**TOPIC 2: ACCOUNTING FOR MATERIALS**

* **Accounting for Materials**
* Materials procurement procedure
* Stock Controls and stock levels
* Inventory systems and Inventory Valuation Methods

## Materials Procurement Procedure

***Materials are all the commodities consumed in the production department to produce items either directly or indirectly***. Inventory is a common term used for raw materials, components, work-in-progress, and finished goods stocked in the store.

Materials are also vital for calculating the cost of production. In some cases, materials account for more than 65% of a product’s cost, and so proper control over them is necessary.

Materials cost includes all the costs of all raw materials that are necessary to produce a finished product for sale to customers. They are direct materials that can be directly identifiable with the product e.g. cement and sand in a building, wood in the chair, clay in the brick, leather in shoe and the plastic in the plastic cup etc. Materials are a major component of total cost of an object and must be properly managed and accounted for.

Companies need to source for materials required for production processes to ensure production costs are kept under watch not to erode the company’s profits.

Material costs must be kept at a minimum level since it is a major component of cost. Those that can be avoided must be avoided. Elements of material costs include:

* **Procurement costs**. (Costs incurred in the process of securing the goods i.e. stock ordering costs)
* **Holding costs**. Cost of having items in store. Keeping items in store involve costs.
* **Shortage costs** (cost of not carrying sufficient stock)
* **Cost of materials (invoice value of materials)**

It is therefore critical that proper control is exercised in the management of materials.

**Materials procurement procedure**

Material procurement refers to the process of getting the required materials for production. It is about purchasing or acquiring the goods or services that the business needs to operate.

The details of a purchase procedure may differ from entity to entity. However, when the purchases are centralised, the key procedures in purchasing, receiving and issue of materials are as follows:

1. Purchase Requisition
2. Selection of Suppliers
3. Purchase Order and Follow-Up
4. Receipt of Materials
5. Inspection and Testing of Materials
6. Return of Rejected Materials
7. Passing Invoices for Payment.

#### Purchase Requisition:

Purchases of materials are initiated through purchase requisitions. A purchases requisition is a formal document raised, requesting the purchasing department to buy the specified materials. Such requisitions are received from authorized persons. Hence;

* It informs the purchasing department of the need for the purchase of materials.
* It fixes the responsibility of the department or personnel making the requisition.
* It can be used for future reference

When a particular item in the stores needs replacement, the stores department makes a requisition which is forwarded to the procurement/purchases department of the organization indicating the quantity and quality of materials needed to restock the stores.

####  Selection of Suppliers

On receiving the purchase requisition duly authorised, the purchase department starts exploring the sources of materials and supplies. Inquiries are made to the different suppliers in order to establish which supplier can supply the required quantities and quality of materials, their price offer, delivery terms and terms of payment. The important rule is to buy the best quality materials at the lowest possible price after giving due consideration to delivery dates and other terms of purchases. Purchase should be made from dependable sources of supply and ethical standards in dealing with suppliers should be maintained.

The offer of the suppliers is usually contained in the quotations send to the procurement department that analyses the quotations and makes a choice of which supplier to use. The supplier is selected if the quotation is of the right description required by the firm.

The purchase department generally maintains a list of suppliers for each type of material and from whom selections are made. In many industries long term contracts are entered into with suppliers. Furthermore, the supplier who gets the firm as a regular customer may offer favourable terms.

####  Placing Purchase Order

After the supplier has been selected, the procurement department place a purchase order requesting the supplier to supply the materials listed on the order. A purchase order is a written request (authorization) to the supplier to supply the specified materials at agreed prices and terms as stated therein. The request stipulates terms of delivery and terns of payment. It is a legal document because it serves as evidence of the contract between the organization and the supplier (forms a basis of legal contract between the parties). For this reason, it should be carefully prepared and the authority to sign purchase orders should be restricted to selected responsible officials. Copies of purchase order are distributed to all affected departments.

#### Receipt of Materials

The materials are always received from the supplier with the delivery note and invoice. A delivery note indicates the quantity and quality of the materials that are delivered to the premises of the organization and the invoice shows how much should be paid for the materials. The received materials are inspected and tested to confirm whether the physical units supplied conform to the specifications of the purchase order. After materials have been received and inspected by the organization, goods received note and an inspection note are prepared acknowledging receipt of those materials and routed to the concerned departments. All incoming material should be received by the receiving department. This department performs the functions of unpacking the goods received and verify their quantities and conditions. The quantity is checked against the purchase order copy and the supplier’s advice note which is normally received along with the goods.

#### Inspection and Testing of Materials

Goods received should be inspected for quantity to ensure that they comply with specifications stated on the purchase order. Where technical or laboratory inspection is necessary, the goods are passed to laboratory which will provide a report on the quality of goods.

An inspection report is prepared to show the results of the inspection. This report is either prepared separately or incorporated in the goods received note. In either case, the report is forwarded to the purchasing department.

#### Return of Rejected Materials

When materials/goods received are damaged or are not in accordance with the specifications (*not of the required standards or quality*), they are usually returned to the supplier along with the accompanying document, namely debit note, informing the supplier of the value of materials concerned. When such a claim is accepted by the supplier, a credit note is issued to signify acceptance. The rejected materials may be returned to the supplier immediately or they may be held pending the supplier’s instructions.

#### Passing Invoices for Payment

As soon as the supplier’s invoice is received, its authenticity and accuracy is checked with reference to the purchase order, goods (materials) received note, inspection report and debit/credit note by accounting and stores departments. After comparison, if found in order, the document is signed and passed to the accounts department for payment. All calculations are checked before the voucher authorizing payment is prepared. All related documents are marked with the invoice number to preclude the passing of a possible duplicate invoice. Preparation and payment of bills follows in accordance to the terms of payment. – accounting and costing records are made in the books (stock control record – item, code, stock levels max &min, reorder quantity, date, details, stock received, stock issued and balance).

NB: once in store, the goods are then issued from the stores on the basis of requisitions received and appropriate entries are made.

## Material Control and Stock Levels:

**MATERIALS CONTROL**

**Material control is the process of systematically controlling materials over the stages of procurement, storage, and usage so as to help maintain the regular and uninterrupted flow of the materials in the production pipeline**.

No system of costing is complete without an effective material control system. Material control is a system that ensures the provision of the required quantity of materials of the required quality at the required time with the minimum capital investment.

An efficient material control system helps to substantially reduce the cost of materials and, in this way, limits the total production cost.

Systematic and effective control over materials also helps to maintain production schedules, meet market demand, and avoid excessive investment in inventories.

Material control, therefore, involves the control of three important functions which encompasses procreant, storage and sage. The control system ensures that the required quantity of materials is available for se at the right time and place. Besides, the system ensures that the right amount of funds is invested in materials. Materials control should therefore encompass the following controls if its intended objectives are to be achieved;

* Quality controls
* Financial controls
* Quantity controls

***Quantity controls***: these controls include policies and procedures put in place to ensure that the right quantity of materials is acquired and stored in the store. The policies should also ensure that the minimum amount of material is used by the user departments.

***Financial controls***: these are controls to ensure that minimum funds are invested in materials; such controls include use of budgets, monitoring of stock levels etc…

***Quality controls:*** These controls cover procedures and policies put in place to ensure that material quality standards are complied with all the time. Controls in this case should ensure that the right quality of materials is purchased from the supplier, and ensuring that better storage facilities are in place.

