MATERIAL COST

Question 1

An invoice in respect of a consignment of chemicals A and B provides the following information:

	Amount (Rs.)
Chemical A: 10,000 kgs. at Rs. 10 per kg.	1,00,000
Chemical B: 8,000 kgs. at Rs. 13 per kg.	1,04,000
Basic Custom Duty @ 10% (Credit is not available)	20,400
Railway freight	3,840
Total cost	**2,28,240**

A shortage of 500 kgs. in chemical A and 320 kgs. in chemical B is noticed due to normal breakages. You are required to determine the rate per kg. of each chemical, assuming a provision of 2% for further deterioration.

Solution

Computation of effective quantity of each chemical available for use

	Chemical A (Kg)	**Chemical B (Kg.)**
Quantity purchased	10,000 kg	8,000 kg
Less Normal Shortage	(500 Kg)	(320 Kg)
Balance	**9,500 Kg**	**7,680 Kg**
Less provision for deterioration 2%	(190 Kg)	(153.60 Kg)
Net Quantity	**9,310 Kg**	**7,526.40 Kg**

Statement showing computation of Rate per Kg of each material

	Chemical A (Rs)	**Chemical B (Rs)**
Purchase Price	1,00,000	1,04,000
Add Basic Custom Duty 10%	10,000	10,400
Add Railway Freight (In ratio of 10,000 kg : 8000 Kg)	2,133	1,707
Total Cost	**1,12,133**	**1,16,107**
Effective Qty (Kg)	**9,310 Kg**	**7,526.40 Kg**
Price per kg. $(\frac{Total\ Cost}{Effective\ Qty})$	**12.04**	**15.43**

Question 2

At what price per unit would Part No. A 32 be entered in the Stores Ledger, if the following invoice was received from a supplier:

Invoice	**(Rs.)**
200 units Part No. A 32 @ Rs. 5	1,000.00
Less : 20% discount	(200.00)
	800.00
Add : GST @ 15%	120.00
	920.00
Add : Packing charges (5 non-returnable boxes)	50.00

	970.00

(i) A 2 per cent cash discount will be given if payment is made in 30 days.

(ii) Documents sustaining payment of GST is enclosed for claiming CENVAT credit.

Solution

Computation of cost price per unit

Particulars	**Amount (Rs.)**
Net Purchase Price	800
Add: Packing charges	50
Total Price	850
Cost per unit ($\frac{850}{200\ units}$)	4.25 per unit

1) Cash discount is interest and finance charges hence shall not considered for valuation of material
2) GST not added to purchase cost since refundable.

Question 3

CALCULATE the Economic Order Quantity from the following information. Also state the number of orders to be placed in a year.

Consumption of materials per annum : 10,000 kg.

Order placing cost per order : Rs.50

Cost per kg. of raw materials : Rs.2

Storage costs : 8% on average inventory

Solution

EOQ = $\sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 10000\ \text{kg} \times \text{Rs.}50}{8\%\ \text{of Rs.}2}}$ = 2500 Kg

Total Number of Orders in a Year = Annual Requirement of Material (A) / EOQ = 10,000 Kg / 2500 Kg = 4 Orders

Question 4

(i) Compute E.O.Q. and the total variable cost for the following:

Annual Demand	=	5,000 units
Unit price	=	Rs.20.00
Order cost	=	Rs.16.00
Storage rate	=	2% per annum
Interest rate	=	12% per annum
Obsolescence rate	=	6% per annum

(ii) Determine the total variable cost that would result for the items if an incorrect price of Rs.12.80 is used.

Solution

1. Carrying cost = Storage rate = 2%
   Interest Rate = 12%
   Obsolescence Rate = 6 %
   Total = 20% per annum

C = 20% of Rs. 20 = Rs. 4 per unit per annum.

EOQ = $\sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 5000\ units \times Rs.16}{Rs.4\ per\ unit\ per\ annum}}$ = 200 units

Total Material Cost

Particulars	Amount (Rs.)
Purchase Price (5,000 units@Rs.20 per unit)	1,00,000
Ordering Cost ($\frac{5000\ units}{200\ units}$ X Rs.16)	400
Carrying Cost ($\frac{200\ units}{2}$ X Rs. 4)	400
Total Material Cost	1,00,800

2. If an incorrect price of Rs. 12.80 is used:
   Carrying cost per unit p.a. = Rs. 12.80 X 20% = Rs. 2.56 p.a. per unit

EOQ = $\sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 5000\ units \times Rs.16}{Rs.2.56\ per\ unit\ per\ annum}}$ = 250 units

Total Material Cost

Particulars	Amount (Rs.)
Purchase Price (5,000 units @ 12.80per unit)	64,000
Ordering Cost ($\frac{5000\ units}{250\ units}$ X Rs.16)	320
Carrying Cost ($\frac{250\ units}{2}$ X Rs. 2.56)	320
Total Material Cost	64,640

Question 5

Two components, A and B are used as follows:
Normal usage 50 per week each
Maximum usage 75 per week each
Minimum usage 25 per week each
Re-order quantity A: 300; B: 500
Re-order period A: 4 to 6 weeks
B: 2 to 4 weeks
CALCULATE for each component (a) Re-ordering level, (b) Minimum level, (c) Maximum level, (d) Average stock level.

