Assignment Chapter 4/6

Problems chapter 4

2. Gabriela Manufacturing was able to find a new supplier that would provide the item for $1.80 per unit with an annual fixed cost of $200,000. Should Gabriela Manufacturing insource or outsource the item?

4. Fast Finish, Inc. (FFI) has made a technological breakthrough in snow board finish application. FFI will apply the finish for $0.23 per unit in variable costs plus a fixed annual cost of $230,000. Use the cost and demand information given in Problem 3 for Downhill Boards to evaluate this proposal.
(a) What will it cost Downhill Boards to outsource the finishing process?
(b) At what demand level does it make sense economically to outsource the finishing process?
(c) What additional factors should be considered when making this outsourcing decision?

6. Cal's Carpentry is considering outsourcing its accounts receivable function. Currently, Cal employs two full-time clerks and one part-time clerk to manage accounts receivable. Each full-time clerk has an annual salary of $36,000 plus fringe benefits costing 30 percent of their salary. The part-time clerk makes $18,000 per year but has no fringe benefits. Total salary plus fringe cost is $111,600. Cal estimates that each account receivable incurs a $10 variable cost. The Small Business Accounts Receivables
Group (SBARG) specializes in handling accounts receivable for small- to medium-size companies. Doris Roberts from SBARG has offered to do the accounts receivable for Cal's Carpentry at a fixed cost of $75,000 per year plus $30 per account receivable. Next year, Cal expects to have 2000 accounts receivable.
(a) Calculate the cost for Cal's Carpentry to continue doing accounts receivable in-house.
(b) Calculate the cost for Cal's Carpentry to use SBARG to handle the accounts receivable.
(c) If the fixed annual cost offered by SBARG is nonnegotiable but it is willing to negotiate the variable cost, what variable cost from SBARG would make Cal indifferent to the two options?
(d) What other alternatives might Cal consider in terms of his current staffing for accounts receivable?
(e) What additional criteria should Cal consider before outsourcing the accounts receivable?

Problems chapter 6

2. Yasuko's Art Emporium (YAE) ships art from its studio located in the Far East to its distribution center located on the West Coast of the United States. YAE can send the art either via transoceanic ship freight service (15 days transit) or by air freight (2 days transit time). YAE ships 18,000 pieces of art annually.
(a) Calculate the average annual transportation inventory when sending the art via transoceanic ship freight service.
(b) Calculate the average annual transportation inventory when sending the art via air freight.
(c) What additional information is needed to compare the two alternatives?

4. Genuine Reproductions (GR) plans on increasing next year's sales by 20 percent while maintaining its same average inventory in dollars of $250,000.
(a) Calculate the expected inventory turnover for next year.
(b) Calculate the expected weeks of supply.

6. Frederick's Farm Factory (FFF) currently maintains an average inventory valued at $3,400,000. The company estimates its capital cost at 10 percent, its storage cost at 4.5 percent, and its risk cost at 6 percent.
(a) Calculate the annual holding cost rate for FFF.
(b) Calculate the total annual holding costs for FFF.

8. A technology problem has rendered some of the inventory at FFF (Problem 6) obsolete. FFF estimates that the risk cost of its
inventory is now 10 percent.
(a) Calculate the new annual holding cost rate.
(b) Calculate the new total annual holding costs for FFF.

10. Custom Computers, Inc. from Problem 9 is considering a new ordering policy. The new order quantity would be 650 heat sinks. Recalculate Problem 9, parts (a) through (e), and compare results.

12. A local nursery, Greens, uses 1560 bags of plant food annually. Greens works 52 weeks per year. It costs $10 to place an
order for plant food. The annual holding cost rate is $5 per bag. Lead time is one week.
(a) Calculate the economic order quantity.
(b) Calculate the total annual costs.
(c) Determine the reorder point.

24. Using the data provided in Problem 23, determine what will happen if HP uses the economic production quantity model to establish the quantity produced each cycle.
(a) Calculate the economic production quantity (EPQ).
(b) Calculate the maximum inventory level using the EPQ.
(c) Calculate the total annual cost of using the EPQ.
(d) Calculate the penalty cost HP is incurring with its current policy.

