2. MATERIAL COST

ASSIGNMENT SOLUTIONS

PROBLEM NO: 1

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

A = Units consumed during year

O = Ordering cost per order

C = Inventory carrying cost per unit per annum

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

No. of orders to be placed in a year

=Total consumption of materials per annum/EOQ

=10,000 kg./2,500 kg.= 4 Orders per year

PROBLEM NO: 2

a) $EOQ = \sqrt{\frac{2AO}{IC}}$

Where

A = Annual usage of material = 5000 units

O = Order cost per order = Rs.16

IC = Inventory Carrying cost per unit per annum = Rs. 20 x 20% = Rs. 4.

$$EOQ = \sqrt{\frac{2 \times 5000 \text{ units} \times Rs16}{Rs4}} = 200 \text{ units}$$

Calculation of total variable cost (Excluding material purchase cost)

Particulars	Amount (Rs.)
Order cost $\left(\frac{\text{Annual usage}}{\text{Order size}} \times \text{Order cost per Order}\right)$	$\left(\frac{5000 \text{ units}}{200 \text{ units}} \times Rs16\right) = 400$
Add: Inventory carrying cost $\left(\frac{1}{2} \times \text{Order Size} \times IC\right)$	$\left(\frac{1}{2} \times 200 \text{ units} \times Rs.4\right) = 400$
Total variable cost (Excluding purchase cost)	**800**

b) If Incorrect price of Rs. 12.80 is 4 used

Then

A = 5000 units

O = Rs. 16

IC = Rs. 12.80 x 20% = Rs.2.56

$$EOQ = \sqrt{\frac{2AO}{IC}} = \sqrt{\frac{2 \times 5000 \text{ units} \times Rs.16}{Rs.2.56}} = 250 \text{ units}$$

Statement of Total Variable cost [Excluding material purchase cost]

Particulars	Amount (Rs.)
Order cost $\left[\frac{5000\,units}{250\,units} X Rs.16\right]$	320
(+) Inventory carrying cost $\left[\frac{1}{2} x 250\,units x 2.56\right]$	320
Total variable cost [excluding material purchase cost]	640

Note: In PM purchase cost of raw material is considered while calculating variable cost.

PROBLEM NO: 3

WORKING NOTE: 1 Calculation of EOQ

a) $EOQ = \sqrt{\frac{2AO}{IC}}$

Where
A = Annual usage of material = 36000 units
O = Order cost per order = Rs.25
IC = Inventory Carrying cost percent per annum = Rs. 1 x 20% = Rs. 0.2

$EOQ = \sqrt{\frac{2 x 36000\,units x Rs\,25}{Rs\,0.2}}$ = 3000 units

WORKING NOTE 2: Calculation of No of orders in EOQ & Existing inventory policy

Order size of existing inventory policy = $\frac{36000 units}{6 Installments}$ = 6000 units

No of orders = $\frac{Annual usage}{Order cost}$

For EOQ = $\frac{36000}{3000}$ = 12 orders

For existing inventory policy => orders = $\frac{36000\,units}{6000\,units}$ = 6 orders

Statement showing comparative cost of material (amount in Rs)

Particulars	EOQ	Existing policy
Purchase Cost (Annual usage x purchase price) (36000 units x RS.1)	36,000	36,000
(+) Order cost (No. of orders x cost per order)	(12 orders x 25) 300	(6 orders x 25) 150
(+) Inventory carrying cost $\left(\frac{1}{2} x Order\,Size x IC\right)$	$\left(\frac{1}{2} x 3000\,units x 0.2\right)$ 300	$\left(\frac{1}{2} x 6000\,units x 0.2\right)$ 600
Total cost of material	36,600	36,750

i) Total annual cost of existing Inventory policy = RS.36,750

a) Money can be saved by EOQ = Rs. 36,750 – Rs. 36,600
= Rs. 150

Note: As the unit purchase cost of Rs.1 doesnot change, No need to consider while calculating total cost of inventory for the purpose of savings.

PROBLEM NO: 4

i) Calculation of EOQ = $\sqrt{\frac{2AO}{IC}}$

Where

A = Annual usage of material = $\frac{1,00,000\,units}{2.5\,kgs}$ = 40000 kgs.