Solution

Re-Order Level = Maximum Usage X Max lead time
A = 75 per week x 6 weeks = 450 units
B = 75 per week x 4 weeks = 300 units
Minimum Level = Re-order Level – Avg. Usage X Avg. Lead Time
A = 450 units – (50 per week x 5 weeks) = 200 units
B = 300 units – (50 per week x 3 weeks) = 150 units
Maximum Stock Level = Re-order Level + Re-order quantity – Minimum Usage X Minimum Lead Time
A = 450 units + 300 units – (25 per week x 4 weeks) = 650 units
B = 300 units + 500 units – (25 per week x 2 weeks) = 750 units
Average stock Level = $\frac{Max.Stock\ Level + Minimum\ Stock\ Level}{2}$
A = (200 units + 650 units) / 2 = 425 units
B = (150 units + 750 units) / 2 = 450 units

Question 6

From the details given below, calculate:

(i) Re-ordering level
(ii) Maximum level
(iii) Minimum level
(iv) Danger level.

Re-ordering quantity is to be calculated on the basis of following information:
Cost of placing a purchase order is Rs. 20
Number of units to be purchased during the year is 5,000
Purchase price per unit inclusive of transportation cost is Rs. 50
Annual cost of storage per units is Rs. 5.

Details of lead time : Average- 10 days, Maximum- 15 days, Minimum- 5 days.
For emergency purchases- 4 days.
Rate of consumption : Average: 15 units per day,
Maximum: 20 units per day.

Solution

A (Number of units to be purchased annually) = 5,000 units
O (Ordering cost per order) = Rs.20
C (Annual cost of storage per unit) = Rs.5
Purchase price per unit inclusive of transportation cost = Rs.50.

Computations:

(i) Re-ordering level = Maximum usage per period × Maximum lead time
(ROL) = 20 units per day × 15 days = 300 units

(ii) Maximum level = ROL + ROQ – [Min. rate of consumption × Min. lead time
= 300 units + 200 units – [10 units per day × 5 days]= **450 units**

Working Notes 1. Minimum Usage Per day

Avg. Usage Per day = $\frac{Max.Usage\ per\ day+Min.Usage\ per\ day}{2}$

15 units = $\frac{20\ units+min.Usage}{2}$

Min. Usage per day = 10 units

W.N. 2 ROQ/EOQ = $\sqrt{\frac{2\ \times A\times O}{C}}$ = $\sqrt{\frac{2\ \times 5{,}000\ units\times Rs.20}{Rs.5}}$ = 200 units

(iii) Minimum level = ROL – Average rate of consumption × Average re-order-period
= 300 units – (15 units per day × 10 days) =150 units

(iv) Danger level = Average consumption × Lead time for emergency purchases
= 15 units per day × 4 days = 60 units

Question 7

M/s Tyrotubes trades in four wheeler tyres and tubes. It stocks sufficient quantity of tyres of almost every vehicle. In year end 20X1-X2, the report of sales manager revealed that M/s Tyrotubes experienced stock-out of tyres.

The stock-out data is as follows:

Stock-out of Tyres*	No. of times
100	2
80	5

50	10
20	20
10	30
0	33

M/s Tyrotubes loses Rs.150 per unit due to stock-out and spends Rs. 50 per unit on carrying of inventory. Determine optimum safest stock level.

Solution

Computation of probability of stock-out

Stock-Out units	No. of times	Probability (%)
100	2	2%
80	5	5%
50	10	10%
20	20	20%
10	30	30%
0	33	33%
	Total	**100%**

Special Note:- stock out units = unexpected demand – safety stock units
Total Stock –out cost = stock out units x Rs. 150
Expected stock-out cost = total stock-out cost x probability (%)
Carrying cost = safety stock x Rs. 50

Computation of stock-out and inventory carrying cost

Unexpected demand	Safety units	Stock-out units	Probability (%)	stock-out cost Rs.	Carrying cost Rs.	Total cost Rs.
100 units	0	100 units	2%	300		
80 units	0	80 units	5%	600		
50 units	0	50 units	10%	750	NIL	
20 units	0	20 units	20%	600		
10 units	0	10 units	30%	450		
Total				**2700**	**NIL**	**2700**
100 units	10	90 units	2%	270		
80 units	10	70 units	5%	525		
50 units	10	40 units	10%	600	500	
20 units	10	10 units	20%	300		
10 units	10	NIL units	30%	----		
Total				**1695**	**500**	**2195**
100 units	20	80 units	2%	240		
80 units	20	60 units	5%	450		
50 units	20	30 units	10%	450	1000	
20 units	20	NIL units	20%	------		
10 units	20	NIL units	30%	----		
Total				**1140**	**1000**	**2140**
100 units	50	50 units	2%	150		
80 units	50	30 units	5%	225	2500	
50 units	50	NIL units	10%	---		

20 units	50	NIL units	20%	------		
10 units	50	NIL units	30%	----		
Total				**375**	**2,500**	**2,875**
100 units	80	20 units	2%	60		
80 units	80	NIL units	5%	----		
50 units	80	NIL units	10%	---	4,000	
20 units	80	NIL units	20%	------		
10 units	80	NIL units	30%	----		
Total				**60**	**4,000**	**4,060**
100 units	100	NIL units	2%	-----		
80 units	100	NIL units	5%	----		
50 units	100	NIL units	10%	---	5,000	
20 units	100	NIL units	20%	------		
10 units	100	NIL units	30%	----		
Total				**----**	**5,000**	**5,000**

If safety stock of 20 units is maintained then total cost is least i.e. Rs. 2,140

Question 8

From the following details, draw a plan of ABC selective control:

Item	Units	Unit cost (Rs.)
1	7,000	5.00
2	24,000	3.00
3	1,500	10.00
4	600	22.00
5	38,000	1.50
6	40,000	0.50
7	60,000	0.20
8	3,000	3.50
9	300	8.00
10	29,000	0.40
11	11,500	7.10
12	4,100	6.20

