2

Material

Question 1

IPL Limited uses a small casting in one of its finished products. The castings are purchased from a foundry. IPL Limited purchases 54,000 castings per year at a cost of ₹ 800 per casting.

The castings are used evenly throughout the year in the production process on a 360-day-per-year basis. The company estimates that it costs ₹ 9,000 to place a single purchase order and about ₹ 300 to carry one casting in inventory for a year. The high carrying costs result from the need to keep the castings in carefully controlled temperature and humidity conditions, and from the high cost of insurance.

Delivery from the foundry generally takes 6 days, but it can take as much as 10 days. The days of delivery time and percentage of their occurrence are shown in the following tabulation:

Delivery time (days):	*6*	*7*	*8*	*9*	*10*
Percentage of occurrence:	*75*	*10*	*5*	*5*	*5*

Required:

(i) Compute the economic order quantity (EOQ).

(ii) Assume the company is willing to assume a 15% risk of being out of stock. What would be the safety stock? The re-order point?

(iii) Assume the company is willing to assume a 5% risk of being out of stock. What would be the safety stock? The re-order point?

(iv) Assume 5% stock-out risk. What would be the total cost of ordering and carrying inventory for one year?

(v) Refer to the original data. Assume that using process re-engineering the company reduces its cost of placing a purchase order to only ₹ 600. In addition, company estimates that when the waste and inefficiency caused by inventories are considered, the true cost of carrying a unit in stock is ₹ 720 per year.

(a) Compute the new EOQ.

(b) How frequently would the company be placing an order, as compared to the old purchasing policy? *(9 Marks, May 2004)*

Answer

(i) Computation of economic order quantity (EOQ) :

(A)	Annual requirement	=	54,000 castings
(C)	Cost per casting	=	₹ 800
(O)	Ordering cost	=	₹ 9,000 / order
(c × i)	Carrying cost per casting p.a.	=	₹ 300

$$EOQ = \sqrt{\frac{2AO}{c \times i}} = \sqrt{\frac{2 \times 54000 \times 9000}{300}} = 1800 \text{ castings}$$

(ii) Safety stock

(Assuming a 15% risk of being out of stock)

Safety stock for one day = 54,000/360 days = 150 castings

Re-order point = Minimum stock level + Average lead time × Average consumption

= 150 + 6 x 150 = 1,050 castings

(iii) Safety stocks:

(Assuming a 5% risk of being out of stock)

Safety stock for three days = 150 x 3 days = 450 castings

Re-order point = 450 castings + 900 castings = 1,350 castings

(iv) Total cost of ordering = (54,000/1,800) x ₹ 9,000 = ₹ 2,70,000

Total cost of carrying = (450 + ½ x 1,800) ₹ 300 = ₹ 4,05,000

(v) (a) Computation of new EOQ :

$$EOQ = \sqrt{\frac{2 \times 54,000 \times 600}{720}} = 300 \text{ castings}$$

(b) Total number of orders to be placed in a year are 180. Each order is to be placed after 2 days (1 year = 360 days). Under old purchasing policy each order is placed after 12 days.

Question 2

Distinguish between Bin card and Stores ledger. *(4 Marks, November 2004)*

Answer

Bin card and Stores ledger

Bin card is quantitative record of stores receipt, issue and balance. Control over stock is more effective, in as much as comparisons of actual quantity in hand at any time with the book balance are possible. Bin cards are kept attached to the bins or quite near thereto, so as to assist in the identification of stock.

Stores ledger is quantitative and value record of stores receipts, issue and balance. It is a subsidiary ledger to the main cost ledger. It is maintained by cost accounting department.

Question 3

Discuss ABC analysis as a system of Inventory control.

(4 Marks, November 2004; November 2005) (3 Marks, May 2008) (4 Marks, November 2011)

Answer

ABC Analysis as a system of inventory control

It exercises discriminating control over different items of stores classified on the basis of investment involved.

'A' category of items consists of only a small %age i.e. approximately 10% of total items handled by stores but requires heavy investment, about 70% of inventory value, because of their high prices or heavy requirement or both.

'B' category of items are relatively less important. They may be approximately 20% of the total items of materials handled by stores. The %age of investment required is approximately 20% of total investment in inventories.

'C' category of items do not require much investment. It may be about 10% of total inventory value but they are nearly 70% of the total items handled by store.

EOQ, re-order level concepts are usually used in case of 'A' category items.