O = Order cost per order = Rs.750 (370 + 380)

IC = Inventory Carrying cost per unit per annum = $[Rs.12 + (0.25 x 12 month)] = Rs.15$

EOQ = $\sqrt{\frac{2 x 40000\,kg.s\,x Rs\,750}{Rs15}}$ = 2000 kgs

ii) No Of Orders = $\frac{Annual usage}{order size} = \frac{40,000\,kgs}{2000\,kgs} = 20\,orders$

Time gap between orders = $\frac{360\,days}{No\,of\,orders} = \frac{360\,days}{20\,Orders} = 18\,Days$

iii) Comparative cost of material Statement (Amount in Rs.)

Particulars	EOQ	Proportionately (quarterly basis)
Order size	2000 kg.s	10000 kg.s
Purchase Cost [Annual usage x purchase price] [40,000 kgs x Rs.80]	32,00,000	32,00,000
+ Order cost $\left[\frac{Annual a usage}{order size} x order cost per order\right]$	$\left[\frac{40,000\,kgs}{2000\,kgs} x Rs.750\right]$ = 15000	$\left[\frac{40,000\,kgs}{10,000\,kgs} x Rs.750\right]$ = 3000
+ Inventory carrying cost $\left(\frac{1}{2} x Order Size x IC\right)$	$\left(\frac{1}{2} x 2000\,kg.s\,x Rs.15\right)$ =15000	$\left(\frac{1}{2} x 10000\,kg.s\,x Rs.15\right)$ = 75000
Total cost of material	**32,30,000**	**32,78,000**

Extra cost incurred on quarterly basis Rs 48000 [i.e. Rs. 3,278,000 - Rs. 3,230,000] should be asked as discount

$\therefore$ Discount rate $= \frac{discount Amt}{Purchase cost} x100$

$= \frac{Rs.48000}{Rs.32,00,000} x100 = 1.5\%$

PROBLEM NO: 5

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

Where,

A = Annual usage of raw material

= 1500 units x 12 months = 18,000 units

S = Ordering cost per order = Rs.75

C = Carrying cost per unit per annum

= Purchase price x % of carrying cost

= 1000 x 3% [2%+1%]

= Rs.30

$$EOQ = \sqrt{\frac{2AS}{C}} = \sqrt{\frac{2 \times 18{,}000 \text{ units} \times 75}{Rs.30}} = 300 \text{ units}$$

ii) Re-order level = Maximum usage x Maximum lead time

= 400 units x 8 weeks

= 3,200 units

Statement showing total cost of raw material

Particulars	With discount (Order size = 6,000 units)	Without discount (EOQ = 300 units)
Purchase price per unit	Rs.950 (Rs.1,000-5%)	1,000
Carrying cost per unit per annum	28.5 (950 x 3%)	30 (1,000 x 3%)
(a) Total carrying cost p.a [Order size/EOQ x ½ x C]	85,500 [6,000 x ½ x 28.5]	4,500 [300 x ½ x 30]
(b) Total ordering cost p.a $\left[\frac{A}{\text{Order size/EOQ}} \times S\right]$	225 $\left[\frac{18{,}000}{6{,}000} \times 75\right]$	4,500 $\left[\frac{18{,}000}{300} \times 75\right]$
(c) Purchase of raw material (Qty x Price)	1,71,00,000 [18,000 x 950]	1,80,00,000 [18,000 x 1,000]
Total cost of raw material (a+b+c)	**1,71,85,725**	**1,80,09,000**

Total cost is less at discount offer.

Therefore, it is advised to accept the discount offer.

PROBLEM NO. 6

(a) Computation of EOQ

i) Purchase price per component (C1) Rs.200

ii) Cost of an order (C0) Rs.100

iii) Annual cost of carrying one unit of inventory is (i × C1) 10% of C_1 . or Rs.20

iv) Total cost of carrying inventory and ordering per annum Rs.4,000

v) Let the total annual inventory usage be S.

To compute E.O.Q. by using the above data we require the figure of total annual usage of inventory. This can be determined by making use of the following relation.

$$\sqrt{2SC_0iC_1} = Rs.4{,}000$$

Or, $\sqrt{2S \times 100 \times 20} = Rs.4{,}000$

Or, $\sqrt{4000S} = Rs.4{,}000$

Squaring both side

Or, 4,000S = 4,000×4,000 or, S =Rs.4,000 units.

Now

$$EOQ = \sqrt{\frac{2SC_0}{iC_1}} = \sqrt{\frac{2x4000 \text{ x} Rs.100}{Rs.20}} = 200 \text{ units}$$

Alternatively, EOQ can also be calculated as below:

Let's EOQ is 'Q', then average holding inventories are $\frac{Q}{2}$ and annual carrying cost is $\frac{Q}{2} \times 20 = 10Q$

Now at EOQ level carrying cost and ordering cost is equal i.e. Rs. 2,000 each.

