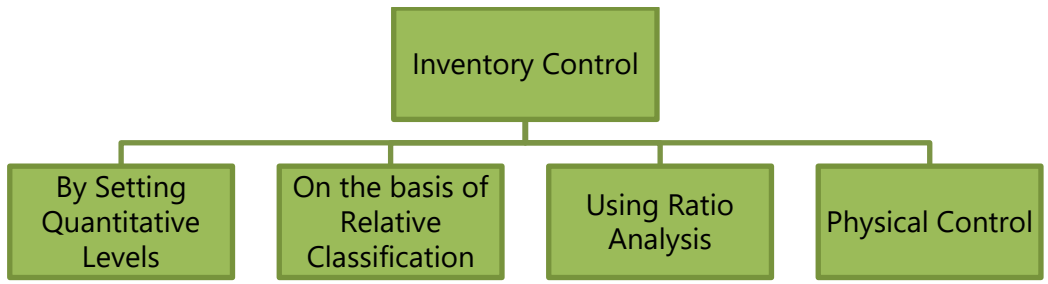
2.6 INVENTORY CONTROL

The Chartered Institute of Management Accountants (CIMA) defines Inventory Control as *"The function of ensuring that sufficient goods are retained in stock to meet all requirements without carrying unnecessarily large stocks."*

The objective of inventory control is to make a balance between sufficient stock and over-stock. The stock maintained should be sufficient to meet the production requirements so that uninterrupted production flow can be maintained. Insufficient stock not only pause the production but also cause a loss of revenue and goodwill. On the other hand, Inventory requires some funds for purchase, storage, maintenance of materials with a risk of obsolescence, pilferage etc. **A trade-off between Stock-out and Over-stocking is required**. The management may employ various methods of Inventory control to have a balance. Management may adopt the following basis for Inventory control:



2.6.1 Inventory Control- By Setting Quantitative Levels

Re-order Stock Level	•When to Order
Re-order Quantiy/ EOQ	•How Much to Order
Maximum Stock Level	•Upto How much to stock
Minimum Stock Level	•Atleast How much to stock
Average Stock Level	•Stock normally kept
Danger Stock Level	•Kept for emergency requirement
Buffer Stock	•To meetigate sudden demand

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(i) Re-order Stock Level (ROL): *This level lies between minimum and the maximum levels* in such a way that before the material ordered is received into the stores, there is sufficient quantity on hand to cover both normal and abnormal consumption situations. In other words, it is the level at which fresh order should be placed for replenishment of stock.

It is calculated as:

ROL = Maximum Consumption × Maximum Re-order Period

Maximum Consumption = The maximum rate of material consumption in production activity

Maximum Re-order period = The maximum time to get order from supplier to the stores

This can also be calculated alternatively as below:

ROL = Minimum Stock Level + (Average Rate of Consumption × Average Re-order period)

Minimum Stock Level = Minimum Stock level that must be maintained all the time.

Average Rate of Consumption = Average rate of material consumption in production activity. It is also known as normal consumption/ usage

Average Re-order period = Average time to get an order from supplier to the stores. It is also known as normal period.

(Re-order period is also known as Lead time)

(ii) Re-Order Quantity: Re-order quantity is the quantity of materials for which purchase requisition is made by the store department. While setting the quantity to be re-ordered, consideration is given to the maintenance of minimum level of stock, re-order level, minimum delivery time and the most important the cost. Hence, **the quantity should be where, the total of carrying cost and ordering cost be at minimum**. For this purpose, an economic order quantity should be calculated.

Economic Order Quantity (EOQ): The size of an order for which total of ordering and carrying cost are at minimum.

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Ordering Cost: The costs which are associated with the purchase or order of materials. It includes *cost to invite quotations, documentation works like preparation of purchase orders,* employee cost directly attributable to the procurement of material, transportation and inspection cost etc.

Carrying Cost: The costs for *holding/ carrying of inventories in store*. It includes the cost of fund invested in inventories, cost of storage, insurance cost, obsolescence etc.

The Economic Order Quantity (EOQ) is calculated as below:

$$EOQ = \sqrt{\frac{2 \times \text{Annual Requirement (A)} \times \text{Cost per order (O)}}{\text{Carrying Cost per unit per annum (C)}}}$$

Annual Requirement (A)- It represents demand for Raw material or Input for a year.

Cost per Order (O) - It represents cost of placing an order for purchase.

Carrying Cost (C) – It represents cost of carrying average inventory on annual basis.

Assumptions underlying E.O.Q.: The calculation of economic order of material to be purchased is subject to the following assumptions:

(i) Ordering cost per order and carrying cost per unit per annum are known and they are fixed.

