CHAPTER 2

MATERIALS

INTRODUCTION

Material is one of the elements of cost Materials cost is generally 60% to 80% of the total cost of any product hence it is an important item of cost to control. This study note covers the under mentioned portion.

Practical Portion
1. Economic order quantity (EOQ)
2. Inventory Levels.
3. Pricing of the issues.
4. Cost of material purchased
5. Rectification of Discrepancies
6. Point of Equilibrium
7. Inventory Turnover

Theory Portion
1. ABC Analysis (Selective control)
2. Perpetual/Continuous Inventory system.
3. Physical Verification
4. Purchase procedure
5. Bill of materials
6. Bin Card
7. Storing of materials etc.

Note: For details on theory portion students should refer study material/text book.

ECONOMIC ORDER QUANTITY

(EOQ/ Order size/ Ordering Quantity/ Optimum size/ Re-order Quantity)

It is the quantity of a material, which should be purchased each time. In case it is calculated in a scientific manner, it is known as EOQ and in that case the total cost of material i.e. Purchase cost + Ordering cost + carrying cost per annum will be lowest.

$$EOQ = \sqrt{\frac{2AO}{I}}$$

Where: A - Annual consumption in quantity.
O - Ordering cost per order. (Cost of placing an order)
I - Carrying cost or Holding cost per unit per annum. (including interest & storage cost)
C – Materials price per unit

Cost per annum = Purchase cost + ordering cost + carrying cost

a) Purchase cost = Annual Quantity x Price per unit. = A x C

b) Ordering cost = No. of order x ordering cost per order. $= \frac{A}{Q} \times O$

$$\text{No. of orders per year} = \frac{\text{Annual requirement}}{\text{Ordering quantity}} = \frac{A}{Q}$$

c) Carrying cost = Average Stock x Carrying cost per unit. $= \frac{Q}{2} \times I$

$$\text{Average stock} = \frac{\text{Order size}}{2} = \frac{Q}{2}$$

EOQ can be calculated by this formula only when the price is constant. When the price changes according to the size of the order or discount is allowed according to the size of the order in such cases EOQ will be calculated by making a detailed table as explained in the class by way of a problem.

Note: 1] The carrying cost (holding cost) and consumption both should be for same time base, either per month or per annum etc. The answer will be same.

Note: 2] At EOQ, CARING COST p.a. = Ordering cost p.a.

Note: 3] At EOQ, Total Caring cost + Total ordering Cost $= \sqrt{2AOI}$

INVENTORY LEVELS

1) *Re-order Level (ROL):* When the balance of quantity of a material reaches re-order level then a requisition for purchase of a new lot is sent. That means ROL shows when to purchase the material.
ROL = Maximum Lead Time x Maximum rate of consumption ***or***
ROL = Minimum Level + (Average lead time X Average Rate of consumption)

2) *Minimum Level:* Normally stock should not go below this level. Whenever minimum level is crossed it gives a warning to expedite the purchase of material.
Minimum Level = ROL - (Average lead time x Average rate of consumption)
= Max LT $\times$ Max RT – Avg. LT $\times$ Avg. RT

3) *Maximum Level:* Normally stock should not go above this level.
Maximum Level = ROL - (Minimum lead time x Minimum rate of usage) + EOQ(or order Qty)

4) $\text{Average level} = \text{Minimum level} + \frac{\text{Order quantity}}{2}$ ***or***

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

5) *Danger Level = Minimum Lead Time For emergency purchases $\times$ Average rate of consumption*

Note:

1) Average level by this two formulae will be different. Any of the formulae can be used.

2) Lead Time/delivery Time is the time gap between sending of requisition for purchase and actually receiving the material.

3) If only one rate of consumption or only one lead-time is given then the same will be taken as minimum, maximum as well as average for above calculations.

4) Whenever Lead Time and rate of consumption is given for different time base then both must be converted into one base say p.m. or p.a.

METHODS OF PRICING ISSUES

Materials are purchased in bulk at different prices at different time & are stored. These are issued in small quantities for production on day to day basis. When material is issued for production (i.e. consumed) its cost has to be ascertained. Cost will be quantity issued x price/rate. Whenever there is one lot of material the price of it can be applied, but when there are more than one lot of material purchased at different prices then we have to decide which particular price should be applied for valuing the issues for that we have this methods.

A) Cost Basis Method

1) Specific price method
2) First in first Out (FIFO)
3) Last in First out (LIFO)
4) Highest in First out (HIFO)
5) Next in First out (NIFO)
6) Base Stock Method.

B) Average Price Method
- **1)** Simple Average Price
- **2)** Weighted Average Price
- **3)** Periodic simple Average
- **4)** Periodic Weighted Average
- **5)** Moving simple Average
- **6)** Moving Weighted Average

C) Market Price Method
- **1)** Replacement Price: (Applicable for Raw materials)
- **2)** Realisable Price : (Applicable for finished Goods)

Note: Market Prices are useful for Financial Accounting where stocks are valued at lower of cost or market value.

D) Notional Price Method
- **1)** Standard Price
- **2)** Inflated Price

1) Specific pricing method: The price of that lot is applied from which material is actually issued. It is physically traced out that which lot is issued and that specific price is charged. Practically this is impossible for regular items hence this is generally not followed.

2) First in First Out (FIFO): It is assumed that out of the lots available the lot which is received first is issued first and accordingly its price is applied. Once that lot is fully issued then the immediate next lot is issued and so on. The earlier purchased material is issued first i.e. cost is calculated from this earlier purchases therefore the stock/balance is valued from the latest purchases. In case of increasing price trend, the cost will be calculated at earlier prices which will be lower accordingly selling price may be calculated at lower price where as the stock will be valued at recent prices i.e. at higher prices. In case of decreasing price trend the cost will be calculated from earlier prices, which are higher and stock, will be valued at recent prices, which will be lower.

3) Last In First Out (LIFO): It is assumed that on the date of issue, out of the lots available, the lot, which was last received, will be issued first. When this lot is exhausted then immediate previous lot will be issued and so on. The last i.e. recent purchases are issued i.e. cost will be calculated from this purchases where as stock will be valued from the earlier values.

Note: IN FIFO and LIFO method the actual prices are applied for valuing the issues. Therefore when prices are fluctuating the value of issues for different jobs, even at the same time, will be valued at different prices.

4) Highest in First Out (HIFO): According to this, the highest Price will be applied first, then the next highest price and so on.

5) Next In First Out (NIFO): Price of the lot, which is due to be received next, will be applied.

6) Base Stock Method: A specific quantity is kept as base stock & is valued at the earliest price. It is assumed that this quantity is not issued, hence it always remains in the stock at that value. The remaining material is issued & valued by following any of the above methods namely FIFO, LIFO, Weighted average etc.

7) Simple Average: Simple average is calculated by dividing total of prices of all the lots available by the number of prices. It is recalculated after receipt of every new lot. Price of earlier lots, which are fully issued, will be excluded. When the simple average is calculated considering all the prices of particular period say a month or a quarter etc. then it is called as periodic simple average. When the lot sizes are fluctuating simple average are not considered as appropriate method.

8) Weighted Average: In Weighted Average prices of all the lots available will be multiplied by the respective quantity and the total of such products (Price X Quantity) is divided by the total of quantity. It is recalculated after receipts of every new lot.

When the Weighted average is calculated considering all the prices of a particular period say a month or a quarter etc. then it is called as Periodic Weighted Average. Such periodic averages can be calculated only at the end of that period and can be applied for valuation of issues of the

same period or next period. In case it is to be applied to same period, the valuation will have to be kept pending till the end of that period.

In weighted average the fluctuation in prices is wiped out and we get only one price which will be in between the lowest and the highest price. Therefore, this method gives more uniform cost in case of fluctuating prices.

VALUATION OF SOME SPECIAL ITEMS

Returns to Supplier: Returns from stores to supplier will be recorded in issue column and it will be valued at the rate at which it was purchased. When replacement of such material is received it will be accounted in the receipt column and it will be valued at the above rate.

Return from department to stores: At the time of Receipt this will be accounted in receipt column and will be valued either at-

1) The rate at which it was originally issued or
2) If above rate can not be ascertained then, value this receipt at the rate, which is currently applicable for valuing the issues as per the method followed.

At the time of issue: Such material can be issued at this rates in either of the following ways-

1) Issue against the immediate next requisition or
2) Issue as per the method followed e.g. FIFO, LIFO etc.

Transfer from one department/job to other department/job: Such transfers are neither receipts nor issues for the stores, therefore it will not be recorded in stores card and in Cost-books. But in subsidiary books (Where jobwise/departmentwise A/c's are maintained) entry will be passed as follows:

Transferee (receiving) department A/c. Dr.
To Transferror (giver) department A/c.

COST OF MATERIAL PURCHASED

This covers:

1) Items of cost to be included.
2) Apportionment of common cost.
3) Treatment of losses

1) **Items of costs to be included:** Whatever expenses are incurred to bring the material up to factory should be included in the cost of material.
Example: The price paid to the supplier including sales tax, packing charges etc. Freight charges, insurance, octroi, customs duty, loading-unloading charges etc. Apart from this stores overhead may also be included on estimated percentage basis.

2) **Apportionment of common cost:** Whenever any cost is incurred commonly for more than one material then it has to be apportioned over this materials because we have to calculate cost separately for each material. Cost should be apportioned on some logical basis like Sales Tax, insurance, octroi duty etc. should be apportioned according to ratio of value of this material, Freight, loading, unloading may be apportioned on the basis of quantity or the weight, whereas packing charges may be apportioned in the ratio of number of packets or quantity.

3) **Treatment of Losses:** Loss should be divided into normal loss and abnormal loss. Cost of normal loss is not valued and segregated therefore cost of good units get increased. But the abnormal loss will be valued at cost and it will be transferred to abnormal loss account so that cost of good units is not affected.

RECTIFICATION OF DISCREPANCIES

The stores ledger contains the account of each and every material and shows the balance thereof. Physical Verification is carried out to confirm that this balances are correct. If the physical balance

and the balance shown by stores ledger don't tally then the reason for such discrepancies is ascertained and rectification is done.

Rectification will be two fold:

1) *Rectification in stores ledger:* In this we have to state whether quantity of difference should be recorded in the receipt column or in issue column, so that Ledger balance will become equal to physical balance.
2) *Rectification in the cost books:* A double entry will be passed in the cost-books according to the reason of discrepancy.

P O I N T O F E Q U I L I B R I U M

When there are two alternatives involving Fixed and Variable cost then one alternative will be cheaper at certain level of activity and other alternative will be cheaper at other levels. And at one particular level both the alternatives will be same that level is know as point of Equilibrium or Point of Indifference or Break-even point between these alternatives.

$$\text{Point of Equilibrium} = \frac{\text{Difference between the Fixed Cost}}{\text{Difference between the Variable Cost}}$$

Below this point alternative having lower Fixed Cost will be cheaper and above this point alternative having higher Fixed Cost will be cheaper.

Note: Point of equilibrium will come only when the Fixed Cost of one alternative is higher and variable cost is lower as compared to the other alternatives. If the Fixed as well as Variable Cost both are higher of one alternative then that will be always Costlier and other will be always cheaper. That means there will not be any point of equilibrium.