Question 4

RST Limited has received an offer of quantity discount on its order of materials as under:

Price per tone	*Tones number*
₹9,600	*Less than 50*
₹9,360	*50 and less than 100*
₹9,120	*100 and less then 200*
₹8,880	*200 and less than 300*
₹8,640	*300 and above*

The annual requirement for the material is 500 tonnes. The ordering cost per order is ₹12,500 and the stock holding cost is estimated at 25% of the material cost per annum.

Required:

(i) Compute the most economical purchase level.

(ii) Compute EOQ if there are no quantity discounts and the price per tonne is ₹10,500.

(6 Marks, November 2004)

Answer

(i)

Order size (Q) (Units) (1)	No. of orders A/Q (Units) (2)	Cost of purchase A x per unit cost (3)	Ordering cost $\frac{A}{Q} \times$ ₹ 12500 (4)	Carrying cost $\frac{Q}{2} \times C \times 25\%$ (5)	Total cost (3+4+5) (6)
40	12.5	48,00,000 (500×9,600)	1,56,250	48,000 $\left(\frac{40}{2} \times 9600 \times 0.25\right)$	50,04,250
50	10	46,80,000 (500×9,360)	1,25,000	58,500 $\left(\frac{50}{2} \times 9360 \times .25\right)$	48,63,500
100	5	45,60,000 (500×9,120)	62,500	1,14,000 $\left(\frac{100}{2} \times 9120 \times .25\right)$	47,36,500
200	2.5	44,40,000 $(500 \times 8,880)$	31,250 (2.5×12,500)	2,22,000 $\left(\frac{200}{2} \times 8880 \times 2.5\right)$	46,93,250
300	1.67	43,20,000 (500×8,640)	20,875 (1.67×12,500)	3,24,000 $\left(\frac{300}{2} \times 8640 \times .25\right)$	46,64,875

The above table shows that the total cost of 500 units including ordering and carrying cost is minimum (₹ 46,64,875) where the order size is 300 units. Hence the most economical purchase level is 300 units.

(ii) $EOQ = \sqrt{\frac{2AO}{c \times i}} = \sqrt{\frac{2 \times 500 \times 12,500}{10,500 \times 0.25}} = 69$ tonnes.

Question 5

SK Enterprise manufactures a special product "ZE". The following particulars were collected for the year 2004:

Annual consumption	*12,000 units (360 days)*
Cost per unit	*₹1*
Ordering cost	*₹12 per order*
Inventory carrying cost	*24%*
Normal lead time	*15 days*
Safety stock	*30 days consumption*

Required:

(i) Re-order quantity

(ii) Re-order level

(iii) What should be the inventory level (ideally) immediately before the material order is received? *(4 Marks, May 2005)*

Answer

(i) How much should be ordered each time i.e., Economic Order Quantity (EOQ)

$$EOQ = \sqrt{\frac{2AB}{CS}}$$

Where A is the annual consumption

B is the ordering cost per order

CS is the carrying cost per unit per annum

$$= \sqrt{\frac{2 \times 12,000 \times 12}{1 \times (24/100)}} = \sqrt{12,00,000}$$

= 1095.4 units or say 1,100 units.

(ii) When should the order be placed i.e., reordering level

Reordering level = *Safety stock +normal lead time consumption

$$\text{Reordering level} = \left[\frac{12,000}{360} \times 30\right] + \left[\frac{12,000}{360} \times 15\right]$$

= 1,000+500 = 1,500 units.

(iii) What should be the inventory level (ideally) immediately before the material ordered is received i.e. the Safety Stock.

$$*\text{Safety Stock} = \left[\frac{12,000}{360} \times 30\right]$$

$$= 1,000 \text{ units.}$$

Question 6

Discuss the treatment of spoilage and defectives in cost accounting

(3 Marks, May 2005; May 2007; May 2009) (2 Marks, November 2007)

Answer

Normal spoilage (which is inherent in the operation) costs are included in costs either by charging the loss due to spoilage to the production order or charging it to production overhead so that it is spread over all the products. Any value realized from the sale of spoilage is credited to production order or production overhead accounts, as the case may be. The cost of abnormal spoilage is charged to Costing P/L A/C. When spoiled work is the result of rigid specification, the cost of spoiled work is absorbed by good production while the cost of disposal is charged to production overhead.

Defectives that are considered inherent in the process and are identified as normal can be recovered by using the following method.

- Charged to goods products
- Charged to general overheads
- Charged to departmental overheads

If defectives are abnormal, they are charged to Costing Profit and Loss Account.