 **ESSENTIALS OF MATERIALS CONTROL**

These are pre-requisites or basic procedures and controls that are needed to be instituted by organizations to achieve the main objectives of material control system. These may include but not limited to:

* Proper selection of suppliers
* Maintenance of stock records
* Regular stocktaking and monitoring of stock items
* Provision of proper storage facilities
* Regular monitoring of stock levels
* Segregation of duties / activities
* Centralized purchase function
* Operation of perpetual inventory system
* Regular material audit
* Availability of up-to-date information

**SCOPE OF MATERIALS CONTROL**

The following functions are within the scope of a material control system:

* ***Purchasing or procurement of materials:*** This role is vested with the Purchasing manager of the organization who ensures that the right quantities and qualities of materials or components are procured at the right tie, price and source. Purchase requisitions are raised by the user departments, a search for suppliers made, quotations made, received and supplier selection made. A purchase order is placed concluding this process.
* ***Receiving of materials and Inspection of materials:*** The materials are always received from the supplier accompanied by the delivery note. The received materials are inspected and tested to confirm whether the physical nits supplied conform to the specifications of the purchase order. After the materials have been inspected the officer in charge prepares a goods received note and an inspection note. An inspection note/ report indicate the items that are accepted or rejected, with reasons. Materials received reports are prepared and routed as follows;
* *The original copy is sent to the stores department*
* *A copy is sent to the cost and accounts department to ease posting to stores ledger*
* *Once copy to the purchase department for comparing it with the purchase order*
* *The forth copy is retained by the receiving department for future reference*
* ***Storage and issuing of materials:*** this is another step in materials control system after the purchasing procedure. The store keeping function in an industry involves both keeping the store of materials and maintaining the record of stores. Store keeping involves the following activities;
* *Issue requisitions for the purchase of materials*
* *Receipt of purchased materials from the receiving department*
* *Storing of materials in proper places so as to identify and locate items without delay*
* *Issuing materials to production and service departments and ensure that material issues are properly authorized and accounted for.*
* *Regular taking of physical stock count and stock control*
* *Classification and identification of materials by their nature, size and vale*
* *Protection of materials against fire, theft, damage and threats*
* *Maintaining proper record of inventory*
* ***Maintenance of material records:*** Proper record of materials in the store sing docents like Bin cards, stock sheets, requisition notes, goods received notes, goods returns notes, materials transfer notes among others. Maintenance of proper records ensures that reliable information is available on all items of materials in the stores. Such records, not only help in detecting losses and pilferages, but also act as a permanent record and facilitate proper production planning
* ***Materials or stock audit:*** this involves regular review of material control system and reconciliation of physical stock against stock records so as to detect weaknesses in the system and any shortages in the stock balances. This has to be done by a party independent from the organization

**TECHNIQUES OF INVENTORY CONTROL**

Inventory Management techniques help in tracking and controlling the inventory orders, their usage, and storage, along with the management of finished goods that are ready for sale. Improper inventory management can increase storage cost, working capital crunch, wastage of labor resources, increase in idle time, disruption of the supply chain, etc. All this leads to a reduction in sales and unsatisfied customers. Therefore, inventory management is an important aspect of the business that the management cannot afford to ignore. Effective and efficient management of the same is a must.

**The 7 Most Effective Inventory Management Techniques**

There are various types of inventory management techniques that can help in efficient inventory management. They are as follows:

1. **ABC Analysis**

ABC analysis stands for Always Better Control Analysis. It is an inventory management technique where inventory items are classified into three categories: A, B, and C. The items in the A category of inventory, are closely controlled as it consists of high-priced inventory, which may be less in number but are very expensive. The items in the B category are relatively less expensive than in the A category, and the number of items in the B category is moderate, so the control level is also moderate. The C category consists of a high number of inventory items that require lesser investments, so the control level is minimum. It is considered the best control approach which is based on the principle of selective control. It is run on the maxim of “put your efforts where the results are maximized”

1. **Just In Time (JIT) Method**

In the Just in Time method of inventory control, the company keeps only as much inventory as it needs during the production process. With no excess inventory in hand, the company saves the cost of storage and insurance. The company orders further inventory when the old inventory stock is close to replenishment. This is a little risky method of inventory management because a little delay in ordering new inventory can lead to a stock-out situation. Thus this method requires proper planning so that new orders can be timely placed.

1. **Material Requirements Planning (MRP) Method**

Material Requirements Planning is an inventory control method in which the manufacturers order the inventory after considering the sales forecast. MRP system integrates data from various areas of the business where inventory exists. Based on the data and demand in the market, the manager would carefully place the order for new inventory with the material suppliers.

1. **Economic Order Quantity (EOQ) Model**

Economic Order Quantity technique focuses on making a decision regarding how much quantity of inventory the company should order at any point in time and when they should place the order. In this model, the store manager will reorder the inventory when it reaches the reordering level. EOQ model helps to save the ordering cost and carrying costs incurred while placing the order. With the EOQ model, the organization is able to place the right quantity of inventory.

1. **Minimum Safety Stocks**

The minimum safety stock is the inventory level that an organization maintains to avoid a stock-out situation. It is the level when we place the new order before the existing inventory is over. For example, if the total inventory in an organization is 18,000 units, they place a new order when the inventory reaches 15,000 units. Therefore, the 3,000 units of inventory shall form part of the minimum safety stock level.

1. **VED Analysis**

VED stands for Vital Essential and Desirable. Organizations mainly use this technique for controlling spare parts of inventory. Like, a higher level of inventory is required for vital parts that are very costly and essential for production. Others are essential spare parts whose absence may slow down the production process. Hence it is necessary to maintain such inventory. Similarly, an organization can maintain a low level of inventory for desirable parts whose requirement does not arise more often for production

1. **Fast, Slow & Non-moving (FSN) Method**

FSN method of inventory control is very useful for controlling obsolescence. All the inventory items are not used in the same order; some are required frequently, while some are not required at all. So this method classifies inventory into three categories, fast-moving inventory, slow-moving inventory, and non-moving inventory. The order for new inventory takes place on the basis of the utilization of inventory

**Other techniques include the following**

1. **Twin-bin system**

This method is commonly used when materials are relatively inexpensive or non-essential. The material inventory is divided and placed in two separate components or bins. The first bin contains quantity of items that will be used between the time an order is received and the next order is placed. The second bin contains enough stock to cover the usage between the dates of placing an order to the date of delivery. New supply is ordered as soon as the first bin is empty.

1. **Order cycling system**

Order cycling is a method in which a review of materials on hand is on a regular basis or periodic cycle is done. For example, materials inventory might be reviewed every 15 days. This will vary depending on the type of materials being reviewed. Essential items have a shorter review cycle than less important items.

1. **Inventory turnover ratios**

Inventory turnover ratio is one of the methods of store control. It indicates how quickly the stocks are converted into sales. Business firms can analyze the turnover of different items of stock to find out which stocks are slow moving. Inventory turnover ratios enable the management to avoid capital being locked up in undesirable stocks.

The stock turnover ratio is calculated as follows;

 **Cost of materials consumed**

**Stock/ inventory turnover ratio = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Average stock of materials held during the pd**

The average stock is taken to be the average of opening and closing stocks. So stock turnover can also be calculated as under;

  **Days during the period**

**Stock turnover = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Stock turnover ratio**

**Conclusion**

Inventory management is an essential part of every business. With an effective inventory management system in place, the business can significantly reduce its various costs like warehousing cost, inventory carrying cost, ordering cost, cost of obsolescence, etc. It improves the supply chain of the business. Managers are able to forecast the level of production at which they need to place new orders for inventory. Hence, organizations should take all the necessary steps to maintain an effective inventory management and control system.

**STOCK LEVELS**

Stock level refers to the amount of goods or raw materials that should be maintained by businesses to continue their activities and avoid any situations of understocking or overstocking. It is the amounts of stock that a firm should have at any given moment. These levels should be determined in view of the requirements of the firm based on past experience. Every organization should always keep an optimum amount of inventory to ensure regular operation of its production activities.