Solution

Statement showing Total cost and ranking of items

Item	**Units**	**Unit Cost (Rs.)**	**Total Cost (Rs.)**	**% of total Cost**	**Ranking based on % of total cost**	**Category (ICAI Assumption Based)**	**My View (70%, 20% & 10% rule in ABC)**
1	7,000	5.00	35,000	9.8378	4	B	Should be A
2	24,000	3.00	72,000	20.2378	2	A	
3	1,500	10.00	15,000	4.2162	7	B	
4	600	22.00	13,200	3.7103	8	C	Should be B
5	38,000	1.50	57,000	16.0216	3	A	
6	40,000	0.50	20,000	5.6216	6	B	
7	60,000	0.20	12,000	3.3730	9	C	

8	3,000	3.50	10,500	2.9513	11	C	
9	300	8.00	2,400	0.6746	12	C	
10	29,000	0.40	11,600	3.2605	10	C	
11	11,500	7.10	81,650	22.9502	1	A	
12	4,100	6.20	25,420	7.1451	5	B	
Total	**2,19,000**		**3,55,770**	**100.00**			

Category A items holds approx.. 70% of total cost, Category B items holds approx.. 20% of total cost while category C holds items approx.. 10% of total cost.

Ranking	Item Nos	Cost (Rs.)	% of total cost	Category
1	11	81,650	22.9502	
2	2	72,000	20.2378	
3	5	57,000	16.0216	
Total	**3**	**210650**	**59.2096**	**A**
4	1	35,000	9.8378	
5	12	25,420	7.1451	
6	6	20,000	5.6216	
7	3	15,000	4.2162	
Total	**4**	**95420**	**26.8207**	**B**
8	4	13,200	3.7103	
9	7	12,000	3.3730	
10	10	11,600	3.2605	
11	8	10,500	2.9513	
12	9	2,400	0.6746	
Total	**5**	**49700**	**13.9697**	**C**

Assumption: ICAI assumed basis for Selective Control as follows

- Rs.50000 and above – Category "A" Items
- Rs.15000 to Rs.50000 – Category "B" Items
- Below Rs.15000 – Category "C" Items

Note: According to me

- Item No. 4 having 9.8378% should also be covered in Category A then Total of A Category would be 69.0474%
- If Items No.4 is covered in Category A as above then Item No.8 having 3.7103% should be covered in Category B then total of category B would be 20.6932%.
- Following answer shall be according to me

Ranking	Item Nos	Cost (Rs.)	% of total cost	Category
1	11	81,650	22.9502	
2	2	72,000	20.2378	
3	5	57,000	16.0216	
4	1	35,000	9.8378	
Total	**4**	**2,45,650**	**69.0474**	**A**
5	12	25,420	7.1451	
6	6	20,000	5.6216	
7	3	15,000	4.2162	
8	4	13,200	3.7103	

Total	**4**	**73,620**	**20.6932**	**B**
9	7	12,000	3.3730	
10	10	11,600	3.2605	
11	8	10,500	2.9513	
12	9	2,400	0.6746	
Total	**4**	**36,500**	**10.2594**	**C**

Question 9

A factory uses 4,000 varieties of inventory. In terms of inventory holding and inventory usage, the following information is compiled:

No. of varieties of inventory	**%**	**% value of inventory holding (average)**	**% of inventory usage (in end-product)**
3,875	96.875	20	5
110	2.750	30	10
15	0.375	50	85
4,000	**100.000**	**100**	**100**

Classify the items of inventory as per ABC analysis with reasons.

Solution

- 15 number of varieties of inventory will be classified as category "A" since it contains 50% of value of inventory holding (average) which is maximum according to information given.
- 110 number of varieties of inventory will be classified as category "B" since it contains 30% of value of inventory holding (average) which is moderate according to information given.
- 3875 number of varieties of inventory will be classified as category "C" since it contains 20% of value of inventory holding (average) which is least according to information given.

Inventory Usage = Opening Inventory + Purchase of Material – Closing Inventory

Question 10

The following data are available in respect of material X for the year ended 31st March, 2016.

	(Rs.)
Opening stock	90,000
Purchases during the year	2,70,000
Closing stock	1,10,000

Calculate:

Inventory turnover ratio, and the number of days for which the average inventory is held.

Solution

Inventory turnover ratio = $\frac{Raw\ material\ consumed\ during\ a\ year}{Avg.stock\ of\ raw\ material}$ = $\frac{\text{Rs.}2,50,000}{Rs.1,00,000}$ = 2.5 times

Raw Material Holding Period (in Days) = $\frac{365\ \text{Days}}{Inventory\ turnover\ Ratio}$ = $\frac{365\ \text{Days}}{2.5\ times}$

= 146 Days

Working Note: (*Rs.)*

Opening stock of raw material	90,000
Add: Material purchases during the year	2,70,000
Less: Closing stock of raw material	1,10,000

Cost of stock of raw material consumed	2,50,000

Question 11

From the following data for the year ended 31st December, 2016, calculate the inventory turnover ratio of the two items and put forward your comments on them.

	Material A (Rs.)	Material B(Rs.)
Opening stock 1.1.2016	10,000	9,000
Purchase during the year	52,000	27,000
Closing stock 31.12.2016	6,000	11,000

Solution:

Cost of materials consumed	**Material A (Rs.)**	**Material B (Rs.)**
Opening stock	10,000	9,000
Add: Purchases	52,000	27,000
	62,000	36,000
Less: Closing stock	6,000	11,000
Materials consumed	56,000	25,000
Average inventory: (Opening Stock + Closing Stock) / 2	8,000	10,000
Inventory Turnover ratio: (Consumption / Average inventory)	7 times	2.5 times
Raw Material Holding Period	52 days	146 days

Comments: Material A is moving faster than Material B.

