



# Material Cost

## 1. EOQ AND EVALUATION OF DISCOUNT POLICY

- Ordering cost ₹ 75 per order, carrying cost 20%, and value of material ₹ 1 per unit. Annual requirement 12000. Calculate EOQ.
- Co produces final product X monthly demand of X is 1500 units. Final product X requires 5 kg of raw material. Ordering cost ₹ 15 per order. Detoration and obsolesces cost ₹ 10 per unit. And co also incurred carrying cost of 15% per annum as interest cost and co incurs storage cost of ₹ 450000 for 90000 units. Purchase price is ₹ 100 per unit. Find EOQ.
- A manufacturer uses 200 units of a component every month and he buys them entirely from outside supplier. The order placing and receiving cost is ₹ 100 and annual carrying cost is ₹ 12. Form this set of data calculate EOQ. What is the ordering cost and carrying cost at EOQ level.
- Form the following particulars find out the EOQ-
 

Annual demand	12,000 units
Ordering cost	₹ 90 per order
Inventory carrying cost per annum	Rs 15
- The annual carrying cost of Material X is ₹ 3.60 per unit and its total carrying cost is ₹ 9000 per annum. What would be the EOQ for material X if there is no Safety Stock of material X? **(Nov 08 – 2 marks)**
- 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? **(Nov 07)**
- 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 ₹ 0.02 per day. The lead period is 32 days. Compute EOQ, Reorder Level, Number of orders per year, Time lag between two purchases and associated cost. Assume no of working days 360. **(Nov 96)**

8. 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 inventory
(SM)		

9. Annual requirement – 24000 units

Ordering cost – ₹ 300/order

Carrying cost – ₹ 1.50/unit/annum

Compute inventory costs for order sizes 1000, 2000, 3000, 4000, 6000 and 12000 units.

10. Tata motors purchase 9,000 motor spare parts for its annual requirements ordering one month's requirement at a time. Each spare part cost ₹ 20. The ordering cost per order is ₹ 15 and the carrying charges are 15% of the average inventory per year. You have been asked to suggest a more economical purchasing policy for the company.

11. Ordering cost ₹ 75 per order, carrying cost 20%, value of material ₹ 1 per unit. Annual requirement 12000. Calculate EOQ. Supplier is ready to offer 5% discount if order size is 12000 units, whether this policy is acceptable or not. If supplier is ready to offer discount of 2% if order size is 6000 units. Assumption 1. Discount policy will not change inventory carrying cost. 2. Assume discount policy will change inventory carrying cost.

12. Form the following particulars find out the EOQ-

Annual demand	24,000 units
Ordering cost	₹ 90 per order
Inventory carrying cost per annum	12%, purchase price 25 ₹
Advice Company if it is proposes to place monthly order if discount is 4%	
Assume carrying cost will change as per discount policy.	

13. The Tata motors ltd uses about 75,000 valves per year and the usage is fairly constant at 6,250 per month. The valves cost ₹ 1.50 per unit when bought in quantities and the carrying cost is estimated to be 20% of average inventory investment on the annual basis. The cost to place an order and process the delivery is ₹ 18. It takes 45 days to receive from the date of an order and a safety stock of 3,250 valves is required. You are required to determine :

- The most economic order quantity and frequency of orders.
- The order point
- The most economic order quantity if the valves cost ₹ 4.50 each instead of ₹ 1.50 each.

14. The complete gardener is deciding on the EOQ for two brands of lawn fertilizers- Super Grow and Nature's Own. The following information is collected:

Particulars	Super Grow	Nature's Own
Annual demand	2000 bags	1280 bags
Relevant Ordering Cost per purchase order	₹ 1200	₹ 1400
Annual relevant carrying cost per bag	₹ 480	₹ 560

- i. Compute EOQ for both products
  - ii. For the EOQ, what is the sum of the total annual relevant ordering costs and total annual relevant carrying costs for both products
  - iii. For the EOQ, compute the number of deliveries per year for both the products. **(Nov 99/SM)**
15. A manager has decided to place order for minimum quantity of 500 no. of a particular item in order to get a discount of 10%. Form the records, it was found that in the last year, 8 orders each of size 200 no's have been placed. Given ordering cost = 500/order, inventory carrying cost = 40% of inventory value, and cost/unit = 400, is the manager justified in his decision? What is the effect of his decision to the company?
16. Anil & Company buys its annual requirement of 36,000 units in 6 installments. Each unit costs ₹ 1 and the ordering cost is ₹ 25. The inventory carrying cost is estimated at 20% of unit value. FIND the total annual cost of the existing inventory policy. CALCULATE, how much money can be saved by Economic Order Quantity? (SM)
17. The annual demand for an item of raw material is 4,000 units and the purchase price is expected to be ₹ 90 per unit. The incremental cost of processing an order is ₹ 135 and the annual cost of storage is estimated to be ₹ 12 per unit. COMPUTE the optimal order quantity and total relevant cost of this order quantity?
- Suppose that ₹ 135 as estimated to be the incremental cost of processing an order is incorrect and should have been ₹ 80. All other estimates are correct. ESTIMATE the difference in cost on account of this error?
- Assume at the commencement of the period that a supplier offers 4,000 units at a price of ₹ 86. The materials will be delivered immediately and placed in the stores. Assume that the incremental cost of placing the order is zero and original estimate of ₹ 135 for placing an order for the economic batch is correct. ANALYSE, should the order be accepted? (Mock Test Paper 1 Nov 18)
18. 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:
- a) Economic order quantity.
  - b) If the minimum lot size to be supplied is 4,000 units, what is the extra cost, the company has to incur?
  - c) What is the minimum carrying cost, the company has to incur? (SM)

