# 2. MATERIAL COST

**NO. OF PROBLEMS IN 40E OF CA INTER: CLASSROOM - 22, ASSIGNMENT - 26**
**NO. OF PROBLEMS IN 41E OF CA INTER: CLASSROOM - 22, ASSIGNMENT - 27**
**NO. OF PROBLEMS IN 42E OF CA INTER: CLASSROOM - 18, ASSIGNMENT – 17**
**NO. OF PROBLEMS IN 42.5E OF CA INTER: CLASSROOM - 13, ASSIGNMENT - 10**

## MODEL - WISE ANALYSIS OF PREVIOUS EXAMINATIONS

| No. | Model Name | M – 11 | N – 11 | M – 12 | N – 12 | M – 13 | N – 13 | M – 14 | N – 14 | M – 15 | N – 15 | M – 16 | N – 16 | M - 17 | N - 17 | M – 18(O) | M – 18(N) | N – 18(O) | N – 18(N) | M – 19(O) | M – 19(N) | N-19(O) | N-19(N) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | EOQ, NO. OF ORDERS, CARRYING & ORDERING COST | - | - | - | 5 | - | 5 | 8 | - | - | - | - | - | - | - | 5 | 5 | - | - | - | - | - | 5 |
| 2. | INVENTORY LEVELS | - | - | - | - | - | - | - | 5 | - | - | - | 5 | - | - | - | - | - | 10 | 8 | - | - | - |
| 3. | MATERIAL TURNOVER RATIO | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4. | RAW MATERIAL VALUATION | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5. | RAW MATERIAL ISSUE METHODS | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 10 | 8 | - |
| 6. | STOCK OUT | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 7. | ABC ANALYSIS | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

## SIGNIFICANCE OF EACH PROBLEM COVERED IN THIS MATERIAL

| Problem No. in this material | Problem No. in new SM | Problem No. in old SM | Problem No. in old PM | RTP | MTP | PQ | Previous Exams | Remarks |
|---|---|---|---|---|---|---|---|---|
| **CR-1** | PQ-7 | ILL-12 | - | - | - | - | - | |
| **CR 2** | | | | | | | | |
| **CR-3** | - | - | - | - | - | M18 | - | |
| **CR-4** | - | - | - | M17 | - | - | - | |
| **CR-5** | - | - | - | - | - | - | N19(N) | |
| **CR-6** | - | - | - | N19(N) | - | - | N14 - 5M | |
| **CR-7** | - | - | 8 | - | - | - | - | |
| **CR-8** | - | - | 16 | - | - | - | N13 - 5M | |
| **CR-9** | - | - | - | - | - | - | M19 – 8M | |
| **CR-10** | ILL-10 | ILL-16 | 25 | - | - | - | - | |
| **CR-11** | ILL-1 | - | - | - | - | - | - | |
| **CR-12** | - | - | - | - | - | M19(N) | | |
| **CR-13** | | | | | | | | |
| **ASG-1** | ILL-3 | ILL-3 | - | - | - | - | - | |
| **ASG-2** | - | - | - | - | - | - | M18(O) - 5M | |
| **ASG-3** | - | - | - | M 18(N)<br>M 18(O) | - | - | - | |
| **ASG-4** | - | - | 3 | - | - | - | - | |
| **ASG-5** | - | - | - | - | - | - | - | |
| **ASG-6** | - | - | - | - | - | - | - | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **ASG-7** | - | - | 17 | N17<br>M19(N&O) | M18(N&O)<br>M19(N&O) | - | - | |
| **ASG-8** | ILL-11 | ILL-17 | - | - | - | - | - | |
| **ASG-9** | - | - | - | - | - | - | - | |
| **ASG-10** | ILL-8 | ILL-15 | -- | - | - | - | - | |

# ECONOMIC ORDER QUANTITY

Purchase department in manufacturing concerns is usually faced with the problem of deciding the 'quantity of various items' which they should purchase. If purchases of material are made in bulk then inventory carrying cost will be high. On the other hand if order size is small, then the ordering cost will be high. In order to minimize ordering and carrying costs it is necessary to determine the order quantity which minimizes these two costs. The size of the order for which both ordering and carrying cost are minimum is known as economic order quantity.

**Assumptions underlying E.O.Q:** The calculation is subject to the following assumptions:

**a)** Ordering cost per order and carrying cost per unit per annum are known and they do not change.

**b)** Anticipated usage of material in units is known in advance.

**c)** Cost per unit of the material is constant and is known in advance.

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

**How to calculate:** An e.g.: Ordering cost per order: Rs.150. Carrying cost per unit: Rs.1.50 per unit per annum. Annual usage of R.M. - 3,200 units. No discounts are offered. Find EOQ.

**Tabular or Trial & Error Method:**

If the entire raw material required is purchased at a time, number of orders to be placed - 1:

Ordering cost P.A. - 1 order x 150 = 150

Carrying cost - 3,200 x ½ x 1.50 = 2,400

Total cost 2,550

If two purchase orders are placed:

Ordering cost P.A. - 2 orders x 150 = 300

Carrying cost - 1,600 x ½ x 1.50 = 1,200 (3,200 X ½ X ½ X 1.50)

Total cost 1,500

If 3 purchase orders are placed: Total cost - 1,250 (450 + 800)

If 4 purchase orders are placed: Total cost - 1,200 (600 + 600)

If 5 purchase orders are placed: Total cost - 1,230 (750 + 480)

**Let us tabulate:**

| No. of Orders (1) | Qty./order (2) | Avg. Inv. (3) = 2 X ½ | Ordering cost (4) = (1) X 150 | Carrying cost (5) = (3) X 1.50 | Total cost (6) = 4 + 5 |
|---|---|---|---|---|---|
| 1 | 3,200 | 1,600 | 150 | 2,400 | 2,550 |
| 2 | 1,600 | 800 | 300 | 1,200 | 1,500 |
| 3 | 1066 | 533 | 450 | 800 | 1,250 |
| **4** | **800** | **400** | **600** | **600** | **1,200 (*)** |
| 5 | 640 | 320 | 750 | 750 | 1,230 |

* Since the total cost is least here, EOQ is 800 units (i.e. 4 orders per annum)

**Some Observations:**

**a)** At EOQ, OC = CC.

**b)** Upto EOQ, total cost is decreasing and thereafter it is increasing.

**Formula/Equation Method (Wilson's Formula):**

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



Where,

A = Annual usage
O = Ordering cost per order
C = Carrying cost per unit per annum

→ Both must be for the same time period

**Costs associated with EOQ:**

1. **Buying or Ordering Costs:** These are costs associated with every purchase order and are incurred every time a purchase order is made out. Some examples are:
   - **a)** Cost of paperwork - Purchase Requisition, Purchase Order.
   - **b)** Cost of placing advertisements in newspapers inviting quotations from suppliers.
   - **c)** Cost of administration - negotiation and liaison with suppliers.
   - **d)** Cost of inspection, sample testing etc.
2. **Carrying or Stockholding Costs:** These are costs associated with carrying one unit of the raw material in stock. It includes:
   - **a)** Interest on working capital.
   - **b)** Insurance & Warehousing Charges.
   - **c)** Loss due to deterioration of materials during storage & obsolescence etc.

