

Accounting for Material & Labor

Material Control

Objectives of material Control

- To make sure the supply of material in right quantity and quality at the right time.
- To maintain a balance between price, Quality and delivery in choosing a supplier.
- To ensure that the investment of capital in stocks is not tied up. (avoiding over – stocking)
- To avoid abnormal wastages, leakages... etc.
- To avoid obsolescence of materials
- To provide the management with information with regard to materials. (Purchases, issues and stocks)
- To ensure proper storage and utilization.
- To facilitate for stock taking.
- To check stock levels physically on a regular basis.

There are 3 stages that material cost can be controlled.

1. At the time of purchase
2. During storage
3. At the time of issuing / consumption

Purchasing Procedure

Material Requisition Note (MRN)	Request materials from the warehouse.
Purchase Requisition Note (PRN)	Request made to purchasing department from the warehouse to purchase the required material from the suppliers.
Purchase Order (PO) (3 copies maintained)	From purchasing department to supplier requiring the materials. 01 copy - warehouse 02 copy - finance department 03 copy - keep within purchasing dep
Delivery Note	Given by the supplier

Good received Note (GRN)	The document issue by the warehouse confirming goods are received. 2 copies maintained. Original - Keep in warehouse 01 copy - Finance dep 02 copy - purchasing dep
Invoice	Issued by the supplier to the finance department.
Bin Card	A document maintained to find the balance of material quantity at a particular date.

ABC PLC Bin Card							
Description :			Code :				
Location :			Maximum :				
Stores ledger page :			Minimum :				
			Re-order level :				
			Re-order quantity :				
Receipts			Issues			Balance Qty.	Remarks
Date	GRN No.	Qty.	Date	MRN No.	Qty.		

Inventory related cost

01. Ordering Cost

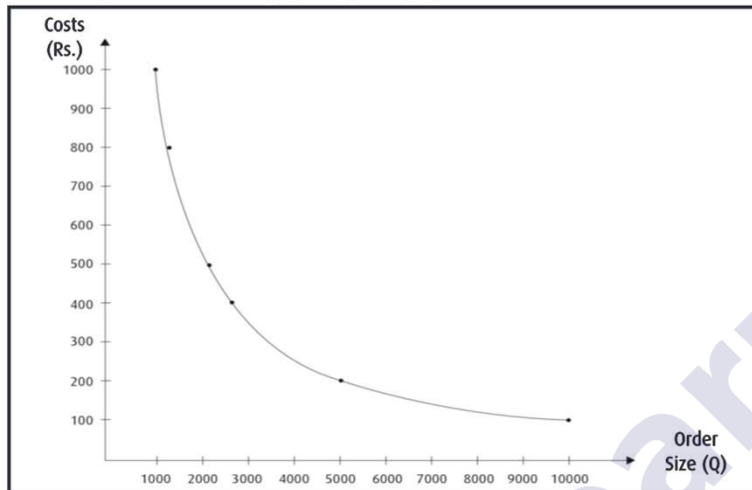
$$\text{Total Ordering Cost (TOC)} = \text{Ordering cost Per order} \times \text{No. of orders placed}$$

02. Holding Cost

$$\text{Total Holding Cost (THC)} = \text{Holding cost Per item p.a.} \times \text{No. of items held}$$