(ii) Anticipated usage of material in units is known.

(iii) Cost per unit of the material is constant and is known as well.

(iv) The quantity of material ordered is received immediately *i.e.* the lead time is zero.

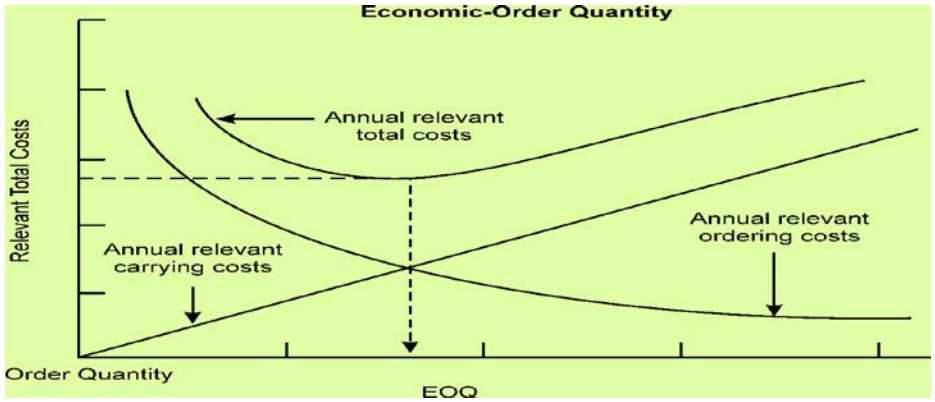

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ILLUSTRATION 3

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

Consumption of materials per annum	:	*10,000 kg.*
Order placing cost per order	:	*₹ 50*
Cost per kg. of raw materials	:	*₹ 2*
Storage costs	:	*8% on average inventory*

SOLUTION

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

A = Units consumed during year

O = Ordering cost per order

C = Inventory carrying cost per unit per annum.

$$EOQ = \sqrt{\frac{2 \times 10,000 \times 50}{\frac{2 \times 8}{100}}} = \sqrt{\frac{2 \times 10,000 \times 50 \times 25}{4}} = \textbf{2,500 kg}.$$

$$\text{No. of orders to be placed in a year} = \frac{\text{Total consumption of materials per annum}}{EOQ}$$

$$= \frac{10,000 \text{ kg.}}{2,500 \text{ kg.}} = \textbf{4 Orders per year}$$

ILLUSTRATION 4

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

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

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

SOLUTION

(i) Carrying cost (C) = Storage rate = 2%

Interest Rate = 12%

Obsolescence Rate = 6%

Total = 20% per annum

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

$$E.O.Q = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2\times5000\times16}{4}} = \sqrt{40,000} = 200 \text{ units}$$

Total cost:

Purchase price of 5,000 units @ ₹ 20.00 per unit	=	₹ 1,00,000
Ordering cost $= \frac{5000}{200}$ = 25 orders @ ₹ 16 =	₹	400
Carrying cost of average Inventory $= \frac{200}{2}$ = 100 units @ ₹ 4 =	₹	400
Total cost		**₹ 1,00,800**

(ii) If an incorrect price of ₹ 12.80 is used:

C = 20% of 12.80 = ₹ 2.56 per unit per annum.

$$E.O.Q. = \sqrt{\frac{2\times5,000\times16}{2.56}} = 250 \text{ units}$$

Total cost:

Purchase price of 5,000 units @ ₹ 12.80 per unit =		₹ 64,000
Ordering cost $= \frac{5,000}{250}$ = 20 orders @ ₹ 16 =	₹	320
Carrying cost (of average inventory) $= \frac{250}{2}$ = 125 units @ ₹ 2.56 =	₹	320
Total variable cost		**₹ 64,640**

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(iii) Minimum Stock Level: It is lowest level of material stock, which must be *maintained in hand at all times*, so that there is no stoppage of production due to non-availability of inventory.

It is calculated as below:

Minimum Stock Level = Re-order Stock Level - (Average Consumption Rate × Average Re-order Period)

(iv) Maximum Stock Level: It is *the highest level of quantity for any material which can be held in stock at any time*. Any quantity beyond this level cause extra amount of expenditure due to engagement of fund, cost of storage, obsolescence etc.

It can be calculated as below:

Maximum Stock Level = Re-order Level + Re-order Quantity - (Minimum Consumption Rate × Minimum Re-order Period)

Here, Re-order Quantity may be EOQ

(v) Average Inventory Level: This is the quantity of material that is normally held in stock over a period. *It is also known as normal stock level.*

It can be calculated as below:

Average Stock Level = Minimum Stock Level + 1/2 Re-order Quantity

Alternatively, it can be calculated as below:

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

(vi) Danger level: It is the level at which normal issues of the raw material inventory are stopped and emergency issues are only made.