As the number of purchase orders decreases, quantity ordered every time increases. Hence carrying cost also increases based on average inventory held.

Total ordering cost = no. of orders X cost per order

Total carrying cost = EOQ / order size X $\frac{1}{2}$ X carrying cost p.u / p.a



## INVENTORY LEVELS

**Reorder Level:** This is the level of Raw material at which a fresh order for Raw material purchases shall be made. This gives the answer to the questions - "When to purchase?", "When the new purchase shall be made?"

**Reorder quantity:** This gives the quantity to be purchased at a time. This gives the answer to the question - "How much to purchase?"

**Maximum Level:** It is the level of stock beyond which inventory should not cross.

**Minimum Level:** It is the level of stock beyond which the inventory will not be allowed to fall.

| | |
|---|---|
| Reorder Level (0r) | Lead time consumption + Safety stock (or) |
| Reorder point | Maximum Usage X Maximum delivery period/lead time |
| Reorder quantity | EOQ |
| Maximum Level | Reorder Level + Reorder quantity - (Minimum usage X Minimum lead time) (Or) EOQ + Safety Stock |
| Minimum Level | Reorder level - (Normal consumption X Normal Lead time) Or Safety Stock |
| Average Level | Min + Max / 2 (Or) Min Level + ½ ROQ |
| Danger Level | Emergency delivery period X Average usage / Minimum usage |

**Note:**

**a)** Both usage and time must be taken for the same period of time.

**b)** In the absence of information relating to normal consumption & normal lead time, use the average levels.

# MATERIAL TURNOVER RATIO

**Meaning:** It measures the speed at which the raw materials are getting consumed. It can be expressed either in number of days or in number of times. (E.g.: 36.5 days or 10 times)

$$\text{ITR (In times)} = \frac{\text{Cost of materials consumed during the period}}{\text{Cost of average stock (Opening + Closing/2)}}$$ **Or**

$$\text{ITR (In days)} = \frac{365 \text{ days}}{\text{ITR in times}}$$

**Conclusion:**

**a)** More the number of times the faster is the movement of Raw Material.

**b)** Less the number of days the faster is the movement of Raw Material.

# COST OF RAW MATERIAL RECEIPTS

$$\text{Cost per Kg. of Raw material:} \frac{\text{Total cost of purchases *}}{\text{Total units/kgs- Normal Loss units/Kgs}}$$

* Includes purchase price, taxes paid, carriage inwards, packing material, insurance etc

| S. No. | Items | Treatment |
|---|---|---|
| **Discounts and Subsidy** | | |
| i) | Trade Discount | Trade discount **is deducted** from the purchase price if it is not shown as deduction in the invoice. |
| ii) | Quantity Discount | Like trade discount quantity discount is also shown as deduction from the invoice. It **is deducted** from the purchase price if not shown as deduction. |
| iii) | Cash Discount | Cash discount **is not deducted** from the purchase price. It is treated as interest and finance charges. It is ignored. |
| iv) | Subsidy/ Grant/Incentives | Any subsidy/ grant/ incentive received from the Government or from other sources **deducted** from the cost of purchase. Duties and Taxes |
| **Duties and Taxes** | | |
| v) | Road Tax/ Toll Tax | Road tax/ Toll tax if paid by the buyer then it **is Included** with the cost of purchase. |
| vi) | Integrated Goods And Service Tax (IGST) | Integrated Goods and Service Tax (IGST) is paid on inter-state supply of goods and provision of services and collected from the buyers. It **is excluded** from the cost of purchase if credit for the same is available. Unless mentioned specifically it should not form part of cost of purchase. |
| vii) | State Goods and Service Tax (SGST) | State Goods and Service Tax (SGST) is paid on intra-state supply and collected from the buyers. It **is excluded** from the cost of purchase if credit for the same is available. Unless mentioned specifically it should not form part of cost of purchase. |
| viii) | Central Goods and Service Tax (CGST) | Central Goods and Service Tax (CGST) is paid on manufacture and supply of goods and collected from the buyer. It **is excluded** from the cost of purchase if the input credits available for the same. Unless mentioned specifically CGST is not added with the cost of purchase. |
| ix) | Basic Custom Duty | Basic Custom duty is paid on import of goods from outside India. It **is added** with the purchase cost. |

| | | |
|---|---|---|
| **Penalty and Charges** | | |
| x) | Demurrage | Demurrage is a penalty imposed by the transporter for delay in uploading or offloading of materials. It is an abnormal cost and **not included** with cost of purchase |
| xi) | Detention charges/ Fine | Detention charges/ fines are imposed for noncompliance of rule or law by any statutory authority.<br>It is an abnormal cost and **not included** with cost of purchase |
| xii) | Penalty | Penalty of any type is **not included** with the cost of purchase. |
| **Other expenditures** | | |
| xiii) | Insurance charges | Insurance charges are paid for protecting goods during transit. It **is added** with the cost of purchase. |
| xiv) | Commission or brokerage paid | Commission or brokerage paid **is added** with the cost of purchase. |
| xv) | Freight inwards | It **is added** with the cost of purchase as it is directly attributable to procurement of material. |
| xvi) | Cost of containers | Treatment of cost of containers are as follows :<br>**Non-returnable containers:** The cost of containers **is added** with the cost of purchase of materials.<br>• **Returnable Containers:** If on return of containers cost of containers is returned back then in this case cost of containers is not added with the cost of purchase.<br>• If the amount of refund on returning the container is less than the amount paid then only short fall is added with the cost of purchase. |
| xvii) | Shortage | Shortage in materials are treated as follows:<br>**Shortage due to normal reasons:** Good units absorb the cost of shortage due to normal reasons. Losses due to breaking of bulk, evaporation, due to unavoidable conditions etc. are the reasons of normal loss.<br>**Shortage due to abnormal reasons:** shortage arises due to abnormal reasons such as material mishandling, pilferage, due to avoidable reasons are not absorbed by the good units. Losses due to abnormal reasons are debited to costing profit and loss account. |