**Factors that determine stock levels in an organisation**

The main factors that affect stock levels are as follows:

1. **Availability of the materials**

If the materials are easily available to the firm throughout the year, low stock levels should be maintained to reduce on the storage or holding costs. But if the materials are not readily available, then it would be better and more cost effective for the firm to maintain high stock levels.

1. **Lead time**

This refers to the time period between the date of the order and the date of delivery. The longer the lead time the higher the stock levels that should be maintained by the firm to avoid running out of materials before orders can be delivered.

1. **Stock holding cost**

If the cost of holding or storing materials is high, then less stock levels should be held by the firm and vice versa.

1. **Rate of consumption / stock usage rate**

The higher the rate at which the firm consumes/uses up the materials, the higher the stock levels to be maintained and vice versa.

1. **Trade discount**

 If the benefit from the trade discount that a firm gets from its suppliers is greater than stock holding cost, then high stock levels should be maintained to gain from the discounts and vice versa

1. **Durability of materials**

The more durable the materials are, the higher the stock levels that can be maintained by the firm and vice versa.

1. **Cost of material**

Too much stock or high stock levels tie up space and cash and it is costly and inefficient; too little stock creates the problem of the likelihood of running out of materials and therefore halting production or resulting in panic buying at probably much higher purchase prices, which is too costly/expensive. Stock control methods are necessary to overcome these two extremes.

Stock control is achieved by setting maximum and minimum levels of stock and by calculating stock holding point where it is necessary to reorder further supplies. In order to set these levels, it is necessary to research the usage of each item over a period of time. This will establish the maximum and minimum quantities used over that particular period of time. Past experience or estimated future requirements can be the basis for these calculations. It is also necessary to ascertain from the supplier the lead time required for the goods to be delivered. Once the usage figures and the lead times have been determined, the various stock levels can be set.

**Setting stock levels (Planning and monitoring materials usage in production Units / departments)**

Planning and maintaining proper stock levels in an organization requires keeping watch of stock levels at all times. Below are stock levels that help firms to plan and monitor materials usage.

1. **Re – Order levels (When to order)**

This is the level of materials at which a new order for supply of materials is to be placed. In other words, at this level, a purchase requisition is made out. Reorder point is important tool for controlling inventory and to ensure that there is no stock out.

Reorder point is dependent on lead time and rate of consumption. This level is fixed somewhere between maximum and minimum levels. Order points are based on usage during time necessary to requisition order, and receipt of materials, plus an allowance for protection against stock out. The reorder level must be sufficient to cover the maximum possible consumption of stock during the reorder period. It is set after considering the following matters;

* The expected usage or rate of consumption
* The time interval between initiating an order and its receipt, referred to as lead-time
* The minimum inventory or safety stock

The order level is reached when inventory on hand and quantities due are equal to the lead time usage plus the safety stock quantity. The following formulas are used for the calculation of reorder level or point

**Ordering point (Reorder level) = Maximum daily/weekly/monthly usage X Maximum lead time**

**Example 1:**

Two types of materials are used as follows:

Minimum usage 20 units per week

Normal usage 40 units per week

Maximum usage 60 units per week

Reorder period or lead time

Material A 3 to 5 weeks

Material B 2 to 4 weeks

Calculate the reorder point for two types of materials

**Suggested Solution:**

Reorder point = Maximum weekly usage X Maximum lead time

For Material A: = 60 X 5 = 300 units

For Material B: = 60 X 4= 240 units

**Note:** the above formula is used when usage and lead time are known with certainty, hence no safety stock is provided. But this is not always the case, therefore a modified formula catering for additional safety stock and replacement costs is adopted to calculate the ideal Reorder levels. This is given below.

Re-order level = Maximum daily/weekly/monthly usage X Maximum Lead time + safety stock

**Example 2**

Two types of materials are used as follows;

Minimum usage 20 units per week

Normal usage 40 units per week

Maximum usage 60 units per week

Additionally, the firm wants 2 days of stock on hand at all times in each case for safety reasons

Reorder period or lead time is indicated below for each material

Material A: 3 to 5 weeks

Material B: 2 to 4 weeks

**Required**:

Calculate the re-order point for the two types of materials.

**Suggested solution:**

Re-order level = Maximum weekly usage X Maximum Lead time + Safety stock

For material A = (60x5) + (2x60) = 300+120=420 units

For Material B = (60x4) + (2x60) = 240+120=360 units

1. **Minimum stock Level**

This represents the quantity which must be maintained in hand at all times. If stocks are less than the minimum level, then the work will stop due to shortage of materials. It is essentially a safety level or Buffer stock level which acts as a cushion against stock outs. When stocks fall below this level, then there is a catastrophe in the organization and production is likely to stop at any time, therefore management is advised to priotise the acquisition of new supplies.

Following factors are taken into account while deciding minimum stock level:

**(i) Lead Time:**

A purchasing firm requires some time to process the order and time is also required by the supplier/vendor to execute the order. The time taken in processing the order and then executing it is known as lead time. It is essential to maintain some inventory during this period to meet production requirements.

**(ii) Rate of Consumption:**

It is the average consumption of materials items in the industry. The rate of consumption will be decided on the basis of past experience and production plans.

**(iii) Nature of Material:**

The nature of material also affects the minimum level. If a material is required only against special orders of the customer then minimum stock will not be required for such materials.

**(iv) Re-ordering Level:**

When the quantity of materials reaches a certain level then fresh order is sent to procure materials again. The order is sent before the materials reach minimum stock level.

Reordering level is fixed between minimum level and maximum level. The rate of consumption, number of days required to replenish the stocks, and maximum quantity of materials required on any day are taken into consideration while fixing reordering level. Re-ordering level is fixed with following formula:

***Reordering Level = Maximum Consumption Rate x Maximum Reorder period****.*

**The minimum stock should only be used during abnormal circumstances.**

If usage pattern is known with certainty and the lead time also known accurately, then no safety stock would be needed. However, if either usage or lead time is subject to variation, then it is necessary for business firms to maintain safety stock levels equal to the difference between the expected usage over lead time and the maximum usage over lead tie that the firm feels necessary for cost minimization.

It is important to note that in order to minimize costs; the amount of safety stock to be maintained should case costs exactly equal to the costs likely to be incurred in case the firm runs out of stock (**stock out costs**).If the level of inventory is below this level, there are chances that plant operations are adversely affected.

Minimum level is an indication of the danger and provides alert for stock ot situations.

Minimum level or minimum limit can be calculated using the following formula or equation:

**Minimum Level** = Re-order Level – (Average or normal usage X Normal or Average lead time)

Alternatively, the formula can be written as:

Minimum stock Level = Re-ordering Level – (Normal Consumption x Normal Reorder Period) or;

**Minimum Level/limit =** Re-order level or ordering point – average usage for average period.

Example:

Normal usage 100 units per day

Maximum usage 130 units per day

Minimum usage 70 units per day

Re-order period 25 to 30 days

Required:

Calculate the minimum stock limit

***Solution:***

1. **Maximum Stock Level:**

It is the quantity of materials beyond which a firm should not exceed its stocks. If the quantity exceeds maximum level limit then it will be termed as overstocking. A firm avoids overstocking because it will result in high material costs. Overstocking will lead to the requirement of more capital, more space for storing the materials, and more charges of losses from obsolescence.