This type of problem (i.e. Point of Equilibrium) can come in Service costing or Marginal Costing also.

I N V E N T O R Y T U R N O V E R

Inventory turnover is the ratio of Cost of Material consumed to the cost of average stock. This shows how effectively the inventory is utilised. Higher ratio means fast moving item & lower ratio means slow moving item.

$$\text{Inventory turnover} = \frac{\text{Cost of Materials consumed}}{\text{Value of average stock}}$$

It can be calculated for all the materials together or for group of items separately or for individual items. In case of individual items, turnover ratio can also be calculated on the basis of quantity, if values are not given.

Questions

Material Cost

Economic Order Quantity

Q.2.1] Calculate EOQ of Material A from the following information:
Annual Requirement is 12,000 units. Ordering Cost per order is ₹100,Price per unit ₹20. Inventory Carrying Cost- Interest etc. is 10% p.a. and others Re.1 per unit. Also calculate cost of carrying, Cost of ordering and total cost per annum.

Q.2.2] A company for one of the A class items, placed 6 orders each of size 200 in a year. Given ordering cost = ₹600 Per order, holding cost = 40%, cost per unit = ₹40, find out the loss to the company in not operating scientific inventory Policy. What are your recommendations for the future?

Q.2.3] XYZ Ltd. has obtained an order to supply 48,000 bearings per year from a concern. On a steady basis, it is estimated that it costs ₹0.20 as inventory holding cost per bearing per month and the set-up cost per run of bearing manufacture is ₹384.

You are required to:
(i) Compute the optimum run size and number of runs for bearing manufacture.
(ii) Compute the interval between two consecutive runs.
(iii) Find out the extra costs to be incurred, if company adopts a policy to manufacture 8,000 bearings per run as compared to optimum run Size.
(iv) Give your opinion regarding run size of bearing manufacture.
Assume 365 days in a year.

[CA-INTER-NOV-2018]

Q.2.4] ABC Limited has received an offer of quantity discounts on its order of materials as under:

Price per tonne ₹	**Tones Nos.**
4,800	Less than 50
4,680	50 and less than 100
4,560	100 and less than 200
4,440	200 and less than 300
4,320	300 and above

The annual requirement for the material is 500 tonnes. The ordering cost Per order is ₹ 6,250 and the stock holding cost is estimated at 25% of the material cost per annum. **[Nov,2010]**
Required:
(i) Compute the most economical purchase level.
(ii) Compute E.O.Q. if there are no quantity discounts and the price per tonne is ₹ 5,250.

Inventory Levels

Q.2.5] Materials X & Y: Minimum Usage 50 Units each per week

Maximum Usage	150 Units each per week			
Ordering Quantity	X	1,000 Units	Y	600 Units
Delivery Period (Lead Time)	X	4-6 Weeks	Y	2-4 Weeks

Calculate for each material i) Minimum level, ii) Maximum level & Reorder level, iii) Average Stock Level.

Q.2.6] A company uses the three raw materials A, B and C for a particular product for which the following data apply:

Raw Material	Usage per Unit of Product (Kgs)	Re-order Quantity (Kgs)	Price per Kg.	Delivery period in Weeks			Re-order level (Kgs)	Min. level (Kgs)
				Min.	Avg.	Max.		

A	10	10,000	0.10	1	2	3	8,000	
B	4	5,000	0.30	3	4	5	4,750	
C	6	10,000	0.15	2	3	4		2,000

Weekly production varies from 175 to 225 units, averaging 200 units of the said product. What would be the following quantities:
(i) Minimum Stock of A? **(ii)** Maximum Stock of B? **(iii)** Re-order level of C?
(iv) Average stock level of A?

Q.2.7] 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 unit is ₹5

Details of lead time: Average 10 days, Maximum 15 days, Minimum 6 days For emergency purchases 4 days.
Rate of consumption: Average - 15 units per day, maximum - 20 units per day.

Q.2.8] M/s. SJ Private Limited manufactures 20,000 units of a product per month. The cost of placing an order is ₹1,500. The purchase price of the raw material is ₹100 per kg. The re-order period is 5 to 7 weeks. The consumption of raw materials varies from 200 kg to 300 kg per week, the average consumption being 250 kg. The carrying cost of inventory is 9.75% per annum.
You are required to calculate:
(i) Re-order quantity
(ii) Re-order level
(iii) Maximum level
(iv) Minimum level
(v) Average stock level

[CA-INTER-NOV-2018]

Q.2.9] Primex Limited produces Product 'P'. It uses annually 60,000 units of a Material 'Rex' costing ₹ 10 per unit. Other relevant information are: **[Nov, 2013]**

Cost of Placing an Order	₹ 800 per Order
Carrying Cost	15% per Annum of Average Inventory
Re-order Period	10 days
Safety Stock	600 Units

The Company operates 300 days in a year. You are required to calculate:
(i) Economic Order Quantity of Material 'Rex'. **(ii)** Maximum Stock Level
(iii) Re-Order Level **(iv)** Average Stock Level

Q.2.10] Following details are related to a manufacturing concern:

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

Calculate:
(i) Maximum consumption per day
(ii) Minimum consumption per day **[Nov-2014]**

Q.2.11] JP Limited, manufacturer of a special product, follows the policy of EOQ (Economic Order Quantity) for one of its components. The component's details are as follows

Purchase price per component	₹200
Cost of an of an order	₹100
Annual cost of carrying one unit in inventory	10% of purchase price
Total cost of inventory carring and ordering per annum	₹4,000

The company has been offered a discount of 2% on the price of the component provided the lot size is 2,000 components at a time.

You are required to:

a. Compute the EOQ

b. Advise whether the quantity discount offer can be accepted

c. Would your advice differ if the company is offered 5% discount on a single order? [Assume that inventory carrying cost does not vary according to discount policy].

[CA PE–II Nov 1994]

Q.2.12] Re-order quantity of material 'X' is 5,000kg.; Maximum level 8,000 kg.; Minimum usage 50 kg. per hour; minimum re-order period 4 days; daily working hours in the factory is 8 hous You are required to calculate the re-order level of material 'X' **[May 2010]**

Q.2.13] ASJ manufacturer produces a product which requires a component costing ₹ 1,000 per unit. Other information related to the component are as under:

Usage. of component	1,500 units per month
Ordering cost	₹75 per order
Storage cost rate	2% per annum
Obsolescence rate	1% per annum
Maximum usage	400 units per week
Lead Time	6-8 weeks

The firm has been offered a quantity discount of 5% by the supplier on the purchase of component, if the order size is 6,000 units at a time.

You are required to compute:

(i) Economic Order Quantity (EOQ)

(ii) Re-order Level and advise whether the discount offer be accepted by the firm or not.

[CA-IPCC – MAY-2018]

Q.2.14] A company manufactures a product from a raw material, which is purchased at ₹80 per kg. The company incurs a handling cost of ₹370 plus freight of ₹380 per order. The incremental carrying cost of inventory of raw material is ₹0.25 per kg per month. In addition, the cost of working capital finance on the investment in inventory of raw material is ₹ 12 per kg per annum. The annual production of the product is 1,00,000 units and 2.5 units are obtained from one kg. of raw material.

Required:

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

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

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

Assume 360 days in year. **[May – 2014]**

Q.2.15] ACE Ltd. Produces a product EMM using a material 'REX'. To produce one unit of EMM 0.80 kg of 'REX' is required. As per the sales forecast conducted by the company it will able to sell 45,600 units of product EMM in the coming year. There is an opening stock of 3150 units of product EMM and company desires to maintain closing stock equal to one month's forecasted sale. Following is the information regarding material 'REX':

(i)	Purchase price per kg	₹25
(ii)	Cost of placing order	₹240 per order
(iii)	Storage cost	2% per annum
(iv)	Interest rate	10% per annum
(v)	Average lead time	8 days
(vi)	Difference between minimum and maximum lead time	6 days

(vii) Maximum usage 150 kg
(viii) Minimum usage 90 kg

Opening stock of material 'REX' is 2100 kg and closing stock will be 10% more than opening stock.

Required:

(i) Compute the EOQ and total cost as per EOQ.
(ii) Compute the recorder level and maximum level.
(iii) If the company places an order of 7500 kg of REX at a time, it gets 2% discount, should the offer be accepted?

[IPCC – MAY - 2019]

Q.2.16] M/s. X Private Limited is manufacturing a special product which requires a component "SKY BLUE". The following particulars are available for the year ended 31st March, 2018:

Annual demand of "SKY BLUE"	12000 Units
Cost of placing an order	₹1,800
Cost per unit of "SKY BLUE	₹640
Carrying cost per annum	18.75%

The company has been offered a quantity discount of 5 on the purchases of "SKY BLUE" provided the order size is 3000 components at a time.

You are required to:

(i) Compute the Economic Order Quantity.
(ii) Advise whether the quantity discount offer can be accepted.

[CA–INTER–MAY–2018]

Q.2.17] The quarterly production of a company's product which has a steady market is 20,000 units. Each unit of a product requires 0.5 kg. of raw material. The cost of placing one order for raw material is ₹100 and the inventory carrying cost is ₹2 per annum. The lead time for procurement of raw material is 36 days and a safety stock of 1,000 kg. of raw materials is maintained by the company. The company has been able to negotiate the following discount structure with the raw material supplier:

Order Quantity Kgs.	**Discount ₹**
Upto – 6,000	Nil
6,000 – 8,000	400
8,000 – 16,000	2,000
16,000 – 30,000	3,200
30,000 – 45,000	4,000

You are required to:

1. Calculate the re – order point tanking 30 days in a month.
2. Prepare a statement showing the total cost of procurement and storage of raw materials after considering the discount if the company elects to place one, two, four or six orders in the year.
3. State the number of orders which the company should place to minimize the costs after taking EOQ also into consideration. **[CA Inter May 2002]**

Q.2.18] In a company weekly minimum and maximum consumption of material A are 25 and 75 units respectively. The re – order quantity as fixed by the company is 300 units. The material is received within 4 to 6 weeks from issue of supply order. Calculate minimum level and maximum level of material A. **[CA Inter May 1995]**

Q.2.19] The following are the details of receipt and issue of material 'CXE' in a manufacturing Co. During the month of April 2019:

Date	**Particulars**	**Quantity (kg)**	**Rate per kg**
April 4	Purchase	3000	₹16
April 8	Issue	1000	
April 15	Purchase	1500	₹18
April 20	Issue	1200	
April 25	Return to supplier out of Purchase made on	300	
April 26	April	1000	
April 28	Issue	500	₹17
	Purchase		

Opening stock as on 01-04-2019 is 1000 kg @ ₹15 per kg
On 30th April, 2019 it was found that 50 kg of material 'CXE' was fraudently misappropriated by the store assistant and never recovered by the Company.

Required:

(i) Prepare a store ledger account under each of the following method of pricing the issue:
- **(a)** Weighted Average Method
- **(b)** LIFO

(ii) What would be the value of material consumed and value of closing stock as on 30-04-2019 as per these two methods?