Question 7

A re-roller produced 400 metric tons of M.S. bars spending ₹ 36,00,000 towards materials and ₹ 6,20,000 towards rolling charges. Ten percent of the output was found to be defective, which had to be sold at 10% less than the price for good production. If the sales realization should give the firm an Overall profit of 12.5% on cost, find the selling price per metric ton of both the categories of bars. The scrap arising during the rolling process fetched a realization of ₹ 60,000. *(6 Marks, November 2006)*

Answer

(a) Computation of Selling Price

	₹	₹
Cost of Materials	36,00,000	
Less: Scrap	60,000	35,40,000
Rolling charges		6,20,000

Total cost		41,60,000
Add Profit (12.5% on cost)		5,20,000
Sales value		46,80,000

Output (effective)

$$360 \text{ tons} + \frac{9}{10} \times 40 \text{ tons} = 396 \text{ tons}$$

Selling price per MT of good output

= ₹ 46,80,000 ÷ 396

= ₹ 11,818.18

Selling price of defective per MT

= 0.9 × ₹ 11,818.18 = ₹ 10,636.36

Question 8

PQR Limited produces a product which has a monthly demand of 52,000 units. The product requires a component X which is purchased at ₹ 15 per unit. For every finished product, 2 units of Component X are required. The Ordering cost is ₹ 350 per order and the Carrying cost is 12% p.a.

Required:

(i) Calculate the economic order quantity for Component X.

(ii) If the minimum lot size to be supplied is 52,000 units, what is the extra cost, the company has to incur?

(iii) What is the minimum carrying cost, the Company has to incur? (8 Marks, May 2006)

Answer

Demand of 'X' is 1,04,000 units (2 × 52,000 units) as per instruction that for every finished product , 2 units of component 'X' are required.

(i) $EOQ = \sqrt{\frac{2AO}{c \times i}}$

$$= \sqrt{\frac{2 \times (2 \times 52{,}000 \times 12) \times 350}{15 \times 0.12}}$$

= 22,030 units of component 'X'

(ii) Extra cost incurred by the company

Total cost (when order size is 52,000 units) = Total ordering cost + Total carrying cost

$$= \frac{A}{Q} \times O + \frac{Q}{2} \times C \times i$$

$$= \left(\frac{2 \times 52,000 \times 12}{52,000} \times ₹\ 350 \right) + \frac{52,000}{2} \times 15 \times 12\%$$

= ₹ 55,200

Total cost (when order size is 22,030 units)

$$= \left(\frac{2 \times 52,000 \times 12}{22,030} \times ₹\ 350 \right) + \frac{22,030}{2} \times 15 \times 12\%$$

Total cost incurred = 19,828 + 19,827 = 39,655.

Extra cost incurred = ₹ 55,200 – ₹ 39,655 = ₹ 15,545.

(iii) Minimum carrying cost, the company has to incur

$$= \frac{Q}{2} \times C \times i$$

$$= \frac{22,030}{2} \times ₹\ 15 \times 12\%$$

= ₹ 19,827.

Question 9

PQR Ltd., manufactures a special product, which requires 'ZED'. The following particulars were collected for the year 2005-06:

(i)	*Monthly demand of Zed*	:	*7,500 units*
(ii)	*Cost of placing an order*	:	*₹ 500*
(iii)	*Re-order period*	:	*5 to 8 weeks*
(iv)	*Cost per unit*	:	*₹ 60*
(v)	*Carrying cost % p.a.*	:	*10%*
(vi)	*Normal usage*	:	*500 units per week*
(vii)	*Minimum usage*	:	*250 units per week*
(viii)	*Maximum usage*	:	*750 units per week*

Required:

(i) Re-order quantity.

(ii) Re-order level.

(iii) Minimum stock level.

(iv) Maximum stock level.

(v) Average stock level. *(10 Marks, November 2006)*

Answer

(i) Re - order quantity = $\sqrt{\frac{2AO}{C \times i}}$

$= \sqrt{\frac{2 \times 7{,}500 \times 12 \times 500}{60 \times 10}}$

= 3,873 units

(ii) Re-order level

= Maximum re-order period × Maximum usage

$= 8 \text{ weeks} \times 750 \text{ units per week}$

= 6,000 units

(iii) Minimum stock level

= Re-order level – {Normal usage × Average reorder period}

= 6,000 – (500 × 6.5)

= 2,750 units

(iv) Maximum stock level

= Re-order level + Re-order quantity – (Minimum usage × Minimum re-order period)

= 6,000 + 3,873 – (5 × 250)

= 8,623 units

(v) Average stock level

= ½ (Minimum stock level + Maximum stock level)

= ½ (2,750 + 8,623)

= 5,687 units

Question 10

Discuss the use of perpetual inventory records and continuous stock verification, and its advantages. *(4 Marks, November 2006)*

Answer

Use of perpetual inventory records and continuous stock verification: Perpetual inventory represents a system of records maintained by the stores department. These are Bin cards and Stores ledger.