## PRICING OF RAW MATERIAL ISSUES

a) **FIFO:** Under this method issues are priced on the assumption that materials purchased first are issued first. The actual physical movement of materials may or may not follow this pattern.

b) **LIFO:** Under this method issues are priced on the assumption that materials purchased last are issued first. The actual physical movement of materials may not follow this pattern.

c) **Simple Average Method:** Before each issue a simple average of the prices is calculated by dividing all the prices of different lots of a material in stock at the time of issue by the total number of prices (In conjunction with FIFO).

d) **Weighted Average Method:** This takes into account the price as well as the quantity of different lots of a material in store. Before each issue the weighted average price cost is calculated by dividing the total book value of materials in hand by the total quantity of materials in stock before the issue (To be calculated at each purchase).

e) **Periodical Simple Average Method:** This is similar to simple average method with the difference that the issue price is calculated only periodically (weekly, fortnightly or monthly etc.) and not at the time of each purchase. For the specified period the issue price remains unchanged. The work of pricing of issues of materials is done only at the end of the period. During the period only the quantities of material issued are entered in store ledger as and when issues are made. Price of opening stock is excluded both in the numerator and denominator.

f) **Periodical Weighted Average Method:** This is similar to weighted average method with the difference that the issue price is calculated only periodically (weekly, fortnightly or monthly etc.) and not at the time of each purchase. For the specified period the issue price remains unchanged. The work of pricing of issues of materials is done only at the end of the period. During the period only the quantities of material issued are entered in store ledger as and when issues are made. Price of opening stock is excluded both in the numerator and denominator.

g) **Base Stock Method:** Base stock represents the minimum stock of materials required to be maintained at all times. No issue shall be made out of this stock. The quantity of materials in excess of the base stock is available for production, while the base stock is used only in case of emergency. The excess is priced in conjunction with one of the other methods such as FIFO or LIFO. Thus this method can't be used independently.

## PROBLEMS FOR CLASS ROOM DISCUSSION

### MODEL 1: ECONOMIC ORDER QUANTITY

**PROBLEM 1:** G. Ltd. produces a product which has a monthly demand of 4,000 units. The product requires a component X which is purchased at Rs 20. For every finished product, one unit of component is required. The ordering cost is Rs 120 per order and the holding cost is 10% p.a.

You are required to calculate:

i) Economic order quantity.

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

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

*(A) (NEW SM, OLD SM) (ANS.: 2400 UNITS, RS.640, RS.2400)*

*(SOLVE PROBLEM NO. 1 OF ASSIGNMENT PROBLEMS AS REWORK)*



**Concept question:**

What would be the impact on question if, four components are required for every finished product?

**Note:**_____

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**PROBLEM 2:** 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 | Rs.1800 |
| - Cost per unit of "SKY BLUE" | Rs.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**

1) Compute the Economic order quantity.

2) Advise whether the quantity discount offer can be accepted.

*(A) (M18 (NEW) – 5 M)(ANS;A.600UNITS,B.77,52,000, 74,74,200)*

*(SOLVE PROBLEM NO.2 OF ASSIGNMENT PROBLEMS AS REWORK)*

**Concept question:**

What would be the impact on question if, ordering cost per order is Rs 2000 ?

**Note:**_____

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**PROBLEM 3:** Arnav Ltd. manufactures a product X which requires two raw materials A and B in a ratio of 1:4. The sales department has estimated a demand of 5,00,000 units for the product for the year. To produce one unit of finished product, 4 units of material A is required.

Stock position at the beginning of the year is as below:

Product X 12,000 units

Material A 24,000 units

Material B 52,000 units

To place an order the company has to spend Rs.15,000. The company is financing its Working capital using a bank cash credit @13% p.a.

Product X is sold at Rs1,040 per unit. Material A and B is purchased at Rs.150 and Rs.200 Respectively.

**Required:**

Compute economic order quantity (EOQ):

**(i)** If purchase order for the both materials is placed separately.

**(ii)** If purchase order for the both materials is not placed separately

*(A) (MTP-N19(N))(PQ) (ANS.: (I) MATERIAL A = 54,462 UNITS; MATERIAL B=94,600 UNITS AND (II) MATERIAL A = 21,592 Tonns; MATERIAL B=86,860 UNITS)) (SOLVE PROBLEM NO.3 OF ASSIGNMENT PROBLEMS AS REWORK)*

**Concept question:**

What would be the impact on question if, To produce one unit of finished product, 6 units of material A is required.

**Note:**_____

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**PROBLEM 4:** Aditya Ltd. has a monthly requirement for an item of raw material is 1,000 units. The purchase price per unit of material is Rs.60. The cost of processing an order is Rs.540 and the carrying cost is 20%. There is a single supplier for the material which offers quantity discounts as under:

| Order Quantity (in units) | Price per unit (Rs.) |
|---|---|
| Less than 2,000 units | 60.00 |
| 2,000 units and less than 4,000 units | 59.80 |
| 4,000 units and less than 6,000 units | 59.50 |
| 6,000 units and less than 8,000 units | 58.90 |
| 8,000 units and above | 58.40 |

The company uses the cash credit facility provided by the company's banker to finance its raw material purchase. The bank due to its own infrastructural constraint can accommodate a maximum of five fund transfer (NEFT/ RTGS) requests for any single beneficiary per annum. The company in short term is unable to arrange any other source of finance.

**Required:**

**i)** Calculate the optimum purchase order size for the company;

**ii)** Calculate the order level where the company could have minimised its total cost;

**iii)** The amount of loss that the company has to bear due to bank's inability to process fund transfer requests

*(B) (RTP - M17) (ANS.: I) EOQ = 1039UNITS; II) AT ORDER LEVEL OF 2000 UNITS TOTAL COST THE COMPANY IS LEAST; III) LOSS IS RS.1,852) (SOLVE PROBLEM NO. 4 OF ASSIGNMENT PROBLEMS AS REWORK)*

**Concept question:**

What would be the impact on question if, carrying cost is 10% p.a.

**Note:**_____

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**PROBLEM 5:** Surekha limited produces 4000 liters of paints on a quarterly basis. Each liter requires 2 kg of raw material. The cost of placing one order for raw material is Rs 40 and the purchasing price of raw material is Rs 50 per kg. the storage cost and interest cost is 2% and 6% per annum respectively. The lead time for procurement of raw material is 15 days.