[CA–INTER–MAY–2019]

Q.2.20] Prepare a Store Ledger Account from the following transactions of XY Company Ltd.:

April 2011

1 Opening balance 200 units @ ₹10 per unit.
5 Receipt 250 units costing ₹ 2,000
8 Receipt 150 units costing ₹ 1,275
10 Issue 100 units
15 Receipt 50 units costing ₹ 500
20 Shortage 10 units
21 Receipt 60 units costing ₹ 540
22 Issue 400 units

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

Q.2.21] The following transaction in respect of material Y occurred during the six months ended 30th June, 2007.

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

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

Cost of Materials Purchased

Q.2.22] An item 'X' was purchased 1000 units @ ₹10/- per Unit. There is loss of 100 units. Calculate the cost per unit under the following alternatives.

(a) Loss is abnormal loss and no scrap value.
(b) Loss is abnormal loss and scrap value is ₹2 per unit.
(c) Loss is normal loss and no scrap value.
(d) Loss is normal loss and scrap value is ₹2 per unit.
(e) 40% of the loss is normal & no scrap value.
(f) 40% of the loss is normal & scrap value is ₹2 per unit.

Q.2.23] One Parcel containing two important materials was received by a factory and the invoice pertaining to the same disclose the following information:
Material 'A' 500 lbs. @ ₹2 per lb ₹1,000.00,
Material 'B' 600 lbs. @ ₹1.60 per lb. ₹960.00
Insurance 39.20, Sales Tax 98.00, Freight etc. 55.00

Due to mishandling in the factory's store, a loss of 10 units of material 'A' and of 6 units of material 'B' was noted. What rate would you adopt for issuing these vital components to the jobs? And also give your changed rate if a provision of 10% to be kept for probable risk of obsolescence.

Q.2.24] The particulars relating to 1200 Kgs. of a certain raw material purchased by a company during June, were as follows:

a) Lot prices quoted by supplier and accepted by the Company for placing the purchase order:
Lot Upto 1000 Kgs. @ ₹22/- per Kg. }
Between 1000-1500 Kgs. @ ₹20/- per Kg. } } F.O.R. Supplier's Factory
Between 1500-2000 Kgs. @ ₹18/- per Kg. }
b) Trade discount 20%
c) Additional charge for containers @ ₹10/- per drum of 25 Kgs.
d) Credit allowed on return of containers @ ₹8/- per drum.
e) Sales Tax at 10% on raw material and 5% on drums.
f) Total freight paid by the Purchaser ₹240/-
g) Insurance at 2.5% (on Net Invoice Value) paid by the purchaser
h) Stores overhead applied at 5% on total purchase cost of material.

The entire quantity was received and issued to production. The containers are returned in due course. Draw up a suitable statement to show:
(a) Total cost of material purchased, and **(b)** Unit cost of material issued to production.

Point of Equilibrium

Q.2.25] After inviting tenders, two quotations are received as follows:
Supplier A - ₹2.20 per unit.
Supplier B - ₹2.10 per unit + ₹2,000 fixed charges irrespective of units ordered.

Calculate the order quantity for which the purchase price per unit will be the same. Considering all factors regarding production requirements and availability of finance, the purchase officer wants to place an order for 15000 units. Which supplier should he selected?

Q.2.26] A company has the option to procure a particular material from two sources:
Source-I: Assures that defectives will not be more than 2% of supplied quantity.
Source-II: Does not give any assurance, but on the basis of past experience of supplies received from it, it is observed that defective percentage is 2.8%
The material is supplied in lots of 1,000 units. For source II the lot at a price, is lower by ₹100 as compared to Source-I. The defective units of material can be rectified for use at a cost of ₹5 per unit.

You are required to find out which of the two sources is more economical.

INVENTORY TOURNOVER RATIO

Q.2.27] The following details are provided by M/s SKU Enterprises for the year ended 31st March, 2018:

Particulars	Material-M (₹)	Material-N (₹)
Stock as on 01-04-2017	6,00,000	10,00,000
Stock as on 31-03-2018	4,50,000	7,25,000
Purchases during the year	9,50,000	18,40,000

You are required to:
(i) Calculate Turnover Ratio of both the materials.
(ii) Advise which of the two materials is fast moving. (Assume 360 days in a year).

[CA–INTER–MAY–2018]

Q.2.28] A factory uses 4,000 varieties of inventory. In terms of inventory holding and inventory usage, the following information is compiled:

No. of varieties Of inventory	%	% value of inventory holding (average)	% of inventory usage (in end-product)
3,875	96,875	20	5
110	2.750	30	10
15	0.375	50	85
4,000	100.000	100	100

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

Q.2.29] ZED Company supplies plastic crockery to fast food restaurants in metropolitan city. One of its products is a special bowl, disposable after initial use, for serving soups to its customers Bowls are sold in pack of 10 pieces at a price of ₹50 per pack.

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

Required:

(i) Calculate Economic Order Quantity.
(ii) Calculate number of orders needed every year.
(iii) Calculate the total cost of ordering and storage of bowls for the year.
(iv) Determine when should the next order to be placed. (Assuming that the company does maintain a safety stock and that the present inventory level is 333 packs with a year of 360 working days.

[CA PCC May 2008]

Q.2.30] The annual carrying cost of material 'X' is ₹3.6 per unit and its total carrying cost and ordering cost is ₹9,000 per annum. What would be the Economic order quantity for material 'X', if there is no safety stock of material X? **[CA PCC Nov 2008]**

Q.2.31] At what price per unit would Part No. A 32 be entered in the Stores Ledger, if the following invoice was received from a supplier:

Invoice	**₹**
200 units Part No. A 32 @ ₹5	1,000.00
Less: 20% discount	200.00
	800.00
Add: Excise duty @ 15%	120.00
	920.00
Add: Packing charges (5 non – returnable boxes)	50.00
	970.00

Notes:

(i) A 2 per cent discount will be given for payment in 30 days.
(ii) Documents substantiating payment of excise duty is enclosed for claiming MODVAT credit.

[CA PE–II Nov 1995]

Q.2.32] A re-roller produced 400 metric tons of M.S. bars spending ₹36,00,000 towards materials and ₹6,20,000 towards rolling charges. Ten percent of the output was found to be defective, which had to be sold at 10% less than the price for good production. If the sales realization should give the firm an Overall profit of 12.5% on cost, find the selling price per metric ton of both the categories of bas The scrap arising during the rolling process fetched a realization of ₹60,000.

[CA PE–II Nov 2005]

MULTIPLE CHOICE QUESTIONS

(1) Direct material is a
(i) Fixed cost **(ii)** Variable Cost **(iii)** Semi-variable cost.

(2) In most of the industries, the most important element of cost is
(i) Material **(ii)** Labour **(iii)** Overheads.

(3) Which of the following is considered to be the normal loss of materials?
(i) Loss due to accidents **(ii)** Pilferage
(iii) Loss due to breaking the bulk **(iv)** Loss due to careless handling of materials
(v) All of these

(4) In which of following methods of pricing, costs lag behind the current economic values when prices are rising?
(i) Last-in-first out price **(ii)** First-in-first out price
(iii) Replacement price **(iv)** Weighted average price.

(5) In which of the following methods, issues of materials are priced at pre-determined rate?
(i) Inflated price method **(ii)** Standard price method
(iii) Replacement price method **(iv)** Specific price method.

(6) When material prices fluctuate widely, the method of pricing that gives absurd results is
(i) Simple average price **(ii)** Weighted average price
(iii) moving average price **(iv)** Inflated price.

(7) When prices fluctuate widely, the method that will smooth out the effect of fluctuations is
(i) Simple average **(ii)** Weighted average **(iii)** FIFO **(iv)** LIFO.

(8) Lead time 5 weeks, average weekly consumption 28 units. What should be the reordering level?
(i) 120 units **(ii)** 130 units **(iii)** 140 units **(iv)** 150 units.

(9) Price per unit ₹150, annual consumption 2,000 units, ordering cost ₹300 per order and other charges 20% of cost. What should be the quantity of each order?
(i) 150 units **(ii)** 200 units **(iii)** 225 units **(iv)** None of the above.

(10) Bin card is maintained by the
(i) Accounts department **(ii)** Costing department
(iii) Stores **(iv)** None of the above.

(11) Bin card contains
(i) Details of the price of raw material lying in the Bin
(ii) Details of the price and quantity of raw material lying in the Bin
(iii) Details of quantity of material lying in the Bin
(iv) None of the above.

(12) Which of the following assumption hold true for the calculation of Economic Order Quantity?
(i) Anticipated usage of material in units is known
(ii) Cost per unit of material is constant and Known
(iii) Ordering cost per order is fixed **(iv)** All of the above.

(13) The most advantageous buying pattern to adopt is found by computing the:
(a) Re-order level **(b)** Optimum stock level
(c) Economic order quantity **(d)** Lead time

(14) The safety stock is 200 units: the supplier quotes a delivery delay of two to three weeks; the factory uses 400 to 700 units a week according to activity levels. The Re-order level is:
(a) 1,000 **(b)** 2,300 **(c)** 1,600 **(d)** 1,575

Use the following information for questi8ons 8 through 10 in respect of materials used by a manufacturing firm:

Monthly consumption	250 units
Cost of placing an order	₹30
Annual Carrying costs P.U.	₹0.50

(15) The Economic Order Quantity is:
(a) 500 units **(b)** 550 units **(c)** 600 units **(d)** 650 units

(16) Number of orders per annum is:
(a) 5 **(b)** 6 **(c)** 6.5 **(d)** 7

(17) The time between two orders is:
(a) 3 months **(b)** 2.5 months **(c)** 2.4 months **(d)** 2.6 months

(18) The cost of holding large stocks are:
(a) Interest **(b)** Spoilage **(c)** Premises **(d)** obsolescence **(e)** All the above

(19) A component has a safety stock of 500, a re-order quantity of 3,000 and a rate of demand which varies between 200 and 700 per week. The average stock is approximately:
(a) 2,000 **(b)** 2,300 **(c)** 2,500 **(d)** 3,500

Data for Questions 20 and 21

A national chain of tyre fitters stocks a popular tyre for which the following information is available:

Average usage	140 tyres per day
Minimum usage	90 tyre per day
Maximum usage	175 tyres per day
Lead time	10 to 16 days
Re-order quantity	3,000 tyres

(20) Based on the above data, at what level of stocks should a replenishment order be issued?
(a) 2,240 **(b)** 2,800 **(c)** 3,000 **(d)** 5,740

(21) Based on the data above, what is the maximum level of stocks possible?
(a) 2,800 **(b)** 3,000 **(c)** 4,900 **(d)** 5,800

(22) Which of the following does not constitute cost of materials received?
(a) Invoice price **(b)** Freight, excise duty and sales tax
(c) Cash discount **(d)** Cost of non-returnable containers

(23) In case of rise in price levels, the most suitable method for valuing materials issued is:
(a) LIFO **(b)** FIFO **(c)** Simple average **(d)** weighted average

(24) The FIFO assumption of cost flow when applied in a period of rising prices:
(a) Overstates profit and closing stock **(b)** Overstates profit and understates closing stock
(c) Overstates profit and shows closing stock at current prices
(d) Understates profit and overstates closing stock

