

WORKING CAPITAL ESTIMATES

Subject matter of this chapter

* To understand the subject matter of this chp, one should first understand the following —

B/s	
liability	Assets
Equity	Fixed Assets
	<u>Current assets</u>
Debt	* Raw material
	* W.I.P
current Liability	* Finished goods
	* Debtors
	* Bank

* W.Cap means —

current assets - current liabilities

* In the balance sheet we will have assets namely

- Fixed assets and
- current assets namely —

- * Raw material stock
- * work-in-progress stock
- * finished goods stock
- * Debtors
- * Bank.

* All the assets are nothing but money in form of assets. Foreg:

a) we have a land worth ₹10crs. we call it property held as investment but one should understand blockage of ₹10crs money.

b) we have 10kgs raw material of ₹10/kg in stock. we should understand that ₹100 money is blocked.

Therefore, one can conclude that all assets are nothing but fund that is blocked.

- * To generate assets, we need to raise money from
 - Equity
 - Debt
 - Current Liability
- * Current assets is also called as "working capital" because, it is financed by both equity and also debt. Equity and debt put together is called as "capital". If that capital is used to fund day-to-day requirements like stock, we call it as, working capital.
- * Every year, company will estimate its wcap requirement. Company has to maintain likely balance of raw material stock, debtors & cash bal. etc. That estimate will be made on the basis of sales. More the sales, more the current assets and vice versa.
- * This w.cap is generally financed by the bank loans. Bank sanctions on loans. For this bank asks for budget on w.cap.
- * Thus, we need to budget raw material stock, w.i.p stock, FG's stock etc. We need to thus budget CA and CL.
- * So, preparation of a w.cap estimate/budget which is to be submitted to the bank is the subject matter of discussion in this chapter.
- * Hence, we need to prepare a w.cap budget and submit to the bank, on the basis of which a certain % of budgeted amount will be given as a cash credit / w.cap loan / o.d facility.

Notes

- Since ICAI sm did not provide enough ques on basics, we will first solve some self-made illustrations.

Raw material Valuation

Practical self made illustrations

1. Budgeted production = 60,000 units
Rm consumption/unit = 2 kgs
Cost of RW = ₹4/kg
Rm holding period = 2 months.

Solution:

$$\begin{aligned}\text{material consumed} &= 60,000 \text{ units} \times 2 \text{ kgs} \\ &= 1,20,000 \text{ kgs.}\end{aligned}$$

stock of raw material required

company evenly maintains 2 months raw material in stock.

$$\begin{array}{ccc} 1,20,000 \text{ kgs} & \longrightarrow & 12 \text{ ms} \\ ? & \longleftarrow & 2 \text{ ms} \\ & & = 20,000 \text{ kgs} \end{array}$$

value of raw material stock

$$20,000 \text{ kgs} \times ₹4 = ₹80,000.$$

Formula

Raw material stock =

$$\text{Annual consumption (Qty)} \times \text{Purchase price} \times \frac{\text{Rm HP}}{12/365}$$

$$\begin{aligned} &= 1,20,000 \text{ kgs} \times ₹4 \times \frac{2}{12} \\ &= ₹80,000 \end{aligned}$$

meanings

- * All the numbers above are just estimates/budget.
- * That means, company is estimated to consume 1,20,000 kgs of Rm.
- * company has to keep some amount of Rm in stock. It is always left to the discretion of company's policy as to how much amount of stock of Rm should be kept in warehouse. It is often expressed in terms of no. of months consumption. In the given question, it is 2 months consumption.
- * Its total consumption is 1,20,000 kgs p.a, for 2 months it is 20,000 kgs **Assumed that Rm**

is evenly distributed through out the year.)

* So, company shall maintain that 20,000 kgs at all the times during the year as RM stock. For that we go for a bank loan. So, amount of loan company expect is $20,000 \times 4 = ₹ 80,000$. So, Co need to ₹ 80,000 capital to keep RM stock in the store room.

2. Estimated production = 60,000 units.
RM cost / unit = ₹ 8/-
stock period = 2 months.

Solution :

Alternative formula

$$\text{material consumed (₹)} \times \frac{\text{RMHP}}{12/365} = 60,000 \times 8 \times 2/12$$
$$12/365 = ₹ 80,000$$

FG's
valuation

3. Illustration on finished goods stock

Particular	per unit
Raw materials	₹ 5
wages	₹ 4
manuf. OH (incl depn ₹ 1)	₹ 3
Admn & selling expenses	₹ 3
Total cost p.u.	<u>₹ 15</u>

FG's holding period = 2 months.

production p.a (estimated) = 60,000 units

calculate stock of FG's in following 3 cases

case 1: when no information is given.

case 2: Stock valuation @ cash cost.

case 3: Stock valuation @ prime cost.

A. Solution - case 1:

* The company has decided to keep 2 months prod in stock of FGs.

$$\text{* FG units} = \text{Annual prod (units)} \times \frac{\text{RMHP}}{12}$$
$$= 60,000 \times \frac{2}{12} = 10,000 \text{ u.}$$

* FG's value = $10,000 \text{ U} \times ₹12 = ₹1,20,000$.

Selling and Admn OH is not considered since it is incurred to sell FGs not to produce.

B. Solution - Case 2

* We do not need capital for funding non-cash expenses because, they are not going to be spent.