So, 10Q = Rs.2,000 and Q = $\frac{2000}{10} = 200$

Hence, EOQ = 200 units

Note: Different logical notations can be used to express variables in the formula.

(b) When order size is 2,000 units

No. of orders = $\frac{4{,}000\text{ units}}{2{,}000\text{ units}} = 2$

Total cost = Ordering Cost + Carrying Cost

= 2× Rs.100 + 1/2 × 2,000 units × Rs 20

= Rs.200 + Rs.20,000 = Rs.20,200

Extra cost = Rs 20,200 – Rs 4,000 = Rs 16,200

Quantity discount received = 2% × 4,000 units × Rs 200

= Rs.16,000

Advice to Management: The quantity discount offer should not be accepted as it results in additional expenditure of Rs 200 (Rs 16,200 – Rs 16,000)

(c) When order size is 4,000 units

No. of orders = $\frac{4{,}000\text{ units}}{4{,}000\text{ units}} = 1$

Total cost = 1 × Rs 100 + 1/2 × 4,000 units × Rs 20 = Rs 40,100

Extra cost = Rs.40,100 – Rs.4,000 = Rs.36,100

Quantity discount received = 5% × 4,000 units × Rs.200

= Rs.40,000

Advice to Management: The quantity discount offer should be accepted as it result In reducing the total cost of carrying and ordering of inventory to the extent of Rs 3,900 [Rs 40,000 – Rs 36,100].

Note: White solving this problem, total cost of inventory and ordering cost per annum, has been considered as total cost of carrying inventory and ordering per annum.

PROBLEM NO: 7

i. Calculation of Economic Order Quantity

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 8{,}000\text{ units} \times Rs.200}{Rs.400 \times 20/100}} = 200\text{ units}$$

ii. Evaluation of Profitability of Different Options of Order Quantity

a) When EOQ is ordered

		Rs.
Purchase Cost	(8,000 units × Rs.400)	32,00,000
Ordering Cost	[(8,000 units/200 units) × Rs.200]	8,000
Carrying Cost	(200 units Rs.400 ½ × 20/100)	8,000
Total Cost		32,16,000

b) When Quantity Discount is accepted

		Rs.
Purchase Cost	(8,000 units × Rs.384)	30,72,000
Ordering Cost	[(8,000 units/4000 units) × Rs.200]	400
Carrying Cost	(4000 units × Rs.384 × ½ × 20/100)	1,53,600
Total Cost		32,26,000

Advise – The total cost of inventory is lower if EOQ is adopted. Hence, the company is advised not to accept the quantity discount.

PROBLEM NO.8

Annual demand of raw material = 4,000 units

Unit price of raw material = Rs.90

Ordering cost per order (O) = Rs.135

Carrying cost per unit per annum = Rs.12

i) Optimal order quantity = E.O.Q $= \sqrt{\frac{2AO}{C}}$

$$= \sqrt{\frac{2 \times 4{,}000\,\text{units} \times \text{Rs.}135}{\text{Rs.}12}} = \sqrt{90{,}000} = 300\,\text{units}$$

Total Relevant Cost for the order = $\sqrt{2AOC} = \sqrt{2 \times 4{,}000 \times 135 \times 12} = \text{Rs.}3{,}600$

ii) Given,

Revised ordering cost per order = Rs.80

$$\text{Revised EOQ} = \sqrt{\frac{2 \times 4{,}000\,\text{units} \times \text{Rs.}80}{\text{Rs.}12}} = 231\,\text{units}$$

Total relevant cost at revised EOQ = $\sqrt{2AOC} = \sqrt{2 \times 4{,}000 \times 80 \times 12} = \text{Rs.}2771$

Difference in total cost due to an error in estimation = Rs.3,600 – Rs.2,771 = Rs.829

iii)

Particulars	Present order size EOQ = 300 units	Proposed order size = 4000 units
Unit price of Raw material	Rs.90	Rs.86
No. of orders		$\frac{A}{\text{Order size}} = \frac{40{,}000}{4{,}000} = 10$
Total Ordering & carrying cost	Rs.3,600	$(10 \times 135) + (\frac{4{,}000}{2} \times 12) =$ Rs.24,135
Raw material cost = Annual usage of raw material x unit price of raw material	4,000 x 90 = Rs.3,60,000	4,000 x 86 = Rs.3,44,000
Total Annual inventory cost	Rs.3,63,600	Rs.3,68,135

This special offer at Rs.86 per unit should not be accepted since the total cost will increase by Rs.4,535 (3,68,135 -3,63,600) as compared to original offer.