Problems chapter 4

2. Indifference Point: Total cost of insourcing = total cost of outsourcing
    Total Cost = FC+VC(Q)   The price from a new supplier is now $1.80.
                        The new fixed cost is $200,000.
    300,000 + 1.5(Q) = 200,000 + 1.8(Q)
                Q = 333,333.3 units
Since the demand of 300,000 is lower than the indifference point, outsourcing is a cheaper alternative. The total cost for outsourcing now becomes $740,000. The actual difference may be computed to be $10,000.

4. a. Using the current demand of 160,000 units:
    Total Cost from FFI = 230,000 + .23(Q) = $266,800 $2,200 lower than insourcing.
b. Indifference point: Total cost of insourcing = total cost of outsourcing
    125,000+0.90Q = 230,000 + 0.23Q
        Q = 156,716.41, so better to outsource when demand is 156,717 or more.
c. Additional factors that need to be considered include the economic stability of FFI, the technical ability of FFI to produce a quality product, the ability of FFI to "partner", the ability of FFI to deliver on time, and the impact of outsourcing on remaining employees.

6. a. fulltime costs = 2 x ($36,000 x 1.3) = $93,600
     part time cost = $18,000   Variable Cost = $10(2,000) = $20,000
     Total Cost = $131,600
b. SBARG cost = $75,000 + $30 (2,000) = $135,000
c. $131,600 = $75,000 + VC(2,000)   VC = $28.30
d. Cal might investigate if he could do more with part time employees or investigate if the variable costs could be reduced from the existing $10.
e. How stable is the future of SBARG? How good is the estimated 2,000 accounts receivable? How reliable is SBARD compared to his own staff?

Problems chapter 6

Problem 2:
a.   AIT = (15)(18000)/365 = 739.7 units
b.   AIT = (2)(18000)/365 = 98.6 units
c.   Cost related information is needed to compare the two alternatives. For example, transportation costs, insurance costs, and the speed and reliability of the mode of service delivery are among the important considerations in comparing the two alternatives.

Problem 4:
a.   Inventory Turnover = $3,600,000/$250,000 = 14.4 inventory turns
b.   Weeks of Supply = $250,000/(3,600,000/52) = 3.6 weeks of supply

Problem 6:
a.   Annual holding cost rate = 20.5%
b.   Annual holding costs = ($3,400,000)(0.205) = $697,000

Problem 8:
a. Annual holding cost rate = 10% + 4.5% + 10% = 24.5%
b. Total annual holding costs = (0.245)(3,400,000) = $833,000

Problem 10:
a. Average inventory level = $\dfrac{Q}{2} = \dfrac{650}{2} = 325$ units

b. Number of orders placed per year = $\dfrac{D}{Q} = \dfrac{5200}{650} = 8$ orders

c. Annual inventory holding cost = $\dfrac{Q}{2}H = (325)(3) = \$975$

d. Total annual ordering cost = (D/Q)(S) = (8)(50) = $400
e. Total annual cost = $975 + $400 = $1375
    Plus $62,400 (the cost of the heat sinks) = $63,775.
An order quantity of 650 units yields lower total annual costs than an order quantity of 1300 units.

Problem 12:

a. $\text{EOQ} = \sqrt{\dfrac{2DS}{H}} = \sqrt{\dfrac{(2)(1560)(10)}{5}} = 79$ units

b. Total annual cost = (79/2)(5) + (1560/79)(10) = $197.50 + $197.47 = $394.97
c. Reorder point = R = dL = (1560 bags/year)(1 year/52)(1 week) = 30 units

Problem 24:

a. $\text{EPQ} = \sqrt{\dfrac{(2)(5,000,000)(200)}{(0.55/50)(1-100,000/250,000)}} = 550,481.85$ pounds or 11009.64 bags

b. $I_{\max} = Q(1 - d/p) = 550,481.85(1 - 100,000/250,000) = 330,289.11$ pounds or 6605.78 bags

c. $\text{Total Cost} = \dfrac{(5,000,000)(200)}{550,481.85} + \dfrac{(330,289.11)(0.55/50)}{2} = \$3633.18$

d. Penalty Cost = $4300 - $3633.18 = $666.82