19. KL Limited produces product 'M' which has a quarterly demand of 8,000 units. The product requires 3kg. Quantity of material 'X' for every finished unit of product. The other information are follows:

Cost of material 'X'	:	₹ 20 per kg.
Cost of placing an order	:	₹ 1,000 per order
Carrying Cost	:	15% per annum of average inventory

You are required:

- Calculate the Economic Order Quantity for material 'X'.
- 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 installments? (Nov 2013 – 5 marks)

20. A company manufactures a special product which requires a component Alpha. Following particulars are collected for a year:

Particulars	
Annual demand of Alpha	8,000 units
Cost per unit of Alpha	₹ 400
Cost of placing an order	₹ 200 per order
Carrying cost % p.a.	20%

The company has been offered a quantity discount of 4% on the purchase of Alpha, provided the order size is 4,000 component at a time.

- Compute EOQ
- Advise whether the quantity discount offer can be accepted? (Nov 07/SM)

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

Required:

- Calculate the economic order quantity of raw materials.
- Advice, how frequently should orders for procurement be placed.
- 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? (May 2014 – 8 marks)

22. a. COMPUTE E.O.Q. and the total cost for the following:

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

b. ALSO DETERMINE the total cost that would result for the items if a new price of ₹ 12.80 is used (SM)

23. HKC Ltd manufacturers of a special product follows the policy of EOQ for one of its components. The components details are as follows.

Purchase price of component ₹ 200 per component

Cost of an order ₹ 100

Annual cost of carrying/unit 10% of purchase price.

Total cost of inventory carrying and ordering p.a. ₹ 4000

The co has been offered a discount of 2% on the price of component provided the lot size is 2000 components at a time. Required

i. EOQ

ii. Advice whether the quantity discount offered can be accepted

iii. Would your advice differ if the co. is offered 5% discount on a single order. (assume that inventory carrying cost does not change according to discount policy)

24. HKC Ltd is reviewing its stock policy, and has the following alternatives available for the evaluation of stock :

Particulatrs		Units
1	Purchase stock twice in a month	400 units
2	Purchase monthly	800 units
3	Purchase every three months	2400 units
4	Purchase Six monthly	4800 units
5	purchase annually	9600 units

It is ascertained that the purchase price per unit is ₹ 40 for deliveries upto 2000 units. A 5% discount is offered by the supplier on the whole order where deliveries are 2001 to 4000 units and 10% reduction on total order for deliveries in excess of 4000 units. Each purchase order incurs administration costs of ₹ 250. Interest on capital and other storage costs are ₹ 12.50 per unit of average stock quantity held. Calculate the optimum order size. (Nov 09)

25. EXE Limited has received an offer of quantity discounts on its order of materials as under:

Price Per ton (₹)	Ton (Nos.)
1,200	Less than 500
1,180	500 and less than 1,000
1,160	1,000 and less than 2,000
1,140	2,000 and less than 3,000
1,120	3,000 and above.

The annual requirement for the material is 5,000 tons. The ordering cost per order is ₹ 1,200 and the stock holding cost is estimated at 20% of material cost per annum. You are required to COMPUTE the most economical purchase level.

WHAT will be your answer to the above question if there are no discounts offered and the price per ton is ₹ 1,500? (SM)

26. The purchase department of your organization has received an offer of quantity discounts on its orders of materials as under :

Ordering quantities (tonnes)	Price per tonnes ₹
Less than 500	1400
500 and less than 1000	1380
1000 and less than 2000	1360
2000 and less than 3000	1340
3000 and above	1320

The annual demand for the material is 5,000 tonnes. Stock holding costs are 20% of material cost p.a. the delivery cost per order is ₹ 1200. The purchase quantity options to be considered are 400 tonnes, 500 tonnes, 1000 tonnes, 2000 tonnes, and 3000 tonnes. **(May 94)**

27. The quarterly production of a company's product which has a steady market is 20000 units. Each unit of a product requires 0.5 kg of raw material. The cost of placing one order of 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 1000 kg of raw material is maintained by the company. The company has been able to negotiate the following discount structure with the supplier:

Ordering quantities (kgs)	Discount in ₹
Up to 6000	Nil
6001-8000	400
8001-16000	2000
16001-30000	3200
30001-45000	4000

Calculate:

- Reorder point taking 30 days in month
- Prepare a statement showing the total cost of procurement and storage of raw materials after considering the discount, if the company elects to place 1,2,4 or 6 order in a year.
- State the number of orders which the company should place to minimize the costs after taking EOQ into consideration.