It can be calculated as below:

Danger Level = Average Consumption* × Lead time for emergency purchase

*Some time minimum consumption is also used.

(vii) Buffer Stock: Some quantity of stock may be kept for **contingency** to be used in case of sudden order, such stock is known as buffer stock.

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All the above stock levels can be understood with the help of the following diagram:

Stock Control Chart

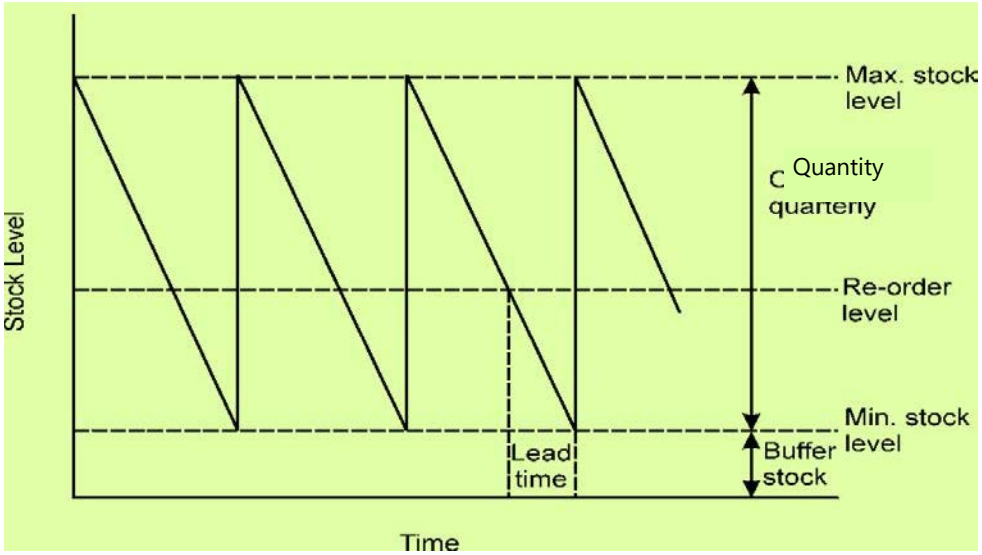

ILLUSTRATION 5

Two components, A and B are used as follows:

Normal usage	*50 per week each*
Maximum usage	*75 per week each*
Minimum usage	*25 per week each*
Re-order quantity	*A: 300; B: 500*
Re-order period	*A: 4 to 6 weeks*
	B: 2 to 4 weeks

CALCULATE for each component (a) Re-ordering level, (b) Minimum level, (c) Maximum level, (d) Average stock level.

SOLUTION

(a) Re-ordering level:

Maximum usage per week × Maximum delivery period.

Re-ordering level for component A = 75 units × 6 weeks = **450 units**

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Re-ordering level for component B = 75 units × 4 weeks = **300 units**

(b) Minimum level:

Re-order level – (Normal usage × Average period)

Minimum level for component A = 450 units – (50 units × 5 weeks) = 200 units

Minimum level for component B = 300 units – (50 units × 3 weeks) = 150 units

(c) Maximum level:

Re-order level + Re-order quantity – (Min. usage × Minimum period)

Maximum level for component A = (450 units + 300 units) – (25 units × 4 weeks) = 650 units

Maximum level for component B = (300 units + 500 units) – (25 units × 2 weeks) = 750 units

(d) Average stock level:

½ (Minimum + Maximum) stock level

Average stock level for component A = ½ (200 units + 650 units) =425 units.

Average stock level for component B = ½ (150 units + 750 units) =450 units.

ILLUSTRATION 6

From the details given below, CALCULATE:

(i) Re-ordering level

(ii) Maximum level

(iii) Minimum level

(iv) Danger level.

Re-ordering quantity is to be calculated on the basis of following information:

Cost of placing a purchase order is ₹ 20

Number of units to be purchased during the year is 5,000

Purchase price per unit inclusive of transportation cost is ₹ 50

Annual cost of storage per units is ₹ 5.

Details of lead time : Average- 10 days, Maximum- 15 days, Minimum- 5 days.

For emergency purchases- 4 days.

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Rate of consumption : Average: 15 units per day,

Maximum: 20 units per day.