01. Ordering Cost

The ordering cost can be shown graphically as displayed below

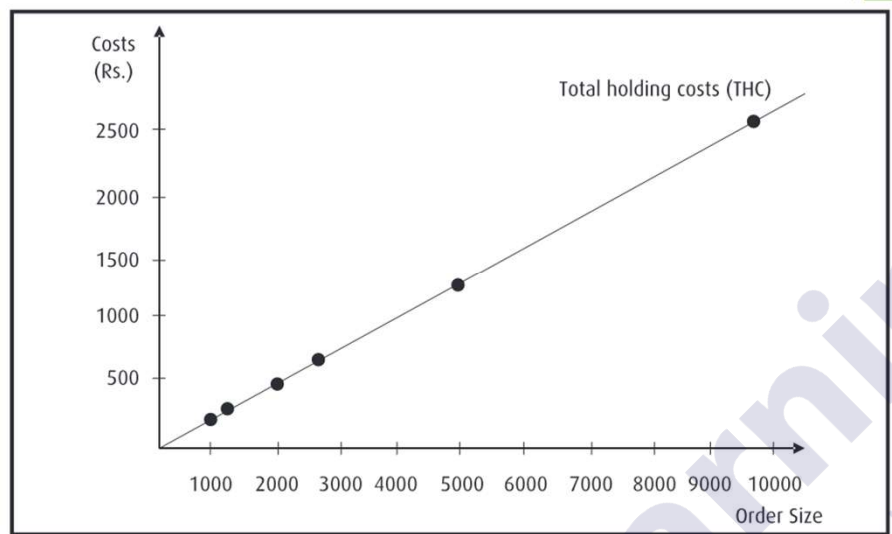


02. Holding Cost

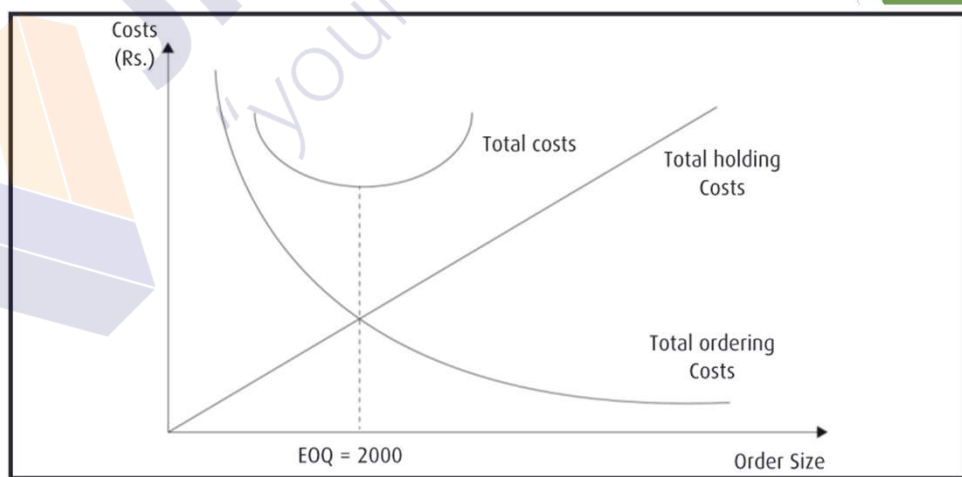
These costs, also known as carrying costs, include the following:

- Storage costs (Rents, rates, heating, lighting... etc.)
- Insurance
- Security
- Deterioration and obsolescence
- Stock taking and audit costs
- Staff costs of stores
- Other costs such as running cost, maintenance cost etc.

Thus, the holding costs can be defined as the costs which are incurred on holding the materials at stores until they are consumed.



Economic Order Quantity



EOQ is the size of the order where the total inventory cost is minimized.

At this point,

1. Total Inventory cost is minimized.
2. Total ordering cost = Total holding cost

Basic EOQ formula

$$EOQ = \sqrt{\frac{2DCo}{Ch}}$$

Where;

D = Annual demand

Co = Order cost per order

Ch = Holding cost per item per annum

Example 01

D = 10,000 Kgs

Co = Rs. 100

Ch = Rs. 0.50

What is EOQ?

Assumptions used in EOQ formula

- (1) Holding cost per unit (C_h) is known and it will be constant.
- (2) Average balance in stock is equal to one-half of the order quantity.
- (3) Ordering cost per order (C_o) is known and it will be constant
- (4) Annual demand is known and it is constant
- (5) There is a known and constant price per unit.
- (6) The replenishment is made instantaneously ie, the whole quantity ordered is delivered at once. (This should not be misunderstood as lead time is zero)

✓ Annual Total Ordering Cost Formula:

$$\text{Annual Ordering Cost} = \frac{D}{EOQ} \times S$$

◆ Where:

- D = Annual demand (units)
- EOQ = Economic Order Quantity
- S = Ordering cost per order

✓ Annual Holding Cost Formula:

$$\text{Annual Holding Cost} = \frac{EOQ}{2} \times H$$

◆ Where:

- EOQ = Economic Order Quantity
- H = Holding cost per unit per year

Example 02

The following information is provided for a raw material used in a manufacturing firm.

- Annual demand 3 200 units
- Cost of raw material Rs. 800 per unit
- Ordering cost Rs. 1 000 per order
- Annual holding cost 20% of cost of raw material

Identify the following:

- (a) Economic order quantity (EOQ) : Units
- (b) Annual total ordering cost if EOQ is ordered : Rs.

