IENG332 Production Planning-I

Tutorial 2

Question 1: A company supplies a certain type of product. The demand for product is **3000** unit per year. The unit purchasing cost is $ 35 per unit. The fixed ordering cost is $ **60**. Unit inventory holding cost is $ **3** for each year. Backlogging is not allowed.

   a) What should be the order size (Q*) in order to minimize the annual total cost?
   b) What is the total annual cost for Q*?
   c) What is the length of time between two successive orders?
   d) How many orders will be given in a year?
   e) What is the average level of inventory?
   f) Suppose the product are ordered in packages of **200** units each. How many packages should order?

Question 2: A company supplies a certain type of product. The demand for the product is **3000** unit per year. The unit purchasing cost is $ 40 per unit. The fixed ordering cost is $ **80**. Unit inventory holding cost is $ **2** for each year. Backlogging is allowed. If the demand exceeds the inventory, the company estimates that there will be two types of penalty costs associated with the backorder. The loss of goodwill is **$0.2** per unit short, and a "bookkeeping" cost of **$6** per unit short per year.

   a) What should be the order size (Q*) in order to minimize the annual total cost?
   b) What is the total annual cost for Q*?
   c) What is the length of time between two successive orders?
   d) How many orders will be given in a year?
   e) What is the average level of inventory?

Question 3: A company produces a certain type of product. The demand for product is **3000** unit per year. The production cost is $ 2**0** per unit and the production rate is **15,000** units per year. The set up cost is $ 2**00**. Inventory holding cost is **20%** for each year. Backlogging is not allowed.

   a) What should be the size of production batch (Q*) in order to minimize their annual total cost?
   b) What is the total annual cost for Q*?
   c) What is the length of time to produce a batch with the size Q*?
   d) What is the length of time between the start points of two successive production periods?
   e) What is the average level of inventory?

Question 4: A company produces a certain type of product. The demand for product is **4000** unit per year. The production cost is $ 35 per unit and the production rate is **12,000** units per year. The set up cost is $ 350. Inventory holding cost is **10%** for each year. Backlogging is allowed. If the demand exceeds the inventory, the company estimates that there will be two types of penalty costs associated with the backorder. The loss of goodwill is $ 0.4 per unit short, and a "bookkeeping" cost of $10 per unit short per year.

    a) What should be the size of production batch (Q*) in order to minimize their annual total cost?

    b) What is the total annual cost for Q*?

    c) What is the length of time to produce a batch with the size Q*?

    d) What is the length of time between the start points of two successive production periods?

    e) What is the average level of inventory?

Question 5: The Weighty Trash Bag Company has the following price schedule for its large trash can lines for orders of less than 500 bags, the company charges 30 cents per bag; for orders of 500 or more but fewer than 1000 bags; it charges 29 cents per bag; and for orders of 1000 or more it charges 28 cents per bag. In this case the breakpoints occur at 500 and 1000. The discount schedule is all units because the discount is applied to all of the units in an order.

Consider example, but assume incremental discounts. That is, the trash bags cost 30 cents each of quantities of 500 or fewer; for quantities between 500 and 500 and 1000, to the first 500 cost 30+B cents each and remaining amount cost 29 cents each; for quantities of 1000 or over the first 500 cost 30 cents each, the next 500 cost 29 cents each, and the remaining amount cost 28 cents each. We need to determine a mathematical expression
Assume that the company considering what sending order to place with Weighty uses trash bags at a fairly constant rate of 600 per year. The accounting department estimates that the fixed cost of placing an order is $8, and holding costs are based on 20 percent annual interest rate.
Which method is better? Why?