SOLUTION

Basic Data:

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

Computations:

(i) Re-ordering level = Maximum usage per period × Maximum lead time

(ROL) = 20 units per day × 15 days = **300 units**

(ii) Maximum level = ROL + ROQ – [Min. rate of consumption × Min. lead time]

(Refer to working notes1 and 2)

= 300 units + 200 units – [10 units per day × 5 days]

= **450 units**

(iii) Minimum level = ROL – Average rate of consumption × Average re-order-period

= 300 units – (15 units per day × 10 days) = **150 units**

(iv) Danger level = Average consumption × Lead time for emergency purchases

= 15 units per day × 4 days = **60 units**

Working Notes:

1. Minimum rate of consumption per day

$$\text{Av. rate of consumption} = \frac{\text{Minimum rate of consumption} + \text{Maximum rate of consumption}}{2}$$

$$15 \text{ units per day} = \frac{X \text{ units/day} + 20 \text{ units per day}}{2} \quad \text{or} \quad X = 10 \text{ units per day.}$$

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2. Re-order Quantity (ROQ) = $\sqrt{\frac{2 \times 5,000 \text{ units} \times ₹ 20}{5}} = 200 \text{ units}$

2.6.2 Inventory Stock- Out

Stock out said to be occurred **when an inventory item could not be supplied due to insufficient stock in the store**. The stock- out situation costs to the entity not only in financial terms but in non-financial terms also. Due to stock out an entity not only loses overheads costs and profit but reputation (goodwill) also due to non-fulfilment of commitment. Though it may not be a monetary loss in short term but in long term it could be a reason for financial loss.

While deciding on the level of inventory, a trade-off between the stock out cost and carrying cost is made so that overall inventory cost can be minimized.

ILLUSTRATION 7:

M/s Tyrotubes trades in four wheeler tyres and tubes. It stocks sufficient quantity of tyres of almost every vehicle. In year end 20X8-X9, the report of sales manager revealed that M/s Tyrotubes experienced stock-out of tyres.

The stock-out data is as follows:

Stock-out of Tyres	No. of times
100	2
80	5
50	10
20	20
10	30
0	33

M/s Tyrotubes loses ₹ 150 per unit due to stock-out and spends ₹ 50 per unit on carrying of inventory.

DETERMINE optimum safest stock level.

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SOLUTION

Computation of Stock-out and Inventory carrying cost

Safety Stock Level (units) (1)	Stock-out (units) (2)	Probability (3)	Stock-out cost (₹) (4) = (2) x ₹150	Expected stock-out cost (₹) (5)=(3)x(4)	Inventory carrying cost (₹) (6) =(1)x₹50	Total cost (₹) (7) = (5)+(6)
100	0	0.00	0	0	5,000	5,000
80	20	0.02	3,000	60	4,000	4,060
50	50	0.02	7,500	150		
	30	0.05	4,500	225		
			12,000	375	2,500	2,875
20	80	0.02	12,000	240		
	60	0.05	9,000	450		
	30	0.10	4,500	450		
			25,500	1,140	1,000	2,140
10	90	0.02	13,500	270		
	70	0.05	10,500	525		
	40	0.10	6,000	600		
	10	0.20	1,500	300		
			31,500	1,695	500	2,195
0	100	0.02	15,000	300		2,700
	80	0.05	12,000	600		
	50	0.10	7,500	750		
	20	0.20	3,000	600		
	10	0.30	1,500	450		
			39,000	2,700	0	2,700

At safety stock level of 20 units, total cost is least i.e. ₹ 2,140.

Working Note:

Computation of Probability of Stock-out

Stock-out (units)	100	80	50	20	10	0	Total
Nos. of times	2	5	10	20	30	33	100
Probability	0.02	0.05	0.10	0.20	0.30	0.33	1.00

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Explanation:
Stock-out means the demand of an item that could not be fulfilled because of insufficient stock level.
Safety stock is the level of stock of any item which is maintained in excess of lead time consumption. It is kept as cushion against any unexpected demand for that item.