PROBLEM NO: 9

i) Calculation of EOQ = $\sqrt{\frac{2AO}{IC}}$

Where

A = Annual usage of material =60,000 pack x 12 months = 7,20,000 packs

O = Order cost per order = Rs.240

IC = Inventory Carrying cost per unit per annum = Rs. 228 x 10% = Rs. 22.8

$$EOQ = \sqrt{\frac{2 \times 7,20,000\,packs \times Rs\,240}{Rs22.8}} = 3894 \text{ paks.}$$

ii) Calculation to no of orders:-

$$\text{No of orders} = \frac{\text{Annal usage}}{\text{order size}} = \frac{7,20,000\,Paks}{3894\,packs} = 185\,orders$$

iii) Calculation of order cost and carrying cost

Particulars	Amount (Rs)
Order Cost $\left[\frac{\text{Annual usage}}{\text{Order size}} \times \text{order cost per order}\right]$ $\left[\frac{720,000\,packs}{3894\,packs} \times 240\right]$	44376
Inventory carrying cost = $\left(\frac{1}{2} \times \text{order size} \times IC\right)$ = $\left[\frac{1}{2} \times 3894\,packs \times 22.8\right]$	44392
Total	88768

iv) No of Packs per day = $\frac{720,000\,packs}{360\,days}$ = 2000 Packs per day

Next order to be placed = Present stock – lead time stock

= 10,033 – (2000 x 5days)

= 33 packs

∴ Next order to be placed "Immediately" (since Units Used per day = 2000 units)

PROBLEM NO: 10

a) Statement showing total comparative cost of material

Particulars	Orders				
a) Order size (say) (Tonnes)	40	50	100	200	300
b) Purchase price (Rs)	9,600	9360	9120	8880	8640
c) No of orders = $\frac{\text{Annual usage}}{\text{Order size}} = \frac{500\,kgs}{(a)}$	13	10	5	3	2
d) Purchase cost = (Annual usage x Purchase price)(500kgs x b) (Rs.)	48,00,000	46,80,000	45,60,000	44,40,000	43,20,000
e) Order cost = (No. of orders x cost per order) (c x 12,500) (Rs.)	1,62,500	1,25,000	62,500	37,500	25,000
f) Inventory carrying cost per unit per annum = (Purchase price x 25 %) (b x 25%) (Rs.)	2,400	2,340	2,280	2,220	2,160
g) Total inventory carrying cost = $\left(\frac{1}{2} \times 24000\,kgs \times\right)$ = (1/2) x a x f (Rs.)	48,000	58,500	1,14,000	2,22,000	3,24,000
Total cost (d + e + g) (Rs.)	**50,10,500**	**48,63,500**	**47,36,500**	**46,99,500**	**46,69,000**

Since cost is least in order size of 300 kgs, it is most economic purchase level

Theoretically number of orders may be in fractional numbers

Note: Number of order rounded off to the nearest whole number

b) EOQ = $\sqrt{\frac{2 \times 500 \text{tonnes} \times \text{Rs.}12{,}500}{\text{Rs.}2{,}625}}$ = 69 Tonnes

PROBLEM NO: 11

Statement showing total cost of materials at various levels

Order SIze	45 units	50 units	100 units	200 units
a) Purchase price (Rs.)	(30 - 0%) 30	(30 – 5%) 28.5	(30 - 10%) 27	(30 – 12%) 26.4
b) Annual consumption (given units)	250	250	250	250
c) Total Purchase cost (a x b) (Rs.)	7,500	7,125	6,750	6,600
d) *No of orders = $\frac{b}{\text{Order Size}}$	6	5	3	2
e) Ordering cost per order (Rs.) given	20	20	20	20
f) Total ordering cost (Rs.) (d x e)	120	100	60	40
g) Inventory carrying cost (Rs.) $\left(\frac{1}{2} \text{x ordersize x } 4\right)$	90	100	200	400
Total cost [c + f + g] Rs.	**7,710**	**7,325**	**7,010**	**7,040**

∴ Optimal order quantity (where cost is low) = 100 units

Calculation of EOQ at Zero quantity discounts:

∴ EOQ = $\sqrt{\frac{2UO}{IC}}$

Where U = Annual consumption

O = Ordering cost per order

IC = Inventory carrying cost p.a

= $\sqrt{\frac{2(250\text{units}) \times \text{Rs.}20}{\text{Rs.}4}}$ = 50units

∴ Minimal total cost of inventory and purchasing cost = Rs.7,010 units (60 + 200 + 6750)

Note: → Here in the calculation of no of orders i.e. $\frac{\text{Annual Consumption}}{\text{Order Size}}$, for 45 units, no of orders are actually 5.5 order size.