Calculate economic order quantity and total annual inventory cost in respect of the above raw material.

**(NOV19 (N) – 5M)**

**Concept question:**

What would be the impact on question if, purchasing price of raw material is Rs 20 per kg.

**Note:**_____

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**PROBLEM 6: (PRINTED SOLUTION AVAILABLE)** HBL limited produces 'M' which has a quarterly demand OF 20,000 UNITS. Each product requires 3 kg. and 4 kg. of material X and Y respectively. Material X is supplied by a local supplier and can be produced at factory stores at any time, hence, no need to keep inventory for material X. the material Y is not locally available, it requires to be purchased from others states in a specially designed truck container with a capacity of 10 tons.

The cost and other information related with the materials are as follows:

| Particulars | Material -X | Material-Y |
|---|---|---|
| Purchase price per kg. (excluding GST) | Rs 140 | Rs 640 |
| Rate of GST | 18% | 18% |
| Freight per trip (fixed irrespective of quantity) | - | Rs 28,000 |
| Loss of materials in transit | - | 2% |
| Loss in process | 4% | 5% |



**Other information:**

i) the company has to pay 15% p.a to bank for cash credit facility.

ii) Input credit is available on GST paid on materials.

**Required:**

i) Calculate cost per kg. of material X and Y

ii) Calculate the economic order quantity for both the materials. **(RTP-NOV19)(N)**

**Concept question:**

What would be the impact on question if, quarterly demand for the finished products is 20,000 UNITS.

## MODEL 2: INVENTORY LEVELS

**PROBLEM 7:** M/s Tubes Ltd. are the manufactures of picture tubes for T.V. The following are the details of their operation during 2011:

| | |
|---|---|
| Average monthly market demand | 2,000 Tubes |
| Ordering cost | Rs.100 per order |
| Inventory carrying cost | 20% per annum |
| Cost of tubes | Rs.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 |

**Compute from the above:**

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

*(A) (OLD PM, M98 – 10M, M00 – 4M, SIMILAR: RTP N18 (N&O)) (ANS.: EOQ = 102 UNITS, MAXIMUM LEVEL = 1,402 TUBES, MINIMUM LEVEL = 900 TUBES, ROL = 1600 TUBES)*

*(SOLVE PROBLEM NO.5 OF ASSIGNMENT PROBLEMS AS REWORK)*

**Concept question:**

**(1)** Suppose consumption of raw material (usage) is not given then EOQ *(Ans:RS155)*

**Note:**_____

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**PROBLEM 8:** Primex limited produces product 'p'. it uses annually 60,000 units of a material 'Rex' costing '10 per unit. Other relevant information are:

| | | |
|---|---|---|
| Cost of placing an order | : | Rs.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:

**a)** Economic order quantity for material 'REX'

**b)** Re – order level

**c)** Maximum stock level

**d)** Average stock level *(A) (OLD PM, N13 – 5M) (ANS.: 6,000 UNITS, 2,600 UNITS, 8,600 UNITS, 4,600 UNITS)*

*(SOLVE PROBLEM NO.6 OF ASSIGNMENT PROBLEMS AS REWORK)*



**Concept question:**

**(1)** Find EOQ if re-order period is 20 days *(Ans:RS.4600)*

**Note:**_____

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**PROBLEM 9: (PRINTED SOLUTION AVAILABLE)** 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 company it will be able to sell 45,600 units of product EMM in the coming year .There is an operating stock of 3150 units of product EMM and company desires to maintain closing stock equal to one months forecasted sale Following is the information regarding material 'REX':

Information regarding material 'REX':

Purchase price per Kg Rs.25

Cost of placing order Rs.240 per order

Storage cost 2% per annum

Interest rate 10% per annum

Average lead time 8 days

Difference between minimum and maximum lead time 6 days

Maximum usage 150 kg

Minimum usage 90 kg

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

**Required:**

**i)** Compute the EOQ and total cost as per EOQ.

**ii)** Compute the re order 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 accepted *(B) (MAY 19 OLD) (ANS.: (A). 2,440 KG, RS.9,37,570 ., (B).1650 KG, 3640 KG., (C).Accept the offer)*

*(SOLVE PROBLEM NO.7 OF ASSIGNMENT PROBLEMS AS REWORK)*

**Concept question:**

What would be the impact on question if closing stock of raw material is 5000 kgs.

**Note:**_____

_____

## MODEL 3: INVENTORY TURNOVER RATIO

**PROBLEM 10:** The following data are available in respect of material X for the year ended 31st March, 2014.

Opening stock : Rs. 90,000

Purchases during the year : Rs. 2,70,000

Closing stock : Rs. 1,10,000

**Calculate:**

**a)** Inventory turnover ratio, and

**b)** The number of days for which the average inventory is held.

*(C) (NEW SM, OLD PM) (ANS.: (A) 2.5 TIMES, (B) 146 DAYS)*

*(SOLVE PROBLEM NO. 8 OF ASSIGNMENT PROBLEMS AS REWORK)*

**Concept question:**

**(1)** High inventory turn over ratio (ITR) indicates?

**Note:**_____

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## MODEL 4: RAW MATERIAL VALUATION

**PROBLEM 11:** An invoice in respect of a consignment of chemicals A and B provides the following information:

| | |
|---|---|
| Chemical A: 10,000 kgs. @Rs.10 per kg. | 1,00,000 |
| Chemical B: 8,000 kgs. @Rs. 13 per kg. | 1,04,000 |
| Basic custom duty @ 10% (Credit is not allowed) | 20,400 |
| Railway freight | 3,840 |
| **Total cost** | 2,28,240 |

A shortage of 500 Kgs. in chemical A and 320 kgs. In chemical B is noticed due to normal breakages. You are required to determine the rate per kg. of each chemical, assuming a provision of 2% for further deterioration. *(C) (NEW SM) (ANS.: COST PER KG: A-RS.12.04, B-RS.15.43.)*

*(SOLVE PROBLEM NO. 9 OF ASSIGNMENT PROBLEMS AS REWORK)*

**Concept question:**

What would be the impact on question if Railway freight is Rs 18,000.

**Note:**_____

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## MODEL 5: RM ISSUE METHODS

**PROBLEM 12: (PRINTED SOLUTION AVAILABLE)** 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 April 15 | 300 | |
| April 26 | Issue | 1000 | |
| April 28 | Purchase | 500 | 17 |

Opening stock as on 01-04-2019 is 1000 kg @ Rs. 15 per kg

On 30th April, 2019 it was found that 50 kg of material 'CXE' was frequently 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 method?

