NURUL ATIKAH NAJWA BINTI MOHAMAT PA421.

No.: 20122066 2 (21A) Date:

Exercise Question (Inventory & Aggregate Planning)

1(a) What is the economic order quantity (EOQ)?

$$Q^* = \sqrt{\frac{2DS}{H}}$$

$$Q^* = \sqrt{\frac{2(5000)(30)}{50}} = \sqrt{6000} = 77 \text{ units} \#$$

b) What is the average inventory?

$$\frac{\text{Order quantity}}{2}$$

$$= \frac{77}{2} = 39 \text{ units} \#$$

c) What is the optimal number of orders per year (N)?

$$\text{Expected number of orders} = N = \frac{\text{Demand}}{\text{Order quantity}} = \frac{D}{Q^*}$$

$$N = \frac{5000}{77} = 65 \text{ orders per year} \#$$

d) What is the optimal number of working days between orders (T)?

$$\text{Expected time between orders} = T = \frac{\text{Number of working days per year}}{N}$$

$$T = \frac{250}{65} = 4 \text{ days between orders}$$

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1 e) What is the total annual inventory cost?

Total annual cost = Setup (order) cost + Holding cost

$$TC = \frac{D}{Q} S + \frac{Q}{2} H$$

$$= \frac{5000}{77} (30) + \frac{77}{2} (50)$$

$$= 1.95 + 1.93$$

$$= RM\ 3.88$$ ✗

f) What is the reorder point (ROP)?

ROP = Demand per day x Lead time for a new order
In days

ROP = d x L

$$d = \frac{D}{\text{Number of working days In a year}}$$

$$= \frac{5000}{250} = 20 \text{ units}$$

ROP = d x L

= 20 unit per day x 10 day = 200 units ✗

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2) Inventory Management : Quantity Discount

D : 4 900

S : RM 50

H : 40% of pur

0 – 999	RM 5
1000 – 3999	RM 4.95
4000 – 5999	RM 4.90
6000 or more	RM 4.85

Calculation of EOQ :

H : 0.40 (5)
: 2

$Q_5 = \sqrt{\frac{2DS}{H}} = \sqrt{\frac{2(4900)(50)}{2}} = 495$ units

H : 0.40 (4.95)
: 1.98

$Q_{4.95} = \sqrt{\frac{2DS}{H}} = \sqrt{\frac{2(4900)(50)}{1.98}} = 498$ units

H : 0.40 (4.90)
: 1.96

$Q_{4.90} = \sqrt{\frac{2DS}{H}} = \sqrt{\frac{2(4900)(50)}{1.96}} = 500$ units

H : 0.40 (4.85)
: 1.94

$Q_{4.85} = \sqrt{\frac{2DS}{H}} = \sqrt{\frac{2(4900)(50)}{1.94}} = 503$ units

Calculation of Total Cost :

TC : Setup cost + Holding cost + Product cost

$TC = \frac{D}{Q} S + \frac{Q}{2} H + PD$

$TC_{495} = \frac{4900}{495}(50) + \frac{495}{2}(1) + (5)(4900) = RM\ 25\ 490$

$TC_{1000} = \frac{4900}{1000}(50) + \frac{1000}{2}(1.98) + (4.95)(4900) = RM\ 25490$

$TC_{4000} = \frac{4900}{4000}(50) + \frac{4000}{2}(1.96) + (4.90)(4900) = RM\ 27\ 991$

$TC_{6000} = \frac{4900}{6000}(50) + \frac{6000}{2}(1.94) + (4.85)(4900) = RM\ 29\ 626$

Order quantity that will minimize the total cost is 495 and 1000

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(3) Aggregate Planning

Month	Demand	Production	Inventory	Hiring	Layoofs	Total Cost
January	1100	1300	0	0	200 (2 x 6000)	RM12000
February	1200	1300	0	0	100 (1 x 6000)	RM 6000
March	1400	1300	0	100 (1 x 3000)	0	RM 3000
April	1800	1300	0	500 (5 x 3000)	0	RM 15000
May	1800	1300	0	500 (5 x 3000)	0	RM 15000
June	1600	1300	0	300 (3 x 3000)	0	RM 9000
					Total	RM 60 000