs)	3000	1500	750	375	200	200

Determine at what age is replacement due?

C = Rs. 6000 S = Scrap value

Year (n) ①	Maintenance cost (R_n) ② (Rs)	Total Maintenance cost ($\leq R_n$) ③ (Rs)	Resale Value (S) ④ (Rs)	$C - S$ ⑤ (Rs)	Total cost ($P(n)$) ③+⑤ ⑥ (Rs)	Avg. cost ($\frac{P(n)}{n}$) ⑦ (Rs)
1	1000	1000	3000	3000	4000	4000
2	1200	2200	1500	4500	6700	3350
3	1400	3600	750	5250	8850	2950
4	1800	5400	375	5625	11025	2756.25
5	2300	7700	200	5800	13500	⊛ 2700
6	2800	10500	200	5800	16300	2716.67

Minimum cost in 5th year ⇒ optimum replacement plan

∴ Replacement should be made at the end of 5th year.