Bin Card is a quantitative record of receipt, issue and closing balance of each item of stores. Separate bin cards are maintained for each item. Each card is filled up with physical movement of goods i.e. on receipt and issue.

Stores Ledger is quantitative and value record of receipt, issue and closing balance of each item of stores. It is filled with the help of goods received note and material issue requisitions.

A perpetual inventory is usually checked by a programme of continuous stock taking. Continuous stock taking means physical checking of those records with actual stock.

Advantages of perpetual inventory

(1) Physical stocks can be counted and book balances adjusted as and when desired without waiting for entire stock taking to be done.

(2) Quick compilation of Profit and Loss Account due to prompt availability of stock figures.

(3) Discrepancies are easily located and thus corrective action can be promptly taken.

(4) A systematic review of the perpetual inventory reveals the existence of surplus, dormant, obsolete and slow moving materials, so that remedial measures may be taken in time.

(5) Fixation of various stock levels and checking of actual balance in hand.

Question 11

The average annual consumption of a material is 18,250 units at a price of ₹ 36.50 per unit. The storage cost is 20% on an average inventory and the cost of placing an order is ₹ 50. How much quantity is to be purchased at a time? *(2 Marks, May 2007)*

Answer

Quantity to be purchased

$$\sqrt{\frac{2 \times 18{,}250 \times 50}{20\% \text{ of } 36.50}} = \sqrt{2{,}50{,}000} = 500 \text{ units}$$

Question 12

Explain, why the Last in First out (LIFO) has an edge over First in First out (FIFO) or any other method of pricing material issues. *(3 Marks, Nov 2007)*

Answer

LIFO has following advantages:

(a) The cost of the material issued will be reflecting the current market price.

(b) The use of the method during the period of rising prices does not reflect undue high profit in the income statement.

(c) In the case of falling price, profit tend to rise due to lower material cost, yet the finished goods appear to be more competitive and are at market price.

(d) During the period of inflation, LIFO will tend to show the correct profit.

Question 13

ZED Company supplies plastic crockery to fast food restaurants in metropolitan city. One of its products is a special bowl, disposable after initial use, for serving soups to its customers. Bowls are sold in pack 10 pieces at a price of ₹ 50 per pack.

The demand for plastic bowl has been forecasted at a fairly steady rate of 40,000 packs every year. The company purchases the bowl direct from manufacturer at ₹ 40 per pack within a three days lead time. The ordering and related cost is ₹ 8 per order. The storage cost is 10% per cent per annum of average inventory investment.

Required:

(i) Calculate Economic Order Quantity.

(ii) Calculate number of orders needed every year.

(iii) Calculate the total cost of ordering and storage bowls for the year.

(iv) Determine when should the next order to be placed. (Assuming that the company does maintain a safety stock and that the present inventory level is 333 packs with a year of 360 working days.) *(8 Marks, May 2008)*

Answer

(i) Economic Order Quantity

$$EOQ = \sqrt{\frac{2 \times C \times O}{UI}}$$

$$= \sqrt{\frac{2 \times 40{,}000 \times 8}{4}}$$

$$= \sqrt{1{,}60{,}000} = 400 \text{ packs.}$$

(ii) Number of orders per year

$$\frac{\text{Annual requirements}}{\text{Economic order quantity}}$$

$$\frac{40{,}000}{400} = 100 \text{ order per year}$$

(iii) Ordering and storage costs

	₹
Ordering costs :– 100 orders × ₹ 8.00	800
Storage cost :– (400/2) × (10% of 40)	800
Total cost of ordering & storage	1,600

(iv) Timing of next order

(a) Day's requirement served by each order.

$$\text{Number of days requirements} = \frac{\text{No. of working days}}{\text{No. of order in a year}}$$

$$= \frac{360}{100} = 3.6 \text{ days supply}$$

This implies that each order of 400 packs supplies for requirements of 3.6 days only.

(b) Days requirement covered by inventory

$$= \frac{\text{Units in inventory}}{\text{Economic order quantity}} \times (\text{Day requirement served by an order})$$

$$\therefore \frac{333}{400} \times 3.6 \text{ days} = 3 \text{ days requirement}$$

(c) Time interval for placing next order

Inventory left for day's requirement – Lead time of delivery

3 day's requirements – 3 days lead time = 0

This means that next order for the replenishment of supplies has to be placed immediately.

