SEMESTER – II

Cost & Management Accounting - I

Topic: Material

By: Avishek Dey

1. In a company weekly minimum and maximum consumption of material A are 25 and 75 units respectively. The re-order quantity as fixed by the company is 300 units. The material is received within 4 to 6 weeks from issue of supply order.
   Calculate minimum level and maximum level of Material A.

2. In a factory component A is used as follows:
   Normal usage 50 kg. per week
   Minimum usage 25 kg. per week
   Maximum usage 75 kg. per week
   Re-order quantity 300 kg.
   Re-order period 4 to 6 weeks.
   Calculate for component A:
   i.Re-order level; ii. Maximum level; iii. Minimum level; iv. Average stock level.

3. KT Ltd. Provides you the following information:
   (a) Re-order level : 64,000 units
   (b) Re-order quantity : 40,000 units
   (c) Minimum stock level : 34,000 units
   (d) Maximum stock level : 94,000 units
   (e) Average lead time in the past : 2.5 days
   (f) The difference between maximum and minimum lead time : 3days
   Determine the maximum and minimum usage rates and lead times.

4. Two component A and B are used as follows:
   Normal usage : 60 per week each
   Minimum usage : 30 per week each
   Maximum usage : 90 per week each
   Re-ordering quantity : A : 500 ; B : 800
   Re-ordered period : A : 3 to 5 weeks ; B : 2 to 4 weeks
   Calculate for each component : (a) Re-ordering level; (b) Minimum level; (c) Maximum level; (d) Average stock level.

5. From the following information , find out the Economic ordering Quantity:
   Annual consumption : 12,000 units (360 days)
   Cost per unit : Re. 1

Ordering cost : Rs. 12 per order
Inventory carrying cost : 24%
Normal lead time : 15 days
Safety stock : 30 day's consumption
Also find out : (a) when should the order be placed; and (b) what should be the ideal inventory level immediately before the ordered material is received.

6. A factory requires 1,500 units of an item per month, each costing Rs. 27. The cost per order is Rs. 150 and the inventory carrying charges work out to 20% of the average inventory.
   Find out the economic ordering quantity and the number of orders per year.
   Would you accept a 2% price discount on a minimum supply of 1,200 units? Compare the total cost in both the cases.

7. A publishing house purchases 2,000 unit of a particular item per year at a unit cost of Rs. 20. The ordering cost per order is Rs. 50 and the inventory carrying cost is 25% of the average inventory.
   Find out optimal order quantity and the minimum total cost including purchase cost.
   If 3% discount is offered by the supplier for the purchase in lots of 1,000 or more, should the publishing house accept the offer?

8. The following relating to inventory costs, have been established for a company: (i) orders must be placed in multiples of 100 units; (ii) requirements for the year are 3,00,000 units; (iii) the purchase price per unit is Rs. 3; (iv) carrying cost is Rs. 25% of the purchase price of goods: (v) cost per order placed is Rs. 20; (vi) desired safety stock is 10,000 units (this amount is on hand initially) and (vii) three days are required for delivery.
   Calculate (a) EOQ; (b) how many orders should the company place each year? And (c) at what inventory should an order be placed?

Semester - II

CMA - I

Material

Problem 1:-

Normal Consumption = $\frac{\text{Max. Consumption} + \text{Min. Consumption}}{2}$

$= \frac{75 \text{ units} + 25 \text{ units}}{2} = 50 \text{ units}$

Normal or average re-order period

$= \frac{\text{Max. re-order period} + \text{Min. re-order period}}{2}$

$= \frac{6+4}{2} = 5 \text{ weeks}$

Re-order level = (Max. rate of consumption × Max. re-order period)

$= 75 \times 6 = 450$ units.

Minimum level of Material:-

Re-order level = (Normal consumption × Normal re-order period)

$= 450 - (50 \times 5) =$ 200 units (Ans)

Maximum level of Material:-

Re-order level + Re-order quantity − (Minimum consumption × Minimum re-order period)

$= 450 + 300 - (25 \times 4) =$ 650 units. (Ans)

Problem 2:-

i) Re-order level =

(Max. usage x Max. re-order period)

= (75 kg x 6) = 450 kg (Ans)

ii) Maximum level =

Re-order level + Re-order quantity - (Min. usage x Min. re-order period)

= 450 kg + 300 kg - (25 x 4) = 650 kg (Ans)

iii) Minimum level :-

Re-order level - (Normal usage x Normal re-order period)

= 450 - (50 x 5) = 200 kgs (Ans)

iv) Average stock :-

$\frac{1}{2}$ (Maximum level + Minimum level)

= $\frac{1}{2}$ (650 + 200) = 425 kgs (Ans)

Alternatively,

Minimum level + ($\frac{1}{2}$ x re-order quantity)

= 200 + ($\frac{1}{2}$ x 300) = 350 kg (Ans)

Problem 3:-

let, Max. lead time = x ; Min. lead time = y

So, $\frac{x+y}{2} = 2.5$ (Avg. lead time = 2.5) ....(i)

& $x - y = 3$ ------ (ii)

or, $x = 3 + y$

Putting the value of x in equation (i)

$$\frac{x+y}{2} = 2.5$$

or, $x + y = 5$; $\Rightarrow 3 + y + y = 5 \Rightarrow 3 + 2y = 5$

$\Rightarrow y = 1$

Min. lead time = 1 day

Max. lead time = (1 + 3) = 4 days

Re-order level = Max. usage × Max. re-order period

or, 64,000 = Max. Usage × 4 days

or, Max. Usage = 64,000/4 = 16,000 units

Maximum level =

Re-order quantity + Re-order level − (Minimum usage × Minimum Re-order period)

or, 94,000 = 40,000 + 64,000 − (Minimum usage × 1)

or, Minimum Usage = 10,000 units (Ans)