*(B) (M 19(N)) (ANS.: VALUE OF CLOSING STOCK UNDER FIFO -RS. 40,376 ; WEIGHTED AVERAGE METHOD :RS. 38650)*

**Concept question:**

What would be the impact on question, if purchase of raw material on April 15th is 2500 kgs @ Rs 20.

**Note:**_____

_____

## MODEL 6: ABC ANALYSIS

**PROBLEM 13: (PRINTED SOLUTION AVAILABLE)** A store keeper has prepared the below list of items kept in the store of the factory.



| Item | Units | Unit cost (Rs.) |
|---|---|---|
| A | 12,000 | 30.00 |
| B | 18,000 | 3.00 |
| C | 6,000 | 35.00 |
| D | 750 | 220.00 |
| E | 3,800 | 75.00 |
| F | 400 | 105.00 |
| G | 600 | 300.00 |
| H | 300 | 350.00 |
| I | 3,000 | 250.00 |
| J | 20,000 | 7.50 |
| K | 11,500 | 27.50 |
| L | 2,100 | 75.00 |

The store keeper requires your help to classify the items for prioritization. You are required to APPLY ABC analysis to classify the store items as follows:

Store items which constitutes approx 70%, 20% and 10% of total value as A, B and C respectively.

*(A) (MTP1 M18 (N&O))*

*(SOLVE PROBLEM NO.10 OF ASSIGNMENT PROBLEMS AS REWORK)*

**Concept question:**

What would be the impact on question if unit cost of item B is Rs 100.

**Note:**_____

_____

# PRINTED SOLUTIONS TO SOME SELECTIVE PROBLEMS

**PROBLEMS NUMBERS TO WHICH SOLUTIONS ARE PROVIDED: 6,9,12,13**

## PROBLEM NO 6:

1. **Working notes:**

**(a)** Annual purchase quantity for material X and Y:

Annual demand product M – 20,000 units x 4 = 80,000 units.

| Particulars | Mat – X | Mat – Y |
|---|---|---|
| Quantity required for per unit of Product M | 3 kg. | 4 kg. |
| Net quantity for materials required | 2,40,000 kg. | 3,20,000 kg. |
| Add: Loss in transit | - | 6,881 kg. |
| Add: Loss in process | 10,000 kg. | 17,204 kg. |
| Purchase quantity | 2,50,000 kg. | 3,44,085 kg. |

**Note:** Input on GST paid is available; hence, it will not be included in cost of material.

**(i)** Calculation of cost per kg. or material X and Y.

| Particulars | Mat – X | Mat – Y |
|---|---|---|
| Purchase quantity | 2,50,000 kg. | 3,44,085 Kg. |
| Rate per kg. | Rs. 140 | Rs. 640 |
| Purchase price | Rs. 3,50,00,000 | Rs. 22,02,14,400 |
| Add: Freight | 0 | Rs. 9,80,000 |
| Total cost | Rs. 3,50,00,000 | Rs. 22,11,94,400 |
| Net Quantity | 2,40,000 kg. | 3,20,000 Kg. |
| Cost per kg. | Rs. 145.83 | 691.23 |



*No of trucks = $\frac{3,44,085\,kg}{10\,ton \times 1,000}$ = 34.40 trucks or 35 trucks

Therefore total freight = 35 trucks x 28,000 = 9,80,000

**(ii)** Calculation of Economic Order Quantity **(EOQ)** for Mat – X and Mat – Y

$$EOQ = \sqrt{\frac{2 X Annual\ Requirement \times Order\ Cost}{Carrying\ cost\ per\ unit\ p.a.}}$$

| Particulars | Mat – X | Mat – Y |
|---|---|---|
| Annual Requirement | 2,50,000 kg. | 3,44,085 kg. |
| Ordering cost | 0 | Rs. 28,000 |
| Cost per unit | 145.83 | Rs. 691.23 |
| Carrying cost | 15% | 15% |
| Carrying cost per unit p.a. | 0 | Rs. 103.68 |
| EOQ | 0 | 13,632.62 kg. |

## PROBLEM NO 9:

**(a)**

**(i)** Computation of Economic Order Quantity (EOQ):

$$EOQ = \sqrt{\frac{2 X Annual\ Requirement \times Order\ Cost}{Carrying\ cost\ per\ unit\ p.a.}}$$

$$= \sqrt{\frac{2X37,210\,kgs.\ x\,Rs.240}{Rs.25\,x\,(10+2)\%.}}$$

$$= \sqrt{\frac{1,78,60,800}{Rs.3.}} = 2,440\ kg$$

No of orders $= \frac{37,210}{2,440} = 15.25$ or 16 order.

Total cost as per EOQ:

| Particulars | Amount (Rs.) |
|---|---|
| Material purchase cost ((Rs. 25 x 37,210 kgs.) | 9,30,250 |
| Add: Rodering costs (Rs. 240 x 16 orders) | 3,840 |
| Add: Carrying cost $\left(\frac{2,440}{2}x3\right)$ | 3,660 |
| **Total Cost** | **9,37,350** |

**(ii)** Computation of Re – order level Maximum level:

Re – order level = Maximum usage x Maximum lead time

= 150 kg x 11 days = 1,650 kg.

Maximum level = Re – order level + Re – order quantity (EOQ) – (Min. usage x Min. lead time).

= 1,650 kg. + 2,440 kg. – (90 kg. x 5 days)

= 4,090 – 450 = 3,640 kg.

**(iii)** Analysis of Offer at order level of 7,500 kgs:

If the company places 7,500 kg REX at a time, number or order and carrying cost per unit would be:

No. of orders $= \frac{37,210}{7,500} = 4.96$ or 5 orders

Carrying cost per unit per annum = Rs. 25 x 98% x 12% = Rs. 2.94

Total Cost at 7,500 order level:



| Particulars | Amount (Rs.) |
|---|---|
| Material purchase cost ((Rs. 25x98%) x 37,210 kgs.) | 9,11,645 |
| Add: Odering costs (Rs. 240 x 5 orders) | 1,200 |
| Add: Carrying cost $\left(\frac{7,500}{2}x2.94\right)$ | 11,025 |
| **Total Cost** | **9,23,870** |

Since, ordering 7,500 kg at a time, the company saves Rs. 13,880 (Rs. 9,37,750 – Rs. 9,23,870) [or Rs. 13,700 (9,37,750 – 9,23,870)]. Hence, the company should accept offer of 2% discount and 7,500 order size.