Question 12

The following transactions in respect of material Y occurred during the six months ended 30th June, 2016:

Month	Purchase (units)	Price per unit (Rs.)	Issued Units
January	200	25	Nil
February	300	24	250
March	425	26	300
April	475	23	550
May	500	25	800
June	600	20	400

Required:

1) The Chief Accountant argues that the value of closing stock remains the same no matter which method of pricing of material issues is used. Do you agree? Why or why not? Detailed stores ledgers are not required.
2) When and why would you recommend the LIFO method of pricing material issues?

Solution:-

1) The Closing Stock at the end of six months period *i.e.,* on 30th June, 2016 will be 200 units, Since up to the end of May 2016, total purchases are equal to total issues *i.e.,* 1,900 units. It means that at the end of May 2016, there was no closing stock.

In themonth of June 2016, 600 units were purchased out of which 400 units were issued. Since there was **only one purchase and one issue** in the month of June, 2016and the Closing Stock of 200 units is to be valued at Rs. 20 per unit.

In view of this, the argument of the Chief Accountant appears to be correct. **Where there is only one purchase and one issue in a month with no opening stock, the method of pricing of material issues becomes irrelevant.**

Therefore, in the given case one should agree with the argument of the Chief Accountant that the value of Closing Stock remains the same no matter which method of pricing the issue is used.

2) LIFO method has an **advantage** over FIFO or any other method of pricing material issues due to the following reasons:

(a) The cost of the materials issued will reflect the current market price or will be nearer to current market price because it represents cost of recent purchase

(b) In the period of rising prices, lower income is reported since currents costs are matched with current revenue. As a result, income tax liability is reduced.

Question 13

The following information is provided by Sunrise Industries for the fortnight of April, 2016: Material Exe :
Stock on 1-4-2016 100 units at Rs. 5 per unit.
Purchases
5-4-16 300 units at Rs.6
8-4-16 500 units at Rs.7
12-4-16 600 Units at Rs.8
Issues
6-4-16 250 units
10-4-16 400 units
14-4-16 500 units

The stock verifier of the company reported a shortage of 30 units on 15-04-2016. This shortage is treated as inflating the price of remaining material on account of shortage.
On 20-04- 2016, There happened fire in company which resulted in loss of 20 units of material.
Required:

1. Calculate using FIFO, LIFO & weighted average methods of pricing issues :
    a. The value of materials consumed during the period
    b. The value of stock of materials on 30-4-16.

Solution

Store Ledger (FIFO)

	Receipts			Issue			Balance		
Date	Qty	Rate	Amt	Qty	Rate	Amt	Qty	Rate	Amt
1/4/16							100	5	500
5/4/16	300	6	1800				100	5	500
							300	6	1800
6/4/16				100	5	500	150	6	900
				150	6	900			
8/4/16	500	7	3500				150	6	900
							500	7	3500

10/4/16				150	6	900	250	7	1750
				250	7	1750			
12/4/16	600	8	4800				250	7	1750
							600	8	4800
14/4/16				250	7	1750	350	8	**2800**
				250	8	2000			
15/4/16 Normal Loss				30	-	-	320	8.75	2800
20/4/16 Abnormal Loss				20	8.75	175	300	8.75	2625
Total						**7800**			

Value of material consumed = Rs. 7800

Cost of closing stock = Rs. 2625

Cost of abnormal loss = 175

Cost of normal loss = Zero (Absorbed by good units)

Store Ledger (LIFO)

	Receipts			**Issue**			**Balance**		
Date	Qty	Rate	Amt	Qty	Rate	Amt	Qty	Rate	Amt
1/4/16							100	5	500
5/4/16	300	6	1800				100	5	500
							300	6	1800
6/4/16				250	6	1500	100	5	500
							50	6	300
8/4/16	500	7	3500				100	5	500
							50	6	300
							500	7	3500
10/4/16				400	7	2800	100	5	500
							50	6	300
							100	7	700
12/4/16	600	8	4800				100	5	500
							50	6	300
							100	7	700
							600	8	4800
14/4/16				500	8	4000	100	5	500
							50	6	300
							100	7	700
							100	8	800
15/4/16				30	--	--	100	5	500
Normal							50	6	300
Loss							100	7	700
							70	11.42	**800(Same)**
20/4/16				20	11.42	228.40	100	5	500
Abnormal							50	6	300

Loss							100	7	700
							50	11.42	571
Total						**8300**			**2300**

Value of material consumed = Rs. 8,300, Cost of closing stock = Rs. 2071
Cost of abnormal loss = 228.40 Cost of normal loss = Zero (Absorbed by good units)

Store Ledger (Weighted Average Method)

	Receipts			**Issue**			**Balance**		
Date	Qty	Rate	Amt	Qty	Rate	Amt	Qty	Amt	Rate
1/4/16							100	500	5
5/4/16	300	6	1800				400	2300	5.75
6/4/16				250	5.75	1437.50	150	862.50	5.75
8/4/16	500	7	3500				650	4362.50	6.71
10/4/16				400	6.71	2684	250	1678.50	6.71
12/4/16	600	8	4800				850	6478.50	7.62
14/4/16				500	7.62	3810	350	2668.50	7.62
15/4/16				30	-	-	320	2668.50	8.34
20/4/16				20	8.34	166.78	300	2501.72	8.34
Total						**7931.50**		**2668.50**	

Value of material consumed = Rs. 7931.50
Cost of closing stock = Rs. 2501.72
Cost of abnormal loss = 166.78
Cost of normal loss = Zero (Absorbed by good units)