Minimum level =

Re-order level − (Normal usage × Normal re-order period)

or, 34,000 = 64,000 − (Normal Usage × 2·5)

or, Normal usage = 12,000 units

$$\frac{\text{Max. Usage} + \text{Min. Usage}}{2} = \text{Normal Usage}$$

or, $\frac{\text{Max. usage} + 10{,}000}{2} = 12{,}000$

or, Max. usage = 24,000 − 10,000 = 14,000 units (Ans)

Problem 4:-

Normal period of A = $\left(\frac{3+5}{2}\right)$ = 4 weeks

Normal period of B = $\left(\frac{2+4}{2}\right)$ = 3 weeks

Re-order level :-

= Maximum Usage × Maximum Re-order period

For Material A:

= 90 × 5 = 450 units

For Material B:

= 90 × 4 = 360 units

Maximum level:

Re-order level + Re-order quantity − (Min. usage × Min. re-order period)

For Material A:-

= 450 + 500 − (30 × 3)

= 860 units

For Material B:-

= 360 + 800 − (30 × 2)

= 1100 units

Minimum level :-

= Re-order level - (Normal Usage × Normal Re-order period)

For Material A :-

= 450 - (60 × 4) = 210 Units

For Material B :-

= 360 - (60 × 3) = 180 Units

Average Stock :-

= $\frac{1}{2}$ (Minimum level + Maximum level)

For Material A :-

= $\frac{1}{2}$ (210 + 860) = 535 Units

For Material B :-

= $\frac{1}{2}$ (180 + 1100) = 640 Units

Problem 5:-

Annual consumption (A) = 12,000 units

cost per unit = Re. 1 Per unit per annum

Inventory carrying cost = (C) = (Re. 1 × 24%)

= Re. 0.24

Ordering cost per order (O) = ₹12

$$EOQ = \sqrt{\frac{2AO}{C}}$$

$$= \sqrt{\frac{2 \times 12000 \times 12}{0.24}} = 1,095 \text{ units}$$

When should the order be placed :-

Normal lead time consumption + Safety stock usage

= (15 × 33.33) + (30 × 33.33)

= 1,500 units

Per day consumption = $\frac{12000}{360}$ = 33.33 units

Ideal Inventory level :-

= Safety stock consumption

= (30 × 33.33) = 1,000 units

Problem 6:-

Annual demand (A) = 1,500 × 12 = 18,000 units

Carrying cost per unit per annum = (₹ 27 × 20%)

= ₹ 5.4

Ordering cost per order = ₹ 150

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 18,000 \times ₹ 150}{5.4}}$$

= 1,000 units

The number of order per year = $\frac{18,000}{1,000}$

= 18 times

Total Cost = Purchase Cost + Ordering cost + Carrying cost

Calculation of total cost at order level 1,000 units and 1,200 units

Particulars	1,000 Units	1,200 Units
Unit Cost (per unit)	₹ 27	₹ 26.46
No. of order per year	$\left(\frac{18000}{1000}\right)=18$	$\left(\frac{18000}{12}\right)=15$
Average Stock	$\left(\frac{1000}{2}\right)=500$	$\left(\frac{1200}{2}\right)=600$
A) Purchase cost – (18,000 × 27) (18,000 × 26.46)	4,86,000	4,76,280
Total ordering cost (18 × 150) (15 × 150)	2,700	2,250
Total Carrying cost (500 × 27 × 20%) (600 × 26.46 × 20%)	2,700	3,175.2
Total Cost →	4,91,400	4,81,705.2

Comment :- Yes, the order should be accepted because the total cost is minimum compare to the cost of ordering @EOQ level, if the supplier gives 2% discount ~~at~~ for purchase of 1200 units.

Problem 7:-

Annual demand (A) = 2,000 units

Ordering cost per order = ₹ 50.

Carrying cost per unit per annum (C)

= (₹ 20 × 25%) = ₹ 5

$$EQQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 2000 \times 50}{5}} = 200 \text{ units}$$

Calculation of total cost of order level 200 units & 1000 unit

Particulars	200 units	1,000 units
Unit cost	20	19.4
No. of order	$(\frac{2000}{200}) = 10$	$(\frac{2000}{1000}) = 2$
Avg. inventory	100	500
Purchase cost	40,000	38,800
Ordering cost	500	100
Carrying cost (Avg. Stock × 25%)	500	2425
Total Cost →	41,000	41,325

Comment:- Order should not be accepted.

Problem 8:—

Annual demand (A) = 3,00,000 units

Carrying cost per unit per annum

= (₹ 3 × 25%) = 0.75

Ordering Cost per order = ₹ 20.

(a) $EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 3,00,000 \times 20}{0.75}}$

= 4,000 units

(b) No. of order in a year = $\frac{3,00,000}{4,000}$

= 75 times

(c) Inventory at the time of order

per day usage = $\left(\frac{3,00,000}{360}\right)$ = 833.33 units

Assuming that, 1 year = 360 days

= Safety stock + 3 day's Consumption

= 10,000 + (3 × 833.33)

= 12,500 units