* Therefore, non-cash items like depn should be excluded while calculating FGs value.

$$\begin{aligned}\text{FGs value} &= 10,000 \text{ U} \times (₹12 - ₹1) \\ &= ₹1,10,000\end{aligned}$$

C. Solution - Case 3

* This model requires us to value FGs at prime cost.

$$\begin{aligned}\text{FGs value} &= 10,000 \text{ U} \times (₹5 + ₹4) \\ &= ₹90,000.\end{aligned}$$

Notes

1. The FGs stock can be calculated as follows—

$$\begin{aligned}\text{FGs} &= \text{Cost of production} \times \frac{\text{FG HP}}{12/365} \\ &= \left[\frac{\text{No. of units}}{\text{Produced}} \right] \times \text{Cost p.u} \times \frac{\text{FG HP}}{12/365} \\ &\quad \text{(OR)}\end{aligned}$$

$$\begin{aligned}\text{FGs} &= \text{Cash COP} \times \frac{\text{FG HP}}{12/365} \\ &\quad \text{(OR)}\end{aligned}$$

$$\text{FGs} = \text{Prime COP} \times \frac{\text{FG HP}}{12/365}$$

W.I.P
Valuation

4. W.I.P HP = $1\frac{1}{2}$ months. (Consider basic into from Q.3)

Case-1:

W.I.P is 60% complete

Case-2

W.I.P is 80% complete as to materials.

W.I.P is 60% complete as to wages.

case -3: No info given.

Solve as per a) total cost model b) cash cost model.
Solution :-

Situation-1 - total cost approach

Case 1: 60% complete

$$\begin{aligned} \text{a. No. of units in W.I.P} &= \text{Total production} \times \frac{\text{WIP\%}}{100} \\ &= 60,000 \times \frac{0.5}{12} \\ &= 2,500 \text{ units.} \end{aligned}$$

b. Calc of cost of W.I.P

$$\begin{aligned} \text{Material} &= ₹ 5 \times 100\% = ₹ 5.00 \\ \text{Labour} &= ₹ 4 \times 60\% = ₹ 2.40 \\ \text{O.H} &= ₹ 3 \times 60\% = ₹ 1.80 \\ &\quad \underline{₹ 9.20} \end{aligned}$$

$$\text{Total cost} = ₹ 9.20 \times 2,500 \text{ units} = ₹ 23,000.$$

Case-2: materials 80% & Labour 60%

$$\begin{aligned} \text{Material} &= ₹ 5 \times 80\% = ₹ 4.00 \\ \text{Labour} &= ₹ 4 \times 60\% = ₹ 2.40 \\ \text{O.H} &= ₹ 3 \times 60\% = ₹ 1.80 \\ &\quad \underline{₹ 8.20} \end{aligned}$$

$$\text{Total cost} = ₹ 8.20 \times 2,500 \text{ units} = ₹ 20,500.$$

Case-3: NO info given.

$$\begin{aligned} \text{Material} &= ₹ 5 \times 100\% = ₹ 5.00 \\ \text{Labour} &= ₹ 4 \times 50\% = ₹ 2.00 \\ \text{O.H} &= ₹ 3 \times 50\% = ₹ 1.50 \\ &\quad \underline{₹ 8.50} \end{aligned}$$

$$\text{Total cost} = ₹ 8.50 \times 2,500 \text{ units} = ₹ 21,250.$$

Notes

* When no info is given, we assume WIP to be 50% complete (ICAI assumption).

* But, material is always fed at the beginning of process, so it is always assumed as 100% complete unless specifically given in question.

Situation-2 - cash cost approach

All calculations are same expect that replace ₹3 with ₹2 in OH calculation (excl depn)

Debtors Valuation

5. Assume the same facts of Q.3,
* Debt collection period = 2 months
* Cash sales = 20%
* SP = ₹20.

Solution:

$$\begin{aligned}\text{Debtors (units)} &= 60,000 \text{ units} \times 2/12 \rightarrow \text{credit sales} \\ &= 10,000 \text{ units} \times 80\% = 8,000 \text{ units}\end{aligned}$$

This 8,000 units is in godown, we call it FA's and if with customer, we call debtors.

a) Sales approach / Total approach:

$$Dx = 8,000 \text{ units} \times ₹20 = ₹1,60,000.$$

b) Total cost approach

$$Dx = 8,000 \text{ units} \times ₹15 = ₹1,20,000.$$

c) Cash cost approach

$$Dx = 8,000 \text{ units} \times ₹14 = ₹1,12,000.$$

Creditors Valuation

6. Assume same facts of Q.3, add info —
* credit period = 2 ms
* Cash purchases = 20%
* Time lag for payment of expenses = 1 month.
Calc CRS for RM and other expenses.

Solution:-

Creditors depends on purchases not on the consumption. If nothing is said otherwise, consumption = purchases.

$$\begin{aligned}a. \text{ CRS} &= \text{Credit purchases} \times \frac{CP}{12/365} && \text{Creditors} \\ &= 60,000 \text{ units} \times ₹5 \times 80\% \times 2/12 && \leftarrow \text{for goods} \\ &= ₹40,000. && \downarrow \\ &&& \text{credit purchase.}\end{aligned}$$

b. creditor for expenses

It is said that time lag is 1 month which means, always 1 month expense is outstanding. Since RM creditor is already considered we will not consider it again. moreover, depn can't have creditor.

$$\text{Expenses/unit} = ₹4 + ₹2 + ₹3 = ₹9$$

$$\begin{aligned}\text{Annual expenses} &= 60,000 \text{ units} \times 9 \\ &= ₹5,40,000.\end{aligned}$$

$$\begin{aligned}\text{Creditor for expenses} &= ₹5,40,000 \times 1/12 \\ &= ₹45,000.\end{aligned}$$

with this we have completed all items of Current assets / w. capital.

7. Proposed production = 6,00,000 units.

Cost Sheet Summary

Particulars	Cost p.u.	Particulars	Cost p.u.
Raw material	₹10.00	Total cost	₹20.00
Direct wages	₹2.50	profit	₹5.00
over heads	₹7.50	Selling price	₹25.00

Cincl depn ₹0.25/u)

Other details

- * Company holds 2 months RM stock.
- * 1/2 months production in WIP Stock.
- * FG Stock remain for 1 month.
- * Creditor for material extend 1 month credit.
- * Debtor - 2 months credit.
- * minimum cash balance - ₹25,000.

Forecast the w. cap requirement.