## PROBLEM NO 12:

**(i)**

**(a)** Stores Ledger Account for the month of April, 2019 (Weighted Average Method)

| Date | Receipt | | | Issue | | | Balance | | |
|---|---|---|---|---|---|---|---|---|---|
| | Qty Units | Rate (Rs.) | Amt. (Rs.) | Qty Units | Rate (Rs.) | Amt. (Rs.) | Qty Units | Rate (Rs.) | Amt. (Rs.) |
| 1-4-19 | - | - | - | - | - | - | 1,000 | 15.00 | 15,000 |
| 4-4-19 | 3,000 | 16.00 | 48,000 | - | - | - | 4,000 | 15.75 | 63,000 |
| 8-4-19 | - | - | - | 1,000 | 15.75 | 15,750 | 3,000 | 15.75 | 47,250 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 15-4-19 | 1,500 | 18.00 | 27,000 | - | - | - | 4,500 | 16.50 | 74,250 |
| 20-4-19 | - | - | - | 1,200 | 16.50 | 19,800 | 3,300 | 16.50 | 54,450 |
| 25-4-19 | - | - | - | 300 | 18.00 | 5,400 | 3,000 | 16.35 | 49,050 |
| 26-4-19 | - | - | - | 1,000 | 16.35 | 16,350 | 2,000 | 16.35 | 32,700 |
| 28-4-19 | 500 | 17.00 | 8,500 | - | - | - | 2,500 | 16.48 | 41,200 |
| 30-4-19 | - | - | - | 50 | 16.48 | 824 | 2,450 | 16.48 | 40,376 |

**(b)** Store Ledger Account for the month of April, 2019 (LIFO)

| Date | Receipt | | | Issue | | | Balance | | |
|---|---|---|---|---|---|---|---|---|---|
| | Qty Units | Rate (Rs.) | Amt. (Rs.) | Qty Units | Rate (Rs.) | Amt. (Rs.) | Qty Units | Rate (Rs.) | Amt. (Rs.) |
| 1-4-19 | - | - | - | - | - | - | 1,000 | 15 | 15,000 |
| 4-4-19 | 3,000 | 16.00 | 48,000 | - | - | - | 1,000<br>3,000 | 15<br>16 | 15,000<br>48,000 |
| 8-4-19 | - | - | - | 1,000 | 16 | 16,000 | 1,000<br>2,000 | 15<br>16 | 15,000<br>32,000 |
| 15-4-19 | 1,500 | 18.00 | 27,000 | - | - | - | 1,000<br>2,000<br>1,500 | 15<br>16<br>18 | 15,000<br>32,000<br>27,000 |
| 20-4-19 | - | - | - | 1,200 | 18 | 21,600 | 1,000<br>2,000<br>300 | 15<br>16<br>18 | 15,000<br>32,000<br>5,400 |
| 25-4-19 | - | - | - | 300 | 18 | 5,400 | 1,000<br>2,000 | 15<br>16 | 15,000<br>32,000 |
| 26-4-19 | - | - | - | 1,000 | 18 | 16,000 | 1,000<br>1,000 | 15<br>16 | 15,000<br>16,000 |
| 28-4-19 | 500 | 17.00 | 8,500 | - | - | - | 1,000<br>1,000<br>500 | 15<br>16<br>17 | 15,000<br>16,000<br>8,500 |
| 30-4-19 | - | - | - | 50 | 17 | 850 | 1,000<br>1,000<br>450 | 15<br>16<br>17 | 15,000<br>16,000<br>7,650 |



**(ii)** Value of Material consumed and Closing Stock

| | Weighted Average Method (Rs.) | LIFO method (Rs.) |
|---|---|---|
| Opening Stock as on 01-04-2019 | 15,000 | 15,000 |
| Add: Purchases | 83,500 | 83,500 |
| | **98,500** | **98,500** |
| Less: Return to supplier | 5,400 | 5,400 |
| Less: Abnormal loss | 824 | 850 |
| **Less: Closing Stock as on 30-04-2019** | **40,376** | **38,650** |
| **Value of Material Consumed** | **51,900** | **53,600** |

## PROBLEM NO 13:

**Statement of Total Cost and Ranking**

| item | Units | % of Total units | Unit cost (Rs.) | Total cost (Rs.) | % of Total cost | Ranking |
|---|---|---|---|---|---|---|
| A | 12,000 | 15.30% | 30.00 | 3,60,000 | 12.97% | 2 |
| B | 18,000 | 22.94% | 3.00 | 54,000 | 1.95% | 11 |

| | | | | | | |
|---|---|---|---|---|---|---|
| C | 6,000 | 7.65% | 35.00 | 2,10,000 | 7.57% | 5 |
| D | 750 | 0.96% | 220.00 | 1,65,000 | 5.95% | 7 |
| E | 3,800 | 4.84% | 75.00 | 2,85,000 | 10.27% | 4 |
| F | 400 | 0.51% | 105.00 | 42,000 | 1.51% | 12 |
| G | 600 | 0.76% | 300.00 | 1,80,000 | 6.49% | 6 |
| H | 300 | 0.38% | 350.00 | 1,05,000 | 3.78% | 10 |
| I | 3,000 | 3.82% | 250.00 | 7,50,000 | 27.03% | 1 |
| J | 20,000 | 25.49% | 7.50 | 1,50,000 | 5.41% | 9 |
| K | 11,500 | 14.66% | 27.50 | 3,16,250 | 11.40% | 3 |
| L | 2,100 | 2.68% | 75.00 | 1,57,500 | 5.68% | 8 |
| | 78,450 | 100.00% | | 27,74,750 | 100.00% | |

**Statement of classification of Inventory**

| Rankin | Item | % of Total units | Cost (Rs.) | % of Total Cost | Category |
|---|---|---|---|---|---|
| **1** | **I** | 3.82% | 7,50,000 | 27.03% | |
| **2** | **A** | 15.30% | 3,60,000 | 12.97% | |
| **3** | **K** | 14.66% | 3,16,250 | 11.40% | |
| **4** | **E** | 4.84% | 2,85,000 | 10.27% | |
| **5** | **C** | 7.65% | 2,10,000 | 7.57% | |
| **Total** | | **46.27%** | **19,21,250** | **69.24%** | **A** |
| **6** | **G** | 0.76% | 1,80,000 | 6.49% | |
| **7** | **D** | 0.96% | 1,65,000 | 5.95% | |
| **8** | **L** | 2.68% | 1,57,500 | 5.68% | |
| **9** | **J** | 25.49% | 1,50,000 | 5.41% | |
| **Total** | | **29.89%** | **6,52,500** | **23.53%** | **B** |
| **10** | **H** | 0.38% | 1,05,000 | 3.78% | |
| **11** | **B** | 22.94% | 54,000 | 1.95% | |
| **12** | **F** | 0.51% | 42,000 | 1.51% | |
| | | **23.84%** | **2,01,000** | **7.24** | |
| | **12** | 100% | 27,74,750 | 100% | |



## ASSIGNMENT PROBLEMS

### MODEL 1: ECONOMIC ORDER QUANTITY

**PROBLEM 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 : Rs.50
Cost per kg. of raw materials : Rs.2
Storage costs : 8% on average inventory

*(A) (NEW SM, OLD SM) (ANS.:2,500 UNITS, 4 PER YEAR)*

**PROBLEM 2:** ASJ manufacturer produces a product which requires a component costing Rs.1000 per unit. Other information related to the component are as under:

| | |
|---|---|
| Usage of component | 1500 units per month |
| Ordering cost | Rs.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 6000 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.