Question 14

The annual carrying cost of material 'X' is ₹ 3.6 per unit and its total carrying cost is ₹ 9,000 per annum. What would be the Economic order quantity for material 'X', if there is no safety stock of material X ? *(2 Marks, November, 2008)*

Answer

Calculation of Economic Order Quantity

$$\text{Average Inventory} = \frac{\text{Total Carrying Cost}}{\text{Carrying Cost per unit}}$$

$$= \frac{₹\ 9,000}{₹\ 3.60} = 2,500 \text{ Units}$$

Economic Order Quantity = Average Inventory × 2

= 2,500 × 2 = 5,000 units.

Alternative Solution:

$$\text{Total Carrying Cost} = \frac{\text{Carrying cost per unit} \times \text{E.O.Q}}{2}$$

$$\text{or } 9,000 = \frac{3.6 \times \text{E.O.Q}}{2}$$

$$\text{or E.O.Q.} = \frac{9,000 \times 2}{3.6} = 5,000 \text{ unit}$$

Question 15

The following information relating to a type of Raw material is available:

Annual demand	*2000 units*
Unit price	*₹ 20.00*
Ordering cost per order	*₹ 20.00*
Storage cost	*2% p.a.*
Interest rate	*8% p.a.*
Lead time	*Half-month*

Calculate economic order quantity and total annual inventory cost of the raw material.

(3 Marks, November 2009)

Answer

$$\text{EOQ} = \sqrt{\frac{2 \times \text{Annual Consumption} \times \text{Buying Cost per Order}}{\text{Storage Cost per unit}}}$$

$$= \sqrt{\frac{2 \times 2,000 \times 20}{₹20 \times \left(\frac{2+8}{100}\right)}} = \sqrt{\frac{80,000}{2}} = 200 \text{ Units}$$

Total Annual Inventory Cost

Cost of 2,000 Units @ ₹20 (2,000 × 20)	= ₹ 40,000
No. of Order $\frac{2,000}{200}$	= ₹ 10

Ordering Cost 10 × 20	= ₹ 200
Carrying cost of Average Inventory $\frac{200}{2} \times 20 \times \frac{10}{100}$	= ₹ 200
	= ₹ 40,400

Question 16

Re-order quantity of material 'X' is 5,000 kg.; Maximum level 8,000 kg.; Minimum usage 50 kg. per hour; minimum re-order period 4 days; daily working hours in the factory is 8 hours. You are required to calculate the re-order level of material 'X'. *(2 Marks, May 2010)*

Answer

Re-order Level = Maximum Level – [Re-order quantity – (Minimum usage per day × Minimum Re-order Period)

= 8,000 kg. – [5,000 kg. – (400 kg* × 4)]

= 8,000 kg. – 3,400 kg. = 4,600 kg.

*Minimum usage per day = 50 kg. × 8 = 400 kg.

Alternative solution

Let the Re-order level is 'X'

Maximum level= Re-order level + Re-order quantity – (Minimum usage per day × Minimum Re-order Period)

Or 8,000 kg. = X + 5,000 kg – (400 kg × 4 days)

Or 8,000 kg. = X + 5,000 kg. – 1,600 kg.

Or X = 8,000 kg. – 3,400 kg.

Or X = 4,600 kg.

Hence, Re-order level is 4,600 kg.

Question 17

ABC Limited has received an offer of quantity discounts on its order of materials as under:

Price per tonnes (₹)	*Tonnes Nos.*
4,800	*Less than 50*
4,680	*50 and less than 100*
4,560	*100 and less than 200*
4,440	*200 and less than 300*
4,320	*300 and above*

The annual requirement for the material is 500 tonnes. The ordering cost per order is ₹ 6,250 and the stock holding cost is estimated at 25% of the material cost per annum.

Required :

(i) Compute the most economical purchase level

(ii) Compute E.O.Q. if there are no quantity discounts and the price per tonne is ₹ 5,250.