Solution

Statement of working capital estimation

I.
Total
approach

Particulars	W.N	Amount(₹)
A. <u>Current Assets</u>		
(i) Raw material	1	10,00,000
(ii) W.I.P	2	3,75,000
(iii) Finished goods	3	10,00,000
(iv) Debtors	4	25,00,000
(v) Cash balance	5	25,000
Total.		49,00,000
B. <u>Current Liabilities</u>		
Creditors		5,00,000
C. <u>working capital</u>		
(A) - (B)		44,00,000

working notes :-

1. Raw material

$$\text{Raw material} = 6,00,000 \text{ units} \times 10 \times 2/12 \\ = ₹10,00,000$$

2. W.I.P

$$\text{WIP (units)} = \frac{6,00,000 \times 0.5}{12} \\ = 25,000 \text{ units.}$$

cost/unit

$$\text{material} = 10 \times 100\% = ₹10.00$$

$$\text{Labour} = 2.50 \times 50\% = ₹1.25$$

$$\text{OH} = 7.50 \times 50\% = ₹3.75$$

$$\underline{₹15.00}$$

Since nothing is said in the question it is assumed 50% completion for Lab & OH & mat @ 100%.

WIP value (for financing)

$$25,000 \text{ units} \times ₹15 = ₹3,75,000$$

3. Finished goods

$$\begin{aligned} \text{a. FG units} &= 6,00,000 \text{ units} \times 1/12 \\ &= 50,000 \text{ units.} \end{aligned}$$

b. Cost/unit

$$\text{material} = ₹10.00$$

$$\text{Labour} = ₹2.50$$

$$\text{OH} = ₹7.50$$

$$\text{total} = ₹20.00$$

c. FG's value

$$50,000 \text{ units} \times ₹20 = ₹10,00,000.$$

4. Debtors

$$\text{Sales} \times \frac{\text{DCP}}{12}$$

$$= 6,00,000 \text{ units} \times ₹25 \times 2/12$$

$$= ₹25,00,000$$

(OR)

$$\begin{aligned} \text{units with customer} &= 6,00,000 \text{ U} \times 2/12 \\ &= 1,00,000 \end{aligned}$$

$$\text{Drs value} = 1,00,000 \text{ U} \times ₹25 = ₹25,00,000$$

5. Creditors

It is assumed that purchases = consumption and all purchases are credit purchases.

$$\begin{aligned} \therefore \text{Credit purchases} &= 6,00,000 \text{ units} \times ₹10 \\ &= ₹60,00,000 \end{aligned}$$

$$\text{creditors} = \text{Credit purchases} \times \frac{\text{CPP}}{12}$$

$$= ₹60,00,000 \times 1/12$$

$$= ₹5,00,000$$

II.

Cash cost approach

$$1. \text{w.Cap} - \text{total approach} = ₹44,00,000$$

$$2. \text{Depn in w.I.P} = (₹3,125)$$

($25,000 \times 0.25 \times 50\%$)

$$3. \text{Depn in F.Gs} = (₹12,500)$$

$$(50,000 \times 0.25)$$

(Indirect method)

4. Depn in Dn = (₹ 25,000)
(1,00,000 × 0.25)

5. Profit in Dn = (₹ 5,00,000)
(1,00,000 × 5)

W.Cap = ₹ 38,59,375

8. **Comprehensive illustration** - Cash cost basis

a. Co : X Ltd

b. Gross profit margin : 20%.

c. Depn is part of COP.

d. Safety margin - 15%

e. Cash - 50% of Current liabilities

f. No W.I.P

g. Stock of RM & FG @ 1m holding.

h. Other info -

Particulars	Amount (₹)
Sales - 2m credit	27,00,000
materials consumed (2ms credit)	6,75,000
wages (paid 1st of next month)	5,40,000
manufacturing expenses payable at the end of year	60,000
(Cash expenses - paid 1m arrears)	
Admn expes (paid as above)	1,80,000
Sales promotion - paid quarterly & in advance	90,000

Solution :

Estimation of working capital

Particulars	W.N	Amount (₹)
<u>A. Current Assets</u>		
(i) Raw material	1	56,250
(ii) Finished goods	3, 4	1,61,250
(iii) Debtors	5	3,67,500
(iv) Pre-paid expense	6	22,500
(v) Cash balance	10	1,16,250

Total.		₹1,23,750
<u>B. Current liabilities</u>		
(i.) Creditors for goods	₹	1,12,500
(ii.) o/s wages	8	45,000
(iii.) o/s mant. exps	Given	60,000
(iv.) o/s Admn. exps	9	15,000
Total		2,32,500
<u>C. working capital</u>		
(A) - (B)		4,91,250
D. Safety margin @15%		₹3,688
E. Total w.cap requirement		5,64,938
(C) + (D)		

working notes:

1. Raw material:

$$\text{Raw material consumption (units)} \times \text{Cost/unit} \times \frac{\text{RM HP}}{12m}$$