But, in practical we have 5 or 6 orders but not 5.5 orders. So such fractions are adjusted to the closing numbers.

PROBLEM NO: 12

a) Re-ordering level = Maximum consumption x Maximum reorder period

∴ Re-ordering level of A = 75 Kg x 6 Weeks = 450Kg

Re-ordering level of B = 75 Kg x 4 Weeks = 300Kg

b) Minimum consumption level = Re-order level – (Avg Consumption x Avg reorder period)

Minimum consumption level for A = 450 Kg – (50 Kg x 5weeks)

= 450 Kg – 250 kg = 200 Kg

Minimum consumption level for B = 300 Kg – (50 Kg x 3 weeks)
= 150 Kg

c) Maximum stock level = Reorder level + reorder quantity – (Minimum consumption x minimum Reorder period)

Maximum stock level for A = 450 Kg + 300 Kg – (25 Kg x 4 weeks)
= 750 Kg – 100kg
= 650 Kg

Maximum stock level for B = 300 Kg + 500 Kg – (25 Kg x 2 weeks)
= 800 Kg – 50 Kg
= 750 Kg

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

Average stock level of A = $\frac{200\text{Kg} + 650\text{Kg}}{2}$ = 425 Kg

Average stock level of B = $\frac{150\text{Kg} + 750\text{Kg}}{2}$ = 450 Kg

PROBLEM NO: 13

a) Re order quantity = Economic order quantity = $\sqrt{\frac{2AO}{IC}}$

Where A = Annual consumption = 7,500 units x 12 months = 90,000 units
O = Ordering cost per order = Rs.500
IC = Inventory carrying cost p.a = Rs.60 x 10% = Rs.6

∴ Re-order quantity = $\sqrt{\frac{2(90{,}000) \times \text{Rs.}500}{\text{Rs.}6}}$ = 3,873 units (Approx.)

b) Re-order level = Maximum consumption x Maximum re-order period
= 75 units x 8 weeks
= 6,000 units

c) Minimum stock level = Re-order level – (Avg consumption x Avg Re-order period)
= 6,000 units – (500 units x $\frac{5+8}{2}$ weeks)
= 6,000 units – 3,250 units = 2,750 units

d) Maximum stock level = (Reorder level + reorder quantity) – (Minimum consumption x minimum Reorder period)
= 6,000 units + 3,873 units – (250 units x 5 weeks)
= 9,873 units – (1,250 units) = 8,623 units

e) Average stock level = $\frac{\text{Minimum stock level} + \text{Maximum stock level}}{2}$
= $\frac{2{,}750\,\text{units} + 8{,}623\,\text{units}}{2}$
= 5,687 units

PROBLEM NO: 14

Calculation of Economic Order Quantity

Average Inventory = Total Carrying Cost /Carrying Cost per unit

=Rs. 9,000 /Rs.3.60= 2,500 Units.

Economic Order Quantity = Average Inventory × 2 = 2,500 units × 2 = 5,000 units.

PROBLEM NO: 15

Maximum Level = Re-order level + Re-order Quantity- (Min. usage × Min. Re-order Period)

Re-order Level = Maximum Level – [Re-order Quantity – (Min. usage × Min. Re-order Period)

= 8,000 kg. – [5,000 kg. – (400 kg* × 4 days)] = 8,000 kg. – 3,400 kg. = 4,600 kg.

Hence, Re-order level is 4,600 kg.

*Minimum usage per day = 50 kg. × 8 hours = 400 kg.

PROBLEM NO: 16

(i) Reorder Quantity (ROQ) = 1,100units *(Refer to working note)*

(ii) Reorder level (ROL) = Lead time consumption + Safety stock

= 500 units + 1,000 units.

= 1,500 units.