Example 03

The following information is provided for a component used in a production process:

Annual demand: 4,000 units

Cost per unit: Rs. 600

Ordering cost: Rs. 1,200 per order

Holding cost: 25% of unit cost

Required:

- (a) Economic Order Quantity (EOQ)
- (b) Annual total ordering cost if EOQ is ordered
- (c) Annual total holding cost if EOQ is ordered

Other types of Inventory Controlling Systems

- (1) Establishing a system of control levels
- (2) Periodic review system/constant order cycle system
- (3) The two bin system
- (4) Just-In-Time system
- (5) ABC system

01. Establishing Control Levels

- Following stock levels are used in stock control.
 1. Re-order level
 2. Minimum stock level
 3. Maximum stock level
 4. Average stock level

(a) Re-order Level (ROL)

This is the level of free stock at which a new order should be placed for replacement. [Free stock means the physical stock plus outstanding orders minus unfulfilled requirements]
This level can be calculated as follows.

$$\text{Re-order level} = \frac{\text{Maximum Usage}}{\text{Lead time}} \times \text{Maximum}$$

- Lead time (LT) is the period of time between placing an order and receiving the items on that order.

(b) Maximum stock level

This is a warning level which signals to the management that stock is rising to a high level. It is calculated as follows.

$$\text{Maximum Stock level} = \text{Re-order Level} + \text{Re-order Quantity} - \left[\frac{\text{Minimum usage} \times \text{Minimum lead time}}{1} \right]$$

(c) Minimum stock level

This is also a warning level which signals to the management that stock is falling to a low level. This level is calculated as follows.

$$\text{Minimum Stock level} = \text{Re-order level} - \left[\frac{\text{average usage} \times \text{average lead time}}{1} \right]$$

(d) Average stock level

This is the average level which is to be maintained at stores. It can be calculated using either of below two models.

$$\text{Average stock Level} = \frac{\text{Maximum stock Level} + \text{Minimum stock Level}}{2}$$

Or

$$\text{Average stock level} = \text{Minimum stock level} + \frac{\text{EOQ}}{2}$$

Example 04

The following data relate to a stock item.

Maximum usage per month	200Kgs
Minimum usage per month	100Kgs
Lead time	2 – 6 months
Re-order quantity (EOQ)	750kgs

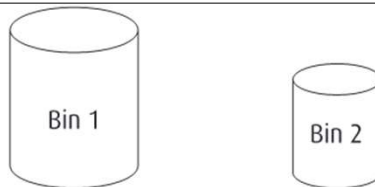
Using these data you are required to calculate

- (i) The re-order level
- (ii) The maximum stock level
- (iii) The minimum stock level
- (iv) the average stock level

02. Constant order cycle systems

This system is sometimes called "Periodic review system". Under this method, stock levels are reviewed at fixed intervals and a replenishment order is placed if necessary. The quantity of the replenishment is not fixed like it in EOQ method. Instead it will be based on the factors such as likely demand until the next review, the present stock level in hand and the lead time. So, the order quantity is variable, whereas the intervals are fixed.

03. Two Bin System



This is one of simple methods used in inventory control. This method uses a visual (physical) technique under which stocks are maintained at two locations (Two bins) i.e. Each item of stock is held in two places (locations / bins) at stores. Issues are first made from one bin until it is empty. Once that bin becomes empty, a new order is placed and the items in 2nd bin are used until the order is delivered. However the order should be delivered before the second bin becomes empty, to avoid stock out costs.

04. Just In Time (JIT) System

Just-in-time (JIT) is a purchasing and inventory control system in which materials are obtained at the time they are required, and the production starts once an order is received.

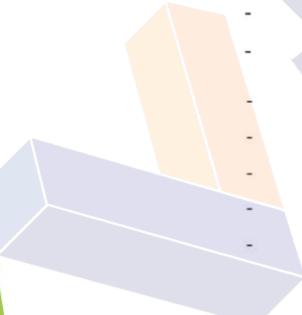
There are two aspects of JIT.

- (i) Just-In-Time (JIT) production
- (ii) Just-In-Time (JIT) purchasing

- (i) **Just-In-Time production** : This refers to producing only what is needed, when it is needed, in the quantity just needed. Thus a JIT manufacturing system requires making goods only when the customer requires it. This will result in a zero or lower level of finished good stock. The organizations, where a JIT production system exists, work on a demand-pull basis.

- (ii) **Just-In-Time Purchasing** : This requires to have a better coordination with suppliers so that materials arrive immediately prior to their use. This means that material stocks can be kept at near zero or zero level. Firms using JIT purchasing enter into long term contracts with suppliers as well as with vendors in order for them to plan it's annual production. For JIT purchasing to work properly, it requires the following :
- strong confidence that suppliers will deliver on time.
 - Those material are of 100% quality, so that there will be no rejects, returns... etc and consequently no delays.

Benefits from JIT

- 
- Zero break downs
 - 100% on time delivery
 - elimination of non-value added activities
 - zero defects
 - lower investment required in inventory
 - space savings
 - greater customer satisfaction resulting from higher quality and better deliveries.