given

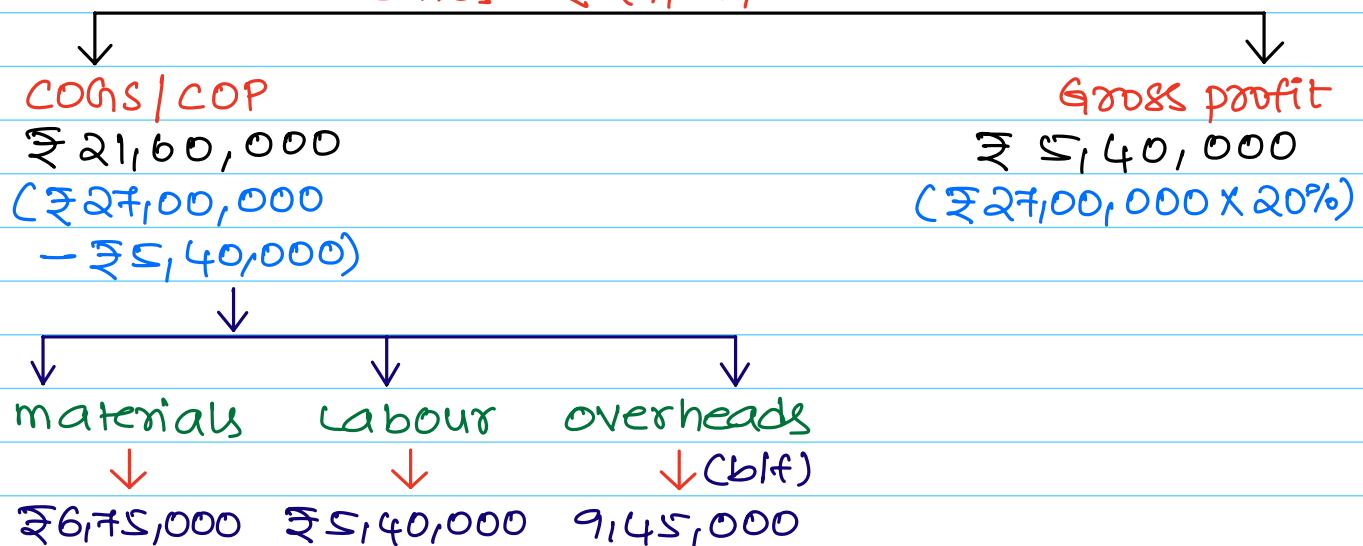
$$= ₹6,75,000 \times 1/12 = ₹56,250.$$

2. WIP: NIL

3. Before we do calculation of FGs stock we should analyse the sales and cost.

Analysis of sales & cost

$$\text{Sales} = ₹27,00,000$$



$$\begin{array}{cc}
 \downarrow & \downarrow \\
 \text{cash OH} & \text{Depreciation} \\
 ₹ 60,000 \times 12m & \text{(bal. fig)} \\
 = ₹ 7,20,000 & = ₹ 2,25,000 \\
 & (₹ 9,45,000 - ₹ 7,20,000)
 \end{array}$$

4. FGS stock

materials	= ₹ 6,75,000
(+) wages	= ₹ 5,40,000
(+) cash cost	= ₹ 7,20,000
cash COP	= ₹ 19,35,000

$$\begin{aligned}
 \text{FGS} &= \text{cash COP} \times \frac{\text{FG HP}}{12} \\
 &= ₹ 19,35,000 \times 1/12 \\
 &= ₹ 1,61,250
 \end{aligned}$$

5. Valuation of DX

cash COP	= ₹ 19,35,000
+ Admn OH	= ₹ 1,80,000
+ Selling OH	= ₹ 90,000
cash COS	= ₹ 22,05,000

$$\begin{aligned}
 \text{DX} &= \text{cash COS} \times \frac{\text{DCP}}{12} \\
 &= ₹ 22,05,000 \times 2/12 \\
 &= ₹ 3,67,500.
 \end{aligned}$$

6. Pre-paid Sales promotion expense

$$\begin{aligned}
 \text{Pre-paid expense} &= 90,000 \times 3/12 \\
 &= ₹ 22,500.
 \end{aligned}$$

7. creditors for goods

$$\text{creditors} = \text{Cr. pur} \times \frac{\text{CPP}}{12}$$

we assume that material consumed = material purchased and all purchases are purchased.

$$= ₹ 6,75,000 \times 2/12 = ₹ 1,12,500$$

8. O/S wages

$$\text{Annual wages} \times \frac{\text{Time lag}}{12}$$

$$= ₹ 5,40,000 \times \frac{1}{12}$$

$$= ₹ 45,000$$

(OR)

Alternative for solving O/S wages

When wages are paid on the 1st of next month, the previous month's 1st day wages will be O/S for 1 month and last day wages will be O/S for 0 months. Hence, on an average, half a month wages is O/S.