(iii) the inventory level (ideally) immediately before the material order is received be the safety stock is 1,500 units

Working Note

i) Annual consumption of raw material (A) = 12,000units

Cost of placing an order (O) = Rs.1

Carrying cost per kg. Per annum (c × i) = Rs.1×24% = Rs.0.24

Economic order quantity (EOQ) $= \sqrt{\frac{2AO}{C \times i}} = \sqrt{\frac{2 \times 12{,}000 \times 12}{Rs.0.24}} = 1{,}100$ units. (Approx)

ii) Lead time consumption = Annual consumption/ no. of days in a year x Normal lead time

=12,000 units / 360 x 15 days

= 500 units.

iii) Safety stock= Annual consumption / no. of days in a year x 30 days

= 12,000 units / 360 x 30 days

= 1,000 units

PROBLEM NO: 17

a) Economic order quantity = $\sqrt{\frac{2AO}{IC}}$

Where A = Annual consumption = 36,000 litres

O = Ordering cost per order = Rs.35,000/-

IC = Inventory carrying cost p.a. = (Rs.900+10%) x (1.5%+0.2676%)

= (Rs.900+10%) x 1.7676%

= Rs. 17.5

$\therefore$ EOQ = $\sqrt{\frac{2(36{,}000) \times Rs.35{,}000}{Rs.17.5}}$ = 12,000 litres

b) Re-order point = lead time consumption + safety stock

Safety stock = $\frac{\text{Annual demand}}{360\text{ days}} \times (\text{Max. lead time} - \text{Avg. Lead time})$

$\therefore$ Safety stock at 10% risk = (14days – 12days) $\times \frac{36000\text{ units}}{360\text{ days}}$

= 200 litres

Lead time consumption = 12 days ($\frac{36000\text{ units}}{360\text{ days}}$) = 1200 litres

$\therefore$ Re-order point = 1200 litres + 200 litres = 1400 litres

c) Safety stock at 5% risk = (15 days – 12 days) x $\frac{36000\text{ units}}{360\text{ days}}$ = 300 litres

Statement showing total ordering & carrying cost at 5% risk

Particulars	**Amount (Rs.)**
i. Ordering cost $\left(\frac{36000\text{ litres}}{12000\text{ litres}} \times \text{Rs.}35{,}000\right)$	1,05,000
ii. Carrying cost $\left[\left(300\text{litres} + \frac{1}{2} \times 12{,}000\text{ litres}\right) \times \text{Rs.}17.5\right]$	1,10,250
Total cost	2,15,250

Note: Here Carrying cost = $\left[(\text{safety stock at 5\% risk}) + \left[\frac{1}{2} \times \text{EOQ}\right]\right] \times \text{IC}$

PROBLEM NO: 18

a) Economic order quantity = $\sqrt{\frac{2AO}{IC}}$

Where A = Annual consumption = 6,250 units x 4 = 25,000 units

O = Ordering cost per order = Rs.45/-

IC = Inventory carrying cost per unit p.a. = Rs.2.4 x 15% = Rs.0.36

$\therefore$ EOQ = $\sqrt{\frac{2(25{,}000) \times \text{Rs.}45,}{\text{Rs.}0.36}}$ = 2,500 units

b) Statement showing total Annual cost at EOQ & existing policy

Particulars	**EOQ (2,500 units)**	**Proposed (6,250 units)**
Total Ordering cost $\left(\frac{25{,}000\text{ units}}{25{,}00\text{ units}, 6{,}250\text{ units}} \times \text{Rs.}45\right)$	450	180
Inventory carrying cost $\left(\frac{1}{2} \times \text{Rs}\,0.36 \times 2500\text{ units}, 6{,}250\text{ units}\right)$	450	1,125
Total cost	900	1305

c) Amount that can be saved by choosing EOQ rather than proposed units = Rs1,305 – Rs.900

= Rs.405

d) Given that no of days = 250,

e) Re-order point = ?

Re-order period = 10 days,

Safety stock = 500 units

∴ Re-order point = lead time consumption + safety stock

$$= \left(\frac{25000\,\text{units}}{250\,\text{days}} \text{x} 10\,\text{days}\right) + 500\,\text{units}$$

= 1,000 units + 500 units

= 1,500 units

Maximum level = EOQ + Safety stock

= 2500 units + 500 units

= 3000 units

Minimum stock level = Re-order level – (Avg consumption x Avg Re-order period)

$$= 1500\,\text{units} - \left(\frac{25000\,\text{units}}{250\,\text{days}} \text{x} 10\,\text{days}\right)$$

= 1500 units – 1000 units

= 500units

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

$$= \left(\frac{3000\,\text{units} + 500\text{units}}{2}\right)$$

= 1750 units

Note: Minimum stock level = Safety stock

PROBLEM NO: 19

$$\text{Inventory turnover ratio} = \frac{\text{cost of goods sold}}{\text{Average Stock}}$$

$$\text{Inventory turnover ratio of A} = \frac{10000 + 52000 - 6000}{\left(\frac{10000 + 6000}{2}\right)} = \frac{\text{Rs.56,000}}{\text{Rs.8,000}} = 7 \text{ times}$$

$$\text{Inventory turnover ratio of B} = \frac{9000 + 27000 - 11000}{\left(\frac{11000 + 9000}{2}\right)} = \frac{\text{Rs.25,000}}{\text{Rs.10,000}} = 2.5 \text{ times}$$

