



GURGAON INSTITUTE OF TECHNOLOGY & MANAGEMENT

**Sem:6th Semester
Session: 2013-14**

**Department of Mechanical Engineering
Course Name: Industrial Engineering
Course Code: ME-312-F**

**Tutorial Sheet no. 3
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- Q1. Overland motors uses 25,000 gear assemblies each year and purchases them at Rs. 3.40 each. It costs Rs.50 to process and receive an order, and inventory can be carried at a cost of Rs. 0.78 per unit –year. (a) How many assemblies should be ordered at a time? (b) How many orders per year should be placed? **(Ans. 1790 assemblies, 14 orders/ year)**
- Q2. A plastic molding firm produces and uses 24,000 Teflon bearing inserts annually. The cost of setting up for production is Rs. 85, and the weekly production rate is 1,000 units. If the production cost is Rs. 2.50 per unit and the annual storage and carrying cost is Rs. 0.50 per unit, how many units should the firm produce during each production run? **(Ans. 3893 inserts)**
- Q3. A producer of photo equipment buys lenses from a supplier at Rs. 100 each. The producer requires 125 lenses per year and the ordering cost is Rs. 18 per order. Carrying costs per unit-year (based on average inventory) are estimated to be Rs. 20 each. The supplier offers a 6% discount for 100 or more lenses at one time. What is the economical amount to order at a time? **(Ans. 50 units)**
- Q4. A firm with an annual demand of 900 units per year estimates its ordering costs at Rs. 15 per order and its carrying costs at Rs 0.30 per unit per year. Assuming that all the conditions of the EOQ model are met, what is the most economical quantity to order? **(Ans. 300 units)**
- Q5. A distributor pays Rs. 80 each for an electrical switch, for which it has an annual demand of 4000 units. Its ordering cost is estimated at only Rs. 20 per order and it estimates carrying charges at 20%. What is the EOQ for this item?**(Ans. 100 units per year)**
- Q6. Far west freeze dry purchase 1200 tins of tea annually in economic order quantity lots of 100 tins and pays Rs 9.85 per tin. If processing costs for each order are Rs10, what are the implied carrying costs of this policy? **(Rs. 2.40/tin-year)**
- Q7. An electronic firm operates 52 weeks per year with an annual requirement for 156000 chips, which it produces in-house. The cost of setting production is Rs. 1600, and the rate at which it produces the chips is 5000 per week. If the carrying cost is Rs. 30 per unit per year, what is the most economical number of chips to make on a production run? **(Ans. 6450 chips/ run)**
- Q8. The finish creamery company produces ice cream bars for vending machines and has an annual demand for 72000 bars. The company has capacity to produce 400 bars per day. It takes only a few minutes to adjust the production set-up (cost estimated at Rs. 7.50 per set-up) for the bars, and the firm is reluctant to produce too many at one time because the storage cost is relatively high at Rs. 1.50 per bar-year. The firm supplies vending machines with its “Fin-Bars” on 360 days of the year. (a) What is the most economical number of bars to produce during any one production run? (b) What is the optimal length of the production run in days? **[Ans. (a) 1200 bars per run (b) 3days]**
- Q9. Magic Mountain Packers use 80000 containers annually and can purchase any quantity up to 10000 at Rs 0.10 per container. Cost of ordering are Rs 30.0 per order, interest costs are 20 % of the price per container and apply to the average inventory. Storage costs are Rs 0.20 per container per year and are based on the maximum inventory. Quantity discount costs are available as shown.

No. of containers ordered	20000	40000	60000	80000
Unit cost per container, Rs	0.07	0.05	0.048	0.046

Assuming the firm purchased in quantities of $Q = 40000$, what is the total annual cost associated with ordering, carrying, storage, and purchase of this inventory? Also find what is the most economical amount to order at a time?

- Q10. Fastcomp is a Japanese electronic firm that buys computer chips from a supplier in the United States. The cost of a chip is Rs 80 per unit, regardless of the order quantity. In addition, the company incurs a fixed cost of approximately Rs 1000 per order to process the order and obtain import licenses. Fastcomp has determined that it costs approximately 12% per year of an item's cost to hold the item in inventory. The lead time for delivery is 1.5 month. The company uses 10,000 computer chips per month at a relatively constant rate. Historically, fastcomp has followed a policy of buying a one-month supply of chips (10000) every month. We want to determine the optimal order quantity and reorder point for fastcomp, the annual cost resulting from the optimal policy, and compare it with the current policy.
- Q11. CNB uses laser printer cartridges at the rate of 10 per week. The price charged by the supplier of the cartridges varies with order quantity as follows:

Order quantity	0-99	100-249	250-499	500+
Price (Rs)	40	39.60	39	38

CNB estimates that it pays Rs100 per order for delivery and for execution of the purchase order. In addition, CNB believes that it costs 18% per year of a cartridges price to hold it in inventory. CNB would like to determine the optimal number of cartridges to order at a time.

- Q12. DSL manufacturers several types of powered laundry detergent. The demand for one of its products, wave detergent, is approximately 1,000,000 cartons per month. DSL estimates that it costs approximately Rs 800 to set up the production line to produce wave. DSL's production facilities operate 24 hours a day, seven days a week, and it estimates that it can produce wave at the rate of 100,000 cartons per 24-hour day. DSL estimates that it invests Rs 2.00 in each carton of wave detergent, and the holding cost rate is estimated to be 0.24 per year of the item's value. Find out the how much cartons of wave produced by the DSL in each production run?
- Q13. Thompson Tooling has a Department of Defense contract for 150,000 bushing a year. Thompson orders the metal for the bushings in lots of 40,000 units from supplier. It costs Rs40 to place an order, and the estimated carrying charge is 20% of the unit cost, which is Rs 0.15. Thompson wants to know what % their order quantity varies from optimal and what this variation is costing them, if anything. Finding optimal order quantity.