$$\text{O/S wages} = ₹ 5,40,000 \times \frac{0.50}{12}$$

$$= ₹ 22,500.$$

9. O/S Admn expense

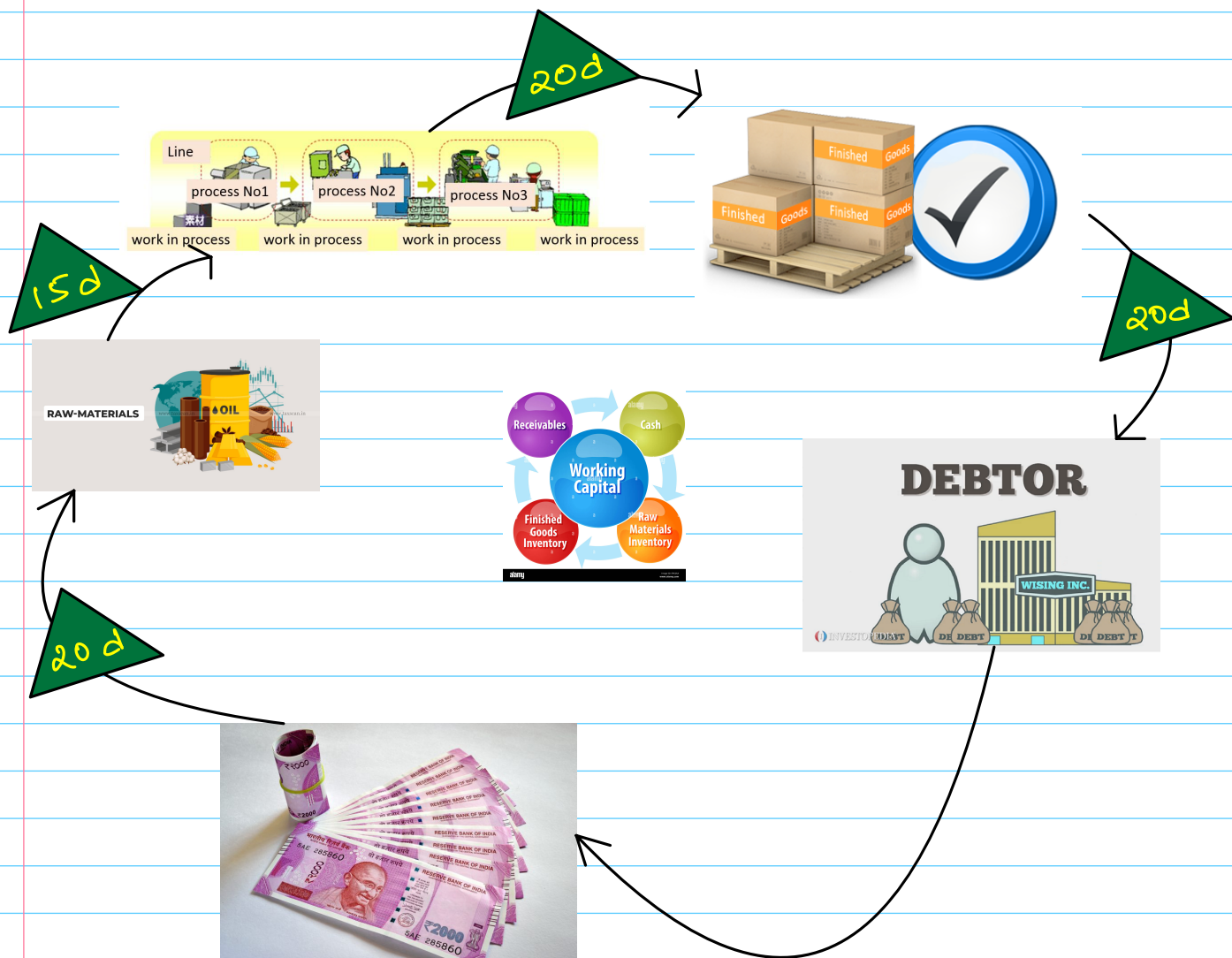
$$\begin{aligned} \text{O/S Admn expense} &= ₹ 1,80,000 \times \frac{1}{12} \\ &= ₹ 15,000. \end{aligned}$$

10. Cash balance

Cash balance is 50% of current liability. Therefore, we can't find cash balance unless CL is known.

$$\begin{aligned} \text{Cash balance} &= \text{CL} \times 50\% \\ &= ₹ 2,32,500 \times 50\% \\ &= ₹ 1,16,250 \end{aligned}$$

working capital cycle – Analysis



Notes :

* w. capital is not a stagnant capital but it is a fluctuating capital/ rotating capital. For eg, if we invest in land & building, the capital is locked in for so many number of years and same is not the case with w. capital.

* In case of working capital,

- S1 we put some fund i.e. cash to start the operations. Essentially in raw materials
- S2 This raw material is not immediately consumed, but is kept in warehouse for days/months.

✓

S3 Then that RM moves from stores to factory taking the shape of W.I.P where in we add other costs like labour and overheads.

S4 It will take some time to get converted into F.Gs and till then it stay as W.I.P stock and then on completion of production process, it becomes F.G and lay as stock of F.Gs since it cant be sold immediately-
(sales promotion, publicity etc shall add)

S5 Then, we sell the goods where some sale is in cash and some on credit which then creates debtor who will be collected at a future time. If debtor pay money, it becomes cash and then entire cycle will again restart.

This is called as "w.cap cycle" or also called as "operating cycle".

so, the summary is, cash is blocked in various forms for some number of days. Therefore, company don't need finance for all 365 days, it actually require fund to finance the wc cycle because, after each cycle we get back the cash.



In the above diagram, total cycle period is 75 days. That means, for the first 30 days co. dont get any kind of cash-flow. Suppose if a company needs ₹20,00,000 p.a for 1 year of production, we need not go for full finance we need financing for wc cycle period. In this case it is _____

365 days → ₹20,00,000
75 days → ?



₹4,10,959.

The amount invested i.e. ₹ 4,10,959 will come back in 75 days and again reinvested. If the company reduces the cycle period more faster the collection is and lesser the financing.

Formulae

$$1. \text{RMHP} + \text{WIPHP} + \text{FGHP} + \text{Debtors} = \text{Gross Op. cycle.}$$

$$2. \text{RMHP} + \text{WIPHP} + \text{FGHP} + \text{DCP} - \text{CPP} - \text{time lag} = \text{Net Op. cycle.}$$

$$3. \text{RMHP} = \frac{\text{RM Stock}}{\text{mat. cons}} \times 12/365$$

$$4. \text{FGHP} = \frac{\text{FG Stock}}{\text{COP}} \times 12/365$$

$$5. \text{WIPHP} = \frac{\text{WIP Stock}}{\text{COP}} \times 12/365$$

$$6. \text{DCP} = \frac{\text{Debtors}}{\text{Cr. Sales}} \times 12/365$$

$$7. \text{CPP} = \frac{\text{Creditors}}{\text{Cr. purchases}} \times 12/365$$

$$8. \text{Time lag} = \frac{\text{O/s expense}}{\text{Annual expense}} \times 12/365$$

Notes

- * Numerator can be either total/average and it depends on question in exam.
- * 12m (or) 365 also depends on type of question
- * WIP calculation may use COP/Gross works cost depending on data given in question.

9. From the following data compute the op. cycle and comment on increase/decrease —

₹ in 000's

Particulars	yr-1	yr-2
Stock of RM	20	27
Stock of WIP	14	18
Stock of FG	21	24
Purchases	96	135
COGS	140	180
Sales	160	200
Debtors	32	50
Creditors	16	18

consider 360 days in year.