(5 Marks, November 2010)

Answer

(i) Calculation of most economical purchase level:

A= Annual requirement = 500 tonnes

Order size	No. of Orders	Cost of Purchase	Ordering Cost	Carrying Cost	Total Cost
(Q) Units	(A/Q)	(A x Cost/total)	(A/Q x ₹ 6,250)	(Q/2 x Price/ tonne × 25%)	₹
40	500/40= 12.5	500×4,800 = 24,00,000	12.5X6,250 = 78,125	$\frac{40}{2}\times 4,800\times .25$ = 24,000	25,02,125
50	500/50= 10	500 X 4,680 = 23,40,000	10X6,250 = 62,500	$\frac{50}{2}\times 4,680\times .25$ = 29,250	24,31,750
100	500/100= 5	500 X 4,560 = 22,80,000	5X62,250 = 31,250	$\frac{100}{2}\times 4,560\times .25$ = 57,000	23,68,250
200	500/200= 2.5	500× 4,440= 22,20,000	2.5× 6,250=15,625	$\frac{200}{2}\times 4,440\times .25$ =1,11,000	23,46,625
300	500/300=1.67	500 X 4,320 = 21,60,000	1.67 X 6,250 = 10,437.50	$\frac{300}{2}\times 4,320\times .25$ = 1,62,000	23,32,437.50

The total cost of purchase ordering cost and carrying cost of 500 tonnes is minimum ₹ 23,32,437.50 when the order size is 300 tonnes. Hence most economical purchase level is 300 tonnes.

(ii) $EOQ = \sqrt{\frac{2AO}{C\times i}} = \sqrt{\frac{2\times 500\text{ tonnes}\times ₹\ 6250\text{ per order}}{₹\ 5250\times .25}}$

= 69 tonnes

A is the annual requirement for the material.

O is the ordering Cost per order

Ci is the carrying Cost per unit per annum.

Question 18

Prepare a Store Ledger Account from the following transactions of XY Company Ltd.

April, 2011

1 Opening balance 200 units @ ₹10 per unit.

5 Receipt 250 units costing ₹2,000

8 Receipt 150 units costing ₹1,275

10 Issue 100 units

15 Receipt 50 units costing ₹500

20 Shortage 10 units

21 Receipt 60 units costing ₹540

22 Issue 400 units

The issues upto 10-4-11 will be priced at LIFO and from 11-4-11 issues will be priced at FIFO. Shortage will be charged as overhead. *(5 Marks, May 2011)*

Answer

Store Ledger Account

Name :-	Max. Stock Level -	Bin No.-
Code No. :-	Min. Stock Level -	Location Code-
Description:-	Re-order level –	
	Re-order quantity-	

Date	Receipts			Issues			Balance		
	Qty. Units	Rate ₹	Amount ₹	Qty. Units	Rate ₹	Amount ₹	Qty. Units	Rate ₹	Amount ₹
April 1							200	10	2,000
" 5	250	8	2,000				200	10	4,000
							250	8	
" 8	150	8.50	1,275				200	10	5,275
							250	8	
							150	8.50	

" 10				100	8.50	8.50	200	10	4,425
							250	8	
							50	8.50	
" 15	50	10	500				200	10	4,925
							250	8	
							50	8.50	
							50	10	
" 20				10 (shortage)	10	100	190	10	4,825
							250	8	
							50	8.50	
							50	10	
" 21	60	9	540				190	10	5,365
							250	8	
							50	8.50	
							50	10	
							60	9	
" 22				190	10	3,580	40	8	1,785 (Closing Stock)
				210	8		50	8.50	
							50	10	
							60	9	

Question 19

Distinguish between bill of material and material requisition note. *(4 Marks, May 2012)*

Answer

Bills of material	Material Requisition Note
1. It is document by the drawing office	1. It is prepared by the foreman of the consuming department.
2. It is a complete schedule of component parts and raw materials required for a particular job or work order.	2. It is a document authorizing Store-Keeper to issue Material to the consuming department.
3. It often serves the purpose of a Store Requisition as it shown the complete schedule of materials required for a particular job i.e. it can replace stores requisition.	3. It cannot replace a bill of material.

4.	It can be used for the purpose of quotation	4.	It is useful in arriving historical cost only.
5.	It helps in keeping a quantitative control on materials draw through stores Requisition.	5.	It shows the material actually drawn from stores.

Question 20

KL Limited produces product 'M' which has a quarterly demand of 8,000 units. The product requires 3 kgs. quantity of material 'X' for every finished unit of product. The other information are follows:

Cost of material 'X'	:	*₹20 per kg.*
Cost of placing an order Carrying Cost	:	*₹1000 per order*
Carrying Cost	:	*15% per annum of average inventory*

You are required:

(i) Calculate the Economic Order Quantity for material 'X'.

(ii) Should the' company accept an offer of 2 percent discount by the supplier, if he wants to supply the annual requirement of material 'X' in 4 equal quarterly installments ?

(4 Marks, November 2012)

Answer

Annual demand of material 'X'

= 8000 units (per quarter) x 4 (No. of Quarter in a year) x 3 kgs. (for every finished product)

= 96,000 kgs.