28. RST Limited has received an offer of quantity discount on its order of materials as under:

Price per ton	Order Size (in ton)
₹ 9,600	Less than 50
₹ 9,360	50 and less than 100
₹ 9,120	100 and less than 200
₹ 8,880	200 and less than 300
₹ 8,640	300 and above

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

- Compute the most economical purchase level.
- Compute EOQ if there are no quantity discounts and the price per ton is ₹ 10,500. (Nov 2010 - 5 marks)

29. A company uses a purchased component in an assembly. It follows a policy of EOQ for procurement of the component. The purchase price of the component is ₹ 800 each and the cost of carrying one unit is 15% p.a. the cost of placing an order is ₹ 150. The company has estimated the total cost of carrying and order placement at ₹ 36,000. If the supplier has offered a discount of 3% on the purchase price if the entire requirement of component is covered in two purchase orders in a year. Required :

- Find EOQ
- Calculate the total cost of component procurement and storage if the discount offer is accepted. Compare this cost with the total cost of EOQ.
- What further discount, if any should be negotiated for minimizing the cost? (assume that inventory carrying cost does not vary according to discount policy)

30. Following information relating to a type of raw material is available :

Annual demand	2000 units
Unit price	20 ₹
Ordering cost per order	20 ₹
Storage cost	2% p.a.
Interest Rate	8% p.a.
Lead time	Half month.

Calculate EOQ and total annual inventory cost in respect of the particular raw material. (Nov 08)

31. A limited a toy company purchases its requirement of raw material from S. limited at ₹ 120 per kg. The company incurs a handling cost of ₹ 400 plus freight of ₹ 350 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 ₹ 15 per kg per annum. The annual production of the toys is 60,000 units and 5 units of toys are obtained from one kg. of raw material.

Required:

- Calculate the EOQ of raw materials.
  - Advise, how frequently company should order to minimize its procurement cost. Assume 360 days in a year.
  - Calculate the total ordering cost & inventory carrying cost/annum as per EOQ (May 22 – 5 Marks)
32. 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 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:

- Calculate Economic Order Quantity.
- Calculate number of orders needed every year.
- Calculate the total cost of ordering and storage bowls for the year.
- 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. (May 2008 – 2+1+2+3 = 8 marks)

33. 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 ₹ 30. The annual demand is 250 units. Ordering cost is ₹ 20 per order and annual inventory carrying cost is ₹ 4 per unit. Determine the optimal order quantity and the associated minimum total cost of inventory and purchasing costs, if shortages are not allowed.

34. An automobile company purchases 27,000 spare parts for its annual requirements. The cost per order is 240 and annual carrying cost of average inventory is 12.5%. Each spare part cost 50. At present, the order size is 3,000 spare parts. (Assume total number of days in a year is 360 days). Find out:
- How much cost will be saved by opting EOQ model?
  - The reorder point under EOQ if lead time is 12 days.
  - How frequently should order for procurement be placed under EOQ model? (Nov 2020 – 10 Marks).



## 2. VARIOUS STOCK LEVELS

35. P Ltd uses 3 type of materials A, B and C for production of product X. The relevant monthly data for consumption of materials are given below. Calculate for each material all levels:

Particulars	A	B	C
Normal usage	200 units	150 units	180 units
Minimum usage	100 units	100 units	90 units
Maximum usage	300 units	250 units	270 units
Reorder quantity	750 units	900 units	720 units
Reorder period	2 to 3 months	3 to 4 months	2 to 3 months

36. From the details given below, CALCULATE:

- (i) Re-ordering level
- (ii) Maximum level
- (iii) Minimum level
- (iv) Danger level.

Re-ordering quantity is to be calculated on the basis of following information: Cost of placing a purchase order is ₹ 20

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

Purchase price per unit inclusive of transportation cost is ₹ 50

Annual cost of storage per units is ₹ 5.

Details of lead time: Average- 10 days, Maximum- 15 days, Minimum- 5 days. For emergency purchases- 4 days.

Rate of consumption: Average: 15 units per day, Maximum: 20 units per day. (SM)

37. 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 ₹ 4,000

Number of units to be purchased during the year is 5,00,000

Purchase price per unit inclusive of transportation cost is ₹ 50

Annual cost of storage per units is ₹ 10.

Details of lead time: Average- 10 days, Maximum- 15 days, Minimum- 5 days. For emergency purchases- 4 days.

Rate of consumption: Average: 1,500 units per day, Maximum: 2,000 units per day. (SM)

38. Calculate the various stock levels for Part K from the following information **(May 96)**

Particulars	Amount
Quantity to be purchase	5000 units
Cost of placing an order	₹ 20 per order
Maximum Lead Time	15 days
Average Lead Time	10 days
Minimum Lead Time	6 days
Cost per unit	₹ 50 per unit
Carrying cost p.a.	₹ 5 per unit per annum
Normal usage	15 units per day
Maximum usage	20 units per day

39. In a company, weekly minimum and maximum consumption of material A are 25 and 75 units respectively. The reorder 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. **(May 95)**

40. Reorder quantity of material X is 5000 kg. maximum level 8000 kg. minimum usage 50 kg. per hour, minimum reorder period 4 days, daily working hours in the factory is 8 hours. You are required to calculate the Reorder level of material X **(May 10 – 2 marks)**