Step 1: operating cycle for year-1

content	Formula	calculation
1. RM holding period	$\frac{\text{RM Stock}}{\text{RM Cons}} \times 360$	$\frac{20}{96} \times 360$ = 75 days
(since, op & clg RM is assumed as same RM Cons = RM purchase)		
2. WIP holding period	$\frac{\text{WIP Stock}}{\text{COP}} \times 360$	$\frac{14}{140} \times 360$ = 36 days.
(COGS = COP because, it is assumed that op & clg FGs are same).		
3. FGs holding period	$\frac{\text{FGs Stock}}{\text{COGS}} \times 360$	$\frac{21}{140} \times 360$ = 54 days.
4. Debt collection period	$\frac{\text{Debtors}}{\text{Cr. Sales}} \times 360$	$\frac{32}{200} \times 360$ = 72 days.
5. Cr. pyt period	$\frac{\text{Creditors}}{\text{Purchases}} \times 360$	$\frac{16}{96} \times 360$ = 60 days

working capital cycle

$$\begin{aligned} & \text{RMHP} + \text{WIPHP} + \text{FGHP} + \text{DCP} - \text{CPP} \\ &= 75 \text{ days} + 36 \text{ days} + 54 \text{ days} + 72 \text{ days} - 60 \text{ days} \\ &= 177 \text{ days.} \end{aligned}$$

Step 2: operating cycle for year-2

content	Formula	calculation
1. RM holding period (Refer WN 1)	$\frac{\text{Avg Stock}}{\text{RM Cons}} \times 360$	$\frac{23.5}{128} \times 360$ $= 66 \text{ days}$
2. WIP holding period (Refer WN 2)	$\frac{\text{Avg WIP}}{\text{COP}} \times 360$	$\frac{16}{183} \times 360$ $= 31 \text{ days.}$
3. FGs holding period (Refer WN 3)	$\frac{\text{Avg FGs}}{\text{COGS}} \times 360$	$\frac{22.50}{180} \times 360$ $= 45 \text{ days.}$
4. Debt collection period (Refer WN 4)	$\frac{\text{Avg. DRs}}{\text{Cr. Sales}} \times 360$	$\frac{41}{200} \times 360$ $= 74 \text{ days.}$
5. Cr. Pyt period	$\frac{\text{Avg. CRs}}{\text{Purchases}} \times 360$	$\frac{17}{135} \times 360$ $= 45 \text{ days}$

working notes

1. Avg Stock & RM consumed

$$\text{a. Avg Stock} = \frac{\text{Opst} + \text{Clg. st}}{2} = \frac{20 + 27}{2} = 23.50$$

$$\begin{aligned} \text{b. material consumed} &= \text{Opst} + \text{purchases} - \text{Cl. st} \\ &= 20 + 135 - 27 \\ &= 128 \end{aligned}$$

2. Avg WIP & COP

$$\text{a. Avg WIP} = \frac{\text{Op WIP} + \text{Cl. WIP}}{2} = \frac{14 + 18}{2} = 16$$

$$\begin{aligned}
 \text{b. } \text{COP} + \text{Op. Fns} - \text{Cl. Fns} &= \text{COGS} \\
 \text{(b/f)} \quad \text{(given)} \quad \text{(given)} \quad &\text{(given)} \\
 \text{COP} + 21 - 24 &= 180 \\
 \text{COP} &= 183
 \end{aligned}$$

3. Avg. Fns

$$\frac{\text{Op Fns} + \text{Clg Fns}}{2} = \frac{21 + 24}{2} = 22.50$$

4. Debt collection period. - All sales are assumed as credit.

$$\begin{aligned}
 \text{Avg Debtors} &= \frac{\text{Op g. Dr} + \text{Cl g. Dr}}{2} \\
 &= \frac{32 + 50}{2} = 41.
 \end{aligned}$$

5. credit payment period - All purchases are assumed as credit.

$$\begin{aligned}
 \text{Avg Creditors} &= \frac{\text{Op Cr} + \text{Cl g. Cr}}{2} \\
 &= \frac{16 + 18}{2} = 17.
 \end{aligned}$$

working capital cycle

$$\begin{aligned}
 &\text{RMHP} + \text{WIPHP} + \text{FGHP} + \text{DCP} - \text{CPP} \\
 &= 66 \text{ days} + 31 \text{ days} + 45 \text{ days} + 74 \text{ days} - 45 \text{ days} \\
 &= 171 \text{ days.}
 \end{aligned}$$

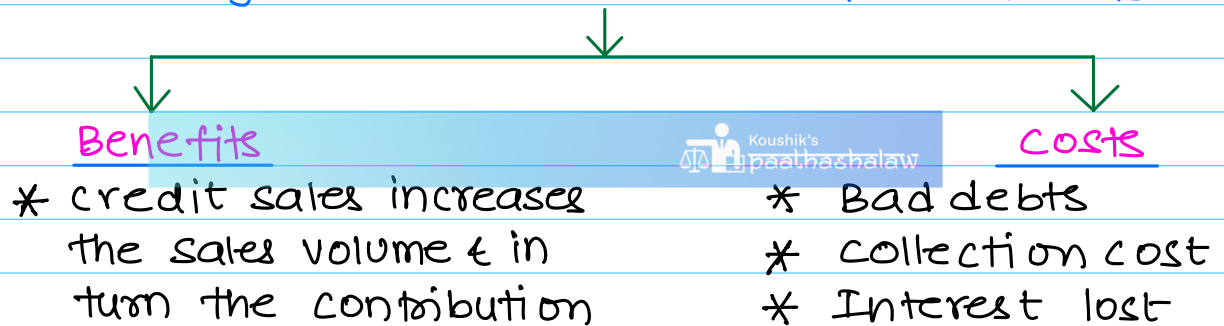
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DEBTORS MANAGEMENT

- * This chapter comes under a bigger chapter called "working capital management".
- * w.cap is CA - CL.
- * Capital is the money invested in the business.
- * Capital can be used for acquiring both FAs & CAs.
- * In CA, there are 3 main aspects —
 - Stock — materials/Inv mgt
 - Debtors — This chapter
 - Cash — cash mgt

I. Introduction:-

- * Debtors arises due to credit sale.
- * Having Debtors has its benefits and costs



$$\text{Debtors} = \text{credit sales} \times \frac{\text{DCP}}{360}$$

For example, Annual sales is ₹ 3,60,000,
DCP = 3 days

$$\begin{aligned}\text{Debtors} &= ₹ 3,60,000 \times \frac{3}{360} \\ &= ₹ 3,000.\end{aligned}$$

* In other words, always 3 days sale is with the customers through out the year.