Safety stock level	Impact
100 units	Any unexpected demand upto 100 units can be met.
80 units	Stock out will only arise if unexpected demand will be for 100 units. In this case 20 units will remain unsatisfied. The probability of any unexpected demand for 100 units is 0.02.
50 units	Any unexpected demand beyond 50 units will be remain unsatisfied. If unexpected demand for 100 units arises (probability is 0.02) 50 units will be unsatisfied. Similarly, if unexpected demand for 80 units arises (probability is 0.05), 30 units will be unsatisfied.
20 units	Any unexpected demand beyond 20 units will be remain unsatisfied. If unexpected demand for 100 units arises (probability is 0.02), 80 units will remain unsatisfied. If unexpected demand for 80 units arises (probability is 0.05), 60 units will remain unsatisfied. Similarly, when unexpected demand for 50 units arises (probability is 0.10), 30 units will remain unsatisfied.
10 units	Any unexpected demand beyond 10 units will be remain unsatisfied. If unexpected demand for 100 units arises (probability is 0.02), 90 units will remain unsatisfied. If unexpected demand for 80 units arises (probability is 0.05), 70 units will remain unsatisfied. If unexpected demand for 50 units arises (probability is 0.10), 40 units will remain unsatisfied. Similarly, when unexpected demand for 20 units arises (probability is 0.20), 10 units will remain unsatisfied.
0 unit	When no safety stock level is maintained, any unexpected demand cannot be satisfied. If unexpected demand for 100 units arises (probability is 0.02), 100 units will remain

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	unsatisfied. If unexpected demand for 80 units arises (probability is 0.05), 80 units will remain unsatisfied. If unexpected demand for 50 units arises (probability is 0.10), 50 units will remain unsatisfied. If unexpected demand for 20 units arises (probability is 0.20), 20 units will remain unsatisfied. Similarly, unexpected demand for 10 units (probability is 0.30), 10 units will remain unsatisfied.

2.6.3 Just in Time (JIT) Inventory Management

JIT is a system of inventory management with an approach to have a **zero inventories in stores**. According to this approach material should *only be purchased when it is actually required for production.*

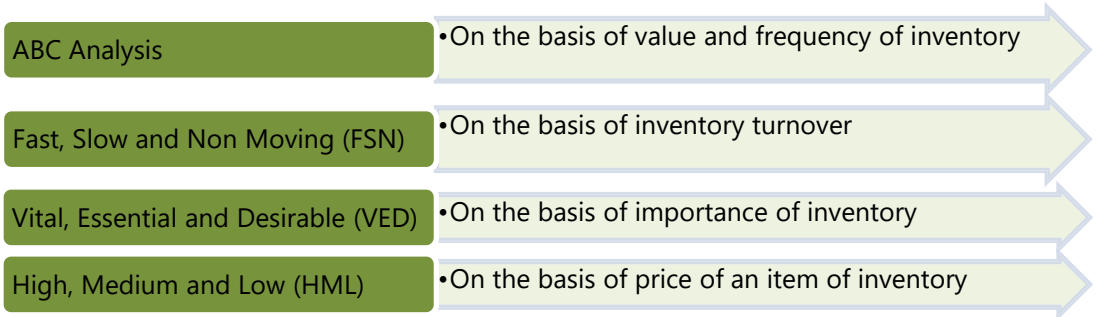
JIT is based on two principles

(i) Produce goods only when it is required and

(ii) the products should be delivered to customers at the time only when they want.

It is also known as 'Demand pull' or 'Pull through' system of production. In this system, production process actually starts after the order for the products is received. Based on the demand, production process starts and the requirement for raw materials is sent to the purchase department for purchase. This can be understood with the help of the following diagram:

2.6.4 Inventory Control- On the basis of Relative Classification



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(1) ABC Analysis: This system exercises discriminating control over different items of inventory on the basis of the investment involved. Usually the items are classified into three categories according to their relative importance, namely, their value and frequency of replenishment during a period.

(i) 'A' Category: *This category of items consists of only a small percentage i.e., about 10% of the total items handled by the stores but require heavy investment about 70% of inventory value*, because of their **high prices or heavy requirement** or both. Items under this category can be controlled effectively by using a regular system which ensures neither over-stocking nor shortage of materials for production. Such a system plans its total material requirements by making budgets. The stocks of materials are controlled by fixing certain levels like maximum level, minimum level and re-order level.

(ii) 'B' Category: This category of items is relatively less important; *they may be 20% of the total items of material handled by stores. The percentage of investment required is about 20% of the total investment in inventories*. In the case these items, as the sum involved is **moderate**, the same degree of control as applied in 'A' category of items is not warranted. The orders for the items, belonging to this category may be placed after reviewing their situation periodically.

(iii) 'C' Category: This category of items does not require much investment; it *may be about 10% of total inventory value but they are nearly 70% of the total items handled by store*. For these category of items, there is no need of exercising constant control. Orders for items in this group may be placed either after six months or once in a year, after ascertaining consumption requirements. In this case the objective is to economies on ordering and handling costs.