(i) Calculation of Economic Order Quantity (EOQ) for material 'X'

$$EOQ = \sqrt{\frac{2 \text{ x Annual demand x ordering cost}}{\text{Carrying cost per unit per annum}}}$$

$$= \sqrt{\frac{2 \times 96{,}000 \text{ kg} \times ₹\ 1000}{₹\ 20 \times 15\%}}$$

= 8,000 kg.

(ii) Evaluation of Cost under different options of 'order quantity'.

Particulars	When EOQ is ordered	When discount of 2% is accepted and supply is in 4 equal installments
Order size	8,000 kgs.	$\frac{96,000 \text{ Kgs}}{4}$ = 24,000 kgs
No. of order	$\frac{96,000 \text{ kgs}}{8,000 \text{ kgs}} = 12$	$\frac{96000 \text{ kgs}}{24,000 \text{ kgs}} = 4$
Purchase Cost per kg.	₹ 20	(20-2% ₹ 20) = ₹ 19.60
Total Purchase Cost (A)	(96,000 kgs. x ₹ 20) =₹19,20,000	(96,000 kgs x 19.6)= ₹18,81,600
Ordering Cost (B)	12 orders x ₹ 1,000 =₹12,000	4 orders x ₹ 1,000 = ₹ 4,000
Carrying Cost (C)	$\frac{8,000 \text{ kgs}}{2} \times 15\%$ x 20 = ₹ 12,000	$\frac{24,000 \text{ kgs}}{2}$ x 15% 19.6 = ₹ 35,280
Total Cost (A+B+C)	₹ 19,44,000	₹19,20,880

Advice – The total Cost is lower if Company accept an offer of 2 percent discount by the supplier, when supply of the annual requirement of material 'X' is made in 4 equal installments.

Question 21

Answer the following:

Primex Limited produces product 'P'. It uses annually 60,000 units of a material 'Rex' costing ₹ 10 per unit. Other relevant information are:

Cost of placing an order	:	*₹ 800 per order*
Carrying cost	:	*15% per annum of average inventory*
Re-order period	:	*10 days*
Safety stock	:	*600 units*

The company operates 300 days in a year.

You are required to calculated:

(i) Economic Order Quantity for material 'Rex'.

(ii) Re-order Level

(iii) Maximum Stock Level

(iv) Average Stock Level *(5 Marks, November 2013)*

Answer

(i) Economic Order Quantity (E.O.Q)

$$= \sqrt{\frac{2 \times \text{Annual requirement of 'Rex'} \times \text{Ordering cost per order}}{\text{Annual carrying cost per unit per annum}}}$$

$$= \sqrt{\frac{2 \times 60{,}000 \text{ units} \times ₹\,800}{₹10 \times 15\%}} \qquad = \sqrt{\frac{9{,}60{,}00{,}000}{₹1.5}}$$

= 8,000 units

(ii) Re-order Level = Safety Stock + (Normal daily Usage × Re-order period)

$$= 600 + \left(\frac{60{,}000 \text{ units}}{300 \text{ days}} \times 10 \text{ days}\right)$$

= 600 + 2,000

= 2,600 units

(iii) Maximum Stock Level = E.O.Q (Re-order Quantity) + Safety Stock

= 8,000 units + 600 units

= 8,600 units

(iv) Average Stock Level = Minimum Stock level + $\frac{1}{2}$ Re-order Quantity

$$= 600^* + \frac{1}{2}\ 8{,}000 \text{ units}$$

= 4,600 units

OR

Average Stock Level $= \dfrac{\text{Maximum Stock level} + \text{Minimum Stock level}}{2}$

$$= \frac{8{,}600 \text{ units} + 600 \text{ units}}{2}$$

= 4,600 units

* Minimum Stock Level = Re-order level – (Normal daily usage × Re-order period)

$$= 2{,}600 - \left(\frac{60{,}000 \text{ units}}{300 \text{ days}} \times 10 \text{ days}\right)$$

= 2,600 – 2,000

= 600 units

OR

Minimum Stock Level = Safety Stock level = 600 units

Note: Various levels can be calculated in different other ways. However answers will be the same.

Question 22

A company manufactures a product from a raw material, which is purchased at ₹ 80 per kg. The company incurs a handling cost of ₹ 370 plus freight of ₹ 380 per order. The incremental carrying cost of inventory of raw material is ₹ 0.25 per kg per month. In addition, the cost of working capital finance on the investment in inventory of raw material is ₹ 12 per kg per annum. The annual production of the product is 1,00,000 units and 2.5 units are obtained from one kg. of raw material.

Required:

(i) Calculate the economic order quantity of raw materials.