*(A) (M18 (OLD) – 5 M)*

**PROBLEM 3:** Aditya Brothers supplies surgical gloves to nursing homes and polyclinics in the city. These surgical gloves are sold in pack of 10 pairs at price of Rs. 250 per pack. For the month of November 2015, it has been anticipated that a demand for 60,000 packs of surgical gloves will arise. Aditya Brothers purchases these gloves from the manufacturer at Rs. 228 per pack within a 4 to 6 days lead time. The ordering and related cost is Rs. 240 per order. The storage cost is 10% p.a. of average inventory investment.



**Required:**

**i)** Calculated the Economic Order Quantity (EOQ)

**ii)** Calculate the number of orders needed every year

**iii)** Calculate the total cost of ordering and storage of the surgical gloves.

**iv)** Determine when the next order to be placed should. (Assuming that the company does maintain a safety stock and that the present inventory level is 10,033 packs with a year of 360 working days).

*B) (RTP M-18, RTP, N15, MTP M19 (N), RTP M19(N& O)) (ANS.: A. 3,894 PACKS, B. 185 ORDERS, C. RS.88, 780.20, D. IMMEDIATELY)*

**PROBLEM 4:** RST Limited has received an offer of quantity discount on its order of materials as under:

| Price per tone | Tones number |
|---|---|
| Rs. 9,600 | Less than 50 |
| Rs. 9,360 | 50 and less than 100 |
| Rs. 9,120 | 100 and less than 200 |
| Rs. 8,880 | 200 and less than 300 |
| Rs. 8,640 | 300 and above |

The annual requirement for the material is 500 tonnes. The ordering cost per order is Rs.12,500 and the stock holding cost is estimated at 25% of the material cost per annum.

**Required:**

**a)** Compute the most economical purchase level.

**b)** Compute EOQ if there are no quantity discounts and the price per tonne is Rs. 10,500.

*(B) (OLD PM, N04 - 6M, N10 - 5M) (ANS.: I. 300, II. 69 TONNES)*

## MODEL 2: INVENTORY LEVELS

**PROBLEM 5:** PQR Ltd. manufactures a special product, which requires 'ZED'. The following particulars were collected for the year 2005-06:

1. Monthly demand of ZED : 7,500 units
2. Cost of placing an order : Rs.500

3. Re-order period : 5 to 8 weeks
4. Cost per unit : Rs.60
5. Carrying cost % p.a. : 10%
6. Normal usage : 500 units per week
7. Minimum usage : 250 units per week
8. Maximum usage : 750 units per week

**Required:**

a) Re- order quantity
b) Re –order level
c) Minimum stock level
d) Maximum stock level
e) Average stock level

*(A) (OLD PM, N06 - 10M) (ANS.: 3,873 UNITS, 6,000 UNITS, 2,750 UNITS, 8,623 UNITS, 5,687 UNITS)*

**PROBLEM 6:** 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 | Rs. 1 |
| Ordering cost | Rs. 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

What should be the inventory level (ideally) immediately before the material order is received?

*(B) (M 05 – 4M) (Ans.: ROQ=1,100, ROL= 1,500, Safety Stock= 1000 Units)*



**PROBLEM 7:** Aditya Ltd. produces a product 'Exe' using a raw material Dee. To produce one unit of Exe, 2 kg of Dee is required. As per the sales forecast conducted by the company, it will able to sale 10,000 units of Exe in the coming year. The following is the information regarding the raw material Dee:

1. The Re-order quantity is 200 kg. Less than the Economic Order Quantity (EOQ).
2. Maximum consumption per day is 20 kg. More than the average consumption per day.
3. There is an opening stock of 1,000 kg.
4. Time required to get the raw materials from the suppliers is 4 to 8 days.
5. The purchase price is Rs.125 per kg.

There is an opening stock of 900 units of the finished product Exe. The rate of interest charged by bank on Cash Credit facility is 13.76%. To place an order company has to incur Rs. 720 on paper and documentation work.

From the above information find out the followings in relation to raw material Dee:

a) Re-order Quantity
b) Maximum Stock level
c) Minimum Stock level
d) Calculate the impact on the profitability of the company by not ordering the EOQ. [Take 364 days for a year].

*(OLD PM, MTP2 M18, RTP M15. MTP19, RTP19) (ANS.: (A). 1,000 KG., (B). 1,440 KG., (C). 260 KG., (D). RS.344)*

**Note:**_____

## MODEL 3: INVENTORY TURNOVER RATIO

**PROBLEM 8:** From the following data for the year ended 31st December calculate the inventory turnover ratio of the two items, and put forward your comments on them.

| Particulars | Material A | Material B |
|---|---|---|
| Opening Stock | 10,000 | 9,000 |
| Purchases during the year | 52,000 | 27,000 |
| Closing Stock | 6,000 | 11,000 |

*(C) (NEW SM) (ANS.: MATERIAL A – 7 TIMES, MATERIAL B – 2.5 TIMES)*

## MODEL 4: RAW MATERIAL VALUATION

**PROBLEM 9:** A Manufacturer of Surratt purchased the Chemicals A, B and C from Mumbai.

| | |
|---|---|
| Chemical A: 3,000 kg. @ Rs 4.20 per kg. | 12,600 |
| Chemical B: 5,000 kg. @ Rs 3.80 per kg. | 19,000 |
| Chemical C: 2,000 kg. @ Rs 4.75 per kg. | 9,500 |
| Sales Tax | 2,055 |
| Railway Freight | 1,000 |
| **Total cost** | 44,155 |

A shortage of 200 kgs in chemical A, of 280 kgs in chemical B and of 100 kgs in Chemical C was noticed due to breakages (Assume as normal loss). At Surat, the manufacturer paid Octroi duty @ Rs.0.10 per kg. He also paid cartage Rs.22 for chemical A, Rs.63.12 for Chemical B and Rs.31.80 for Chemical C. Calculate the stock rate that you would suggest for pricing issue for chemicals assuming a provision of 5% towards further deterioration.