41. HKC required requires 1000 units of material X on an average for a week which is purchased at a price of ₹ 30 per unit. The ordering cost is ₹ 150 per purchase order and inventory carrying cost per unit amounts to ₹ 0.06 per week. The reorder period is 1 to 3 weeks and the weekly usage of material X varies from 750 to 1250 units. Calculate EOQ, Reorder stock level, Minimum Stock Level and Maximum stock level. **(Nov 09)**

42. A company manufactures 5000 units of a product per month. The cost of placing an order is ₹ 100. The purchase price of the raw material is ₹ 10 per kg. the reorder period is 4 to 8 weeks. The consumption of raw material varies from 100 kgs to 450 kgs per week, the average consumption being 275 kg. the carrying cost of inventory is 20% per annum. From the above calculate EOQ, Reorder stock level, Minimum Stock Level and Maximum stock level. **(Nov 02)**

43. HKC manufactures picture tube for TV. The details of their operations during the year are :

Average Monthly market demand	2000 tubes
Cost of placing an order	₹ 100 per order
Reorder period	6-8 weeks
Cost per unit	₹ 500
Carrying cost % p.a.	20%
Normal usage	100 tubes per week
Minimum usage	50 tubes per week
Maximum usage	200 tubes per week

Compute:

- i. EOQ
- ii. Reorder Level, Maximum and Average Stock Levels
- iii. If the supplier is willing to supply quarterly 1500 units at a discount of 5% is it worth accepting? **(May 98/00)**

44. A company buys in lots of 6250 units which is a 3 months supply. The cost per unit is ₹ 2.40. Each order costs ₹ 45 and inventory carrying cost is 15% of average inventory value.

- i. What is total annual cost of existing inventory policy
- ii. How much money could be saved by employing the EOQ
- iii. If the company operates 250 days a year, procurement time is 10 days and safety stock is 500 units. What will be the reorder level, maximum level, minimum level and average inventory level.

45. HKC manufactures a special product, which requires Z following particulars were collected for the year:

Monthly demand of Z	7500 units
Cost of placing an order	₹ 500
Reorder period	5 to 8 weeks
Cost per unit	₹ 60
Carrying cost % p.a.	10%
Normal usage	500 units per week
Minimum usage	250 units per week
Maximum usage	750 units per week

Calculate EOQ, Reorder stock level, Minimum Stock Level and Maximum stock level, Average stock level. **(Nov 06 – 10 marks)**

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

Raw material	Usage per unit of product (kg.)	Reorder quantity (kg.)	Price per kg	Delivery period			Reorder level (kg.)	Minimum level (kg.)
				Minimum	Average	Maximum		
A	10	10000	0.10	1	2	3	8000	
B	4	5000	0.30	3	4	5	4750	
C	6	10000	0.15	2	3	4		2000

Weekly production varies from 175 to 225 units, averaging 200 units of the said product. Compute the following quantities:

- i. Minimum stock of A
- ii. Maximum stock of B
- iii. Reorder Level of C
- iv. Average stock level of A (SM)

47. A company uses four raw materials A, B, C and D for a particular product for which the following data apply

Raw Material	Usage per unit of product (Kg.)	Re-order Quantity (Kg.)	Price per Kg. (₹)	Delivery period (in weeks)			Re- order level (Kg.)	Minimum level (Kg.)
				Minimum	Average	Maximum		
A	12	12,000	12	2	3	4	60,000	?
B	8	8,000	22	5	6	7	70,000	?
C	6	10,000	18	3	5	7	?	25,500
D	5	9,000	20	1	2	3	?	?

Weekly production varies from 550 to 1,250 units, averaging 900 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?
- (v) Re-order level of D?
- (vi) Minimum Stock level of D? (RTP May 2020)

48. HKC manufactures a special product K. the following particulars are collected for the year:

Annual consumption	12000 units (360 days in year)
Cost per unit	₹ 1
Ordering cost	₹ 12 per order
Inventory carrying cost	24%
Normal lead time	15 days
Safety stock	30 days consumption

Required :

- i. Compute Reorder Quantity and Reorder Level.
- ii. What should be the inventory level (ideally) immediately before the material order is received?(**May 05**)

49. HKC publishing house purchases 72000 rims of a special type paper per annum at cost ₹ 90 per rim. Ordering cost per order is ₹ 500 and the carrying cost is 5% per year of the inventory cost. Normal lead time is 20 days and the safety stock is Nil. Assume 300 working days in a year. Required:

- i. Calculate EOQ
- ii. Calculate the Reorder Inventory Level
- iii. If a 1% discount is offered by the supplier for purchases in lots of 18000 rims or more, should the publishing house accept the proposal? (**Nov 08**)

50. 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	:	₹ 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.

51. Following details are related to a manufacturing concern: (Nov 2014 – 5 marks)

Reorder level	160000 units
Economic order quantity	90000 units
Minimum stock level	100000 units
Maximum stock level	190000 units
Average lead time	6 days
Difference between minimum lead time and maximum lead time	4 days

Calculate

- Maximum consumption per day
- Minimum consumption per day

52. a) Compute E.O.Q. and the total variable cost for the following:

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

b) Determine the total cost that would result for the items if an incorrect price of ₹ 12.80 is used.