(25) The LIFO assumption of cost flow when applied in a period of rising prices:
(a) Overstates profit and closing stock **(b)** Understates profit and closing stock
(c) Charges stock to profit at current prices and understates closing stock
(d) Charges stock to profit at current prices and overstates closing stock

(26) Purchased 10,000 units at ₹4; 18,000 units at ₹5 and 25,000 units at ₹6. The weighted average cost is:
(a) ₹4.90 **(b)** ₹5 **(c)** ₹5.28 **(d)** ₹6.13

(27) Materials are purchased and any difference between the unit price and a present figure is written- off to the profit and loss account. This describes which method or stock valuation?
(a) Replacement cost method **(b)** Base stock method
(c) Next in first out method **(d)** Standard cost method

Use the following information for questions 28 through 34. Transactions for raw materials during a period are given below:

Date 2,005	**Receipts Quantity**	**Price ₹**	**Issues Quantity**
Jan.1			
Opening balance	1,500	1.50	
Jan.12	2,000	1.525	
Jan.15			1,100
Jan.18			800

(28) Following FIFO method, the value of issue on January 18 is:
(a) ₹1,200 **(b)** ₹1,210 **(c)** ₹1,220 **(d)** None of the above

(29) Following LIFO method, the value of issue on January 18 is:
(a) ₹1,220 **(b)** ₹1,200 **(c)** ₹1,250 **(d)** None of the above

(30) Following simple average price method, the value of issue on January 18 is:
(a) ₹1,200 **(b)** ₹1,205 **(c)** ₹1,210 **(d)** ₹1,220

(31) Following weighted average price method, the value of issue on January 18 is:
(a) ₹1,211 **(b)** ₹1,215 **(c)** ₹1,210 **(d)** ₹1,220

(32) Following LIFO method, the value of stock on January 18 is:
(a) ₹2,400.00 **(b)** ₹2,402.50 **(c)** ₹2,405.50 **(d)** ₹2,408.50

(33) Following FIFO method, the value of stock on January 18 is:
(a) ₹2,440 **(b)** ₹2,400 **(c)** ₹2,420 **(d)** None of the above

(34) Using simple average method, the value of stock on January 18 is:
(a) ₹2,400 **(b)** ₹2,440 **(c)** ₹2,420 **(d)** ₹2,446

(35) Inventory carrying costs include the following:
(a) Spoilage and obsolescence **(b)** Warehousing, insurance and tax
(c) opportunity cost **(d)** All of the above

(36) Opening stock ₹50,000
Purchases ₹3,70,000
Closing stock ₹80,000
The Stock Turnover is:

	Times	Months	Days
(a)	5.69	2.1	64
(b)	7.02	1.7	52
(c)	6.50	1.9	56
(d)	5.23	2.29	69

(37) The principles of ABC Analysis of material control are:
(a) Materials whose consumption value is very high fall in the 'A' category
(b) 'B' category represents medium value items
(c) Materials of low value are classified under 'C' Category **(d)** All of the above

(38) Advantages of ABC analysis include the following except:
(a) Low stock turnover **(b)** Reduction in carrying costs
(c) Optimum investment **(d)** Stricter control on high value items

PRACTICE PROBLEMS

P 2.1] 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

P 2.2] G Ltd. produces a product which has a monthly demand of 4,000 units. The product requires a component X which is purchased at ₹20. For every finished product, one unit of component is required. The ordering cost is ₹120 per order and the holding cost is 10% p.a.

You are required to calculate:

(i) Economic order quantity.

(ii) If the minimum lot size to be supplied is 4,000 units, what is the extra cost, the company has to incur?

(iii) What is the minimum carrying cost, the company has to incur?

P 2.3] PQR Limited produces a product which has a monthly demand of 52,000 units. The product requires a component X which is purchased at ₹15 per unit. For every finished product, 2 units of Component X are required. The Ordering cost is ₹350 per order and the carrying Cost is 12% p.a.

Required:

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

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

(iii) What is the minimum carrying cost, the Company has to incur? **[CA PE–II May 2006]**

P 2.4] 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.

P 2.5] About 50 items are required every day for a machine. A fixed cost of ₹50 per order is incurred for placing an order. The inventory carrying cost per item amounts to Re 0.02 per day. The lead time is 32 days.

You are required to compute:

a. Economic order quantity **b.** Re – order level

[CA PE–II Nov 1996]

P 2.6] If the minimum stock level and average stock level of raw material As are 4,000 and 9,000 units respectively, find out its re-order quantity.

[CA PE–II May 1997]

P 2.7] Shriram enterprise manufactures a special product "ZED". The following particulars were collected for the year 2006:

(a) Monthly demand of ZED – 1,000 units **(b)** Cost of placing an order ₹100.

(c) Annual carrying cost per unit ₹15. **(d)** Normal usage 50 units per week.

(e) Minimum usage 25 units per week. **(f)** Maximum usage 75 units per week.

(g) Re – order period 4 to 6 weeks.

Compute from the above

(1) Re – Order quantity **(2)** Re – Order level **(3)** Minimum level **(4)** Maximum level

(5) Average stock level.

P 2.8] M/s. tubes Ltd. Are the manufacturers of picture tubes for T.V. The following are the details of their operation during 2006:

Average monthly market demand	2,000 Tubs
Ordering cost	₹100 per order
Inventory carrying cost	20% per annum
Cost of tubes	₹500 per tube
Normal usage	100 tubes per week
Minimum usage	50 tubes per week
Maximum usage	200 tubes per week
Lead time to supply	6 – 8 weeks

(1) Economic order quantity. If the supplier is willing to supply quarterly 1,500 units at a discount of 5%, is it worth accepting?
(2) Maximum level of stock.
(3) Minimum level of stock.
(4) Re-order level **[CA PE–II May 1998/2000]**

P 2.9] SK Enterprise manufactures a special product "ZE". The following particulars were collected for the year 2004:

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

Required:
(i) Re–order quantity
(ii) Re–order level
(iii) What should be the inventory level (ideally) immediately before the material order is received?
[CA PE–II May 2005]

P 2.10] PQR Ltd. manufactures a special product, which requires 'ZED'. The following particulars were collected for the year 2005 – 06

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

Required :
(i) Re–order quantity
(ii) Re–order level
(iii) Minimum stock level
(iv) Maximum stock level
(v) Average stock level. **[CA PE–II Nov 2006]**

P 2.11] The following information is provided by SUNRISE INDUSTRIES for the fortnight of April, 2006:
Material Exe:

Stock on 1-4-2006 100 units at ₹5 per unit.

Purchases		
5 – 4 – 06	300	units at ₹6
8 – 4 – 06	500	units at ₹7
12 – 4 – 06	600	units at ₹8
Issues		
6 – 4 – 06	250	unit
10 – 4 – 06	400	unit

14 – 4 – 06	500	unit

Required:

(A) Calculate using FIFO and LIFO methods of pricing issues:

(b) The value of materials consumed during the period

(c) The value of stock of materials on 15 – 4 – 06.

(B) Explain why the figures in (a) and (b) in part A of this question are different under the two methods of pricing of material issues used. You need not draw up the Stores Ledger

P 2.12] An invoice in respect of a consignment of chemicals A and B provides the following information:

	₹
Chemical A: 10,000 lbs. at ₹10 per lb.	1,00,000
Chemical B: 8,000 lbs. at ₹13 per lb.	1,04,000
Sales tax @ 10%	20,400
Railway freight	3,840
Total cost	2,28,240

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

P 2.13] The following data are available in respect of material X for the year ended 31st March, 2006.

	₹
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.

P 2.14] The average annual consumption of a material is 18,250 units at a price of ₹36.50 per unit. The storage cost is 20% on an average inventory and the cost of placing an order is ₹50. How much quantity is to be purchased at a time? **[CA PCC May 2007]**

P.2.15] X Ltd. is committed to supply 24,000 bearings per annum to Y Ltd. on a steady basis. It is estimated that it costs 10 paise as inventory holding cost per bearing per month and that the set-up cost per run of bearing manufacture is ₹324.

1. What would be the optimum run size for bearing manufacture?
2. Assuming that the company has a policy of manufacturing 6,000 bearings per run, how much extra cost the company would be incurring as compared to the optimum run suggested in (1) above?
3. What is the minimum inventory holding cost?

Inventory Turnover

P.2.16] From the following data for the year ended 31st December 1995, calculate the inventory turnover ratio of the two items, and put forward your comments on them.

	Material-A ₹	*Material-B* ₹
Opening Stock 1-1-1995	10,000	9,000
Purchases during the year	52,000	27,000
Closing Stock 31-12-1995	6,000	11,000

Methods of Pricing the Issues

P.2.17] At the beginning of October 1996, Quality Brush Company has in stock 10,000 brushes valued at ₹10 each. Further purchases were made during the month as follows:

On 7th 4,000 Brushes @ ₹12.50,

14th 6,000 Brushes @ ₹15.00 ,
24th 8,000 Brushes @ ₹16.50

Issues to shop floor were as follows:
16th October 16,000 Brushes,
28th October 10,000 Brushes

You are required to:

(a) To prepare a stores Ledger Card for the month of October on the assumption that materials were issued on the First-in-first out Principle, LIFO, & Weighted Average.

(b) To state the value of Closing Stock at the end of October if issues are priced by the weighted average method.

P.2.18] The following information relating to a type of Raw material is available: **[Nov 2009]**

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

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

P.2.19] KL Limited produces product 'M' which has quarterly demand of 8,000 units. The product requires 3 kgs quantity of material 'X' for every finished unit of product. The other information are follows: **[Nov, 2012]**

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

You are required:

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

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

SOLUTIONS TO PRACTICE PROBLEMS

S.P 2.1]

$$EOQ = \sqrt{\frac{2AS}{C}}$$

A = Unit consumedduring year

S = Ordering cost per order

C = Inventory carrying cost per unit per annum.

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

$$= 2,500 kg.$$

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

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

S.P 2.2]

(a) (i) Economic order quantity:

S (Annual requirement or Component 'X') = 4,000 units per month x 12 months

= 48,000 units

C_1 (Purchase cost p.u.) = ₹20

C_0 (Ordering cost per order) = ₹120

i (Holding cost) = 10% per annum

$$E.O.Q. = \sqrt{\frac{2SC_0}{C1 \times i}} = \sqrt{\frac{2 \times 48,000 units \times Rs.120}{10\% Rs.20}} = 2,400 units$$

(ii) Extra cost incurred by the company

Totalcost = Totalordering cost + Totalcarrying cost

(Whenorder size is 4,000units)

$$= \frac{S}{Q} \times C_0 + q(iC_1)$$

$$= \frac{48,000 units}{4,000 units} \times Rs.120 + \frac{1}{2} \times 4,000 units \times 10\% \times Rs.20$$

$$= Rs.1,440 + Rs.4,000 = RS.5,440 \quad ...(a)$$

$$\text{Totalcost} = \frac{48,000 units}{2,400 units} \times Rs.120 + \frac{1}{2} \times 2,400 units \times 10\% \times Rs.20$$

(Whenorder size is 2,400units)

$$= Rs.2,400 + Rs.2,400 = Rs.4,800 \quad ...(b)$$

Extra cost : (a) - (b) = Rs.5,440 - Rs.4,800 = Rs.640

(incurred by the company)

(iii) Minimum carrying cost:

Carrying cost depends upon the size of the order. It will be minimum on the least order size **.** (In this part of the question the two order sizes are 2,400 units and 4,000 units. Here 2,400 units is the least of the two order sizes. At this order size carrying cost will be minimum.)