Maximum stock level will depend upon the following factors:

1. The availability of capital for the purchase of materials in the firm.

2. The maximum requirements of materials at any point of time.

3. The availability of space for storing the materials as inventory.

4. The rate of consumption of materials during lead time.

5. The cost of maintaining the stores.

6. The possibility of fluctuations in prices of various materials.

7. The nature of materials. If the materials are perishable in nature, then they cannot be stored for long periods.

8. Availability of materials. If the materials are available only during seasons then they will have to be stored for the future period.

9. Restrictions imposed by the government. Sometimes, government fixes the maximum quantity of materials which a concern can store. The limit fixed by the government will become the deciding factor and maximum level cannot be fixed more than that limit.

10. The possibility of changes in fashions will also affect the maximum level.

The following formula can be used for calculating maximum stock level:

***Maximum Stock Level = Reordering Level + Reordering Quantity – (Minimum Consumption x Minimum Reordering period)***

Example:

Normal usage 100 units per day

Maximum usage 130 units per day

Minimum usage 70 units per day

Re-order period 25 to 30 days

Economic order qty 5,000 units

**Required:**

Calculate the maximum stock limit / level

***Solution:***

* **Re-order level = max usage X Max lead time**

 **= 130 X 30 = 3,900 units**

**Maximum Stock level = Reorder level + EOQ – (Min usage \* Min lead time)**

 **= 3,900 + 5,000 – (70\*25)**

 **= 7,150 Units**

1. **Danger Level:**

It is the level below which stocks should not fall in any case. If danger level approaches, then immediate steps should be taken to replenish the stocks even if more cost is incurred in arranging the materials. Danger level can be determined with the following formula:

***Danger Level = Average Consumption x Maximum reorder period for emergency purchases.***

1. **Average Stock Level:**

The Average stock level is calculated such as:

***Average Stock Level = Minimum stock Level + 1/2 of Reorder Quantity***.

**Example:**

From the following information, calculate minimum stock level, maximum stock level and re-ordering level:

(i) Maximum Consumption = 200 units per day

(ii) Minimum Consumption = 120 units per day

(ii) Normal Consumption =160 units per day

(iv) Re-order period = 10-15 days

(v) Reorder quantity = 1,600 units

(vi) Normal reorder period = 10 days

**Solution:**

1. Reordering Level = Maximum Consumption x Maximum Reorder period

 = 200 units X 15 = 3,000 units

1. Minimum Stock Value = Reordering Level – (Normal Consumption x Nominal Reordering Period)

 = 3,000 – (160 X 10) = 3,000 – 1,600 = 1,400 units

1. Maximum Stock Level = Reordering Level + Reorder Quantity – (Minimum Consumption x Reorder period)

= 3,000 + 1,600 – (120 X 10) = 3,000 + 1,600 – 1,200 =2,400 units.

1. **Economic Order Quantity (EOQ)**

For any business that buys and holds inventory, it's essential to place orders in the amounts that best fit your needs. That is where economic order quantity (EOQ) comes in.

Economic Order Quantity (EOQ) is the quantity of materials or stock which is to be ordered in one time in order to minimize inventory costs. It determines the point at which the combination of order costs and inventory carrying costs are the least. The result is the most cost effective quantity to order. In purchasing, this is known as the order quantity, in manufacturing it is the production lot size.

There are three major elements of inventory costs i.e. Ordering Costs, Storage Costs (cost of carrying inventory) and Stock-out Costs (Cost of lost sales due to inventory shortages).

Ordering costs are influenced by the amount of units purchased (batch size) whereas Carrying Costs depend on the amount of units maintained in the warehouse. Whereas re-order level addresses the problem of when to place and order, EOQ model attempts to address the problem of how much to buy whenever an order is to be made.

The EOQ model works under the following underlying assumptions;

* The ordering costs are constant
* The rate of demand is known, and spread evenly throughout the year
* The lead time is fixed
* The purchase price of the item is constant i.e. no discount is available
* The replenishment is made instantaneously; the whole batch is delivered at once
* Only one product is involved

**Benefits of Economic Order Quantity (EOQ)**

**Improved Order Fulfillment:** When you need a certain item or something for a customer order, optimal EOQ ensures the product is on hand, allowing you to get the order out on time and keep the customer happy. This should improve the customer experience and may lead to increased sales.

**Less Over ordering**: An accurate forecast of what you need and when will help you avoid over ordering and tying up too much cash in inventory.

**Less Waste**: More optimized order schedules should cut down on obsolete inventory, particularly for businesses that hold perishable inventories that can result in dead stock.

**Lower Storage Costs**: When your ordering matches your demand, you should have less products to store. This can lower real estate, utility, security, insurance and other related costs.

**Quantity Discounts:** Planning and timing your orders well allows you to take advantage of the best bulk order or quantity discounts offered by your vendors.

**Challenges of Economic Order Quantity (EOQ)**

While many businesses want to use EOQ to determine order sizes, it isn’t always easy to achieve. When determining EOQ, you may run into these challenges:

**Poor Data:** One of the biggest challenges of determining EOQ is access to accurate and reliable data. Manual or spreadsheet-driven systems may provide low-quality or outdated information, which can lead to inaccurate calculations.

**Outdated Systems:** Old and outdated systems may have incomplete data and lead to missing out on potential savings. An inventory management system or cloud-based ERP can solve this problem.

**Business Growth:** The EOQ formula is ideal for businesses with consistent inventory needs. With a fast-growing business, relying on EOQ can lead to inventory shortages.

**Inventory Shortages:** If you’re just starting to use this method, it often generates smaller orders. If you are too conservative with your calculations, you could wind up under-ordering.

**Seasonal Needs:** Seasonality can make EOQ more challenging, but not impossible. This is because there could be major changes in customer demand throughout the year.

**Calculating Economic Order Quantity (EOQ)**

The EOQ can be determined using any of the three methods i.e. Equation approach, Tabulation approach and graphic approach.

1. **Equation Approach:**

Note the following

A = Annual requirement or annual consumption of materials

S = Ordering cost per order

C = Annual holding or carrying cost of one unit, (carrying cost % x Cost of one unit)

Q = Economic Order Quantity

At EOQ, Carrying costs = Ordering Costs

Q/2 \* C = A/Q\*S QC/2 = AS/Q

Q²C = 2AS Q² = 2AS/c

Therefore,

$$Q= \sqrt{2AS}/C$$

Note:

Order cost per order is a fixed cost because it is not influenced by the quantity of material but it is charged on the process of transferring, it will be high with increasing the number of orders.

Carrying costs may include interest on your capital, if you have borrowed money for buying the material, then interest on loans has to be part of the cost.

**Example 1:**

Normal usage 500kgs per month

Ordering cost per order UGX 30

Cost per unit UGX 5

Carrying cost per unit per annum 20% of cost of inventory

Calculate

1. Economic Order Quantity
2. Total Cost of managing Inventory

Solution:

1. Economic Order Quantity (Q\*)

Q\* =$\sqrt{\frac{2AS}{c}}$ = $\sqrt{\frac{2\*6000\*30}{1}}$ = 600 kgs

A= Annual Demand = 500\*12 = 6,000 Kgs

S= Ordering costs per Oder = 30

C= Carrying cost per unit = 20% of Inventory = 20% \* 5

1. Total cost of managing the inventory

Total cost of managing inventory = Total ordering costs + Total carrying costs

But Total ordering costs = No of orders \* cost per order

And also No of Orders = (Annual demand/EOQ)= (6000/600)=10 orders

Total ordering costs= 10\*30 = 300

Total carrying costs = Average stock \* carrying cost per unit

But Average stock = EOQ/2 = 600/2 = 300

Total carrying costs = 300\*1 = 300

Therefore

Total cost of managing inventory = Total ordering costs + total carrying costs

 = 300 + 300

 = 600/=

**Example 2:**

The following data has been provided by Nick Industries regarding the way it manages its raw materials

Annual demand 40,000 units

Ordering cost UGX 50

Unit price UGX 200

Storage cost 2%

Interest rate/ Cost of funds 8%

**Required:**

1. What will be Nick’s total inventory management costs?
2. What will be the total inventory costs if Nick Ltd is to acquire materials at a discount of 5%
3. If the supplier is willing to supply monthly 500 units at a discount of 5% is it worthwhile accepting?