- * Receivables manager has to make the foll. decisions :
 - a. credit period
 - b. credit appraisal
 - c. Discount policy
 - d. collection policy.

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Question 1

facts :-

Sales = ₹ 15 million p.a.

Cost of sales = 75% (80% VC, 20% FC)

Bad debts = 1% of sales

RR = 12%

Credit period = 30 days (expect to ↑ to 60 days)

Expected changes due to CP increase

* sales increase : 15%

* Bad debts : 1% increased to 4%

* No change in FC.

comment on proposed policy.

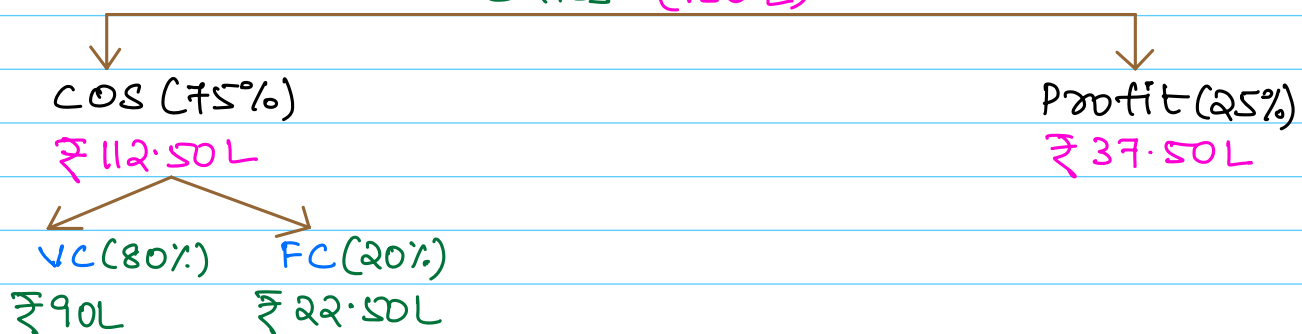
Solution

1. Cost - benefit analysis

Particulars	Amt (₹)
A. BENEFIT	
Increase in contribution	9,00,000
B. COSTS	
a. Increase in Bad debts	5,40,000
b. opp. cost of interest	1,39,500
Total	6,79,500
C. NET BENEFIT (A-B)	2,20,500

working note - 1: increase in contribution

a. Existing sales (150 L)



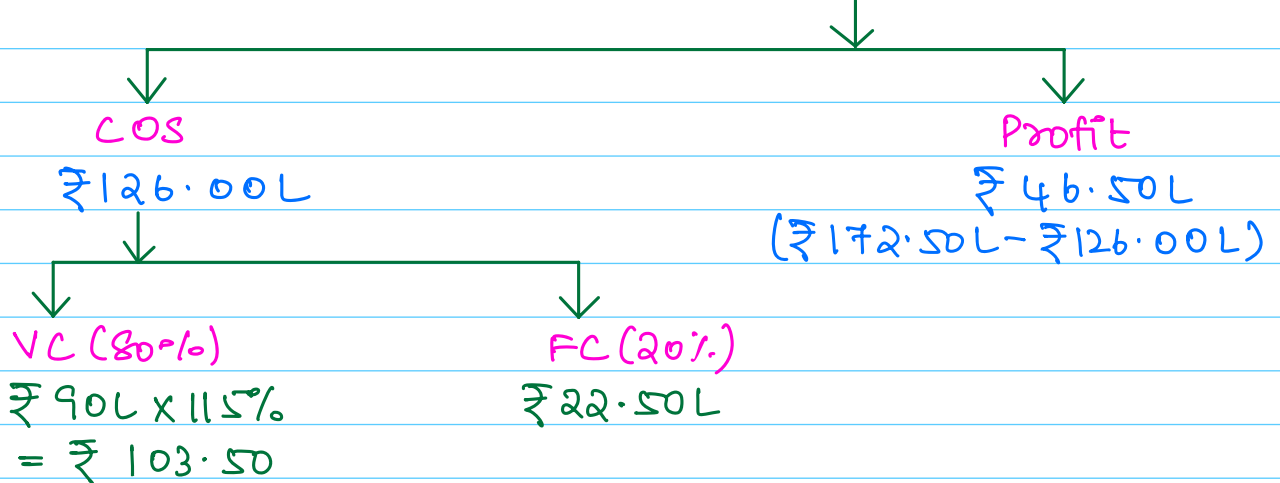
$$C = S - VC = ₹ 150L - ₹ 90L = ₹ 60L$$

$$PVR = C/S = ₹ 60L / ₹ 150L = 40\%$$

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b. Proposed sales

$$1. \text{ sales} = ₹150L \times 115\% = ₹172.50L$$



$$2. C = S - VC = ₹172.50L - ₹103.50 = ₹69L$$

$$3. PVR = C/S = ₹69L / ₹172.50L = 40\%$$

$$4. \text{ Increase in } Cnt = ₹69L - ₹60L = ₹9L$$



working note 2: Increase in Bad debts

$$a) \text{ Existing Bad debts} = ₹150L \times 1\% = ₹1.50L$$

$$b) \text{ Proposed Bad debts} = ₹172.50L \times 4\% = ₹6.90L$$

$$c) \text{ Increase in Bad debts} = (b-a) = ₹5.40L$$

working note 3: Interest loss

A. Sales approach :-

$$\begin{aligned} a) \text{ Existing interest lost} &= ₹150L \times 30/360 \\ &= ₹12.50L \times 12\% \\ &= ₹1.50L \end{aligned}$$

$$\begin{aligned} b) \text{ Proposed interest lost} &= ₹172.50L \times 60/360 \times 12\% \\ &= ₹3.45L \end{aligned}$$

$$\begin{aligned} c) \text{ Increase in Interest loss} &= ₹3.45L - ₹1.50L \\ &= ₹1.95L \end{aligned}$$

