

SOLUTION

Name.....

Student ID.....

OM201, 1/2019

Quiz on Inventory Management

(8 November 2019: 1 hour)

Instructions:

- * Individual quiz.
- * Open book.
- * Use of calculator is permitted.
- * Show your calculation in detail.

1) Your company has compiled the following data on the small set of products that comprise the specialty repair parts division. Perform ABC analysis on the data. Which products do you suggest the firm keep classified as A items, B items, and C items. Show your analysis. (1 point)

SKU	Annual Demand	Unit Cost
R11	250	\$250
S22	75	\$90
T33	20	\$60
U44	150	\$150
V55	100	\$75

	Dollar volume	% Dollar volume	Class
R11	$250 \times \$250 = \$62,500$	62.22%	A
U44	$150 \times \$150 = \$22,500$	22.40%	B
V55	$100 \times \$75 = \$7,500$	7.47%	C
S22	$75 \times \$90 = \$6,750$	6.72%	C
T33	$20 \times \$60 = \$1,200$	1.19%	C
Total	<u><u>\$100,450</u></u>		<u><u>Ans</u></u>

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2) A product has a demand of 4000 units per year. Ordering cost is \$20, and holding cost is \$4 per unit per year. How many units per order should be made to minimize the annual cost? (1 point)

$$D = 4000 \text{ units per year}$$

$$S = \$20 \text{ per order}$$

$$H = \$4 \text{ per unit per year}$$

$$Q^* = \sqrt{\frac{2DS}{H}} = \sqrt{\frac{2(4000)(20)}{4}} = 200 \text{ units/order}$$

Ans

3) A production order quantity problem has a daily demand rate = 10 and a daily production rate = 50. The production order quantity for this problem is approximately 612 units. What is the average inventory for this problem? (1 point)

Production order quantity model

$$Q = 612 \text{ units per order}$$

$$d = 10 \text{ units per day}$$

$$p = 50 \text{ units per day}$$

$$\begin{aligned} \text{Average inventory} &= \frac{Q}{2} \left(1 - \frac{d}{p}\right) \\ &= \frac{612}{2} \left(1 - \frac{10}{50}\right) \end{aligned}$$

$$= 244.8 \approx 245 \text{ units}$$

2/3

Ans

4) The annual demand, ordering cost, and the annual inventory carrying cost rate for a certain item are $D = 600$ units, $S = \$20/\text{order}$ and $I = 30\%$ of item price. Price is established by the following quantity discount schedule. What should the order quantity be in order to minimize the total annual cost? And what is the minimum total annual cost? (2 points)

Quantity	1 to 49	50 to 249	250 and up
Price	\$5.00 per unit	\$4.50 per unit	\$4.10 per unit

$$Q_{\text{price} = 5}^* = \sqrt{\frac{2(600)(20)}{0.3(5)}} = 126.49$$

$\therefore$ This quantity is infeasible at price = \$5 per unit

$$Q_{\text{price} = 4.5}^* = \sqrt{\frac{2(600)(20)}{0.3(4.5)}} = 133.33$$

$\therefore$ This quantity is feasible at price = \$4.5 per unit.

$$Q_{\text{price} = 4.1}^* = \sqrt{\frac{2(600)(20)}{0.3(4.1)}} = 139.69$$

$\therefore$ This quantity is infeasible at price = \$4.1 per unit

If you want to buy at \$4.1 per unit, the minimum order quantity is 250 units

$$\begin{aligned} TC_{\text{price} = \$4.5} &= 4.5(600) + \frac{600}{133.33}(20) + \frac{1}{2}(133.33)(0.3 \times 4.5) \\ &= 2700 + 90 + 90 = \$2,880 \text{ per year} \end{aligned}$$

$$\begin{aligned} TC_{\text{price} = \$4.1} &= 4.1(600) + \frac{600}{250}(20) + \frac{1}{2}(250)(0.3 \times 4.1) \\ &= 2,460 + 48 + 153.75 = \$2,661.75 \text{ per year} \end{aligned}$$

Minimum total annual cost = \$2,661.75

when you buy 250 units per order at \$4.10 per unit

Ans