1. Describe the systematic approach to the equipment replacement programme. State the advantages of sound equipment replacement programme.
2. Define inventory. What are the various types of inventory? Why they are maintained?
3. Describe various inventory models. Explain briefly the following terms:
    (i) Purchase cost (ii) Ordering cost (iii) Inventory carrying cost (iv) Shortage cost
4. Derive a formula for economic order quantity (EOQ) for an inventory model with uniform demand.

5. The annual demand of an item is 3200 units. The unit cost is Rs.6 and inventory carrying charges 25% per annum. If the cost of one procurement is Rs. 150, determine:
    (i) EOQ (ii) number of orders per year (iii) time between two consecutive orders (iv) the optimal cost.

6. Describe the following replacement policies,
    (i) Replacement policy for items when money value remains constant.
    (ii) Replacement policy for items when money value changes with constant rate during the period.

7. The demand for an item is deterministic and constant over time and it is equal to 600 units per year. The per unit cost of the item is Rs. 50 while the cost of placing an order is Rs.5. The inventory carrying cost is 20% of the cost of inventory per annum and the cost of shortage is Rs.1per unit per month. Find the optimal ordering quantity and when stock outs are permitted. If the stock outs are not permitted, what would be the loss to the company?

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

Year	1	2	3	4	5	6	7	8
Maintenance Cost	1000	1200	1400	1800	2300	2800	3400	4000
Resale Price	3000	1500	750	375	200	200	200	200

Determine at what age a replacement is due.

9. A company has a demand of 12000 units/year for an item and it can produce 2000 such items per month. The cost of one setup is Rs. 400 and the holding cost/unit/month is Rs.0.15. Find the optimum lot size and the total cost per year, assuming the cost of 1 unit as Rs.4. Also find the maximum inventory, manufacturing time and total time.

10. (i) Machine A costs Rs. 9000. Annual operating costs are Rs. 200 for the first year, and then increases by Rs. 2000 every year. Determine the best age to replace the machine. If the optimum replacement policy is followed, what will be the average yearly cost of owning and operating the machine?

   (ii) Machine B costs Rs. 10000. Annual operating costs are Rs. 400 for the first year and then increases by Rs.800 every year. You now have a machine of type A which is one year old. Should you replace it with B, if so when ?

11. Write short notes on
   (i) Individual replacement
   (ii) Group replacement
   (iii) Deteriorating items and sudden failure items
   (iv) MAPI method

12. Determine the optimal replacement policy for the data given below,
   (i) Group replacement cost Rs. 20 per unit
   (ii) Cost of individual replacement of failure = Rs. 90 per unit
   (iii) Total number of units in a system = 1000 units.
   (iv) Mortality data of units to be used in the system

Interval of time period (hours)	Probability of failure
0 - 200	0.00
200.01 - 400	0.06
400.01 - 600	0.30
600.01 - 800	0.48
800.01 - 1000	0.16

13. A computer contains 10000 resisters. When any resister fails, it is replaced. The cost of replacing a resister individually is Rs. 1 only. If all the resisters are replaced at the same time, the cost per resister would be reduced to 35 paise. The percent surviving at the end of month 't' is given below,

Month→	0	1	2	3	4	5	6
% surviving at the End of the month (S_t)	100	97	90	70	30	15	0

   What is the optimum replacement plan?

14. A company requires 16000 units of raw material costing Rs. 2 per unit. The cost of placing an order is Rs.45 and the carrying costs are 10% per year per unit of the average inventory. determine,
   (i) the economic order quantity
   (ii) cycle time
   (iii) total variable cost of managing the inventory.

15. With the help of a diagram, explain the following terms:
(i) Order quantity (ii) Lead time (iii) Safety stock (iv) Re-order point