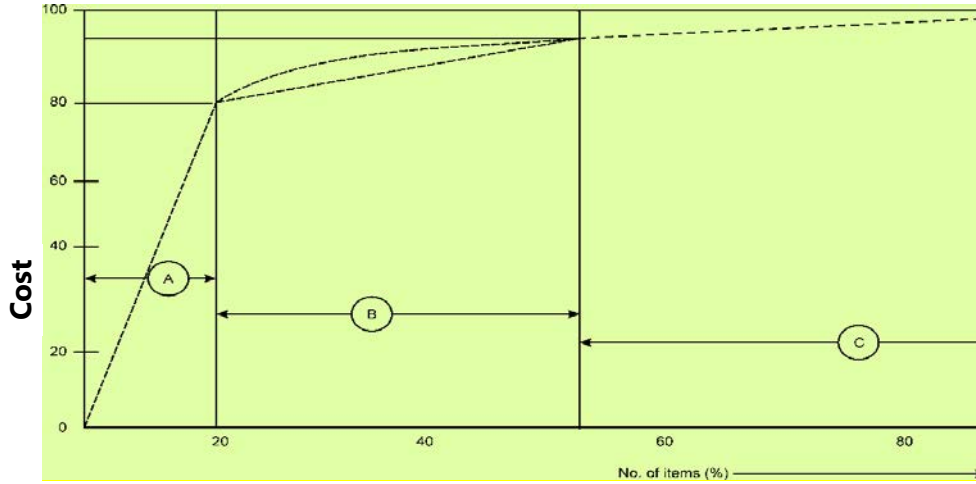

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ILLUSTRATION 8

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

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

SOLUTION

Statement of Total Cost and Ranking

Item	Units	% of Total units	Unit cost (₹)	Total cost (₹)	% of Total cost	Ranking
1	7,000	3.1963	5.00	35,000	9.8378	**4**
2	24,000	10.9589	3.00	72,000	20.2378	**2**
3	1,500	0.6849	10.00	15,000	4.2162	**7**
4	600	0.2740	22.00	13,200	3.7103	**8**
5	38,000	17.3516	1.50	57,000	16.0216	**3**
6	40,000	18.2648	0.50	20,000	5.6216	**6**
7	60,000	27.3973	0.20	12,000	3.3730	**9**
8	3,000	1.3699	3.50	10,500	2.9513	**11**
9	300	0.1370	8.00	2,400	0.6746	**12**
10	29,000	13.2420	0.40	11,600	3.2605	**10**

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11	11,500	5.2512	7.10	81,650	22.9502	**1**
12	4,100	1.8721	6.20	25,420	7.1451	**5**
	2,19,000	**100**		**3,55,770**	**100**	

Basis for selective control (Assumed)

₹ 50,000 & above -- 'A' items

₹ 15,000 to 50000 -- 'B' items

Below ₹ 15,000 -- 'C' items

On this basis, a plan of A B C selective control is given below:

Ranking	Item Nos.	% of Total units	Cost (₹)	% of Total Cost	Category
1	11	5.2512	81,650	22.9502	
2	2	10.9589	72,000	20.2378	
3	5	17.3516	57,000	16.0216	
Total	**3**	**33.5617**	**2,10,650**	**59.2096**	**A**
4	1	3.1963	35,000	9.8378	
5	12	1.8721	25,420	7.1451	
6	6	18.2648	20,000	5.6216	
7	3	0.6849	15,000	4.2162	
Total	**4**	**24.0181**	**95,420**	**26.8207**	**B**
8	4	0.2740	13,200	3.7103	
9	7	27.3973	12,000	3.3730	
10	10	13.2420	11,600	3.2605	
11	8	1.3699	10,500	2.9513	
12	9	0.1370	2,400	0.6746	
Total	**5**	**42.4202**	**49,700**	**13.9697**	**C**
Grand Total	12	100	3,55,770	100	

(1) Advantages of ABC analysis: The advantages of ABC analysis are the following:

(i) *Continuity in production:* It ensures that, without there being any danger of interruption of production for want of materials or stores, minimum investment will be made in inventories of stocks of materials or stocks to be carried.

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(ii) *Lower cost:* The cost of placing orders, receiving goods and maintaining stocks is minimised specially if the system is coupled with the determination of proper economic order quantities.

(iii) *Less attention required:* Management time is saved since attention need be paid only to some of the items rather than all the items as would be the case if the ABC system was not in operation.

(iv) *Systematic working:* With the introduction of the ABC system, much of the work connected with purchases can be systematized on a routine basis to be handled by subordinate staff.