The minimum carrying cost in this case can be computed as under:

$$\text{Minimum carrying cost} = \frac{1}{2} \times 2{,}400 \text{ units} \times 10\% \times \text{Rs.}20 = \text{Rs.}2{,}400.$$

S.P 2.3] A = 52,000 × 12 × 2 = 12,48,000

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

$$= \sqrt{\frac{2 \times (12{,}48{,}000) \times 350}{15 \times 0.12}}$$

$$= 22{,}030 \text{ units of components}$$

(ii) Extra cost incurred by the company

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

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

$$= \frac{12{,}48{,}000}{52{,}000} \times \text{Rs.}350 + \frac{52{,}000}{2} \times 15 \times 12\%$$

$$= \text{Rs.}8{,}400 + \text{Rs.}46{,}800$$

$$= \text{Rs.}55{,}200$$

Total cost when order size is 22,030 units

$$= \frac{12{,}48{,}000}{22{,}030} \times \text{Rs.}350 + \frac{22{,}030}{2} \times 15 \times 12\%$$

$$= 19{,}827 + 19{,}827 = 39{,}654$$

∴ Extra cost incurred = 55,200 - 39,654 = 15,546

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

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

$$= \frac{22{,}0330}{2} \times \text{Rs.}15 \times 12\%$$

$$= \text{Rs.}19{,}827$$

S.P 2.4]

(a) Re – ordering level:
Maximum usage per week x Maximum delivery period.
Re-ordering level for component A = 75 units x 6 weeks = 450 units
Re-ordering level for component B = 75 units x 4 weeks = 300 units

(b) Minimum level:
Re-order level – (Normal usage x Average period)
Minimum level for component A = 450 units – 50 units x 5 weeks = 200 units
Minimum level for component B = 300 units – 50 units x 3 weeks = 150 units

(c) Maximum level:
ROL + ROQ – (Min. usage x Minimum period)
Maximum level for component A=(450 units+300 units)– (25 units x 4 weeks)= 650 units
Maximum level for component B=(300 units+500 units)– (25 units x 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.

S.P 2.5]

a. Economic Order Quantity

Annual consumption = A = 50 items × 365 days = 18,250 items

Fixed cost per order = O = Rs.50

Carrying cost per unit p.a. = CC = Re 0.02 × 365 = Rs.7.30

$\therefore$ Economic Order Quantity $= \sqrt{\frac{2AO}{CC}} = \sqrt{\frac{2 \times 18,250 \times 50}{7.30}} = 500$ items

b. Re - order Level

= Maximum usage per day × Maximum lead time

= 50 items per day × 32 days

= 1,600 items.

S.P 2.6]

Average stock Level = Minimum stock level + ½ of Re - order Quantity

$\therefore$ 9,000 units = 4,000 units + ½ of Re - order Quantity

$\therefore$ ½ of Re - order Quantity = 5,000 units

$\therefore$ Re - order Quantity = 10,000 units

S.P 2.7]

1. Re-order quantity of units used $= \sqrt{\frac{2AS}{C}} = \sqrt{\frac{2 \times 2,600 \times Rs.100}{Rs.15}}$

= 186 units (approximately)

(Refer to note)

Where, A = Annual demand of input units

S = Cost of placing an order

C = Annual carrying cost per unit

2. Re-order level = Maximum re-order period x maximum usage
= 6 weeks x 75 units = 450 units

3. Minimum Level = Re-order level – (normal usage x average re-order period)
= 450 units – 50 units x 5 weeks.
= 450 units – 250 units = 200 units.

4. Maximum Level = Re-order level + Re-order quantity – minimum usage x Minimum order period.
= 450 units + 186 units – 25 units x 4 weeks
= 536 units

5. Average Stock Level = 1/2 (Minimum stock level+ maximum stock level)
= 1/2 (200 units + 536 units)
= 368 units.

Note: A = Annual demand of input units for 12,000 units of 'ZED'
= 52 weeks x Normal usage of input units per week
= 52 weeks x 50 units of input per week
= 2,600 units.

S. P 2.8]

S = Annual usage of tubes = Normal usage per week x 52 weeks
= 100 tubes x 52 weeks = 5,200 tubes.

C_0 = Ordering cost per order = ₹100/- per order

C_1 = Cost per tube = ₹500/-

iC_1 = 20% x ₹500 = ₹100/- per unit, per annum

(1) Economic order quantity

$$E.O.Q. = \sqrt{\frac{2SC_0}{iC_1}} = \sqrt{\frac{2 \times 5,200 \text{ units} \times Rs.100}{Rs.100}} = 102 \text{ tubes (approx.)}$$

If the supplier is willing to supply 1500 units at a discount of 5% is it worth accepting?
Total cost (When order size is 1,500 units) = Cost of 5,200 units + Ordering cost + Carrying cost

$$= 5{,}200\text{units} \times \text{Rs.}475 + \frac{5{,}200 \text{ units}}{1{,}500 \text{ units}} \times \text{Rs.}100 + +1{,}500\,\text{units} \times 20\% \times \text{Rs.}475$$

= ₹24,70,000 + ₹346.67 + ₹71,250
= ₹25,41,596.67
Total cost (When order size is 102 units)

$$= 5{,}200\text{units} \times \text{Rs.}500 + \frac{5{,}200\,\text{units}}{102\,\text{units}} \times \text{Rs.}100 + \times 102\,\text{units} \times 20\% \times \text{Rs.}500$$

= ₹26,00,000 + ₹5,098.03 + ₹5,100
= ₹26,10,198.03

Since, the total cost under quarterly supply of 1,500 units with 5% discount is lower than that when order size is 102 units, therefore the offer should be accepted. While accepting this offer consideration of capital blocked on order size of 1,500 units per quarter has been ignored.

(2) Maximum level of stock
= Re-order level + Re-order quantity – Min. re-order period × min. usage
=1,600 units + 102 units – 50 units x 6 weeks
= 1,402 units

(3) Minimum level of stock
= Re-order level – Normal usage x Average recorder period
= 1,600 units – 100 units x 7 weeks = 900 units.

(4) Re-order level
= maximum consumption x Maximum re-order period
= 200 unit x 8 weeks = 1,600 units.

S.P 2.9]

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

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

Where A is the annual consuption
B is the ordering cost per order
CS is the carrying cost per unit per annum

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

$$= 1095.4\,\text{units of say } 1{,}100\,\text{units}$$

(ii) When should the order be placed i.e., reordering level
Reordering level = *Safety stock + normal lead time consumption

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

$$= 1{,}000 + 500 = 1{,}500\,\text{units}$$

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

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

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

S. P 2.10]

(i) $\text{Reorder quantity} = EOQ = \sqrt{\frac{2AO}{I}}$

$= \sqrt{\frac{2 \times 26{,}000 \times 500}{60 \times 10\%}}$

$= 2082 \text{ Units}$

(ii) Reorder Level $= \text{Max. usage per week} \times \text{Max lead time}$

$= 750 \times 8$

$= 6000 \text{ units}$

(iii) Minimum stock Level

$= \text{Max. usage Rate} \times \text{Max. lead time} - \text{Normarl usage Rate} \times \text{Avrage lead time}$

$= 750 \times 8 - 500 \times 6.5$

$= 2750 \text{ units}$

(iv) $\text{Max. stock Level} = ROL - \text{Minimum usage} \times \text{minimum lead time} + ROQ$

$= 6000 - 250 \times 5 + 2082 = 6832$

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

$= \frac{6832 + 2750}{2}$

$= 4791 \text{ units}$

S.P 2.11]

(A) (a) Value of Material Exe consumed during the period

Date	Description Units	Qty.	Rate ₹	Amount ₹
1-4-06	Opening balance	100	5	500
5-4-06	Purchased	300	6	1,800
6-4-06	Issued	100	5	
		150	6	1,400
8-4-06	Purchased	500	7	3,500
10-4-06	Issued	150	6	
		250	7	2,650
12-4-06	Purchased	600	8	4,800
14-4-06	Issued	250	7	
		250	8	3,750
15-4-06	Blance	350	8	2,800

Total value of material Exe consumed during the period under FIFO method comes to (₹1,400+₹2,650+₹3,750) ₹7,800 and balance on 15-4-06 is of ₹2,800.

Value of Material Exe consumed during the period 1-4-06 to 15-4-06 by using LIFO method

Date	Description Units	Qty. Units	Rate ₹	Amount ₹
1-4-06	Opening balance	100	5	500
5-4-06	Purchased	300	6	1,800
6-4-06	Issued	250	6	1,500
8-4-06	Purchased	500	7	3,500
10-4-06	Issued	400	7	2,800
12-4-06	Purchased	600	8	4,800
14-4-06	Issued	500	8	4,000
15-4-06	Balance	350	–	2,300*

Total value of material Exe issued under LIFO method comes to (₹1,500+₹2,800+₹4,000) ₹8,300.

*The balance 350 units on 15-4-06 of ₹2,300, relates to opening balance on 1-4-06 and purchase made on 5-4-06, 8-4-06 and 12-4-06. (100 units @ ₹5,50 units @ ₹6, 100 units @ ₹7 and 100 units @ ₹8).

(b) As shown in (a) above, the value of stock of materials on 15-4-06
Under FIFO method ₹2,800
Under LIFO method ₹2,300

(B) Total value of material Exe issued to production under FIFO and LIFO methods comes to ₹7,800 and ₹8,300 respectively. The value of closing stock of material Exe on 15-4-06 under FIFO and LIFO methods comes to ₹2,800 and ₹2,300 respectively.

The reason for the difference of ₹500 (₹8,300 – ₹7,800) as shown by the following table in the value of material Exe, issued to production under FIFO and LIFO are as follows:

Date	Quantity Issued (Units)	Value FIFO ₹	Total ₹	Value LIFO Rs	Total ₹
6-4-06	250	1,400		1,500	
10-4-06	400	2,650		2,800	
14-4-06	500	3,750	7,800	4,000	8,300

1. On 6-4-06, 250 units were issued to production. Under FIFO their value comes to ₹1,400 (100 units x ₹5 + 150 units x ₹6) and under LIFO ₹1,500 (250 x ₹6). Hence, ₹100 was more charged to production under LIFO.
2. On 10-4-06, 400 units were issued to production. Under FIFO their value comes to ₹2,650 (150 x ₹6 + 250 x ₹7) and under LIFO ₹2,800 (400 x ₹7). Hence, ₹150 was more charged to production under LIFO
3. On 14-4-06, 500 units were issued to production. Under FIFO their value comes to ₹3,750 (250 x ₹7 + 250 x ₹8) and under LIFO ₹4,000 (500 x ₹8). Hence, ₹250 was more charged to production under LIFO.

