**Problem Set 2:**

**Operations**

1. Determine the reorder point for spatulas

R = D x T + SS

= 400 x 14 + 500

= **6,100 spatulas**

2. a. The economic order quantity (EOQ) is the square root of the product of the numerator (two times order cost and demand) divided by the product of the denominator (inventory carrying cost times unit cost):

**EOQ**  = 2CoD = 2(8)(44,000) = 704,000 = **2,797 cups**

√ CiU √ (.12)(.75) √ .09

1. Annual total cost with order quantities of 2,797 cups ( calculated in part (a)):

Inventory Carrying Costs = 2,797 x .75 x .12 = $ 125.87

2

Order Costs: determine the number of whole orders/yr.

44,000 = 15.73 or **16 whole orders/yr.**

2,797

16 orders x $8 per order = 128.00

Transportation Costs = 44,000 units x $ .05 / unit = 2,200.00

**Total Cost ( qe** **= 2,797 units ) $ 2,453.87**

Annual total cost with order quantities of 4,000 cups:

Inventory Carrying Costs = 4,200 x (.75) x (.12) = $ 180.00

2

Order Costs : determine the number of whole orders/ yr.

44,000 = 11 whole orders/ yr

4,000

11 orders x $8/order = 88.00

Transportation Costs = 44,000 units x ($ .04/unit) = 1,760.00

**Total Cost ( qe** **= 4,000 units) $ 2,028.00**

The order quantity of 4,000 units costs ( $2,453.87 – 2,028.00) **$425.87** less annually than 2,797 order quantity found in part (a) when transportation costs are considered.

1. We found that the low cost alternative in part (b) was the order quantity of 4,000 units. Therefore, the number of orders per year required to meet demand can be calculated as follows:

Orders per year = 44,000 = **11 orders**

4,000

From the number of orders we can find the order interval:

Order interval = 12 months = **1.1 months**

11

**-or-**

Order interval = 365 days = 33.18 = **33 days**

11

3. a. Reorder point under perpetual review:

R = D x T + SS

= 100 x 8 + 0 = **800 watches**

b. Average inventory = Q/2 + SS = 1,200 + 0 = **600 watches**

c. Reorder point under weekly review:

R = D (T + P/2) + SS

= 100 (8 + 7/2) + 0 = 100 (11.5) = **1,150 watches**

1. Average inventory = Q/2 + (P x D)/2 + SS

= (1,200/2) + (7 x 100) /2 + 0

= 600 + 350

= **950 units**

1. a. Common days’ supply of chocolate chewies:

DS = A + ∑ Ij = (42,000 - 7,000) + 18,500

∑ Dj 4,500

= **11.89 days**

1. Fair Share Allocation Logic:

Allocation = (Days’ Supply x Daily Requirements) - Inventory

**ACincinnati** = (11.89 x 2,500) - 12,500 = **17,225 units**

**APhoenix** = (11.89 x 2,500) - 6,000 = **17,780 units**

**Note:**  Together, the allocations equal 35,005 units (17,225 + 17,780) which is 5 more than the plant warehouse’s allocation supply. The difference rests with the rounding of the days’ supply figure.

1. a.

Dallas Distribution Center

On Hand Balance: 220 Performance Cycle: 1 week

Safety Stock: 80 Order Quantity: 200



DC1

Lexington Distribution Center

On Hand Balance: 420 Performance Cycle: 2 weeks

Safety Stock: 100 Order Quantity: 400



DC2

Evansville Warehouse

On Hand Balance: 900 Performance Cycle: 2 weeks

Safety Stock: 250 Order Quantity: 650 s