Solution:

1. Total Inventory management costs = Total ordering costs + Total carrying costs

But

Total ordering costs = No of orders \* cost per order

= (Annual demand/EOQ) \* Cost per Order

= (40,000/447)\*50

**= 4,450**

Total carrying costs = Average stock \* carrying cost per unit

 = (EOQ/2) \* Carrying cost per Unit

 = (447/2)\*20

 **= 4,470**

But EOQ (Q\*) = $\sqrt{\frac{2AS}{c}}= \sqrt{\frac{2\*40,000\*50}{20}}=$ 447

1. **Using the Tabulation method**

Using the information from example 1 above, the economic quantity can be determined using the tabulation approach as below

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Annual usage (a)** | **Orders per year (b)** | **Units per Order ( c ) = b/a** | **Average Inventory (d) = c/2** | **Value per Order (UGX) (e ) =Sp\*c** | **Average inventory value (UGX) (f) = e/2** | **Order cost (g) = b\*30/=** | **Carrying cost (20%) (h) = f\*20%** | **Total (UGX ) I = h+g)** |
| 6,000 units            | 1 |  6,000  |  3,000  |  30,000  |  15,000  |  30  |  3,000  |  3,030  |
| 2 |  3,000  |  1,500  |  15,000  |  7,500  |  60  |  1,500  |  1,560  |
| 3 |  2,000  |  1,000  |  10,000  |  5,000  |  90  |  1,000  |  1,090  |
| 4 |  1,500  |  750  |  7,500  |  3,750  |  120  |  750  |  870  |
| 5 |  1,200  |  600  |  6,000  |  3,000  |  150  |  600  |  750  |
| 6 |  1,000  |  500  |  5,000  |  2,500  |  180  |  500  |  680  |
| 7 |  857  |  429  |  4,286  |  2,143  |  210  |  429  |  639  |
| 8 |  750  |  375  |  3,750  |  1,875  |  240  |  375  |  615  |
| 9 |  667  |  333  |  3,333  |  1,667  |  270  |  333  |  603  |
| **10** |  **600**  |  **300**  |  **3,000**  |  **1,500**  |  **300**  |  **300**  |  600  |
| 11 |  545  |  273  |  2,727  |  1,364  |  330  |  273  |  603  |
| 12 |  500  |  250  |  2,500  |  1,250  |  360  |  250  |  610  |

Note: In the table above, the EOQ is 600Kgs. That is 10 orders per year are needed.

At level of 600kgs, the ordering costs and carrying costs are equal i.e. UGX. 300 and also the total inventory cost is at minimum at UGX. 600

**Treatment of material losses**

During production, some material is lost due to factors beyond the firm’s control. These losses may be waste, scrap, spoilage and defective among others.

**Waste:** these are materials lost during the manufacturing process, storage and handling; and such amounts have no disposable value or recoverable value. Waste can either be normal or abnormal.

**Normal waste** is expected and is normally provided for before the operation or process begins. It constitutes the cost of the final product or service. On the other hand, **abnormal waste** is unexpected and avoidable if the process is properly managed. It is valued on the basis of cost of materials or the calculated cost of the product. Abnormal wastage occurs because of carelessness, defective scheduling or designing, sabotage, and so on. **The resulting amount is treated as operating loss thus debited to the P&L account.**

**Scrap:** this refers to incidental residue from the manufacturing processes and it has insignificant or minor recoverable value. The scrap does not require further processing and it may result from obsolete stock, defective and broken parts or materials being processed. Scrap can be treated as below

The net scrap value (Sales value minus cost of selling scrap) can be credited to P&L account as other Incomes; or

**The net scrap value (sales value minus cost of selling scrap) can be deducted from material costs incurred in production process.**

**Spoilage:** these are materials that do not meet the production standards because of being badly damaged. Such items are either disposed off at their scrap value or discarded without further processing. The cost of spoiled goods (the difference between costs incurred up to the point of rejection less the disposal value) may be treated by either of the following methods;

* **If it is normal spoilage that has come from manufacturing process, the cost of such spoilage will be borne by good units**
* **In case of abnormal spoilage, cost of spoilage is transferred to profit and loss account as a debit entry.**

**Defectives:** these are goods that do not meet production standards but which can be processed further to make them ready for sale, that is, to attain saleable condition. Defectives may be due to imperfections in manufacturing process which may arise because of bad workmanship, poor quality of raw materials, careless in running the entire process and laxity in inspection.

The difference between spoilages and defectives is that spoilages are sold without further processing whereas defectives can be reconditioned or reworked by the application of additional materials, labor and overheads and brought to the point of standard before they are sold a first or seconds.

## Inventory systems and Inventory Valuation Methods

**INVENTORY SYSTEMS**

An Inventory system is a system of recording materials/stock held in the stores of an organization. There are several different kinds of inventory systems available, however, and they fall under two main types: perpetual inventory systems and periodic inventory systems.

1. ***Perpetual System***

Perpetual inventory systems update records continually. It involves a continuous record of additions and deductions of materials in the stores after every receipt and issue. They frequently track when materials are received, sold or moved from one place to another. The inventory account is updated after every inventory purchase or sale. The key benefit of using a perpetual inventory system is that they provide up-to-date records that always reflect stock levels. This avoids closing down of the warehouse to count stock physically. Physical inventory systems are usually taken once a year to test the validity of the accounting records. It is a system of record maintained by the controlling department which reflects the physical movement of stocks and their current balances.

However, these kinds of systems require specialized equipment and software, which come with a high cost of implementation. It is worst for small business with multiple locations or warehouses, since the number of locations also drives up the cost.

**Activity for students**

**Discuss the Advantages and disadvantages of Perpetual system of inventory recording (at least 5 points each)**

1. ***Periodic system***

Periodic inventory systems don’t track materials on a continuous basis. The entire inventory book is verified at a given date by an actual count of materials at hand. This system provides the beginning and ending inventory levels during a certain specified period of time. A careful evaluation of inventory (stock-take) normally occurs only at the end of each accounting period. At the end of the period a physical count of the quantity and value of goods is made using an inventory pricing method like FIFO, LIFO, and Average cost method. Periodic inventory systems rely on a physical count of the materials at the start and end of the time period. At that time, each product available for sale is counted and multiplied by its per unit cost, and the total of all such calculations equals the value of inventory. As a result, inaccuracies can be introduced by staff since the count is done manually. In addition, regular business activities generally need to be paused during the count, which can result in a loss of revenue for the company. Businesses also need to spend additional amounts in labor costs for the inventory count, which is why this kind of system is better suited for smaller businesses with limited inventory.

**Activity for students**

Discuss the Advantages and disadvantages of Periodic system of inventory recording (at least 5 points each)

**Inventory shortages**

When carrying out stock taking, it is possible that physical materials counted may not agree with the records in the stores ledger. The difference between these two may be due to the following reasons;

1. Unavoidable causes
2. Evaporation
3. Temperature changes affecting the volume of stock
4. Shrinkage
5. Deterioration of quality in stores e.g. through rust
6. Loss due to breaking bulk or cutting up
7. Avoidable causes
* Pilferage (workers stealing very small amounts each day)
* Unsuitable storage
* Careless handling
* Under or over issues of materials
* Materials unused but not returned to stores.