Thus the total excess amount charged to production under LIFO comes to ₹500. The reasons for the difference of ₹500 (₹2,800 – ₹2,300) in the value of 350 units of Closing Stock of material Exe under FIFO and LIFO are as follows:

1. In the case of FIFO, all the 350 units of the closing stock belongs to the purchase of material made on 12-4-06, whereas under LIFO these units were from opening balance and purchases made on 5-4-06, 8-4-06 and 12- 4- 06.
2. Due to different purchase price paid by the concern on different days of purchase the value of closing stock differed under FIFO and LIFO. Under FIFO 350 units of closing stock were valued @ ₹8 p.u. Whereas under LIFO first 100 units were valued @ ₹5 p.u., next 50 units @ ₹6 p.u., next 100 units @ ₹7 p.u. and last 100 units @ ₹8 p.u.

Thus under FIFO, the value of closing stock increased by ₹500.

S.P 2.12]

Statement showing computation of effective quantity of each chemical available for use

	Chemical A lbs.	Chemical B lbs.
Quantity purchased	10,000	8,000
Less: Shortage due to normal breakages	500	320
	9,500	7,680
Less: Provision for deterioration 2%	190	53.6
Quantity available	9,310	7,526.4
Statement showing the computation of rate per lb. of each chemical		
Purchase price	1,00,000	1,04,000
Add: Sales tax (10%)	10,000	10,400
Railway freight (in the ratio of quantity purchased i.e., 5:4)	2,133	1,707
Total cost	1,12,133	1,16,107

Rate per lb. A: $\frac{Rs.1,12,133}{9,310 lbs} = Rs.12.04$

Rate per lb. B: $\frac{Rs.1,16,107}{7,526.34 lbs} = Rs.15.43$

S.P 2.13]

Inventory turnover ratio

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

$= \frac{Rs.2,50,000}{Rs.1,00,000}$

$= 2.5$

Average number of days for which the average inventory is held $= \frac{365}{\text{Inverntory turnover ratio}} = \frac{365 \text{ days}}{2.5}$

$= 146$

Working Note:

	₹
Opening stock of raw material	90,000
Add: Material purchases during the year	2,70,000
Less: Closing stock of raw material	1,10,000
Cost of stock of raw material consumed	2,50,000

S.P 2.14]

Quantity to be purchased at a time.

$= \sqrt{\frac{2 \times 18,250 \times 50}{20\% \text{ of } 36.50}} = \sqrt{\frac{18,25,000}{7.3}}$

$= \sqrt{2,50,000} = 500 \text{ units}$

S.P 2.15]

I = 10% x 12 = 1.20 P.U. p.a.
A = Annual supply O = setup Cost = ₹324
= 24000 units

1. EBQ = Economic batch QM = Economic Run Size

$= \sqrt{\frac{2AO}{I}} = \sqrt{\frac{2 \times 24000 \times 324}{1.20}}$

= 3600 Bearings.

2. STATEMENT of Extra Cost to Company

	Run Size Q	Set up Cost $\frac{A}{Q} \times O$ ₹	Carring Cost $\frac{A}{2} \times I$ ₹	TOTAL COST P.A. ₹
1.	6,000 Bearings	$\frac{24000}{6000} \times 324 = 1296$	$\frac{6,000}{2} \times 1.20 = 3600$	4896
2.	EBQ = 3600	$\frac{24000}{3600} \times 324 = 2160$	$\frac{3,600}{2} \times 1.20 = 2160$	4320
		Extra Cost		₹576

3. Of the Two Minimum Holding cost is ₹2160 for Lot size of 3600 units

S.P 2.16]

Inventory Turnover Ratio

$$= \frac{\text{Annual Consumption}}{\text{Average Inventory}}$$

Inventory Turnover Ratio

Particulars	Material A ₹	Material B ₹
a. O/p Stock	10,000	9,000
b. Add: Purchases	52,000	27,000
c. Loss: Closing stock	(6,000)	(11,000)
d. Consumption	56,000	25,000
e. Average Stockl	$\frac{10,000 + 6000}{2}$ = 8,000	$\frac{9,000 + 11,000}{2}$ = 10,000
f. Inventory Turnover Ratio $= \frac{Consumption}{Average\ Stock}$	$\frac{56,000}{8000}$ = 7 times	$\frac{56,000}{8000}$ = 2.5 times

S.P 2.17]

Stores Ledger Card

Item Code: ROL:

Item Description Brush EOQ:

Max Level:

Min Level:

STORES LEDGER CARD **METHOD: FIFO**

DT	RECEIPTS				ISSUES				
	GRN	QTY	RT	AMT. ₹	SRN	QTY		RT	AMT. ₹	
1										
7		4,000	12.50	50,000						
14		6,000	15	90,000						
16						1,00,000 4,000 2,000	 16,000	15 12.50 10	1,00,000 50,000 60,000	 2,80,000
24		8,000	16.50	1,32,000						
28						8,000 6,000	 10,000	15 16.50	60,000 99,000	 1,59,000

BALANCE

DT	QTY		RT		AMOUNT ₹
1		10000	10		1,00,000
7	10,000 4,000	 14,000	10 12.50	1,00,000 50,000	 1,50,000
14	10,000 4,000 6,000	 20,000	10 12.50 15	1,00,000 50,000 90,000	 2,40,000
16		4,000	15		60,000
24	4,000 8000	 12,000	15 16.50	60,000 1,32,000	 1,92,000
28		 2,000	 16.50		 33,000

STORES LEDGER CARD METHOD LIF **METHOD: LIFO**

DT	RECEIPTS				ISSUES			
	GRN	QTY	RT	AMT. ₹	SRN	QTY	RT	AMT. ₹
1								
7		4,000	12.50	50,000				
14		6,000	15	90,000				

16						6,000 4,000 6,000	 16,000	15 12.50 10	90,000 50,000 60,000	 2,00,000
24		8,000	16.50	1,32,000						
28						8,000 2,000	 10,000	16.50 10	1,32,000 20,000	 1,52,000

BALANCE

DT	QTY		RT		AMOUNT ₹
1		10000	10		1,00,000
7	10,000 4,000	 14,000	10 12.50	1,00,000 50,000	 1,50,000
14	10,000 4,000 6,000	 20,000	10 12.50 15	1,00,000 50,000 90,000	 2,40,000
16		4,000	10		40,000
24	4,000 8000	 12,000	10 16.50	40,000 1,32,000	 1,72,000
28		2,000	10		20,000

STORES LEDGER CARD METHOD: WEIGHED AVERAGE

DT	RECEIPTS				ISSUES				
	GRN	QTY	RT	AMT. ₹	SRN	QTY	RT	AMT. ₹	
1									
7		4,000	12.50	50,000					
14		6,000	15	90,000					
16						16,000	12		1,92,000
24		8,000	16.50	1,32,000					
28						10,000	15		1,50,000

BALANCE

DT	QTY	RT	AMOUNT ₹
1	10,000	10	1,00,000
7	14,000	10.71	1,50,000
14	20,000	12	2,40,000
16	4,000	12**	48,000
24	12,000	15***	1,80,000
28	2000	15	30,000

$$\frac{\text{Rs. } 1,00,000 \times 50,000}{10,000 + 4,000}$$

= ₹10.71*

$$\frac{1,50,000 + 90,000}{14,000 + 6,000}$$

$$\frac{2,40,000}{20,000}$$

= ₹12**

$$\frac{48,000 \times 1,32,000}{4,000 + 8,000}$$

= ₹15***

CLOSING BALANCE

Method	Unit	Amt. ₹
FIFO	2,000	33,000
LIFO	2,000	20,000
Weighed Average	2,000	30,000

S.P 2.18]

A = 2000 units C = 20 O = 20 I = 20 x 10% = 2

$$EOQ = \sqrt{\frac{2 \times 2000 \times 20}{2}} = 200 \text{ units}$$

Total Inventory Cost

1.	Ordering Cost = $\frac{A}{Q} \times O = \frac{2000}{200} \times 20 =$	₹200
2.	Caring Cost = $\frac{Q}{2} \times I = \frac{200}{2} \times 2 =$	₹200
3.	Materials Cost = A x C = 2000 x 20 =	40,000
	TOTAL Inventory Cost p.a.	₹40,400

S.P 2.19]

A = 8000 x 4 x 3Kg 96,000 Kg
C = ₹20 per Kg
O = ₹1000 / order
I = 15% x 20 = ₹3 P.U. p.a.

(i)

$$EOQ = \sqrt{\frac{2AO}{I}}$$

$$= \sqrt{\frac{2 \times 96000 \times 1000}{3}}$$

= 8,000 unite

For discount of 2%
C = 20 – 2% = ₹19.60 per unit
I = 19.60 x 15% = 2.94 P.U. p.a.

(ii) **Statement of Inventory cost**

Order QTY Q Kg	**Ordering Cost p.a. = $\frac{A}{Q} \times O$ ₹**	**Caring Cost p.a. = $\frac{Q}{2} \times I$ ₹**	**Material Cost A x C ₹**	**Total Cost ₹**
Q=EOQ = 8000 Kg	$\frac{96000}{8000} \times 1000$ = 12000	$\frac{8000}{2} \times 3$ = 12000	96000 x 20 = 19,20,000	19,44,000
$Q = \frac{96000}{4}$ = 24,000 Kg	4 x 1000 = 4,000	$\frac{24,000}{2} \times 2.94$ = 35,200	96,000 x 19.60 = 18,81,600	19,20,800
				₹23,200 savings

Saving ₹23,200 p.a. ∴ 2% discount offer should be accepted.

THEORY QUESTIONS & ANSWERS

T.2.1] What is stores requisition note.

Ans. It is also called Materials Requisition Note. When production or other departments requires materials from the stores it raises a requisition, which is an order on the stores for the material required for execution of the work order. This note is signed by the department in-charge of the concerned department. It is a document which authorise the issue of a specified quantity of materials. It will include the cost centre or job number for which the requisition is being made.

Any person who requires materials from the stores must submit Stores Requisition Note. The store keeper should only issue materials from stores against such a properly authorised requisition and this will be entered in the Bin card and Stores Ledger. A copy of the requisition will be sent to the Costing department for recording the cost or value of materials issued to the cost centre or job. Important from exam point of view [*STUDENT is advised to see, the pro-forma of S. R. Note from C. A. Institutes Study Material*]

T.2.2] Write short notes on bill of materials.

Ans. Bill of materials is a comprehensive list of materials, with specifications, material codes and quantity of each material required for a particular job, process or production unit. It will also include the details of substitute materials. It is prepared by the engineering or planning department for submission of quotation and after the receipt of work order. It is method of documenting materials required for execution of the specified job work. Bill of material acts as an authorisation to the stores department in procuring the materials. It is an advance intimation to the concerned departments of the Job, Work order to be completed, it is circulated to the following departments:

i. Purchase department **ii.** Stores department **iii.** Cost Accounts department
iv. Production department

T.2.3] Distinguish between bill of material and material requisition note **[May, 2012]**

Answer

Bills of material	Material Requisition Note
1. It is document by the drawing office	**1.** It is prepared by the foreman of the consuming department.
2. It is a complete schedule of component parts and raw materials required for a particular job or work order.	**2.** It is a document authorizing Store-Keeper to issue Material to the consuming department.
3. It often serves the purpose of a Store Requisition as it shown the complete schedule of materials required for a particular job i.e. it can replace stores requisition.	**3.** It cannot replace a bill of material.
4. It can be used for the purpose of quotation	**4.** It is useful in arriving historical cost only.
5. It helps in keeping a quantitative control on materials draw through stores Requisition.	**5.** It shows the material actually drawn from stores.