ILLUSTRATION 9

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

No. of varieties of inventory	%	% value of inventory holding (average)	% of inventory usage (in end-product)
3,875	96.875	20	5
110	2.750	30	10
15	0.375	50	85
4,000	100.00	100	100

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

SOLUTION

Classification of the items of inventory as per ABC analysis

1. 15 number of varieties of inventory items should be classified as 'A' category items because of the following reasons:

(i) Constitute 0.375% of total number of varieties of inventory handled by stores of factory, which is minimum as per given classification in the table.

(ii) 50% of total use value of inventory holding (average) which is maximum according to the given table.

(iii) Highest in consumption about 85% of inventory usage (in end-product).

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2. 110 number of varieties of inventory items should be classified as 'B' category items because of the following reasons:

   (i) Constitute 2.750% of total number of varieties of inventory items handled by stores of factory.

   (ii) Requires moderate investment of about 30% of total use value of inventory holding (average).

   (iii) Moderate in consumption about 10% of inventory usage (in end–product).

3. 3,875 number of varieties of inventory items should be classified as 'C' category items because of the following reasons:

   (i) Constitute 96.875% of total varieties of inventory items handled by stores of factory.

   (ii) Requires about 20% of total use value of inventory holding (average).

   (iii) Minimum inventory consumption *i.e.* about 5% of inventory usage (in end-product).

(2) Fast Moving, Slow Moving and Non Moving (FSN) Inventory: It is also known as FNS (Fast, Normal and Slow moving) classification of inventory Analysis. Under this system, inventories are controlled by classifying them **on the basis of frequency of usage**. The classification of items into these three categories depends on the nature and managerial discretion. A threshold range on the basis of inventory turnover is decided and classified accordingly.

(i) Fast Moving- This category of items are placed nearer to store issue point and the stock is reviewed frequently for making of fresh order.

(ii) Slow Moving- This category of items are given stored little far and stock is reviewed periodically for any obsolescence and may be shifted to Non-moving category.

(iii) Non Moving- This category of items are kept for disposal. This category of items is reported to the management and an appropriate provision for loss may be created.

(3) Vital, Essential and Desirable (VED): Under this system of inventory analysis, inventories are classified **on the basis of its criticality for the production function and final product**. Generally, this classification is done for spare parts which are used for production.

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(i) Vital- Items are classified as vital when its unavailability can interrupt the production process and cause a production loss. Items under this category are strictly controlled by setting re-order level.

(ii) Essential- Items under this category are essential but not vital. The unavailability may cause sub standardisation and loss of efficiency in production process. Items under this category are reviewed periodically and gets the second priority.

(iii) Desirable- Items under this category are optional in nature, unavailability does not cause any production or efficiency loss.

(4) High Cost, Medium Cost, Low Cost (HML) Inventory: Under this system, inventory is classified **on the basis of the cost of an individual item**, unlike ABC analysis where inventories are classified on the basis of overall value of inventory. A range of cost is used to classify the inventory items into the three categories. High Cost inventories are given more priority for control, whereas Medium cost and Low cost items are comparatively given lesser priority.

2.6.5 Using Ratio Analysis

(i) Input Output Ratio: Inventory control can also be exercised by the use of input output ratio analysis. **Input-output ratio is the ratio of the quantity of input of material to production and the standard material content of the actual output**.

This type of ratio analysis enables comparison of actual consumption and standard consumption, thus indicating whether the usage of material is favourable or adverse.

(ii) Inventory Turnover Ratio: Computation of inventory turnover ratios for different items of material and comparison of the turnover rates provides a useful guidance for measuring inventory performance. *High inventory turnover ratio indicates that the material in the question is a fast moving one. A low turnover ratio indicates over-investment and locking up of the working capital in inventories*. Inventory turnover ratio may be calculated by using the following formulae: -

$$\text{Inventory Turnover Ratio} = \frac{\text{Cost of materials consumed during the period}}{\text{Cost of average stock held duirng the period}}$$

$$\text{Average stock} = 1/2 \text{ (opening stock + closing stock)}$$

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$$\text{Average no. of days of Inventory holding} = \frac{360\,\text{days}/12\,\text{months}}{\text{Inventory Turnover Ratio}}$$

By comparing the number of days in the case of two different materials, it is possible to know which is fast moving and which is slow moving. On this basis, attempt should be made to reduce the amount of capital locked up, and prevent over-stocking of the slow moving items.

ILLUSTRATION 10

The following data are available in respect of material X for the year ended 31st March, 20X9.

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

CALCULATE:

(i) Inventory turnover ratio, and

(ii) The number of days for which the average inventory is held.

