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Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET UNIVERSITY)

Ph.D. (Second Semester-Summer) Examinations, April – 2026

PPEMT2038 –Inventory Control Models

(Mathematics)



Time: 3 hrs

Maximum: 70 Marks

The figures in the right hand margin indicate marks.

Answer ANY FIVE Questions.

(14 x 5 = 70 Marks)

Marks

- 1.a. Write the functional Role of Inventory Management. 8
 The production department of a company required 3600kg of raw material for Manufacturing a particular item per year. It has been estimated that the cost of placing an Order is Rs.36 and the cost of carrying inventory is Rs.25 percent of the investment in Inventories. The price is Rs.10 per kg. Help the purchase Manager to determine an Ordering Policy for raw Material. 6
- 2.a. What are the Classification of EOQ Models. 7
 b. Discuss about the Single Item Inventory Control Models without Shortages Problem when Demand rate is constant. 7
3. A commodity is to be supplied at a constant rate of 200 units per day. Supplies of any amount can be obtained at any required time, but each ordering costs Rs.50, cost of holding the commodity in inventory is Rs.2 per unit per day while the delay in the supply of the item induces a penalty of Rs.10 per unit per day. Find the optimal policy (Q, t) , where t is the reorder cycle period and Q is the inventory after reorder. What would be the best policy to adopt if the penalty cost becomes infinite? 14
4. A shop produces three items in a lots. The demand rate for each item is constant and can be assumed to be deterministic. No back orders are to be allowed. The pertinent data for the items is given in the following table.

Item	I	II	III
Carrying cost(Rs per unit per year)	20	20	20
Set-up cost (Rs. per set-up)	50	40	60
Cost per unit(Rs.)	6	7	5
Yearly demand(units)	10,000	12,000	7,500

14

Determine the approximate economic order quantities for three items subject to the condition that the total value of average inventory levels of these items does not exceed Rs.1,000.

5. Discuss about the following terminology 14
 - (i)VED analysis
 - (ii)FSN analysis
 - (iii)SDE analysis
 - (iv)GOLF analysis

For a fixed order quantity system, find out (i) Economic order quantity, (ii) Optimum

- 6.a. buffer stock, (iii) Reorder level for an item with the following data: 7
 Annual consumption = 10,000 units, Cost of one unit = Rs.1.00, Set-up cost = Rs.12 per production run, carrying cost = 0.24%, past lead times: 15 days, 25 days, 13 days, 14 days, 30 days, 17 days.

- b. Define Replenishment Lead Time in inventory Management. 7
7. The demand for an item in a company is 18,000 units per year, and the company can produce the item at a rate of 3,000 per month. The cost of one set-up is Rs.500 and the holding cost of one unit per month is 15 paise. The shortage cost of one unit is Rs.240 per year. Determine the optimum manufacturing quantity and the number of shortages. Also determine the manufacturing time and the time between set-ups. 14

8.a. A company has to purchase four items A, B, C and D for the next year. The projected demand and unit price (in Rs) are as follows:

Item	Demand(units)	Unit Price (Rs)
A	60,000	3
B	40,000	2
C	1,200	24
D	5,000	4

7

If the company wants to reject the total number of orders to 40 for all the four items, how many orders should be placed for each item?

- b. The annual demand of a product is 10,000 units. Each unit costs Rs.100 if the orders are placed in quantities below 200 units. For orders of 200 or above, however, the price is Rs.95. The annual inventory holding costs is 10% of the value of the item and the ordering cost is Rs.5 per order. Find the Economic lot size. 7

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