53. 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. (SM)

54. A company manufactures 5,00,000 units of a product per month. The cost of placing an order is ₹1,000. The purchase price of the raw material is ₹50 per kg. The re-order period is 4 to 8 days. The consumption of raw materials varies from 14,000 kg to 18,000 kg per day, the average consumption being 16,000 kg. The carrying cost of inventory is 20% 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 |                     |

55. 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 ₹ 250 per pack.

For the month of April 2018, 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 ₹ 228 per pack within a 4 to 6 days lead time. The ordering and related cost is ₹ 240 per order. The storage cost is 10% p.a. of average inventory investment. Required:

- CALCULATE the Economic Order Quantity (EOQ)
- CALCULATE the number of orders needed every year
- CALCULATE the total cost of ordering and storage of the surgical gloves.
- DETERMINE when should the next order to be placed. (Assuming that the company does not maintain a safety stock and that the present inventory level is 10,033 packs with a year of 360 working days).

56. Rounak Ltd. is the manufacturer of monitors for PCs. A monitor requires 4 units of Part-M. The following are the details of its operation during 20X8:

Average monthly market demand	2,000 Monitors
Ordering cost	₹ 1,000 per order
Inventory carrying cost	20% per annum
Cost of Part	₹ 350 per part
Normal usage	425 parts per week
Minimum usage	140 parts per week
Maximum usage	710 parts per week
Lead time to supply	3-5 weeks

COMPUTE from the above:

- Economic Order Quantity (EOQ). If the supplier is willing to supply quarterly 30,000 units of Part-M at a discount of 5%, is it worth accepting?
- Reorder level
- Maximum level of stock
- Minimum level of stock.

57. Ananya 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 be able to sell 10,000 units of Exe in the coming year. The following is the information regarding the raw material Dee:

- The Re-order quantity is 200 kg. less than the Economic Order Quantity (EOQ).
- Maximum consumption per day is 20 kg. more than the average consumption per day.
- There is an opening stock of 1,000 kg.
- Time required to get the raw materials from the suppliers is 4 to 8 days.
- The purchase price is ₹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 ₹ 720 on paper and documentation work. From the above information FIND OUT the followings in relation to raw material Dee:

- Re-order Quantity
- Maximum Stock level
- Minimum Stock level
- CALCULATE the impact on the profitability of the company by not ordering the EOQ. [Take 364 days for a year] (Mock Test Paper 2 May 19)

58. 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 31<sup>st</sup> 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:

- Compute the Economic Order Quantity.
- Advise whether the quantity discount offer can be accepted.

### 3. QUESTIONS ON STOCK OUT COSTS

59. Experience of CP Ltd of being stock out situation is as follows:

Stock out(no of units)	No of times
500	2
400	4
250	6
100	8
50	20
0	160
Total	200

Stock out cost is ₹ 40 per unit. Carrying cost per unit per annum ₹ 20. Determine optimum safety stock is to be maintained.

60. The following information is available relating to the stock out of firm :

Stock out ( units)	No of times	Probability
800	2	0.04
600	3	0.06
400	5	0.10
200	10	0.20
0	30	0.60
Total	50	1.00

The selling price of each unit is ₹ 200. The carrying cost is ₹ 19/unit. The stock out cost is ₹ 50/unit.

- If the firm wishes to never miss a sale, what should be the safety stock? what is the total cost associated with this level of safety stock ? what are the associated costs with safety stock of 600, 400, 200 and 0 units respectively.
- What is the optimal safety stock level?

61. M/s Tyro tubes trades in four wheeler tyres and tubes. It stocks sufficient quantity of tyres of almost every vehicle. In year end 2019-20, 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 of Stock Out
100	2
80	5
50	10
20	20
10	30
0	33



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

DETERMINE optimum safest stock level

62. DC Ltd distributes a wide range of water purifier system, one of its best selling items is a standard water purifier. The management of DC Ltd used the EOQ decision model to determine optimal number of standard water purifiers to order. Management now wants to determine how much safety stock to hold.

DC Ltd estimates annual demand (360 working days) to be 36,000 standard water purifiers. Using the EOQ decision model, the company orders 3,600 standard water purifiers at a time. The lead time for and order is 6 days. The annual carrying cost of one standard water purifier is ₹ 450. Management has also estimated the additional stock out costs would be ₹ 900 for shortage of each standard water purifier. DC Ltd has analysed the demand during 200 past reorder periods. The records indicate the following patterns:

Demand during lead time	Number of times quantity was demanded
540	6
560	12
580	16
600	130
620	20
640	10
660	6
Total	200

- Determine the level of safety stock for standard water purifier that the DC Ltd should maintain in order to minimize expected stock out costs and carrying costs. While computing carrying costs, assume that the safety stock is on hand at all times and that there is no overstocking caused by decrease in expected demand (consider safety stock levels of 0, 20, 40 and 60 units)
- What would be the DC Ltds new reorder point
- What factors DC Ltd should have considered in estimating stock out costs?

63. The following information is given to you-

Daily usage	Probability	Lead time	Probability
2 tons	20%	25 days	20%
3 tons	60%	35 days	50%
4 tons	20%	45 days	30%

The company's carrying cost of inventory is ₹ 2000 per ton whereas the stock out cost are estimated at ₹ 8000 per ton. Calculate the optimum level of stock that should be held by the company.