Question 14

Imbrios India Ltd. is recently incorporated start-up company back in the year 2019. It is engaged in creating Embedded products and Internet of Things (IoT) solutions for the Industrial market. It is focused on innovation, design, research and development of products and services. One of its embedded products is LogMax, a system on module (SoM) Carrier board for industrial use. It is a small, flexible and embedded computer designed as per industry specifications. In the beginning of the month of September 2022, company entered into a job agreement of providing 4800 LogMax to NIT, Mandi. Following details w.r.t. issues, receipts, returns of Store Department handling Micro-controller, a component used in the designated assembling process have been extracted for the month of September, 2022:

- Sep. 1 - Opening stock of 6,000 units @ Rs.285 per unit
- Sep. 8 - Issued 4875 units to mechanical division vide material requisition no. Mech 009/22
- Sep. 9 - Received 17,500 units @ Rs.276 per unit vide purchase order no. 159/22
- Sep. 10 - Issued 12,000 units to technical division vide material requisition no. Tech 012/22
- Sep. 12 - Returned to stores 2375 units by technical division against material requisition no. Tech 012/22.
- Sep. 15 - Received 9,000 units @ Rs.288 per units vide purchase order no. 160/2222
- Sep. 17 - Returned to supplier 700 units out of quantity received vide purchase order no. 160/22.
- Sep. 20 - Issued 9,500 units to technical division vide material requisition no. Tech 165/22

On 25th September, 2022, the stock manager of the company expressed his need to leave for his hometown due to certain contingency and immediately left the job same day. Later, he also switched his phone off.

As the company has the tendency of stock-taking every end of the month to check and report for the loss due to rusting of the components, the new stock manager, on 30th September, 2022, found that 900 units of Micro-controllers were missing which was apparently misappropriated by the former stock manager. He, further, reported loss of 300 units due to rusting of the components. From the above information you are required to prepare the Stock Ledger account using 'Weighted Average' method of valuing the issues.

Solution

Store Ledger - Weightage Average Method

Date (Sept)	Receipts			Issues			Stock		
	Qty – Kg	Rate	Amount	Qty – Kg	Rate	Amount	Qty – Kg	Rate	Amount
1							6000	285	1710000
8				4875	285	1389375	1125	285	320625
9	17500	276	4830000				18625	276.54	5150625
10				12000	276.54	3318480	6625	276.54	1832145
12	2375	276.54	656783				9000	276.54	2488928
15	9000	288	2592000				18000	282.27	5080928
17				700	288 WN - 1	201600	17300	282.04	4879328
20				9500	282.04	2679380	7800	282.04	2199948
30				900	282.04 WN – 2	253836	6900	282.04	1946112
30				300	- WN - 3	-	6600	294.87	1946112

Main Note:

1. **Transaction of 12th Sept** – Technical Division Returned 2375 units to Store Department which were issued on 10th Sept. at Rs.276.54. hence such Return from Division to store shall be shown as Receipt of 2375 units at Rs.276.54 i.e. Same price at which these were issued on 10th Sept.
2. **Transaction of 17th Sept** – Store Dept. Returned to supplier 700 units which were purchased on 15th Sept. via purchase order number – 160/22 at Rs.288. Hence 700 units shall be shown under issues at Rs.288 i.e. Same price at which these were purchased on 15th Sept.
3. **"Misappropriated"** means "Stolen" hence 900 units are abnormal loss.
4. "Rusting" means normal scrap hence normal loss.

Question 15

Anil & Company buys its annual requirement of 36,000 units in 6 installments. Each unit costs Rs.1 and the ordering cost isRs.25. The inventory carrying cost is estimated at 20% of unitvalue. Find the total annual cost of the existing inventory policy. How much money can be saved by Economic Order Quantity.

Solution

(a) Total Annual Cost in Existing Inventory Policy

(Rs.)

Ordering cost (6 orders @ Rs. 25)		150
Carrying cost of average inventory [$\frac{Q}{2}$ x C (Purchase cost x 20%)]		600
[Q = $\frac{36000\ units}{6\ installments}$ = 6000 units]		
[$\frac{6000\ units}{2}$ x Rs. 1 x 20%]		
Total of ordering and carrying cost	A	**750**

b) Total annual cost in EOQ

EOQ = $\sqrt{\frac{2\ \times 36000\ units \times Rs.25}{Rs.1\ x\ 20\%}}$ = 3000 units

		(Rs.)
No. of orders = 36,000 ÷3,000 units = 12 orders		
Ordering cost (12 ordersXRs. 25) =		300
Carrying cost of average inventory ($\frac{Q}{2}$ x Purchase cost x 20%)		300
Total of ordering and carrying Cost	**B**	**600**
Savings due to E.O.Q Rs. (750 – 600)	**(A – B)**	**150**

Note :- Purchase cost shall be same in both cases and it will not affect savings in cost hence ignored

Question 16

NOV. 2007 A Company manufactures a special product which requires a component 'Alpha'. The following particulars are collected for the year 2016:

(i) Annual demand of Alpha 8,000 units
(ii) Cost of placing an order Rs.200 per order
(iii) Cost per unit of Alpha Rs.400
(iv) Carrying cost p.a. 20%

The company has been offered a quantity discount of 4 % on the purchase of 'Alpha' provided the order size is 4,000 components at a time.

Required :

1) Compute the economic order quantity
2) Advise whether the quantity discount offer can be accepted.

Question in short:- A (Annual DD) = 8000 units, O(Order Cost per order) = Rs.200, Purchase Cost p.u. = Rs. 400 Carrying Cost p.u.p.a = 20% and 4% discount if order size is 4,000 components

Solution:- The component "Alpha" is raw material.