(ii) Advise, how frequently company should order for procurement be placed.

(iii) If the company proposes to rationalize placement of orders on quarterly basis, what percentage of discount in the price of raw materials should be negotiated?

Assume 360 days in a year. *(8 Marks, May, 2014)*

Answer

(i) Calculation of Economic Order Quantity (E.O.Q)

Annual requirement (usage) of raw material in kg. (A) $= \frac{1,00,000 \text{ units}}{2.5 \text{ units per kg.}} = 40,000 \text{ kg.}$

Ordering Cost (Handling & freight cost) (O) = ₹ 370 + ₹ 380 = ₹ 750

Carrying cost per unit per annum (C) i.e. inventory carrying cost + working capital cost

= (₹0.25 × 12 months) + ₹ 12

= ₹15 per kg.

E.O.Q. $= \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 40,000 \text{ kg.} \times ₹750}{₹15}}$ = 2,000 kg.

(ii) Frequency of placing orders for procurement:

Annual consumption (A) = 40,000 kg.

Quantity per order (E.O.Q) = 2,000 kg.

No. of orders per annum $\left(\frac{A}{E.O.Q}\right)$ $= \frac{40,000 kg.}{2,000 kg.}$ = 20 orders

Frequency of placing orders (in days) $= \frac{360 days}{20 orders}$ = 18 days

(iii) Percentage of discount in the price of raw materials to be negotiated:

Particulars	On Quarterly Basis	On E.O.Q Basis
1. Annual Usage (in Kg.)	40,000 kg.	40,000 kg.
2. Size of the order	10,000 kg.	2,000 kg.
3. No. of orders (1 ÷ 2)	4	20
4. Cost of placing orders or Ordering cost (No. of orders × Cost per order)	₹ 3,000 (4 order × ₹ 750)	₹ 15,000 (20 orders × ₹ 750)
5. Inventory carrying cost (Average inventory × Carrying cost per unit)	₹ 75,000 (10,000 kg. × ½ × ₹ 15)	₹ 15,000 (2,000 kg. × ½ × ₹ 15)
6. Total Cost (4 + 5)	₹ 78,000	₹ 30,000

When order is placed on quarterly basis the ordering cost and carrying cost increased by ₹ 48,000 (₹78,000 - ₹ 30,000).

So, discount required = ₹ 48,000

Total annual purchase = 40,000 kg. × ₹ 80 = ₹ 32,00,000

So, Percentage of discount to be negotiated = $\frac{₹48,000}{₹32,00,000} \times 100$ = 1.5%

Question 23

Following details are related to a manufacturing concern:

Re-order Level	*1,60,000 units*
Economic Order Quantity	*90,000 units*
Minimum Stock Level	*1,00,000 units*
Maximum Stock Level	*1,90,000 units*
Average Lead Time	*6 days*
Difference between minimum lead time and Maximum lead time	*4 days*

Calculate:

(i) Maximum consumption per day

(ii) Minimum consumption per day *(4 Marks, November, 2014)*

Answer

Difference between Minimum lead time Maximum lead time = 4 days

Max. lead time – Min. lead time = 4 days

Or, Max. lead time = Min. lead time + 4 days.....(i)

Average lead time is given as 6 days i.e.

$\frac{\text{Max.lead time} + \text{Min.lead time}}{2}$ = 6 days.....(ii)

Putting the value of (i) in (ii),

$\frac{\text{Min. lead time} + 4 \text{ days} + \text{Min.lead time}}{2}$ = 6 days

Or, Min. lead time + 4 days + Min. lead time = 12 days

Or, 2 Min. lead time = 8 days

Or, Minimum lead time = $\frac{8 \text{ days}}{2}$ = 4 days

Putting this Minimum lead time value in (i), we get

Maximum lead time = 4 days + 4 days = 8 days

(i) Maximum consumption per day:

Re-order level = Max. Re-order period × Maximum Consumption per day

1,60,000 units = 8 days × Maximum Consumption per day

Or, Maximum Consumption per day = $\frac{1,60,000 \text{ units}}{8 \text{ days}}$ = 20,000 units

(ii) Minimum Consumption per day:

Maximum Stock Level =

Re-order level + Re-order Quantity – (Min. lead time × Min. Consumption per day)

Or, 1,90,000 units = 1,60,000 units + 90,000 units – (4 days × Min. Consumption per day)

Or, 4 days × Min. Consumption per day = 2,50,000 units – 1,90,000 units

Or, Minimum Consumption per day = $\frac{60,000 \text{ units}}{4 \text{ days}}$ = 15,000 units