**Inventory control techniques**

Organization can employ a number of inventory control techniques. The common Techniques of inventory control system include:

* **Setting up various stock levels**

To avoid over-stocking and under stocking of materials, the management may decide to set the maximum level, minimum level, re-order level, danger level and average level of materials to be kept in the store.

* Preparations of inventory budgets (Budgetary control systems)

Organisations having huge material requirement normally prepare purchase budgets. The budget for production and consumable material, capital and maintenance material are separately prepared. At periodical intervals actuals are compared with the budgeted figures and reported to management which provide a suitable basis for controlling the purchase of materials.

* **Maintaining perpetual inventory system**

The basic objective of this system is to make available details about the quantity and value of stock of each item at all times. Under this method, proper information relating to receipt, issue and materials in hand (availability of materials and their movement in stores) is kept. Thus, this system provides a rigid control over stock of materials as physical stock can be regularly verified with the stock records kept in the stores and the cost office. Perpetual inventory control system cannot-be successful unless and until it is accompanied by a system of continuous stock taking

* **Establishing proper purchase procedures**

A proper purchase procedure should be established and adopted to ensure necessary inventory control. This involves a number of steps from purchase requisition to purchase order.

* **Inventory turnover ratios (Control ratios)**

#### The ratio indicates how quickly the inventory is used for production. The Higher the ratio, the shorter the duration of inventory at the factory. It is the index of efficiency of material management. The comparison of various inventory turnover ratios at different items with those of previous years may reveal the following four types of inventories

#### (a) Slow moving Inventories:

#### (b) Dormant Inventories:

#### (c) Obsolete Inventories:

#### (d) Fast moving inventories:

* **ABC analysis (ABC classification and control method)**

In order to exercise effective control over materials, A.B.C. method is of immense use. Under this method material is classified in three categories according to its respective value. Group ‘A’ constitutes costly items which may be only 10 to 20% of the total items but account for about 50% or more of the total value of the stores. A greater degree of control is exercised to preserve these items. Group ‘B’ consists of items which constitutes 20 to 30% of the store items and represent about 30% of the total value of stores. A reasonable degree of care may be taken in order to control these items. In the last category i.e. group ‘C’ about 70 to 80% of the items is covered costing about 20% of the total value. This can be referred to as residuary category. A routine type of care may be taken in the case of the third category.

* **Statistical control systems**
* **Just in time (J-I-T) etc.**

**Accounting for material losses**

In the process of material handling, storage and usage of materials (issue to respective departments or jobs), part of the materials may be lost. Some materials may be lost because of the nature of the products or other factors that cannot be controlled by the firm. These losses are classified as:

1. Normal loss, and

2. Abnormal loss.

**(1) Normal Loss:**

This is that loss which cannot be avoided and it has a tendency to occur, therefore must inevitably be incurred. E.g.

1. Loss due to evaporation (in case of liquid materials)
2. Loss due to breaking the bulk (e.g. when materials are purchased in large quantity and issued to production in small lots).
3. Loss in loading and unloading of materials.

Normal losses of materials cannot be completely eliminated but may be controlled to a limited extent.

**(2) Abnormal Loss:**

This loss arises due to inefficiency in operations, bad luck, mischief, etc. Examples include:

1. Improper storage of materials
2. Breakage of materials
3. Theft and Pilferage
4. Use of defective/inaccurate weighing machine/instruments
5. Fire, accident, flood, earth quacks etc.
6. Other unavoidable reasons.

**Material losses in cost accounting**

Material losses can be categorized on the basis of: Wastage, Spoilage, Scrap, Defective work and Obsolescence. These are handled or treated differently when it comes to recording them in the books of accounts.

**1. Scrap**

This is the incidental residue of small quantity and low value from processes/operations that is recoverable without further processing. Examples of scrap are – metal from stamping operation; iron fillings, odd pieces of timber, strips of cloth, chemical residue etc., left after the completion of the manufacturing process. Scrap may occur because of – faulty planning, poor manufacturing methods, employment of low quality materials, defective inspection methods, outdated machines and tools etc. Scrap increases the cost of production and requires proper control.

Scrap may be treated in accounts using any of the following approaches:

* Where the value of scrap is very insignificant, it is credited to the profit and loss account as other income.
* If the value of scrap is significant, the net sale proceeds of the scrap (sales value of scrap – cost of selling scrap) is deducted from the material costs incurred in the production process.

The realised value of scrap may be credited to the process account.

##### **2. Waste**

This is material loss that has no recoverable value. e.g., gases, dust, smoke, unsaleable residue, losses on account of shrinkage or evaporation of materials, inefficient handling etc. Waste may be visible or invisible. Quantity of production is reduced on account of wastes and the unit cost of production increases, since the total cost is spread over a smaller number of good.

Treatment:

* Normal waste is treated as production costs and hence contributes to the cost of the final product.
* Abnormal waste is treated as operating loss and is transferred to Costing Profit and Loss Account (ie debited to profit and loss account)

Normal waste can be pre-determined on the basis of past experience. This waste is unavoidable/ uncontrollable and expected for example failure of machines. The costing rule is that the loss on account of normal waste is borne by the good units. Loss of materials in excess of normal waste is abnormal waste. Abnormal waste isunexpected and controllable for example workers breaking products during packaging. In order to control waste, a waste report is prepared at regular intervals. The actual percentage of waste is compared with the standard percentage and remedial measures are taken to remove any abnormal waste. Abnormal waste needs careful investigation to determine the causes so as to prevent recurrence.

**3. Spoilage**

These are materials that are damaged or have developed some imperfections which cannot be economically corrected/ cannot be brought to normal conditions. Such goods are either sold for their scrap value or discarded without further processing, they can’t be rectified with some additional cost.

For effective cost control, normal spoilage rates should be established for each department and for each type or class of material. Weekly or monthly spoilage reports should be reviewed by the inspector. The actual spoilage is compared with the standard or normal spoilage and steps are taken to remove any abnormal spoilage.

Accounting Treatment*:*

* The loss due to spoilage may be charged to a specific product or job on which the spoilage occurred, if it is clearly traceable to the work done on that order.
* The normal spoilage loss may be charged to factory overhead and thus spread over the cost on all products or jobs.
* The cost of abnormal spoilage (i.e due to causes not inherent in the manufacturing process) is transferred to profit and loss account.

**4. Defectives**

These are Products, semi-finished or finished products which develop some imperfections that require extra cost of operation (using more materials or working extra hours) to be rectified. These products do not meet production standards and must be processed further in order to be saleable as good units. Defective work is below the fixed standard but can be corrected/rectified to meet specified standards by incurring additional expenditure inform of additional materials, labour and overhead. Defectives may arise due to sub­standard materials (poor quality of raw materials), poor workmanship (carelessness in running the entire production process), bad supervision & careless inspection etc.

Proper control should be exercised over defective goods. On the receipt of defective work report, a decision is taken whether to rectify or not to rectify the work. Adequate steps should be taken to see that defective work remains within standard limits.

Proper control should be exercised over defective goods. On the receipt of defective work report, a decision is taken whether to rectify or not to rectify the work. Adequate steps should be taken to see that defective work remains within standard limits.

***Accounting Treatment;***

*-* If defective units are clearly identified with a specific job or product, then the cost to complete the defective units can be charged to that job.

- If the defective units occur irregularly, then the cost of rectification is properly charged to factory overheads.

- If the defective production is because of abnormal reasons, then the rectification cost is transferred to profit and loss account.