1) EOQ = $\sqrt{\frac{2\ \times A \times O}{C}}$ = $\sqrt{\frac{2\ \times 8{,}000\ units \times Rs.200}{400\ X\ 20\%}}$ = 200 units
2) Calculation of total cost when

	EOQ is ordered (200 units)	**4,000 units are ordered**
Total Annual purchase cost	32,00,000 (8,000 units X Rs. 400)	30,72,000 (8,000 units X Rs. 400 X 96%)
Total annual ordering Cost	8,000 (40 Orders X Rs. 200)	400 (2 orders X RS. 200)
Total annual carrying cost	8,000($\frac{200\ units}{2}$ X Rs.400 X 20%)	1,53,600 ($\frac{4000\ units}{2}$ X Rs. 400 X 96% X 20%)
Total Material Cost	32,16,000	32,26,000

Advise:- Don't accept discount offer since extra cost of Rs. 10,000

Question 17

The complete Gardener is deciding on the economic order quantity for two brands of lawn fertilizer. Super Grow and Nature's Own. The following information is collected:

	Fertilizer	
	Super Grow	**Nature's Own**
Annual demand	2,000 bags	1,280 bags
Relevant ordering cost per purchase order	Rs.1,200	Rs.1,400
Annual relevant carrying cost per bag	Rs.480	Rs.560

Required:

(i) Compute EOQ for Super Grow and Nature's own.

(ii) For the EOQ, what is the sum of the total annual relevant ordering costs and total annual relevant carrying costs for Super Grow and Nature's own?

(iii) For the EOQ, compute the number of deliveries per year for Super Grow and Nature's own.

Solution:-

i. Calculation of EOQ

Super Grow	Nature's Grow
EOQ = $\sqrt{\frac{2 \times 2{,}000\ bags \times Rs.1200}{Rs.480\ per\ unit\ per\ annum}}$ = 100 bags	EOQ = $\sqrt{\frac{2 \times 1{,}280\ bags \times Rs.1400}{Rs.560\ per\ unit\ per\ annum}}$ = 80 bags

ii. Total annual relevant cost = annual ordering cost + annual carrying cost

Super Grow	Nature's Grow
=($\frac{2000\ bags}{100\ bags}$ x Rs. 1200)+($\frac{100\ bags}{2}$xRs.480 =Rs. 48,000	=($\frac{1280\ bags}{80\ bags}$ x Rs. 1400)+($\frac{80\ bags}{2}$xRs.560 =Rs. 44,800

iii. No. of deliveries in a year = $\frac{Annual\ requirement}{order\ size}$

Super Grow	Nature's Grow
= $\frac{2000\ bags}{100\ bags}$ = 20 orders	= $\frac{1280\ bags}{80\ bags}$ = 16 orders

Question 18

A company uses three raw materials A, B and C for a particular product for which the following data apply

Raw Material	**Usage per unit of Product (Kgs.)**	**Re-Order Quantity (Kgs.)**	**Price per Kg**	**Delivery Period (In Weeks)**			**Re-Order Level (Kgs)**	**Minimum Level (Kgs.)**
				Minimum	**Average**	**Maximum**		
A	10	10,000	0.10	1	2	3	8,000	?
B	4	5,000	0.30	3	4	5	4,750	?
C	6	10,000	0.15	2	3	4	?	2,000

Weekly production varies from 175 to 225 units, averaging 200 units of the said product. What would be the following quantities:–

1. Minimum Stock of A?

2. Maximum Stock of B?
3. Re-order level of C?
4. Average stock level of A?

Solution:-

Minimum stock of A

Formula 1:- Re-order level – (Average Usage × Average Lead Time)

8,000 kg. – (200 units × 10 kg. × 2 weeks) = 4,000 kg.

Formula 2:- Max. Lead Time X Max. Usage – Avg. Lead Time X Avg. Usage

225 units x 10 kg x 3 week – 200 units x 10 kg x 2 weeks = 2750 Kg

Formula 3:- Safety Stock (Not Given)

Maximum stock of B

Formula 1:- Re-order level – (Min. Consumption of raw material × Min. Lead Time) + Re-order quantity

= 4,750 kg. – (175 units × 4 kg. × 3 weeks) + 5,000 kg.

= 9,750 - 2,100 = 7,650 kg.

Re-order level of C

Formula 1:- Maximum Lead Time × Maximum Usage of raw material

= 4 weeks × (225 units × 6 kg.) = 5,400 kg.

Formula 2:- Minimum stock of C + (Average consumption × Average delivery time)

= 2,000 kg. + [(200 units × 6 kg.) × 3 weeks] = 5,600 kg.

Formula 3:- Safety Stock + Avg. Usage X Avg. Lead Time (Safety Stock Not given)

Average stock level of A

Formula 2:- = Minimum stock level of A + $\frac{Re-order\ Quantity}{2}$

= 4,000 kg. + $\frac{10{,}000\ kg}{2}$ = 4,000 + 5,000 = 9,000 kg.

OR

Formula 1:- $\frac{Max.Level\ (W.N.1)+Min.Level}{2}$ = $\frac{4{,}000+16{,}250}{2}$ = 10,125 Kg

W. Note 1 Max. Level of A =

Formula 1:- ROL + ROQ – Min. Usage of raw material X Min. Lead Time

= 8,000 kg + 10,000 kg – [(175 units X 10Kg) X 1 week) = 16,250 Kg

Question 19

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

Price per ton (Rs.)	Ton (Nos.)
1,200	Less than 500
1,180	500 and Less than 1,000
1,160	1,000 and Less than 2,000
1,140	2,000 and Less than 3,000
1,120	3,000 and above

The annual requirement for the material is 5,000 tons. The ordering cost per order is Rs.1,200 and the stock holding cost is estimated at 20% of material cost per annum.

a) You are required to COMPUTE the most economical purchase level.

b) WHAT will be your answer to the above question if there are no discounts offered and the price per ton is Rs.1,500?