Note: COGS = Opening stock +purchases – closing stock

$$\text{Average stock} = \frac{\text{Opening stock} + \text{Closing stock}}{2}$$

Comment: Material A is faster moving than Material B

PROBLEM NO: 20

Calculation of total cost of materials

Particulars	Amount (Rs.)
Purchase value of 200 units @ Rs.5 each	1000
Less: discount of 20%	(200)
Net purchase price	**800**
Add: packing charges	50
	850

Total No. of Units = 200 units

$$\therefore \text{ Cost per unit} = \frac{\text{Net purchase price}}{\text{No of units}} = \frac{\text{Rs.850}}{200\,\text{units}} = \text{Rs.4.25 per unit}$$

PROBLEM NO: 21

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

Particulars	Chemical A (Kg)	Chemical B (Kg)	Chemical C (Kg)
Quantity purchased	3,000	5,000	2,000
Less: Shortage due to breakage	(200)	(280)	(100)
	2,800	**4,720**	**1,900**
Less: Provision for further deterioration 5%	(140)	(236)	(95)
	2,660	**4,484**	**1,805**

Statement showing total cost of material

Particulars	Chemical A (Rs.)	Chemical B (Rs.)	Chemical C (Rs.)
Purchase price	12,600	19,000	9,500
Add: Sales Tax*	630	950	475
Railway Freight*	300	500	200
Octroi duty @ 0.1 kg	300	500	200
cartage paid	22	63.12	31.8
	13,852	**21,013.12**	**10,406.8**

Rate per Kg.

Chemical A = $\frac{\text{Rs.13,852}}{\text{2660 kgs}}$ = Rs.5.2

Chemical B = $\frac{\text{Rs.21,013.20}}{\text{4484 kgs}}$ = Rs. 4.6

Chemical C = $\frac{\text{Rs.10,406.80}}{\text{1805 kgs}}$ = Rs. 5.7

*Sales tax is apportioned on the basis of purchase price

* Railway freight is apportioned in the ratio of quantity purchased

PROBLEM NO: 22

Working Notes

Date	Particulars		Qty. (kgs)	Rate (Rs.)	Value (Rs.)
01.03.2013	Opening Stock	(A)	22,000	58.50	12,87,000
03.03.2013	Purchase		35,000	60.75*	21,26,250
18.03.2013	Purchase		32,000	61.25*	19,60,000
25.03.2013	Purchase		22,000	61.75*	13,58,500
	Total Purchase	(B)	89,000		54,44,750
	Total (A+B)	(C)	1,11,000		67,31,750
31.03.2013	Closing Stock	(D)	23,000		
	Quantity issued during March, 13	(C - D)	88,000		53,12,000#

* Cost of purchase includes freight paid @ RS.1.75 per kgs

Value of material issued under FIFO method

Quantity (kgs)	Rate (RS.)	Value (RS.)
22,000	58.50	12,87,000

35,000	60.75	21,26,250
31,000	61.25	18,98,750
88,000		53,12,000

(i) Value of Closing Stock as on 31.03.2013 using FIFO method

	(Rs.)
Value of Opening Stock	12,87,000
Add: Purchases made	54,44,750
	67,31,750
Less: Value of material issued	(53,12,000)
Value of Closing Stock	14,19,750

(ii) Cost of Goods Sold

Cost of materials issued = 53,12,000

(iii) Profit for the month of March, 2013

	(Rs.)
Value of Material issued	53,12,000
Add: Accountant's Salary	11,000
Total Cost	53,23,000
Less: Sales Value	(62,00,000)
Profit	8,77,000

PROBLEM NO: 23

Store Ledger Account

Name - Code No. - Description-				Max. Stock Level – Min. Stock Level – Re-order level –			Bin No.- Location Code- Re-order quantity-		
Date	Receipts			Issues			Balance		
	Qty. Units	Rate (Rs.)	Amount (Rs.)	Qty. Units	Rate (Rs.)	Amount (Rs.)	Qty. Units	Rate (Rs.)	Amount (Rs.)
April 1							200	10	2,000
April 5	250	8	2000				200	10	4,000
							250	8	
April 8	150	8.50	1275				200	10	5,275
							250	8	
							150	8.50	
April 10				100	8.50	850	200	10	4,425
							250	8	
							50	8.50	
April 15	50	10	500				200	10	4,925
							250	8	
							50	8.50	
							50	10	
April 20				10 (shortage)	10	100	190	10	4,825
							250	8	
							50	8.50	
							50	10	
April 21	60	9	540				190	10	5,365
							250	8	
							50	8.50	