*(C) (ANS.: FOR A: 5.2 PER KG, FOR B: 4.68 PER KG, FOR C 5.76 PER KG)*

## MODEL 6: ABC ANALYSIS

**PROBLEM 10:** From the following details, draw a plan of ABC selective control:

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



*(C) (NEW SM)*

# ADDITIONAL PROBLEMS FOR SELF PRACTICE

## MODEL 1: ECONOMIC ORDER QUANTITY

**PROBLEM 1:**

i) The annual demand for an item of raw material is 4,000 units and the purchase Price is expected to be Rs. 90 per unit. Cost of processing of an order is Rs. 135 and annual cost of storage is estimated to be Rs. 12 per unit. Find out the optimal order quantity and total relevant cost for the order?

ii) If the estimated cost of Rs.135 for processing of an order is incorrect and the correct cost is Rs. 80 only, find out the difference in total cost due to error in estimation?

iii) A supplier is ready to supply the raw materials at a price of Rs. 86 per unit if the entire annual demand is ordered at a time. Suggest the order quantity that should be placed to lower total cost. Information regarding ordering cost and carrying cost given at (i) above is to be taken.

*(B) (MTP N18(N&O),N17) (ANS.: (I) ORDER QUANTITY IS 300 UNITS AND TOTAL RELEVANT COST IS RS.3600 ; (II) DIFFERENCE IN TOTAL COST IS RS.829 ; (III) THIS SPECIAL OFFER AT RS.86 PER UNIT SHOULD NOT BE ACCEPTED AS TOTAL COST WILL INCREASE BY RS.4,535)*

**PROBLEM 2:** Assume that the following quantity discount schedule for a particular bearing is available to a

**Retail store:**

| Order size (unit) | Discount |
|---|---|
| 0 – 49 | 0% |
| 50 – 99 | 5% |
| 100 - 199 | 10% |
| 200 and above | 12% |

The cost of a single bearing with no discount is Rs. 30. The annual demand is 250 units. Ordering cost is Rs. 20 per order and annual inventory carrying cost is Rs. 4 per unit. Determine the optimal order quantity and the associated minimal total cost of inventory and purchasing costs, if shortages are not allowed. *(A) (OLD PM) (ANS.:100 UNITS, RS.7,000)*

**PROBLEM 3:** A company manufactures a product from a raw material, which is purchased at Rs.60 per kg. The company incurs a handling cost of Rs.360 plus freight of Rs.390 per order. The carrying cost of inventory of raw material is Rs.0.50 per kg per month. In addition, the cost of working capital finance on the investment in inventory of raw material is Rs.9 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.

a) Calculate the economic order quantity of raw materials. *(N 01 - 10M)*

b) Advice, how frequently should orders for procurement be placed.

c) 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.

*(A) (NEW SM, OLD SM, OLD PM)(MTP N18(N&O)) (ANS.: A. 2000, B. 18 DAYS, C. 2%)*



**Concept question:**

**(1)** What is EOQ if carrying cost per unit per quarter is RS.3 *(Ans:RS.2236)*

**Note:**_____

## MODEL 2: INVENTORY LEVELS

**PROBLEM 4: (PRINTED SOLUTION AVAILABLE)** IPL Limited uses a small casting in one of its finished products. The castings are purchased from a foundry. IPL Limited purchases 54,000 castings per year at a cost of Rs. 800 per casting. The castings are used evenly throughout the year in the production process on a 360-days-per-year basis. The company estimates that it costs Rs.9,000 to place a single purchase order and about Rs.300 to carry one casting in inventory for a year. The high carrying costs result from the need to keep the castings in carefully controlled temperature and humidity conditions, and from the high cost of insurance. Delivery from the foundry generally takes 6 days, but it can take as much as 10 days. The days of delivery time and percentage of their occurrence are shown in the following tabulation:

| Delivery time (days) : | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|
| Percentage of occurrence : | 75 | 10 | 5 | 5 | 5 |

**Required:**

a) Compute the economic order quantity (EOQ).

b) Assume the company is willing to assume a 15% risk of being out of stock. What would be the safety stock? The re-order point?

c) Assume the company is willing to assume a 5% risk of being out of stock. What would be the safety stock? The re-order point?

d) Assume 5% stock-out risk. What would be the total cost of ordering and carrying inventory for one year?

e) Refer to the original data. Assume that using process re-engineering the company reduces its cost of placing a purchase order to only Rs.600. In addition company estimates that when the waste and inefficiency caused by inventories are considered, the true cost of carrying a unit in stock is Rs. 720 per year.

i) Compute the new EOQ.

ii) How frequently would the company be placing an order, as compared to the old purchasing policy?

***(A) (OLD PM) (ANS.: (A) 1,800 CASTINGS, (B) 1,050 CASTIGS (C) 450 CASTINGS, 1,350 CASTINGS, (D) RS.2,70,000, RS.4,05,000, (E) 300 CASTINGS, 2 DAYS)***

**Note:**_____

## MODEL 3: RM ISSUE METHODS

**PROBLEM 5**: The following transactions in respect of material Y occurred during the six months ended 30th June, 20X1:

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



**Required:**

a) 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.

b) When and why would you recommend the LIFO method of pricing material issues?

***(C) (NEW SM) (ANS.: CHIEF ACCOUNTANT ARGUES IS CORRECT)***

## MODEL 4: ABC ANALYSIS

**PROBLEM 6: (PRINTED SOLUTION AVAILABLE)** M/s Tyro tubes trades in four wheeler tires and tubes. It stocks sufficient quantity of tyres of almost every vehicle. In year end 2011-12, the report of sales manager revealed that M/s Tyro tubes experienced stock-out of tyres. The stock-out data is as follows:

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

M/s Tyro tubes loses Rs.150 per unit due to stock-out and spends Rs. 50 per unit on carrying of Inventory.

Determine optimum safest stock level.

*Demand that could not be fulfilled due to insufficient stock of tyres.

***(A) (NEW SM) (ANS.: AT SAFETY STOCK LEVEL OF 20 UNITS, TOTAL COST IS LEAST I.E. RS. 2,140.)***

**Note:**_____

# THE END