64. HKC Ltd. Uses small casting in one of its finished products. The castings are purchased from a foundry. HKC purchases 54000 castings per year at a cost of ₹ 800 per casting.

The casting are used evenly throughout the year in the production process on a 360 day per year basis. The company estimates that it costs ₹ 9000 to place a single purchase order and about ₹ 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 occurrences are shown in the following tabulation:

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

Required

- i. Compute the economic order quantity (EOQ)
- ii. Assume the company is willing to assume a 15% risk of being out of stock. What would be the safety stock? The reorder point?
- iii. Assume the company is willing to assume a 5% risk of being out of stock. What would be the safety stock? Reorder point?
- iv. Assume 5% stock out risk. What would be the total cost of ordering and carrying inventory for one year?
- v. Refer to the original data. Assume that using process reengineering the company reduces its cost of placing a purchase order to only ₹ 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 ₹ 720 per year.
  - a. Compute the new EOQ
  - b. How frequently would the company be placing an order, as compared to the old purchasing policy? (SM)

#### 4. Landed cost of material

65. At what price per unit would part no 8181 be entered in the stores ledger, if the following invoice was received from a supplier:

Invoice	Amount
200 units part number 8181 @ ₹ 5	1000
Less : discount 20%	200
	800
Add : SGST @ 12%	96
	896
Add : Packing charges (5 non-returnable boxes)	50
	946

Note :

- 2% discount will be given for payment in 30 days.
- Documents substantiating payment of GST is enclosed for claiming credit.(SM)

66. The particulars relating to the import of mobile phone made by HKC Ltd during January are given as below

- Mobile price : 1,000 pieces invoiced @ \$2.00 CIF Goa port
- Customs duty was paid @ 100% on invoice value ( which was converted to Indian currency by adopting an exchange rate of ₹ 40 per \$
- Clearing charges ₹ 1,800 for the entire consignment and
- Freight charges ₹ 1,400 for transporting the consignment from Goa port to factory premises.

It was found on inspection that 100 pieces of the above material were broken and therefore, rejected. There is no scrap value for the rejected part. No refund for the broken material would be admissible as per the terms of contract. The management decided to treat 40 pieces as normal loss and the rest 60 pieces as abnormal loss. The entire quantity of 900 pieces was issued to production.

Calculate:

- The total cost of material
- Unit cost of material issued to production, State briefly how the value of 100 pieces, rejected in inspection will be treated in cost.

67. A manufacturer organization has imported four types of materials. The invoice reveals the following data

Material	Quantity Kgs	Rate US \$ per Kg
A	1,000	1.50
B	2,000	1.25
C	1,500	2.00
D	3,000	1.00

- i. Import duty 23% of invoice value
- ii. Insurance 2% of invoice value
- iii. Freight and clearing ₹ 30,000
- iv. Exchange rate U.S. \$ 1 = ₹ 16
- v. 50% of materials imported are issued to production centres. While determining value of closing stock 10% allowance is provided to cover up storage loss.

Determine the value of closing stock of each type of materials.

68. An invoice in respect of a consignment of chemicals A and B provides the following information :

Particulars	(₹)
Chemical A: 10,000 kgs. at ₹ 10 per kg.	1,00,000
Chemical B: 8,000 kgs. at ₹ 13 per kg.	1,04,000
Basic custom duty @ 10% (Credit is not allowed)	20,400
Railway freight	3,840
<b>Total cost</b>	<b>2,28,240</b>

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. (SM)

69. SKD Company Ltd., not registered under GST, purchased material P from a company which is registered under GST. The following information is available for the one lot of 1,000 units of material purchased:

Listed price of one lot	₹ 50,000
Trade discount	@ 10% on Listed price
CGST and SGST (Credit Not available)	12% (6% CGST + 6% SGST)
Cash discount	@10%
(Will be given only if payment is made within 30 days.)	
Freight and Insurance	₹ 3,400
Toll Tax paid	₹ 1,000
Demurrage	₹ 1,000
Commission and brokerage on purchases	₹ 2,000
Amount deposited for returnable containers	₹ 6,000
Amount of refund on returning the container	₹ 4,000
Other Expenses	@ 2% of total cost

20% of material shortage is due to normal reasons.

The payment to the supplier was made within 20 days of the purchases.

You are required to calculate cost per unit of material purchased to SKD Company Ltd.  
(SM/Similar sum in RTP May 22)

### 5. VALUATION OF INVENTORY (FIFO, LIFO, AVERAGE, WEIGHTED AVERAGE METHOD)

70. Following information regarding material D is provided by HKC:(May 89)

Date of April	Particulars	
1	Opening stock	100 units at ₹ 5 per unit
5	Purchases	300 units at ₹ 5 per unit
6	Issue	250 units
8	purchases	500 units at ₹ 7 per unit
10	issue	400 units
12	purchases	600 units at ₹ 8 per unit
14	issue	500 units

Required: prepare stores ledger using LIFO method of pricing issue. Also compute cost of materials consumed.