							50	10	
							60	9	
April 22				190	10	3,580	40	8	1,785
				210	8		50	8.50	(closing
							50	10	Stock)
							60	9	

PROBLEM NO:24

a) The Closing Stock at the end of six months' period i.e., on 30th June, 20X1 will be 200 units, whereas up to the end of May 20X1, total purchases coincide with the total issues i.e., 1,900 units. It means that at the end of May 20X1, there was no closing stock. In the month of June 20X1, 600 units were purchased out of which 400 units were issued. Since there was only one purchase and one issue in the month of June, 20X1 and there was no opening stock on 1st June 20X1, the Closing Stock of 200 units is to be valued at ' 20 per unit. In view of this, the argument of the Chief Accountant appears to be correct. Where there is only one purchase and one issue in a month with no opening stock, the method of pricing of material issues becomes irrelevant. Therefore, in the given case one should agree with the argument of the Chief Accountant that the value of Closing Stock remains the same no matter which method of pricing the issue is used. It may, however, be noted that the argument of Chief Accountant would not stand if one finds the value of the Closing Stock at the end of each month.

b) LIFO method has an edge over FIFO or any other method of pricing material issues due to the following advantages:

(i) The cost of the materials issued will be either nearer or will reflect the current market price. Thus, the cost of goods produced will be related to the trend of the market price of materials. Such a trend in price of materials enables the matching of cost of production with current sales revenues

(ii) The use of the method during the period of rising prices does not reflect undue high profit in the income statement, as it was under the first-in-first-out or average method. In fact, the profit shown here is relatively lower because the cost of production takes into account the rising trend of material prices.

(iii) In the case of falling prices, profit tends to rise due to lower material cost, yet the finished products appear to be more competitive and are at market price.

(iv) During the period of inflation, LIFO will tend to show the correct profit and thus, avoid paying undue taxes to some extent.

PROBLEM NO. 25

Statement of Total Cost and Ranking

Item	Units	%of Total units	Unit cost (Rs.)	Total cost (Rs.)	%of Total cost	Ranking
1	7,000	3.1963	5.00	35,000	9.8378	4
2	24,000	10.9589	3.00	72,000	20.2378	2
3	1,500	0.6849	10.00	15,000	4.2162	7
4	600	0.2740	22.00	13,200	3.7103	8
5	38,000	17.3516	1.50	57,000	16.0216	3
6	40,000	18.2648	0.50	20,000	5.6216	6
7	60,000	27.3973	0.20	12,000	3.3730	9
8	3,000	1.3699	3.50	10,500	2.9513	11
9	300	0.1370	8.00	2,400	0.6746	12
10	29,000	13.2420	0.40	11,600	3.2605	10
11	11,500	5.2512	7.10	81,650	22.9502	1
12	4,100	1.8721	6.20	25,420	7.1451	5
	2,19,000	100		3,55,770	100	

Basis for selective control (Assumed)

Rs. 50,000 & above -- 'A' items

Rs. 15,000 to 50000 -- 'B' items

Below Rs. 15,000 -- 'C' items

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

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

PROBLEM NO: 26

Classification of the items of inventory as per ABC analysis

1. 15 number of varieties of inventory items should be classified as 'A' category items because of the following reasons:
   - **i)** Constitute 0.375% of total number of varieties of inventory handled by stores of factory, which is minimum as per given classification in the table.
   - **ii)** 50% of total use value of inventory holding (average) which is maximum according to the given table.
   - **iii)** Highest in consumption about 85% of inventory usage (in end-product).
2. 110 number of varieties of inventory items should be classified as 'B' category items because of the following reasons:
   - **(i)** Constitute 2.750% of total number of varieties of inventory items handled by stores of factory.
   - **(ii)** Requires moderate investment of about 30% of total use value of inventory holding (average).
   - **(iii)** Moderate in consumption about 10% of inventory usage (in end–product).
3. 3,875 number of varieties of inventory items should be classified as 'C' category items because of the following reasons:
   - **(i)** Constitute 96.875% of total varieties of inventory items handled by stores of factory.
   - **(ii)** Requires about 20% of total use value of inventory holding (average).
   - **(iii)** Minimum inventory consumption i.e. about 5% of inventory usage (in endproduct).

THE END