T.2.4] Write short note on periodic inventory.

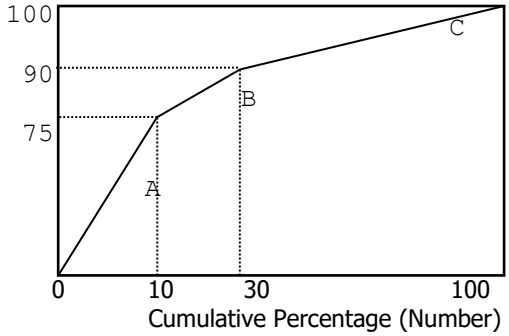
Ans. This refers to a system where stock-taking is usually done periodically, say once or twice in a year. In case of materials of small value, the periodic inventory system is adopted for determining the physical movement of stock and its closing balance as on a particular date. Thus, companies even adopting 'ABC' Analysis and Perpetual Inventory System for some of stock items, may follow periodic inventory system for other₹ Again, when the Perpetual Inventory System becomes very costly (say, for slow moving items of low value), periodic inventory is the only alternative. But the oft-quoted disadvantages of the system are:

i. In the absence of a continuous check, there is possibility of greater fraud, discrepancy, etc.
ii. The discrepancy, fraud, if any, are revealed only after stock counting at the end of a certain period and, therefore, there is little scope for taking preventive action.

iii. Stock-taking will take a considerable time at a time and this may affect production and other important work. Interim Profit and Loss Accounts and Balance Sheet cannot also be prepared for want of stock figures.

T.2.5] Write short note on ABC analysis.

Ans. Any effective inventory control system will not have all items in the inventory treated in the same manner under the same control techniques. Many companies find it useful to divide materials, parts, supplies, and finished goods into sub-classifications for purposes of stock control. The classification is made on the basis of annual consumption value of stock. In other words, all items of materials in respect of which the total value of, consumption is substantial are classified as 'A' items. On the other hand, 'C' items represent those items in which case the value of consumption is comparatively insignificant. 'B' items fall midway between 'A' and 'C' class items. On the basis of physical quantities and value of materials used, a table as follows may be constructed.



Stock items	Percentage of total items	Percentage of total material cost
A	10	75
B	20	15
C	70	10

This technique of inventory classification and control is often called the ABC Analysis or Proportional Parts Value Analysis.

The main object of this analysis is to develop policy guidelines for selective control. That is, after the analysis has been done, the following policy guidelines can be established in respect of each of the classified categories of inventories.

The *advantages* of the ABC analysis are:

i. Closer and stricter control is ensured on those items which represent a significant portion of usage value. It helps management by exceptions.

ii. Optimum investment in inventory will make available fund to be channelled into other profitable investments.

iii. Reduction in carrying costs.

iv. Enables to keep enough safety stock for 'C' items.

v. Scientific and selective control enables maintenance of high stock turnover rate viz. within a range of 6 to 12 times per annual.

ABC analysis is, no doubt, a very useful technique. But it should be used with caution because it classifies various items based on their value alone and not on their relative importance. Thus, an item may represent an insignificant portion of total annual consumption value but at the same time may be very critical to the production process. In items of ABC analysis this item would deserve least attention of management. But because of its special importance to the production process is should, in fact, deserve special attention of management.

T.2.6] What is E.O.Q.

Ans. Economic order quantity is a quantity of materials to be ordered which takes into account the optimum combination of:

i. Bulk discounts from high volume purchase.

ii. Usage rate.

iii. Stock holding costs.
iv. Order delivery time.
v. Cost of processing the order.

It is an optimum size of either a normal outside purchase order or an internal production order that minimises total annual holding and ordering costs of inventory. The major objective of managing inventory is to discover and maintain the optimum level of investment in inventory. The optimum level will be that quantity which minimises the total costs associated with inventory.

T.2.7] List down the assumptions made to calculate E.O.Q. by the formula.

Ans. The optimum order quantity, Q, is based on a number of assumptions, they are:

i. The usage of a particular item of inventory is known with certainty. That is, production and/or sales can be forecasted perfectly.

ii. The usage is steady throughout the period of time. That is, it is evenly distributed over the period.

iii. Lead time is constant and known with certainty. That is, orders will be received on the expiry of lead time.

iv. Cost of materials or finished goods remains constant during the year.

v. Variable inventory carrying cost per unit and ordering cost per order remain constant throughout the year.

vi. No buffer or safety stock is maintained.

vii. No quaintly discount (i.e. reduction in price per unit for bulk purchasing) is allowed by the supplier.

T.2.8] Draw a specimen draft of purchase order.

Ans.

XYZ LTD.
PURCHASE ORDER

Sl. No:
Date:
Purchase Order No.:
Supplier Quotation No. & Date:

To,
_____
_____
_____

Please supply the following items on the terms and conditions mentioned below:

Sl. No.	Description	Material Code	Size	Qty.	Price	Amount	Delivery Date

Term of Delivery :
Term of Payment :
Special Conditions :

For XYZ Ltd.

Purchase Manager

T.2.9] Write short note on i. Perpetual Inventory System, ii. Continues Stock Taking.

Ans. i. Perpetual Inventory System: Under this system a continuous record of receipt and issue of materials is maintained by the stores department and the information about the stock of material is always available. In this method stock records are maintained in such a way as to make an entry in the records, the physical movement of stock on receipts and issues of materials and to indicate the balance of each item of material in the stores at any point of time.

CIMA defines perpetual inventory system as "*the recording as they occur of receipts, issues and the resulting balances of individual items of stock in either quantity or quantity and value*".

In this system, the entries are made in *Bin Cards and Stores Ledger* as and when the receipts and issues of materials take place and ascertaining the balance after every receipt or issue of materials.

The stocks as per the dual records namely bin card and stores ledger are reconciled on a continuous basis.

Advantages:

- This system avoids the disruptions to production or trading caused by the periodic stock taking.
- This system facilitates production planning and inventory control.
- Perpetual inventory system is efficiently maintained with continuous stock taking.
- The perpetual inventory system avoids the necessity of stock taking by actual count at the end of financial period.
- Stock can be taken for the purpose of preparation of Profit and Loss account and Balance Sheet.
- In helps in having a detailed and more reliable check on the stocks.
- The stock records are more reliable and stock discrepancies are investigated and appropriate actions are taken immediately.

ii. Continues Stock Taking: Under this system, physical stock verification is made for each item of stock on continuous basis. It is physical checking of the stock records with actual stocks on continuous basis.

CIMA defines "*continuous stock taking is the process of counting and valuing selected items at different times on a rotating basis".*

It is a method of verification of physical stock on a continuous basis instead of at the end of the accounting period. It is a verification conducted round the year, thus covering each item of store twice or thrice. Valuable items are checked more frequently than the stock with lesser value.

Advantages:

- Any discrepancies, irregularities or changes are detected at early stage and brought it to the notice of management.
- It acts as a moral check on stores staff and acts as a deterrent to dishonesty.
- It insists on uptodate maintaining of stock records.
- It is carried out by independent staff from store keepers avoiding any irregularities in stock taking.
- The disruption in production caused by periodic stock taking is eliminated.
- Control over stock is improved by eliminating over stocking or running out of stock.
- More time is available, reducing errors and allowing time for investigations.
- Regular skilled stocks takers can be employed, reducing likely erro₹

T.2.10] Write short note on periodic stock taking OR periodic inventory system.

Ans. Under this system the stock levels are reviewed at fixed intervals e.g., at the end of every months. All the items of stocks in the store are reviewed periodically.

CIMA defines periodic stock taking as "*a process whereby all stock items are physically counted and then valued*". The aim of periodic stock taking is to find out the physical quantities of materials of all types are physically counted at a given date. The following points should be noted for adopting this system:

- A team of stock-checkers should be allocated to count all stock in one area, to ensure that all stock is counted once, and that no omissions or duplications occur.
- In the office, the completed stock sheets should be collected and totalled, and the quantities checked against the stock records.
- Senior staff or auditors should perform sample checks on a number of items.
- All staff involved should be issued with stock taking instructions well before the date of the actual count. Often non-stores staff will be involved in the count.
- Any stocks showing discrepancies should be recounted, and if still not resolved should be reported to management.
- Stock checkers should enter amounts counted on pre-printed stock sheets.
- A 'cut-off' time should be set, after which no movement of stock is allowed until the count has been completed.

T.2.11] Write short note on inventory turnover OR stock turnover.

Ans. Stock Turnover: To minimise the amount of investment raw materials stocks may be classified into:

a. fast moving items, and b. slow moving items.

The stock turnover ratio will facilitate such a classification and it will act as a tool for exercising control on raw material inventories.

It is calculated as: $\frac{\text{Cost of materials consumed during the period}}{\text{Average stock of materials during the period}}$

The turnover ratio should be normally 2. A low ratio indicates bad buying, accumulation of obsolete stock, carrying of too much stock, etc. On the other hand, a high ratio is an indicator of fast moving stock and therefore speaks of better inventory management.

It can also be expressed in days as: $\frac{\text{Day during the period}}{\text{Turnover ratio}}$.

T.2.12] What are the important requirements of every system of materials control?

Ans. Essential to an adequate control of inventory are the following requirements:

i. There should be proper co-ordination and co-operation between various departments concerned, viz., Purchasing, Receiving, Inspection, Storage, Issues and Cost Departments.
ii. Purchasing should be centralised under the control of a competent manager.
iii. There should be proper planning of material requirements.
iv. There should be proper classification of materials with codes, material standardisation.
v. There should be planned physical as well as efficient book control through satisfactory storage control procedures.
vi. There should be planned storage control and issues so that there will be delivery of materials upon requisition to departments in the right quantity at the time they are needed.
vii. Appropriate records should be maintained to control issues and utilisation of stores in production.
viii. The system of perpetual inventory should be operated so that it is possible to determine at any time the amount and value of each item of material in stock.
ix. Maximum, minimum and re-ordering levels of stock should be fixed.
x. There should be an efficient system of internal audit and internal checks.
xi. There should be a system of regular reporting to management regarding materials purchase, storage and utilisation.

T.2.13] Write short notes on (i) VED Analysis, (ii) FNSD Analysis, (iii) Just in time inventory Management and (iv) Two Bin System.

Ans. (i) VED Analysis: This type of analysis divides items into three categories in the descending order of their critically. Here V stands for *vital items* and their stock analysis requires more attention, because out of stock situation will result in stoppage of production. Thus, V items must be stored adequately to ensure smooth operation of the plant. E means *essential items.* Such items are considered essential for efficient running but without these items the system would not fail. Care must be taken to see that they are always in stock. D stands for *desirable items* which do not affect the production immediately but availability of such items will lead to more efficiency and less fatigue. *VED analysis* can be very useful to capital intensive process industries. As it analyses items based on their critically, it can be used for those special raw materials which are difficult to procure.