71. Prepare a stores ledger account from the following transactions in April of XY company Ltd:

Date of April	Particulars	
1	Opening stock	200 units at ₹ 10 per unit
5	Receipt	250 units costing ₹ 2000
8	Receipt	150 units costing ₹ 1275
10	Issue	100 units
15	Receipt	50 units costing ₹ 500
20	Shortage	10 units
21	Receipt	60 units costing ₹ 540
22	Issue	400 units

Issues up to 10th April will be priced at LIFO and from 11th April, issues will be priced at FIFO. Shortage will be charged as OH. (May 11 - 5 marks)

72. The following are the details of receipts and issues of a material of stores in a manufacturing company for the period of 3 months ending 30th June:

Receipts			Issues	
Date	Quantity (kgs)	Rate per Kg	Date	Quantity (kgs)
10 April	1600	5.00	4 April	1100
20 April	2400	4.90	24 April	1600
5 May	1000	5.10	10 May	1500
17 May	1100	5.20	26 May	1700
25 May	800	5.25	15 June	1500
11 June	900	5.40	21 June	1200
24 June	1400	5.50		

There was 1500 kgs in stock at 1st April, which was valued at ₹ 4.80 per kg.

Issues are to be priced on the basis of weighted average method. The stock verifier of the company reported a shortage of 80 kgs on 31st may and 60 kgs on 30th June. The shortage is treated as inflating the price of remaining material on account of shortage. You are required to prepare a stores ledger account. (Nov 08)

73. The following transactions in respect of material Y occurred during the six months ended 30th June, 2014:

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

Required

The chief accountant argues that the value of closing stock remains the same nomatter which method of pricing of material issues is used. Do you agree? Why or why not? Detailed stores ledgers are not required. (SM)

74. 'AT' Ltd. furnishes the following store transactions for Septem-ber, 20X1:

1-9-X1	Opening balance	25 units value ₹ 162.50
4-9-X1	Issues Req. No. 85	8 units
6-9-X1	Receipts from B & Co. GRN No. 26	50 units @ ₹ 5.75 per unit
7-9-X1	Issues Req. No. 97	12 units
10-9-X1	Return to B & Co.	10 units
12-9-X1	Issues Req. No. 108	15 units
13-9-X1	Issues Req. No. 110	20 units
15-9-X1	Receipts from M & Co. GRN. No. 33	25 units @ ₹ 6.10 per unit
17-9-X1	Issues Req. No. 121	10 units
19-9-X1	Received replacement from B & Co. GRN No. 38	10 units
20-9-X1	Returned from department, material of M & Co. MRR No. 4	5 units
22-9-X1	Transfer from Job 182 to Job 187 in the dept. MTR 6	5 units
26-9-X1	Issues Req. No. 146	10 units
29-9-X1	Transfer from Dept. "A" to Dept. "B" MTR 10	5 units
30-9-X1	Shortage in stock taking	2 units

Write up the priced stores ledger on FIFO method and discuss how you would treat the shortage in stock taking. (SM)

75. Arnab Electronics manufactures electronic home appliances. It follows weighted average Cost method for inventory valuation. Following are the data of component X

Date	Particulars	Units	Rate per unit (₹)
15-12-19	Purchase Order- 008	10,000	9,930
30-12-19	Purchase Order- 009	10,000	9,780
01-01-20	Opening stock	3,500	9,810
05-01-20	GRN*-008 (against the Purchase Order- 008)	10,000	-
05-01-20	MRN**-003 (against the Purchase Order- 008)	500	-
06-01-20	Material Requisition-011	3,000	-
07-01-20	Purchase Order- 010	10,000	9,750
10-01-20	Material Requisition-012	4,500	-
12-01-20	GRN-009 (against the Purchase Order- 009)	10,000	-
13-01-20	MRN-004 (against the Purchase Order- 009)	400	-
15-01-20	Material Requisition-013	2,200	-
24-01-20	Material Requisition-014	1,500	-
25-01-20	GRN-010 (against the Purchase Order- 010)	10,000	-
28-01-20	Material Requisition-015	4,000	-
31-01-20	Material Requisition-016	3,200	-

\*GRN- Goods Received Note; \*\*MRN- Material Returned Note Based on the above data, you are required to CALCULATE:

- Re-order level
- Maximum stock level
- Minimum stock level
- PREPARE Store Ledger for the period January 2020 and DETERMINE the value of stock as on 31-01-2020.
- Value of components used during the month of January, 2020.
- Inventory turnover ratio. (RTP May 2020)

76. Imbrios India Ltd. is recently incorporated start-up company back in the year 2019. It is engaged in creating Embedded products and Internet of Things (IoT) solutions for the Industrial market. It is focused on innovation, design, research and development of products and services. One of its embedded products is LogMax, a system on module (SoM) Carrier board for industrial use. It is a small, flexible and embedded computer designed as per industry specifications. In the beginning of the month of September 2021, company entered into a job agreement of providing 4800 LogMax to NIT, Mandi. Following details w.r.t. issues, receipts, returns of Store Department handling Micro-controller, a component used in the designated assembling process have been extracted for the month of September, 2021:

Sep. 1	Opening stock of 6,000 units @ ₹ 285 per unit
Sep. 8	Issued 4875 units to mechanical division vide material requisition no. Mech 009/20
Sep. 9	Received 17,500 units @ ₹ 276 per unit vide purchase order no. 159/2020
Sep. 10	Issued 12,000 units to technical division vide material requisition no. Tech 012/20
Sep. 12	Returned to stores 2375 units by technical division against material requisition no. Tech 012/20.
Sep. 15	Received 9,000 units @ ₹ 288 per units vide purchase order no. 160/ 2020
Sep. 17	Returned to supplier 700 units out of quantity received vide purchase order no. 160/2020.
Sep. 20	Issued 9,500 units to technical division vide material requisition no. Tech 165/20

On 25th September, 2021, the stock manager of the company expressed his need to leave for his hometown due to certain contingency and immediately left the job same day. Later, he also switched his phone off.