**5. Obsolete Materials:**

Obsolete items are those for which there is no demand at all owing to the fact that the finished product, in which they are used, is no longer being produced. The reasons may be change in fashion or the use of substitute materials. The finished product of obsolete materials has gone out of production, the materials in question are no longer needed. Further, with industrial progress, there is absolutely no possibility of production of the same article for which the materials were formerly used. Obsolescence is thus linked to industrial progress.

**Control of Material Losses:**

The following steps may be taken to control losses of materials:

1. Proper storage conditions should be provided, particularly in case of perishable materials.
2. The store rooms should be well guarded and protected to avoid the risks of theft, fire, etc.
3. To reduce losses due to obsolescence, materials should be issued on first-in-first-out basis.
4. Accuracy of weighing instruments should be periodically checked.
5. A systematic procedure should be developed regarding movement of materials from one place to another and no unauthorised movements of materials should be permitted.
6. Specialised material handling equipment should be employed so as to minimise losses in material handling.

 **Activity for students**

1. Distinguish between spoilage and defectives in a manufacturing company. Discuss their treatment in cost accounts and suggest a procedure for their control.
2. “The perpetual inventory control system is an integral part of materials control.” Discuss this statement bringing out briefly the salient features and advantages of the system.
3. Discuss the difference between waste and scrap.
4. How does Defective work differ from spoiled work?
5. Distinguish Obsolete materials from slow-moving and dormant items.

**METHODS OF INVENTORY/STOCK VALUATION**

## Introduction

Inventory is quantity of goods and materials at hand.  Inventory includes finished goods held for sale, goods in the process of production, raw materials, and items that will be consumed in the process of producing salable goods.  These are considered as assets in the statement of financial position and priced either at cost value or market value.

Inventory valuation is a process in accounting that businesses use to find out the value of unsold stock. It is a calculation of the value of the products or materials contained in a firm's inventory at the end of a particular accounting period. The purpose of valuing stock is to determine the material cost of different jobs and products that have consumed the materials issued. Different methods of valuing stock are aimed at ensuring that the right price is used in issuing stock. For instance, it will not be appropriate for a firm to make losses by issuing stock at a lower price than purchasing price. The method of inventory valuation is also aimed at attaching monetary value in the store.

Inventory values change according to price fluctuations.  The valuation of an inventory directly affects the inventory, total current asset, and total asset balances.  There are different methods of valuing inventories used by public and private companies.  This unit highlights some of the methods used in valuing inventories.

**Costing Materials Received.**

The invoice from the supplier is the basic document providing a base figure for determining the cost of materials to be entered in the accounting books. The figure however may be adjusted after considering the discount received (may be deducted from the cost of materials or taken to the income statement), carriage in ward on raw materials (charge to materials or take to income statement), material handling charges – expenses involved in receiving, storing, issuing and handling materials (charged to materials though at times treated as indirect costs)

**Costing Materials Issued.**

Where raw materials have been purchased for a specific product or job, the cost of materials received is wholly charged to that job. But most often materials are purchased for several products/jobs. Moreover, each consignment is usually bought at different prices. This brings up the need of determining the cost of materials issued from the stores to the production departments of the organization. The main inventory valuation methods include the following:

1. **Cost price method**
2. First in first out (FIFO)
3. Last-In, First-Out (LIFO)
4. HIFO (Highest-in First –out)
5. Base stock
6. Specific Identification Method
7. **Average Price method**
8. Simple average
9. Weighted average
10. Periodic Simple average
11. Periodic Weighted average
12. Moving simple average
13. Moving weighted average
14. **Notional Price Method**
15. Standard price
16. Inflated price
17. Replacement or market price

# NB: Note the following for each of the stock valuation methods above:

1. Ensure that you know how each method operates
2. The advantages and disadvantages of each method
3. How to arrive at closing stock using each method
4. The format of stores ledger sheet

# Common methods of costing materials issued or sold

1. **First in first out (FIFO)**

According to the first-in-first-out (FIFO) valuation method, the goods are consumed in the sequence in which they are purchased. That is, inventory items are sold in the same order in which they are purchased or manufactured. Hence, materials purchased first are consumed first in a manufacturing concern and goods purchased first are sold first in case of a merchandising firm. Consequently, when costing material issues, the first materials received into the stores will be the first to be issued (given out) to the production department or to be sold. It follows the principle that materials received first are issued first. After the first lot or batch of materials purchased is exhausted, the next lot is taken up for supply. It does not suggest, however, that the same lot will be issued from stores. Sometimes, all materials are tagged with their arrival date and issued in date order especially with stocks that deteriorate. The inventory is priced at the latest costs. The rates at which the different consignment of materials are priced should be taken into consideration.

**Example 1**

1. AA company Ltd purchases masks and sell them to their customers. The following transactions took place during the year 2021.

|  |  |  |
| --- | --- | --- |
| No. of masks bought | Price per mask ($) | Month when it was bought |
| 200 | 2 | April |
| 200 | 3 | May |
| 100 | 4 | June |

During the year, 300 masks were sold.

Required: using FIFO,

1. Determine the value of inventory at the end of the year.
2. What is the cost of sales for the masks sold?

**Example 2**

A business bought Laptops at different timing and prices during the month of November 2022.

First transaction- Bought Ten laptops at $1,000 each

Second transaction- Bought Five laptops at $1,100 each

At the end of the month, eight laptops were sold.

**Required**

Calculate the value of laptops remaining in stock at the end of the month and cost of the laptops sold using FIFO.

1. **Last-In, First-Out (LIFO)**

This method assumes that the most recently purchased or manufactured items (last items to enter the inventory) are the first to be sold/used. I.e. recent goods purchased are consumed first and the goods purchased first are consumed later. Thus, cost of goods sold is calculated using the most recent prices. However, the ending inventory is costed using the cost of the oldest units available. It is rarely used in practice, as the company using it would have a great risk of only selling the most recently purchased goods or manufactured products and having their older products become obsolete and unsellable. Nonetheless, it is sometimes used because it charges the most recent costs to the cost of goods sold; in a period of price inflation, this tends to reduce profits and therefore the amount of income taxes to be paid.

**Example 3**

Use the details in example 1 &2 above and their requirement applying LIFO method.

1. **Simple average cost method**

This method computes the average cost of items available for sale. Hence, the cost of goods sold and the closing inventory is calculated using average cost of units. This is based on the principle that materials issued should be priced on an average price and not on exact cost price. The simple average is an average of prices without having regard to the quantities involved.

With the average cost method, the materials are issued at the average cost per unit. This is calculated by getting the average of the different purchase prizes for the different consignments received into the stores, after each new purchase. Each new item is issued at the latest average price and this average price only changes when a new consignment is received. This method should be used when prices do not fluctuate very much and the stock value is small. Otherwise, the method may lead to over-recovery or under-recovery of cost of materials from production because quantity purchased in each lot is ignored. This method is easy to operate.

**Example 4**

The following are three different lots of materials in stock when the material is to be issued:

1,000 units purchased at $ 10 each

2,000 units purchased at $ 11 each

3,000 units purchased at $ 12 each

**In this example, simple average price will be $ 11 calculated as below:**

($ 10 + $ 11 + $ 12)/3 = $ 11

### Weighted Average Method

The weighted average price takes into account the price and quantity of the materials in store. This method consists of assigning an average cost of production to all inventory products. The average is calculated by dividing the cost of goods that are currently available for sale (total cost of materials in the stock) by the total quantity in that stock, giving average cost per unit. This value is an average between the oldest and the newest products purchased and placed in stock. This means that the cost of goods sold will be neither excessively high nor low in a period of price inflation, making this method representative of the actual cost of the items stored in inventory.