05. ABC method

This is a classification aimed at to control materials according to their values. This is also known as "Proportional parts value analysis". Under this method, efficient and rigid control techniques are required to give more care on costlier items. As such, on the basis of value of materials, items are grouped in to three categories;

- (1) High priced or high value items ("A" category)
- (2) Medium priced or medium value items ("B" category)
- (3) Low priced or low value items ("C" category)

Category	% of Total Quantity	% of Total Value
A	20%	80%
B	30%	15%
C	50%	5%
	} 80%	} 20%

Pricing and
valuation
methods of
material issue

- (1) First in, First Out (FIFO) method
- (2) Last in, First Out (LIFO) method
- (3) Weighted Average (AVCO) Method

FIFO Method

The FIFO formula assumes that the items of inventory that were purchased or produced first are sold first and consequently the items remaining in inventory at the end of the period are those most recently purchased or produced. But in Practically, it is not needed to sell the items in first out first out basis only.

Examples

01.01.2025 raw material "y" units were 100. Per unit cost 10/=

05.01.2025 purchased 200 units at a price 12/=

10.01.2025 purchased 500 units at a price 15/=

15.01.2025 Issue 150 units for the production.

16.01.2025, 50 units were returned to supplier which was purchased at 10.01.2025.

20.01.2025, 300 units issued for the production.

What is the cost of inventory as at 31.01.2025 per FIFO method?

What is the cost of sale during the January month?

Date	Receipts			Issues			Balance	
	Quantity	Per unit price	Total value	Quantity	Per unit price	Total value	Quantity	Total value
1/1/25	100	10	1000				100	1,000
5/1/25	200	12	2400				300	3,400
10/1/25	500	15	7500				800	10,900
15/1/25				100	10	1000		
				50	12	600	650	9,300
16/1/25				50	15	750	600	8,550
20/1/25				150	12	1,800		
				150	15	2,250	<u>300</u>	<u>4,500</u>

Cost of sale

15/01/2025 – 150 units = 1,600/=

21/01/2025 – 300 units = 4,050/=

Total COS = (1,600 + 4,050) = Rs. 5,650

Examples – FIFO Method

Calculate the cost of sales and cost of inventory as at 31.01.2025 using FIFO method

- **01.01.2025** raw material “y” units were 200. Per unit cost 15/=
- **05.01,2025** purchased 300 units at a price 10/=
- **10.01.2025** purchased 600 units at a price 15/=
- **15.01.2025** Issue 100 units for the production.
- **16.01.2025**, 100 units were returned to supplier which was purchased at 10.01.2025.
- **20.01.2025**, 100 units issued for the production.
- **25.01.2025**, 100 units purchased for 25/=

Date	Receipts			Issues			Balance	
	Quantity	Per unit price	Total value	Quantity	Per unit price	Total value	Quantity	Total value

Weighted Average Cost method (WAC)

Under this method, the cost of each item is determined from the weighted average of the cost of similar items at the beginning of a period and the cost of similar items purchased or produced during the period.

It is calculated as follows.

$$\text{Weighted Average Price} = \frac{\text{Value of inventory at the issuing date}}{\text{Quantity of inventory at the issuing date}}$$

Example

- **01.01.2025** raw material “y” units were 100. Per unit cost 10/=
- **05.01,2025** purchased 200 units at a price 12/=
- **10.01.2025** purchased 500 units at a price 15/=
- **15.01.2025** Issue 150 units for the production.
- **16.01.2025**, 50 units were returned to supplier which was purchased at 10.01.2025.
- **20.01.2025**, 300 units issued for the production.

Date	Inwards			Outwards			Balance		
	Quantity	Per unit price	Total value	Quantity	Per unit price	Total value	Quantity	Average price per unit	Total value
1/1/25	100	10	1000				100	10	1,000
5/1/25	200	12	2400				300	11.33	3,400
10/1/25	500	15	7500				800	13.63	10,900
15/1/25				150	13.63	2044.5	650	13.63	8,855.5
16/1/25				50	15	750	600	13.50	8,105.5
20/1/25				300	13.50	4,050	300	13.51	4,055.5

Cost of sale

15/01/2025 – 150 units = 2,044.5/=

21/01/2025 – 300 units = 4,050/=

Total COS = (2,044.5 + 4,050) = Rs. 6,094.5

Example - WACC

Calculate the cost of sales and cost of inventory as at 31.01.2025 using WACC method

- **01.01.2025** raw material “y” units were 200. Per unit cost 15/=
- **05.01,2025** purchased 300 units at a price 10/=
- **10.01.2025** purchased 600 units at a price 15/=
- **15.01.2025** Issue 100 units for the production.
- **16.01.2025**, 100 units were returned to supplier which was purchased at 10.01.2025.
- **20.01.2025**, 100 units issued for the production.