As the company has the tendency of stock-taking every end of the month to check and report for the loss due to rusting of the components, the new stock manager, on 30th September, 2021, found that 900 units of Micro-controllers were missing which was apparently misappropriated by the former stock manager. He, further, reported loss of 300 units due to rusting of the components.

From the above information you are REQUIRED to prepare the Stock Ledger account using 'Weighted Average' method of valuing the issues. (SM)



## 6. INVENTORY TURNOVER RATIOS

77. The following data are available in respect of material X for the year just ended- opening stock ₹ 90,000, purchases during the year ₹ 2,70,000, closing stock ₹ 1,10,000. Calculate inventory turnover ratio and number of days for which the average inventory is held. (Nov 97/SM)

78. The inventory records of HKC for the year 1998 show the following figures:

Particulars	Opening stock	Purchases	Closing stock
Material A	700 kg	11500 kg	200 kg
Material B	200 liter	11000 liter	1200 liter
Material C	1000 kg	1800 kg	1200 kg

The inventory is valued at ₹ 1 per kg or litre.

Calculate the material turnover ratios regarding each of these materials and express in number of days the average inventory held. What inference do you draw.

79. From the following data for the year ended 31st March, 2020, CALCULATE the inventory turnover ratio of the two items and put forward your comments on them

Particulars	Material A (₹)	Material B (₹)
Opening stock 1.04.2019	10,000	9,000
Purchase during the year	52,000	27,000
Closing stock 31.03.2020	6,000	11,000

(SM)

## 7. TREATMENT OF LOSSES

80. 1000 units of material are purchased at ₹ 1.80/unit. Normal loss is 10%. Actual loss is a: 100 units, b: 150 units, c: 80 units. What is the treatment of the losses.

81. After the annual stocktaking, you come to know of some significant discrepancies between book stock and physical stock. You gather the following information

Item	Stock card (units)	Stores Ledger (units)	Physical check (units)	Cost per unit
A	600	600	560	₹ 60
B	380	380	385	₹ 40
C	750	780	720	₹ 10

Required:

- What action should be taken to record the information shown above?
- Suggest reasons for the shortage and discrepancies disclosed above and recommend a possible course of action by management to prevent future losses.

## 8. ABC ANALYSIS

82. From the following details, draw a plan of ABC selective control-

Item	Units	Unit cost ₹
1	7000	5.00
2	24000	3.00
3	1500	10.00
4	600	22.00
5	38000	1.50
6	40000	0.50
7	60000	0.20
8	3000	3.50
9	300	8.00
10	29000	0.40
11	11500	7.10
12	4100	6.20

(SM)

83. From the following information classify the inventory items into A, B and C categories:

Item	Units	Unit cost ₹
A	200	501
B	600	83
C	250	250
D	470	50
E	250	64
F	300	85
G	400	25
H	280	400
I	400	55
J	300	40
K	250	30
L	1000	15

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

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

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

85. MM Ltd. has provided the following information about the items in its inventory.

Item Code Number	Units	Unit Cost (₹)
101	25	50
102	300	01
103	50	80
104	75	08
105	225	02
106	75	12

MM Ltd. has adopted the policy of classifying the items constituting 15% or above of Total Inventory Cost as 'A' category, items constituting 6% or less of Total Inventory Cost as 'C' category and the remaining items as 'B' category.

You are required to:

- Rank the items on the basis of % of Total Inventory Cost.
- Classify the items into A, B and C categories as per ABC Analysis of Inventory Control adopted by MM Ltd. (July 21 – 5 Marks)

## 9. OTHER MISCELLANEOUS SUMS

86. DC Ltd. currently has two sources of supply for a component. With an eye on reducing investment in working capital by minimizing outlay on materials for a given output, a study on the comparative economics of the two sources is undertaken. The component is bought in lots of 500 numbers. Source A gives an assurance that the defectives will not exceed 1% of the quantity supplied. Source B does not offer any such guarantee but supplies each lot at a price which is lower by ₹ 40 as compared to source A. The past experience on defectives from source B has been

Percentage defective	Probability
1	0.20
5	0.30
10	0.50

Normally the defective components can be reworked and brought to specification at a cost of ₹ 5 each. Examine the comparative cost implications and recommend the more economical source.

87. Bajaj Ltd 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 1000 units. Source II supplies the lot at a price, which 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.

88. A 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 Rs.1,040 per unit. Material A and B are purchased at Rs.150 and Rs.200 respectively.

Required:

COMPUTE economic order quantity (EOQ):

- If purchase order for the both materials is placed separately.
- If purchase order for the both materials is not placed separately. (Mock Test Paper Nov 19)