**Example 5**

**Using the details in example 4, the weighted average price is** $ **11.33 per unit calculated as follows:**

(1,000 x $ 10 + 2,000 x $ 11 + 3,000 x $ 12)/ (1,000 + 2,000 + 3,000) = $ 11.33

Issue of material at weighted average price method is able to recover the cost price of materials from production. The value of the remaining inventory is then calculated by multiplying the quantity with the $ 11.33 average cost.

1. **Etc.**

***Stores Ledger Account***

This is the ledger where stock is recorded and monitored to ensure that stock doesn’t run out or there is no over stocking in the stores. It’s in this ledger that receipt of materials into the store is recorded, together with the quantity received, rate or cost per item and the total amount paid for the items.

Materials issued from the stores are also recorded in this ledger giving details of the quantities issued, at what rate and the total amount of materials issued. The last column of this ledger shows the balances of stock giving details of the quantities, the rates and total cost of those materials at the end of the day, month or year. (Also known as closing stock)

It is this ledger that is used to control or monitor how much stock is in the stores at any given period of time. Equipped with this information, the organization will know exactly when it needs to place an order for fresh supplies of materials. Below is simple format of the ledger.

|  |
| --- |
| NAME OF THE COMPANY ………………………………………………… |
| DEPARTMENT ………………………………………PERIOD ……………………………………………………. |
| ITEM NAME:………………….. ITEM CODE:………………. |
| MIN. LEVEL:…………. RE-ORDER LEVEL:……………….. MAX.LEVEL:…………….. |
| Date |  RECEIPTS |  ISSUES |  BALANCE |
| QTY | RATE | AMT | QTY | RATE | AMT | QTY | RATE | AMT |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

# Alternative

|  |  |  |  |
| --- | --- | --- | --- |
| Date |  Purchases |  Issues |  Balance |
| Qty | Unit cost | Total | Qty | Unit cost | Total | Qty | Unit cost | Total |
|  |  |  |  |  |  |  |  |  |  |

# NB:

1. A column can be inserted between date & receipts to cater for details.
2. Another column can be inserted between issues and balance with 3 divisions to cater for adjustments arising from returns, stock taking.

# Question for class discussion

**Question one**

The receipts and issues of material for the month January 2020 for JUST Stores were as follows:

|  |  |
| --- | --- |
| ***2020*** | ***Details of transactions*** |
| Jan. 1 | Opening Balance: 500 valued at £4 per unit |
| Jan. 4 | Issued 200 units  |
| Jan 5 | Received 200 units at £4.25 per unit |
| Jan. 10 | Issued 400 units  |
| Jan. 12 | Received 150 units at £ 4.10per unit |
| Jan 15 | Issued 100 units  |
| Jan 19 | Issued 100 units |
| Jan. 20 | Received 300 units at £ 4.50 per unit |
| Jan. 25 | Received 400 units at £ 4.00 per unit |
| Jan. 26 | Issued 200 units |
| Jan. 30 | Issued 250 units |

**Required:**

Prepare the Stores Ledger Account in respect of the materials and establish the cost of closing stock, total value of materials issued and total value of purchases for the month of January using:

1. FIFO method
2. LIFO method

**Question two**

The Following transactions took place in respect of an item of material in 2021.

|  |  |  |
| --- | --- | --- |
| **Date** | **Receipts** | **Issue** |
| **Quantity** | **Rate per unit ($)** | **Quantity** |
| 2-9-2021 | 200 | 2.00 |  |
| 10-9-2021 | 300 | 2.40 |  |
| 15-9-2021 |  |  | 250 |
| 18-9-2021 | 250 | 2.60 |  |
| 20-9-2021 |  |  | 200 |

**Required:**

Record the above transactions in the stores ledger account, pricing the issues using

1. Simple average method
2. Weighted average method

# Questions for practice

1. You are presented with the following information by AA Engineering Company, related to the first week of December, 2019.

|  |  |  |
| --- | --- | --- |
| **Days** | **Receipts** | **Issues**  |
|  | **Units** | **Rate per unit ($)** | **(units)** |
| 1st  | **40** | **15.00** |  |
| 2nd  | **20** | **16.50** | **30** |
| 3rd  |  |  |  |
| 4th  | **50** | **17.10** |  |
| 5th  |  |  | **20** |
| 6th  |  |  | **40** |

**Required**

Calculate the cost of materials issued and value of closing stock under each of the methods below:

1. FIFO Method
2. LIFO method
3. Weighted average method
4. The information below was extracted from the books of NUNU General enterprise Ltd for the month of July 2022.

|  |  |
| --- | --- |
| ***2022*** | ***Details of transactions*** |
| 1st July  | Opening stock: 1,000 bags valued each at Shs 120,000 |
| 2nd July | Received 1,200 bags at Shs 125,000 per bag |
| 3rd July | Issued 1,250 bags |
| 7th July | Received 1,500 bags at Shs 128,000 per bag |
| 8th July  | Issued 1,250 bags |
| 14th July | Issued 1,200 bags |
| 20th July | Received 1,000 bags at Shs 130,000 per bag |
| 22nd July | Issued 1,050 bags |
| 28th July | Received 1,250 bags at Shs 140,000 per bag |
| 30th July | Issued 1,200 bags |

**Required:**

Show the value of materials issued to the production centre and the value of closing stock using FIFO

1. The purchases and issues of a raw material for a five months’ period for JJ Stores were as follows:

|  |  |
| --- | --- |
| ***2019*** | ***Details of transactions*** |
| 1st July  | Received 2,000 units at $10 per unit |
| 9th July | Received 520 units at $10.50 per unit |
| 18th July | Issued 1,400 units |
| 5th August | Received 800 units at $11.50 per unit |
| 22nd August | Received 600 units at $12.50 per unit |
| 15th September | Issued 1,240 units |
| 14th October | Issued 480 units |
| 8th November | Received 1,000 units at $11 per unit |
| 24th November | Issued 760 units |

There was no opening stock of the raw material.

**Required:**

Use FIFO and Simple Average cost methods to establish the cost of closing stock and total value of materials issued for the five months.

1. The following information was obtained from the records of JUST CO. Ltd concerning material purchases and issues from January to May 2020.

|  |  |
| --- | --- |
| 2020 | ***Details of transactions*** |
| 1st January | Received 1,000 units at £1.00 per unit |
| 10th January | Received 260 units at £1.05 per unit |
| 20th January | Issued 700 units |
| 4th February | Received 400 units at £1.15 per unit |
| 21st February | Received 300 units at £1.25 per unit |
| 16th March  | Issued 620 units |
| 12th April | Issued 240 units |
| 10th May | Received 500 units at £1.10 per unit |
| 25th May | Issued 380 units |

**Required:**

1. Using FIFO and Simple average methods prepare stores ledger account.
2. Determine the value of closing stock and cost of materials to be charged to production.
3. The following is a summary of the receipts and issues of materials in the production department of RUBAGA Company Ltd for the month of February 2019

|  |  |
| --- | --- |
| ***February 2017*** | ***Details of transactions*** |
| 1st  | Opening balance 500 units @ $25 per unit |
| 3rd  | Issue 70 units |
| 4th  | Issue 100 units |
| 8th  | Issue 80 units |
| 13th  | Received from supplier 200 units @ $24.50 per unit |
| 16th  | Issue 180 units |
| 20th  | Received from supplier 240 units @ $24.75 per unit |
| 24th  | Issue 304 units |
| 25th  | Received from supplier 320 units @ $24.50 per unit |
| 26th  | Issue 112 units |
| 28th  | Received from supplier 100units @ $25 per unit |

**Required:**

Use the FIFO and Simple Average methods to draw a stock ledger account showing clearly the value of materials issued and the value of closing stock at the end of the month