Solution

Requirement No.1

Computation of most economical purchase level – Trial Method

Range Order Size (in Ton)	Order Size (Q) in tons	No. of orders	Purchase Cost	Ordering Cost	Carrying Cost	Total Cost
Less than 500	400	13 orders	60,00,000 (5000 ton X Rs. 1200)	15,600	48,000 (400 ton / 2) x Rs. 1200 x 20%	60,63,600
500 and less than 1000	500	10 orders	59,00,000 (5000 ton X Rs. 1180)	12,000	59,000	59,71,000
1000 and less than 2000	1000	5 orders	58,00,000 (5000 ton X Rs. 1160)	6,000	1,16,000	59,22,000
2000 and less than 3000	2000	3 orders	57,00,000 (5000 ton X Rs. 1140)	3,600	2,28,000	59,31,600
3000 and above	3000	2 orders	56,00,000 (5000 ton X Rs. 1120)	2,400	3,36,000	59,38,400

Note:- No. of orders = $\frac{\text{Annual requirement}}{\text{Order Size (Q)}} = \frac{500\ tons}{Q}$ (it shall be increased to highest whole no.)

Ordering cost per order = Rs.1200 per order

Note:- Carrying cost = $\frac{Q}{2}$ X Purchase price X 20%

From the calculation above, total cost of 5000 tons is minimum i.e. Rs. 59,22,000 when order size is 1000 tons. Hence most economical purchase level is 1000 tons.

Solution to Requirement No.2

Calculation of EOQ when no discount is available.

EOQ = $\sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 5000\ \text{tons} \times \text{Rs.}1200}{\text{Rs.}1500\ \text{X}\ 20\%}}$ = 200 Ton

Question 20

From the details given below, calculate:

(i) Re-ordering level
(ii) Maximum level
(iii) Minimum level
(iv) Danger level.

Re-ordering quantity is to be calculated on the basis of following information:
Cost of placing a purchase order is Rs. 20
Number of units to be purchased during the year is 5,000
Purchase price per unit inclusive of transportation cost is Rs. 50
Annual cost of storage per units is Rs. 5.

Details of lead time : Average- 10 days, Maximum- 15 days, Minimum- 5 days.
For emergency purchases- 4 days.
Rate of consumption : Average: 15 units per day,
Maximum: 20 units per day.

Solution

A (Number of units to be purchased annually) = 5,000 units
O (Ordering cost per order) = Rs.20
C (Annual cost of storage per unit) = Rs.5
Purchase price per unit inclusive of transportation cost = Rs.50.

Solution:

(i) Re-ordering level = Maximum usage per period × Maximum lead time
(ROL) = 20 units per day × 15 days = 300 units

(ii) Maximum level = ROL + ROQ – [Min. rate of consumption × Min. lead time
= 300 units + 200 units – [10 units per day × 5 days] = **450 units**

Working Notes 1. Minimum Usage Per day

Avg. Usage Per day = $\frac{Max.Usage\ per\ day+Min.Usage\ per\ day}{2}$

15 units = $\frac{20\ units+min.Usage}{2}$

Min. Usage per day = 10 units

W.N. 2 ROQ/EOQ = $\sqrt{\frac{2\ \times A\times O}{C}}$ = $\sqrt{\frac{2\ \times 5{,}000\ units\times Rs.20}{Rs.5}}$ = 200 units

(iii) Minimum level = ROL – Average rate of consumption × Average re-order-period
= 300 units – (15 units per day × 10 days) =150 units

(iv) Danger level = Average consumption × Lead time for emergency purchases
= 15 units per day × 4 days = 60 units

Question 21

G. Ltd. produces a product which has a monthly demand of 4,000 units. The product requires a component X which is purchased at Rs. 20. For every finished product, one unit of component is required. The ordering cost is Rs. 120 per order and the holding cost is 10% p.a. You are required to calculate:

(i) Economic order quantity.
(ii) If the minimum lot size to be supplied is 4,000 units, what is the extra cost, the company has to incur?
(iii) What is the minimum carrying cost, the company has to incur?

Solution

(i) EOQ:-Purchase cost p.u.= Rs. 20

A (Annual requirement)= 4,000 units per month × 12 months= 48,000 units
O (Ordering cost per order)= Rs. 120
C (Holding cost)= 10% per annum

EOQ = $\sqrt{\frac{2\ \times A\times O}{C}}$ = $\sqrt{\frac{2\ \times 48000\ units\times Rs.120}{Rs.10\ X\ 20\%}}$ = 2400 units

ii. Extra cost incurred by the company whenTotal cost when order size is equal 4,000 units:

Particulars	When EOQ is ordered	When Order size is 4000 units
Order Size	2,400 units	4,000 units
No. of orders	20 orders	12 orders

	(48000 units / 2400 units)	(48000 units / 4000 units)
Purchase cost per kg Rs.	20	20
Total purchase cost Rs.	9,60,000	9,60,000
Total Ordering cost Rs.	2,400	1,440
Total carrying cost Rs.	2,400 (2400 units / 2) x Rs. 20 x 10%	4,000 (4000 units / 2) x Rs. 20 x 10%
Total material cost Rs.	9,64,800	9,65,440

Extra cost that the company has to incur = Rs.965,440 – Rs.964,800 = Rs. 640

iii. **Minimum carrying cost :** Rs. 2,400 at EOQ size

Question 22

AT Ltd. furnishes the following store transactions for September, 20X8:

1-9-X8 Opening balance	25 units value Rs. 162.50
4-9- X8 Issues Req. No. 85	8 units
6-9- X8 Receipts from B & Co. GRN No. 26	50 units @ Rs. 5.75 per unit
7-9- X8 Issues Req. No. 97	12 units
10-9- X8 Return to B & Co.	10 units
12-9- X8 Issues Req. No. 108	15 units
13-9- X8 Issues Req. No. 110	20 units
15-9- X8 Receipts from M & Co. GRN. No. 33	25 units @ Rs. 6.10 per unit
17-9- X8 Issues Req. No. 121	10 units
19-9- X8 Received replacement from B & Co. GRN No. 38	10 units
20-9- X8 Returned from department, material of M & Co. MRR No. 4	5 units
22-9- X8 Transfer from Job 182 to Job 187 in the dept. MTR 6	5 units
26-9- X8 Issues Req. No. 146	10 units
29-9- X8 Transfer from Dept. “A” to Dept. “B” MTR 10	5 units
30-9- X8 Shortage in stock taking	2 units

PREPARE the priced stores ledger on FIFO method and STATE how would you treat the shortage in stock taking.

Solution

Main Notes:

1) Transaction 10th Sept – Store Dept. Returned to B & Co. 10 units which were purchased on 6th Sept at Rs.5.75 hence 10 units shall be shown under issue at Rs.5.75 i.e. same price at which these were purchased.
2) Transaction of 19th Sept – B & Co. replaced 10 units returned on 10th Sept which were returned on B & Co. on 10th Sept. at 5.75 hence these 10 units will be shown under receipts at 5.75 i.e. same price at which these were returned.
3) Transaction of 20th Sept – Division M Returned 5 units to store dept. But information regarding the date on which material was issued to Division M is not given in Question hence it is assumed that Last issue was made to Division M at Rs.5.75 hence these 5 units shall be shown under

receipts at Rs.5.75 i.e. same price at which these were issued to Division M. Also note these 5 units shall be shown as first lot now.

4) Shortage is treated as abnormal loss.

Stores Ledger (FIFO Method) – Sept 2008

	Receipts				Issued				Balance		
Date	**GRN/ MRN No.**	**Qty Units**	**Rate (Rs.)**	**Amt. (Rs.)**	**Reqn. No.**	**Qty Units**	**Rate (Rs.)**	**Amt. (Rs.)**	**Qty Units**	**Rate (Rs.)**	**Amt. (Rs.)**
1									25	6.50	162.50
4					85	8	6.50	52	17	6.50	110.50
6	26	50	5.75	287.50					17 50	6.50 5.75	110.50 287.50
7					97	12	6.50	78	5 50	6.50 5.75	32.50 287.50
10						10	5.75	57.50	5 40	6.50 5.75	32.50 230.00
12					108	5 10	6.50 5.75	32.50 57.50	30	5.75	172.50
13					110	20	5.75	115	10	5.75	57.50
15	33	25	6.10	152.50					10 25	5.75 6.10	57.50 152.50
17					121	10	5.75	57.50	25	6.10	152.50
19	38	10	5.75	57.50					25 10	6.10 5.75	152.50 57.50
20	4	5	5.75	28.75					5 25 10	5.75 6.10 5.75	28.75 152.50 57.50
26					146	5 5	5.75 6.10	28.75 30.50	20 10	6.10 5.75	122.00 57.50
30					Shortage	2	6.10	12.20	18 10	6.10 5.75	109.80 57.50

Question 23

The following information is extracted from the Stores Ledger:

Material X

Opening Stock Nil

Purchases :

Jan. 1 100 @ Rs. 1 per unit

Jan. 20 100 @ Rs. 2 per unit

Issues :

Jan. 22 60 for Job W 16

Jan. 23 60 for Job W 17

Complete the receipts and issues valuation by adopting the **First-In-First- Out, Last-In-First -Out and the Weighted Average Method**. Tabulate the values allocated to Job W 16, Job W 17 and the closing stock under the methods aforesaid.

Solution: Stores Ledger (FIFO)

Date	Job No.	Receipts			Issue			Balance		
		Qty	Rate	Amt	Qty	Rate	Amt	Qty	Rate	Amt
1 jan.		100	1	100				100	1	100
20 jan.		100	2	200				100	1	100
								100	2	200
22 jan.	W-16				60	1	60	40	1	40
								100	2	200
23 jan.	w-17				40	1	40	80	2	160
					20	2	40			

Material consumed (FIFO) Job W-16 = Rs. 60 and Job W-17 = Rs. 80

Closing stock (FIFO) = Rs. 160

Stores Ledger (LIFO)

Date	Job No.	Receipts			Issue			Balance		
		Qty	Rate	Amt	Qty	Rate	Amt	Qty	Rate	Amt
1 jan.		100	1	100				100	1	100
20 jan.		100	2	200				100	1	100
								100	2	200
22 jan.	W-16				60	2	120	100	1	100
								40	2	80
23 jan.	W-17				40	2	80	80	1	80
					20	1	20			

Material consumed (LIFO) Job W-16 = Rs. 120 and Job W-17 = Rs. 100

Closing stock (LIFO) = Rs. 80

Stores Ledger (Weighted Average)

Date	Job No.	Receipts			Issue			Balance		
		Qty	Rate	Amt	Qty	Rate	Amt	Qty	Amt	Rate
1 jan.		100	1	100				100	100	1 $(\frac{Rs.100}{100\ Qty})$
20 jan.		100	2	200				200	300	1.50 $(\frac{Rs.300}{200\ Qty}$
22 jan.	W-16				60	1.50	90	140	210	1.50
23 jan.	w-17				60	1.50	90	80	120	1.50

Material consumed (WAM) Job W-16 = Rs. 90 and Job W-17 = Rs. 90

Closing stock (WAM) = Rs. 120