

10/05/22

## UNIT - 1st

### Replacement Problems

#### Replacement And Replacement situations :-

The efficiency of all the industrial and military equipments, deteriorates with time. Some times the equipments fails completely and effect the whole system.

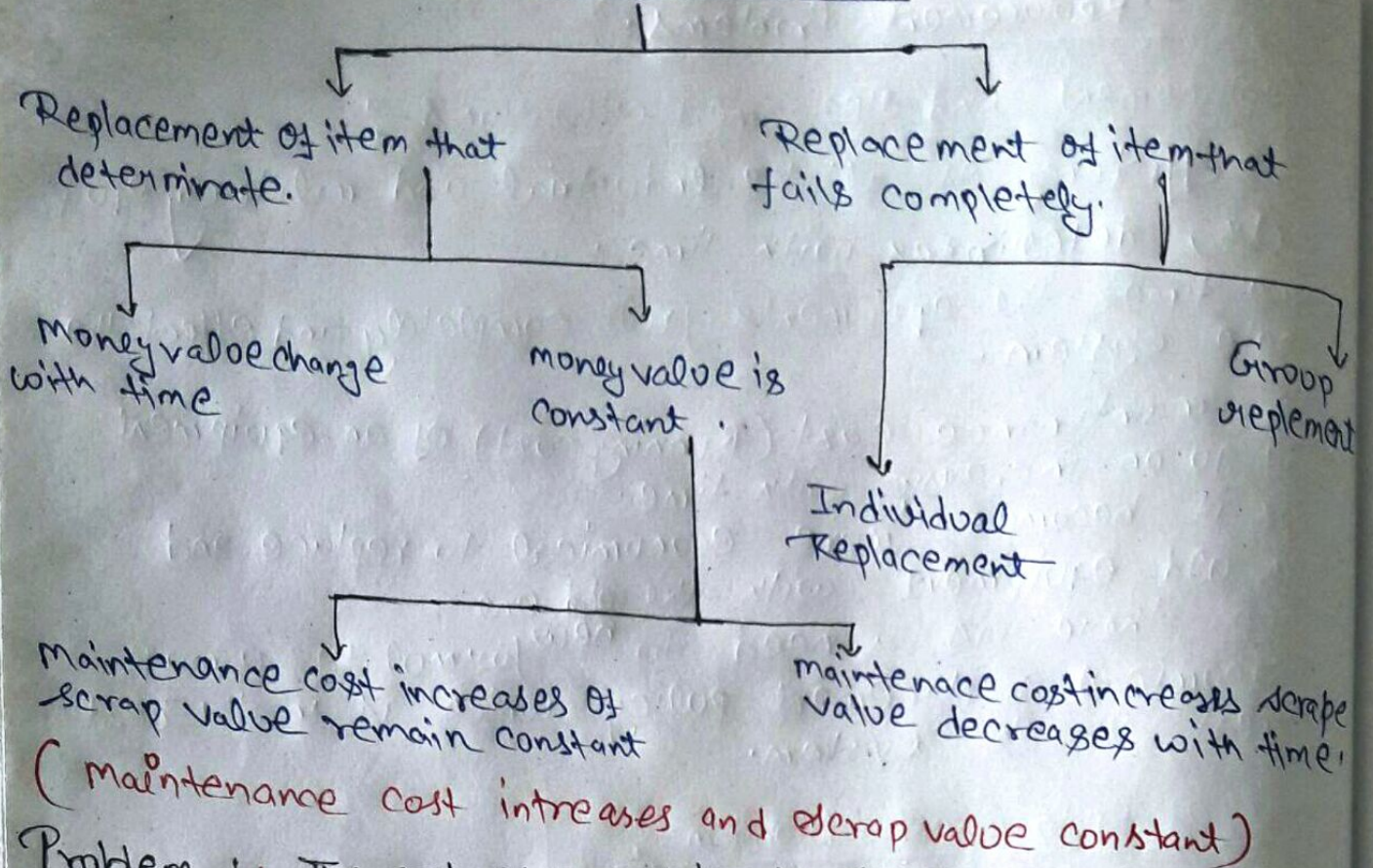
The maintenance cost (Running cost) of an equipment also go on increasing with time.

Thus it becomes more economical to replace and an old equipment with the ~~old~~ new one. Hence there is a need to formulate a most economical replacement policy which is in the best interest of the system.

#### Types of Replacement Problem :-

- ① Replacement of equipment, yet, deteriorates, with time.
- ② Replacement of equipments in anticipation of complete failure, the probability of which increasing with time.
- ③ Problems in modelity and staffing.
- ④ Replacement of an equipment may be necessary due to new researches otherwise the system may become out of date.

# "Replacement-model"



Problem :- The cost of a machine is RS-6100 and its scrap value is only 100 RS. The maintenance cost are found from, experience to be year

experience of year	1	2	3	4	5	6	7	8
maintenance cost	100	250	400	600	900	1200	1600	2000

When should machine be replace ?

Solution :- Given machine cost = 6100  
 scrap value = 100  
 Difference = 6100 - 100 = 6000 RS

Year (n)	maintenance cost (m <sub>n</sub> )	Total maintenance cost (T <sub>m</sub> )	Difference (D)	Total cost (T <sub>n</sub> )	Average cost (T <sub>n</sub> /n)
1	100	100	6000	T <sub>m</sub> + D = 6000 + 100 = 6100	6100 / 1 = 6100
2	250	100 + 250 = 350	6000	6350	6350 / 2 = 3175
3	400	300 + 400 = 700	6000	6700	6700 / 3 = 2233
4	600	700 + 600 = 1300	6000	8250	1837
5	900	2250	6000	9000	1650

6	1250	3500	6000	19500	1583
7	1600	5100	6000	11100	1583.6
8	2000	7100	6000	14000	

1583.6  
 since  $M_n > T_n$

Since maintenance cost of 7<sup>th</sup> year is greater than the average cost of 6<sup>th</sup>.  
 Hence machine should be replaced at the end of 6<sup>th</sup> year.