

Question:

A company has a chance to reduce its inventory ordering costs by placing larger quantity orders using the price-break order quantity schedule below. What should their optimal order quantity be if this company purchases this single inventory item with an e-mail ordering cost of \$4, a carrying cost with a rate of 2% of the unit price, and an annual demand of 10,000 units?

	Order Quantity (units)	Price/unit (\$)
Model1	0 to 2,499	1.20
Model2	2,500 to 3,999	1.00
Model3	4,000 or more	0.98

Solution

Step 1 $D = 10,000$ units $C_o = \$4$ $C_h = 2\%$ of the unit Price

$$Q_1 = \sqrt{\frac{2DC_o}{C_h}} = \sqrt{\frac{2(10,000)(4)}{0.02(1.20)}} = 1,826 \text{ units}$$
$$Q_2 = \sqrt{\frac{2(10,000)(4)}{0.02(1.00)}} = 2,000 \text{ units}$$
$$Q_3 = \sqrt{\frac{2(10,000)(4)}{0.02(0.98)}} = 2,020 \text{ units}$$

Step 2 Adjust Quantities

$$Q_1 = 1,826$$
$$Q_2 = 2,500$$
$$Q_3 = 4,000$$

$$\text{(Step 3)} \quad TC = \boxed{DC} + \frac{D}{Q} C_o + \frac{Q}{2} C_h$$

$$TC_1 = 10,000(1.20) + \frac{10,000}{1,826}(4) + \frac{1,826}{2}(0.02)(1.20)$$

$$= \$12,043.81$$

$$TC_2 = 10,000(1.00) + \frac{10,000}{2,500}(4) + \frac{2,500}{2}(0.02)(1.00)$$

$$= \$10,041$$

$$TC_3 = 10,000(0.98) + \frac{10,000}{4,000}(4) + \frac{4,000}{2}(0.02)(0.98)$$

$$= \$9,849.2$$

(Step 4) select model 3 because it has the lowest total cost.

- Order Quantities of 4,000 is the optimal Order Quantity that would lower the total annual cost for the company.

Steps:

- 1) Calculate EOQ for each model.
- 2) Adjust quantities according to the ranges of each model.
- 3) Calculate The total annual cost for each model.
- 4) Select the discount model that gives the lowest total cost.

Question:

Apply the EOQ model to the following quantity discount situation in which $D = 470$ units per year, $C_o = \$35$, and the annual holding cost rate is 30%.

Discount Category	Order Size	Unit Cost
1	0 to 99	\$12.00
2	100 or more	\$11.52

Solution

Step1:

$$EOQ1 = \sqrt{\frac{2(470)(35)}{0.3(12.00)}} = 95.5$$

$$EOQ2 = \sqrt{\frac{2(470)(35)}{0.3(11.52)}} = 97.5$$

Step2:

$$Q1 = 95.5$$

$$Q2 = 100$$

Step3:

$$\text{Total Cost1} = 470(12.00) + \frac{470}{95.5}(35) + \frac{95.5(0.3)(12.00)}{2} = \$ 5984.15$$

$$\text{Total Cost2} = 470(11.52) + \frac{470}{100}(35) + \frac{100(0.3)(11.52)}{2} = \$ 5751.7$$

Step4

Select the second discount model because it has the lowest total cost of \$ 5751.7