SOLUTION

Inventory turnover ratio

(Refer to working note) $= \frac{\text{Cost of stock of raw material consumed}}{\text{Average stock of raw material}}$

$= \frac{₹2,50,000}{₹1,00,000} = 2.5$

Average number of days for which the average inventory is held

$= \frac{365}{\text{Inventory turnover ratio}} = \frac{365\,\text{days}}{2.5}$

$= \mathbf{146\ days}$

Working Note:

	(₹)
Opening stock of raw material	90,000

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Add: Material purchases during the year	2,70,000
Less: Closing stock of raw material	1,10,000
Cost of stock of raw material consumed	2,50,000

ILLUSTRATION 11

From the following data for the year ended 31st December, 20X9, CALCULATE the inventory turnover ratio of the two items and put forward your comments on them.

	Material A (₹)	*Material B (₹)*
Opening stock 1.1.20X9	*10,000*	*9,000*
Purchase during the year	*52,000*	*27,000*
Closing stock 31.12.20X9	*6,000*	*11,000*

SOLUTION

First of all it is necessary to find out the material consumed:

Cost of materials consumed	Material A (₹)	Material B (₹)
Opening stock	10,000	9,000
Add: Purchases	52,000	27,000
	62,000	36,000
Less: Closing stock	6,000	11,000
Materials consumed	56,000	25,000
Average inventory: (Opening Stock + Closing Stock) ÷ 2	8,000	10,000
Inventory Turnover ratio: (Consumption ÷ Average inventory)	**7 times**	**2.5 times**
Inventory Turnover (Number of Days in a year/IT ratio)	**52 days**	**146 days**

Comments: Material A is moving faster than Material B.

2.6.6 Physical Control

(i) Two Bin System: Under this system each bin is divided into two parts - one, smaller part, should stock the quantity equal to the minimum stock or even the re-ordering level, and the other to keep the remaining quantity. Issues are made

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out of the larger part; but as soon as it becomes necessary to use quantity out of the smaller part of the bin, fresh order is placed. "Two Bin System" is supplemental to the record of respective quantities on the bin card and the stores ledger card.

(ii) Establishment of system of budgets: To control investment in the inventories, it is necessary to know in advance about the inventories requirement during a specific period usually a year. The exact quantity of various types of inventories and the time when they would be required can be known by studying carefully production plans and production schedules. Based on this, inventories requirement budget can be prepared. Such a budget will discourage the unnecessary investment in inventories.

(iii) Perpetual inventory records and continuous stock verification: Perpetual inventory represents a system of records maintained by the stores department. **It in fact comprises: (i) Bin Cards, and (ii) Stores Ledger.**

The success of perpetual inventory depends upon the following:

(a) The Stores Ledger–(showing quantities and amount of each item).

(b) Stock Control cards (or Bin Cards).

(c) Reconciling the quantity balances shown by (*a*) & (*b*) above.

(d) Checking the physical balances of a number of items every day systematically and by rotation.

(e) Explaining promptly the causes of discrepancies, if any, between physical balances and book figures.

(f) Making corrective entries where called for after step (*e*) and

(g) Removing the causes of the discrepancies referred to in step (*e*)

Advantages of perpetual inventory: The main advantages of perpetual inventory are as follows:

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

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

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

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

(5) Fixation of the various stock levels and checking of actual balances in hand with these levels assist the Store keeper in maintaining stocks within limits and in initiating purchase requisitions for correct quantity at the proper time.

(iv) Continuous Stock Verification: The checking of physical inventory is an essential feature of every sound system of material control. The system of continuous stock-taking consists of **physical verification of items of inventory**. The stock verification may be done by internal audit department but are independent of the store and production staff. Stock verification are done at appropriate interval of time without prior notice. The element of surprise, that is essential for effective control of the system.

Advantages of continuous stock-taking: The advantages of continuous stock-taking are:

1. Closure of normal functioning is not necessary.
2. Stock discrepancies are likely to be brought to the notice and corrected much earlier than under the annual stock-taking system.
3. The system generally has a sobering influence on the stores staff because of the element of surprise present therein.
4. The movement of stores items can be watched more closely by the stores auditor so that chances of obsolescence buying are reduced.
5. Final Accounts can be ready quickly. Interim accounts are possible quite conveniently.

Disadvantages: Annual stock-taking, however, has certain inherent shortcomings which tend to detract from the usefulness of such physical verification. For instance, since all the items have to be covered in a given number of days, either the production department has to be shut down during those days to enable thorough checking of stock or else the verification must be of limited character.

2.7 MATERIAL ISSUE PROCEDURE

Issue of material must not be made except under properly authorised requisition slip; usually it is the foreman of a department who has the authority to draw

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