(ii) FNSD Analysis: FNSD analysis divides the items into four categories in the descending order of their usage rate. F stands for *fast moving items* and stocks of such items are consumed in a short span of time. N means *normal moving items* and such items are exhausted over a period of a year or so. S indicates *slow moving items;* existing stock of which would last for two years or more at the current rate of usage but it is still expected to be used up. D stands for *dead stock* and for its existing stock no further demand can be foreseen. Stocks of fast moving items must be observed constantly

and replenishment orders be placed in time to avoid stock-out situations. Slow moving stock must be reviewed very carefully before any replenishment orders are placed. The re-order levels and quantities for such items should be on the basis of a new estimate of future demand, to minimise the risks of a surplus stock being left when a slow-moving item becomes obsolescent or dead. Dead stock figures in the inventory represents money spent that can not be realised but it occupies useful space. Hence, once such items are identified, efforts must be made to find all alternative uses for it. Otherwise, it must be disposed off.

(iii) Just in time inventory Management: The major emphasis of just in time philosophy is inventory management. A widely used analogy, that the inventory of water in a river. For as long as level is high, the rocks and other obstacles remain hidden, but as soon as the levels dropped, the problems surface and must be attack directly. JIT begins by identifying problems and then forcing firms to tackle them. The main tactic used to reveal such problems is inventory reduction. The major focus is upon the idea of producing in response to need rather than as a consequence of plans and forecasts. Instead of pushing inventory into the system in order to make products they turned the process round and used the pull from the market place or the next operation as a way of making the system more directly responsive and eliminating unnecessary waste due to over production and so on. It attempts to minimise inventories through small incremental reductions rather than prescribe particular techniques or methodologies.

(iv) Two Bin System: Under *two bin system,* each item of material is stored in two bins and material is continuously issued from one bin until the stock of material is emptied in that bin. Then material from the second bin is started using and action will be taken to replenish the material in the first bin. The material in the second bin will be sufficient enough until the fresh delivery is received. The maintenance of two bin system is a continuous process.

This system is maintained in another form by maintenance of a single bin marking it inside with a red line. It indicates the re-order of stock for replenishment.

The operative convenience and the cost analysis is to be made before adopting two bin system. The major advantage under this system is that stock can be kept at a lower level because of the ability to re-order whenever stock fall to a low level, rather than having wait for the next re-order date.

T.2.14] Distinguish between Bin card and stores ledger.

Bin Card	Stores Ledger
1. It is maintained by the store keeper.	**1.** It is maintained by the Cost department.
2. Entries are first made in this record.	**2.** Entries are made after being recorded in the Bin Card.
3. It discloses the units of closing stock.	**3.** It discloses the units as well as the value of closing stock.
4. It records only the physical movement of stock.	**4.** It records the physical movement as well as the rates of relevant stock items.
5. The store keeper is held responsible for any discrepancy in stock.	**5.** The cost accountant merely records the receipts and issues. He cannot be held responsible for any discrepancy.
6. An entry is made for each and every transaction, i.e. transactions are recorded perpetually.	**6.** Entries may be made for a number of transactions in a particular period together, i.e. transactions may be recorded periodically.
7. It is kept at the place close to the materials	**7.** It is kept in the cost department. It need not be at the same place where the materials are stored.

T.2.15] Short note on Pareto Analysis

Ans:- It is very similar to ABC Analysis. It was suggested by an economist, **Vilfredo Pareto.** According to him, 80% of a nation's wealth is held by 20% of it's population. Hence, the remaining 80% population holds only 20% of the wealth. Hence, this method is also known **as 80:20 analysis.** This analysis is applied to stocks so that 20% of the items account for 80% value of stocks in hand. Hence, rigorous control is required on these 20% items. The remaining 80% items constituting only 20% value of stocks in hand are relatively less important. Hence, Rigorous control on them is not required.

T.2.16] What are different categories of material losses and how are they treated?

Ans:-

1. Waste

It is that portion of raw materials which is lost during production and has no recoverable value. It may happen due to evaporation, chemical reaction, shrinkage, etc. Wastage can be **visible** (remnants of raw material) or **invisible** (disappearance through smoke). Waste may be **normal** or **abnormal**.

Accounting of Wastes

i. Normal wastage is inevitable in production and thus regarded as part of the production cost. The good units in the process absorb this normal waste of material and hence the cost of finished output per unit increases.

ii. Abnormal wastage on the other hand, is an accidental loss and not part of routine production activity. The cost of abnormal loss is separated from the cost sheet and should not be absorbed by the finished output. Thus the cost of the good units remains unaffected by this abnormal loss. The loss is eventually transferred to the Costing Profit and Loss Account.

Control of Wastes

i. Using past experiences and technical factors, normal allowances for output and waste should be made.

ii. Actual output and waste should then be compared with these anticipated figures and deviation therefrom, should be carefully studied.

iii. Responsibility should be fixed on various department heads and strict adherence to set standards must be ensured.

iv. Management should be constantly kept aware of any unusual activity or performance, as compared with standards.

v. Better material handling systems should be established.

2. Scrap

It is the incidental residue usually of small amount and low value, having some recoverable value. Scraps may of three types – legitimate, administrative and defective scrap. **Legitimate scrap** is a predetermined scrap arising from manufacturing operations. **Administrative scrap** results from decisions taken by the management. E.g, change in product design change in sales policy, eyc. **Defective scrap** arises due to mis-handling of materials or due to purchase of poor-quality raw material.

Accounting of Scraps

i. If the value of scrap is negligible, the cost of the scrap is borne by the good units. Any income realized on sale of such scrap should be treated as miscellaneous income.

ii. When scraps cannot be identified with a particular job or process, then the overhead cost should be reduced by the net sales value of such scrap (i.e. sales – selling and distribution costs) Generated from such scrap. This method reduces the overhead rate of recovery. Alternatively, material cost could be reduced by the net realizable value.

iii. When scraps can be identified with a particular job or process, then its cost should be transferred to Scrap Account and any sales proceeds of such scrap should be credited to that Scrap Account, the net profit or loss being transferred to Costing Profit and Loss Account.

Control of Scraps

i. Standard allowance for scrap should be fixed and actual scrap should be compared.

ii. Periodical scrap report should be prepared by the departments responsible for the scrap.

iii. Responsibility should be delegated to all production department heads.

iv. Material details regarding the right type of material/equipments/ personnel, should be specified at the product design stage.

3. Spoilage

They are those materials which are badly damaged during manufacturing process. Since, they cannot be rectified economically, they need to be separated from the process and disposed off without further processing. Spoilage may be **normal** (if within acceptable limits) or **abnormal** (if it exceeds the standard limits).

Accounting of Spoilage

i. Normal spoilage costs are included in the cost sheet as part of the specific production order or production overhead in general.
ii. Abnormal loss is charged to the Costing Profit an Loss Account. If the spoilage is due to strict specifications of the client, its cost is absorbed by the production order while the disposal cost is charged to production overhead.

Control of Spoilage

i. Pre – determined standards should be fixed.
ii. A systematic procedure of reporting should be established and immediate corrective actions should be taken.
iii. Responsibility should be delegated to all production department heads.

4. Defectives

These are also damaged materials. However, unlike spoilage, they can be economically rectified by application of additional materials, labour or other service. Defectives can arise due to sub – standard materials, bad supervision and planning, inadequate inspection, careless application, etc.

Accounting of Defectives

i. Defectives identifiable with a particular job should be charged to that job.

Normal Defectives

ii. These are charged to good products.
iii. The rectification costs are charged to general overheads, if no department can be identified for causing such defectives.
iv. If the department responsible for such defectives is identifiable then rectification cost should be charged to that department only.

Abnormal Defectives

v. These should be charged to Costing Profit and Loss Account.

Control of Defectives

i. Standard allowance for defectives should be fixed and actual defectives should be compared.
ii. Periodical defectives report should be prepared by the departments responsible for the defectives.

Note: The main difference between spoilage and defective is that spoilage cannot be rectified. However defectives can be rectified and reconditioned either into the original product or as seconds.

T.2.17] 'Scraps' and 'Defectives' in costing. **(Nov-2015)**

Answer:– Difference between Scrap and Defectives

Scrap	Defectives
1. It is loss connected with output	**1.** This type of loss connected with the output but it can be in the input as well.
2. Scraps are not intended but cannot be eliminated due to nature of material or process itself.	**2.** Defectives also are not intended but can be eliminated through proper control.
3. Generally scraps are not used or rectified.	**3.** Defectives can be used after rectification.
4. Scraps have insignificant recoverable value.	**4.** Defectives are sold at lower value from that of good one.

T.2.18] Distinguish between Re-order level and Re-order Quantity

Ans: Reorder Level: Reorder level is the level of stock availability when a new order should be raised by preparing purchase requisition by stores department. This level is fixed between the minimum & maximum stock levels and it will be, normal, higher than the minimum stock level. This is necessary to guard against abnormal usage of materials and also against abnormal delay in the supply of materials.

Reorder Level = Maximum Usage × Maximum Lead time

Reorder quantity: Reorder quantity refers to the quantity refers to the quantity to be purchased every time so as to minimise the total. of two types of costs associated with purchase. The size of the order for which both ordering and carrying costs are minimum is known as EOQ. this is also known as Reorder quantity.

$$EOQ = ROQ = \sqrt{\frac{2AO}{I}}$$

A = Annual requirement
O = Ordering cost / order
I = Carrying cost / unit

T.2.19] How normal and abnormal loss of material arising during storage treated in Cost Accounts?

Ans: Normal and Abnormal Loss of Materials:

At the time of physical verification of stocks, discrepancies may be found between physical stock shown in Bin card & book stock shown in store ledge₹ These discrepancies are in the form of shortage / losses. For accounting purpose, the loss is classified into Normal or Abnormal loss.

Normal / Unavoidable Loss:

(i) Based on past data, a standard % age of normal shortage is set.
(ii) Cost of normal shortage / loss should be treated as regular cost.
(iii) Cost of normal loss may be accounted under any of the following methods:
  (a) As direct materials-by inflating the issue price; or
  (b) As overheads.

Abnormal Loss:

(i) It is the excess of actual loss over the normal loss (Note: Above normal = abnormal)
(ii) Cost of abnormal materials shortage is a loss and should be charged to costing profit & loss A/c.
(iii) If the losses or surpluses arise from errors in documentation, posting etc. they are not abnormal. Such errors should be rectified through appropriate adjustment entries.

T.2.20] How will you treat following items associated with purchase of materials?
(i) Custom duty
(ii) Penalty
(iii) Subsidy received from the government
(iv) Insurance charges **[CA-IPCC-NOV-2018]**

Answer:

Item	Treatment
(i) Custom Duty	Custom duty is paid on import of goods from outside India. It is added with the purchase cost
(ii) Penalty	Penalty of any type is not included with the cost of purchase
(iii) Subsidy received from the government	Any subsidy / grant / incentive received from the Government or from other sources deducted from the cost of purchase.
(iv) Insurance charges	Insurance charges are paid for protecting goods during transit. It is added with the cost of purchase.