Date	Inwards			Outwards			Balance		
	Quantity	Per unit price	Total value	Quantity	Per unit price	Total value	Quantity	Average price per unit	Total value

What is free stock?

The free stock balance is a notional, not physical, stock balance which helps the management to ensure that stock-outs do not occur. This is a key figure in inventory control. It is necessary to know the "physical stock" for issue purposes, for stock taking, and for controlling physical stock levels while knowing the "Free stock balance" is necessary for both replenishment decisions and decisions on undertaking new orders of customers.

Free stock Balance	=	Physical stock	+	stock on order with suppliers	-	outstanding requirements Unfulfilled
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Example

Suppose that the physical stock balance is 6,500 Kgs and 35,500 Kgs are on orders with suppliers but not yet been received. The quantity on material requisitions not yet fulfilled is 22,300 Kgs. Calculate free stock balance?

Let's do some past papers

2025 July

(B) You are provided the following information with reference to **Product Z** of **ABC Ltd.:**

Annual Demand	8,000 units
Purchase price per unit	Rs.30,000/-
Ordering Cost	Rs.300,000/- per order
Lead Time	2 - 3 months
Annual Holding cost per unit	25% of the purchase price
Usage	200 - 400 units

You are required to:

Calculate the following:

- (a) Economic Order Quantity (EOQ).
- (b) Re-order Level.
- (c) Minimum Stock Level.

(02 marks)

(02 marks)

(02 marks)

(Total 10 marks)

Answers

2025 January

Question 06

- (A) You are given the following information with reference to **Product Q** of **Smith Ltd.** a mattress manufacturer:

Annual Demand	4,000 units
Purchase price per unit	Rs.12,500/-
Usage	400 - 900 units
Lead Time	2 - 4 months
Annual Holding cost per unit	10% of the purchase price
Ordering Cost	Rs.506,250/- per order

You are required to:

Calculate the following:

- (a) Economic Order Quantity (EOQ). (02 marks)
(b) Re-order Level. (02 marks)
(c) Maximum Stock Level. (02 marks)
- (B) The following information is given for the Raw Material "X" of **Wellington (Pvt) Ltd.** for the month of April 2024:

01 st April 2024	Opening stock balance - 500 units @ Rs.12/-
12 th April 2024	Purchased 300 units @ Rs.15/-
20 th April 2024	Issued 400 units
23 rd April 2024	Purchased 150 units @ Rs.16/-
28 th April 2024	Issued 250 units

You are required to:

Prepare the Stores Ledger for the raw material "X" for the month of April 2024 under the First In First Out (FIFO) method. (04 marks)

(Total 10 marks)

Answers

Answers

Date	Inwards			Outwards			Balance		
	Quantity	Per unit price	Total value		Quantity	Per unit price	Total value	Quantity	Total value

2024 July

(A) **Moon Ltd.** buys **Raw Material A** for its production from an outside supplier at Rs.60/- per unit. The following information is also provided relating to **Raw Material A**:

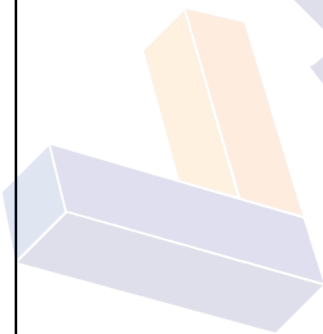
- Annual demand for **Raw Material A** is 6,400 units.
- Rent and insurance cost on the storage facility of a unit of raw material per year is Rs.2/-.
- Cost of placing an order is Rs.100/-.

You are required to:

Calculate the following for **Raw Material A**:

- | | |
|--|------------|
| (a) Economic Order Quantity (EOQ). | (03 marks) |
| (b) Optimum Number of Orders to be placed. | (02 marks) |

Answers



2023 July

- (B) The following information was extracted from **RAM Ltd.** with reference to **Product A** for the month of June 2023:

Date	Description	Quantity (in units)	Unit Price (Rs.)
01.06.2023	Opening Balance	220	670
10.06.2023	Purchases	500	619.60
15.06.2023	Issues	600	-
20.06.2023	Purchases	200	690

You are required to:

Prepare the stock ledger for **Product A** using the Weighted Average Cost (WAC) method.
(05 marks)
(Total 10 marks)

Date	Inwards			Outwards			Balance		
	Quantity	Per unit price	Total value	Quantity	Per unit price	Total value	Quantity	Average price per unit	Total value