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B. Cost approach :-

$$\begin{aligned} \text{a) Existing interest lost} &= \text{COS} \times \text{DCP} / 360 \times 12\% \\ &= 112.50 \text{L} \times 30 / 360 \times 12\% \\ &= 1.125 \text{L} \end{aligned}$$

$$\begin{aligned} \text{b) Proposed interest lost} &= \text{COS} \times \text{DCP} / 360 \times 12\% \\ &= 126 \times 60 / 360 \times 12\% \\ &= 2.52 \text{L} \end{aligned}$$

$$\begin{aligned} \text{c) Increase in Interest loss} &= b - a \\ &= ₹ 2.52 \text{L} - ₹ 1.125 \text{L} \\ &= ₹ 1.395 \text{L} \end{aligned}$$

C. V.Cost approach :-

$$\begin{aligned} \text{a) Existing interest lost} &= \text{VCOS} \times \text{DCP} / 360 \times 12\% \\ &= ₹ 90 \text{L} \times 30 / 360 \times 12\% \\ &= ₹ 0.90 \text{L} \end{aligned}$$

$$\begin{aligned} \text{b) Proposed interest lost} &= \text{VCOS} \times \text{DCP} / 360 \times 12\% \\ &= ₹ 103.50 \text{L} \times 60 / 360 \times 12\% \\ &= 2.07 \text{L} \end{aligned}$$

$$\begin{aligned} \text{c) Increase in Interest loss} &= b - a \\ &= 2.07 \text{L} - ₹ 0.90 \text{L} \\ &= ₹ 1.17 \text{L} \end{aligned}$$

Since Net benefit is +ve, it is recommended to give extra credit period.

Notes:

1. When problem doesn't give any cost detail, value debtor using **Sales approach**.
2. When problem gives details regarding only VC use **VC approach**.
3. When problem gives details regarding **sales, VC & FC**, use **Total Cost approach**.

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Question 2	Particulars	Present policy	₹ in Lakhs	
			Option I	Option II
	Annual credit Sales	225	275	350
	A/c's receivable Turnover ratio	5	4	3
	Bad debts losses	7.5	22.50	47.50

Other info:

- a. Expected return : 20%
 b. Variable costs : 60% on S.P.

Solution

a) Debtors Turnover ratio = $\frac{\text{Sales}}{\text{Debtors}}$

b) A DTR of say, 12 times means, the debtors are rotated 12 times.

c) Hence, Debtors = $\frac{\text{Sales}}{\text{DTR}}$. If, DTR increases,

Debtors decreases and vice versa.

1. Cost - Benefit analysis

Particulars	₹ in Lakhs	
	Option I	Option II
<u>A. BENEFIT</u>		
Increase in cont	20.00	50.00
<u>B. COSTS</u>		
(i) Increase in BD	15.00 (22.5 - 7.5)	40.00
(ii) Increase in interest lost	4.75	14.33
Total	19.75	54.33
<u>C. NET BENEFIT (A - B)</u>		
	0.25	-4.33

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WN-1: Increase in contribution

$$\begin{aligned} \text{PVR} &= 100\% - \text{VCR} \\ &= 100\% - 60\% \\ &= 40\% \end{aligned}$$

- a) Existing contribution = ₹ 225 L × 40% = ₹ 90 L
b) contribution Option I) = ₹ 275 L × 40% = ₹ 110 L
c) Contribution Option II) = ₹ 350 L × 40% = ₹ 140 L

WN-2: Increase in interest lost

$$\begin{aligned} \text{a) Existing Interest lost} &= \frac{\text{₹ 225 L}}{5} \times 20\% \\ &= ₹ 9 L \end{aligned}$$

$$\begin{aligned} \text{b) interest lost (opt-1)} &= \frac{\text{₹ 275 L}}{4} \times 20\% \\ &= ₹ 13.75 L \end{aligned}$$

$$\begin{aligned} \text{c) interest lost (opt-2)} &= \frac{\text{₹ 350 L}}{3} \times 20\% \\ &= ₹ 23.33 L \end{aligned}$$

2. Conclusion : select opt-1 because it has highest positive net benefit.

Question 3

facts:

current sales = ₹ 2,56,48,750

proposed credit terms = 60 days

present credit term = 45 days.

increase in BD = 1.5% to 2% of sales

increase in sales = 10%

Variable opg costs = 72% of sales.

Tax = 35%

ROI (after tax) = 15%

comment of new credit policy.

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Solution

Notes :

- * When we have tax, the contribution we derive is subject to tax and entire amount doesn't belong to the company.
- * Like wise, when we have bad debts, we will charge the BD to P&L acc and therefore BD is going to give a tax shield.
- * In the same way, cost of interest lost should be after tax. However, if rate of interest given in the question is already after tax, no tax adjustment is needed.

1. COST-BENEFIT ANALYSIS — VC approach

<u>Particulars</u>	<u>Amount</u>
<u>A. BENEFITS</u>	
Increase in contribution	4,66,807
<u>B. COSTS</u>	
i. Increase in BD	1,16,702
ii. Increase in interest lost on debts	1,61,587
iii. Total	2,78,289
<u>C. NET BENEFIT (A-B)</u>	+ 1,88,518

WNI: Increase in contribution (₹)

- Existing cnt after tax = 46,68,073
(₹ 2,56,48,750 × 28% × (1-0.35))
- Proposed cnt after tax = 51,34,880
(₹ 2,56,48,750 × 110% × 28% × (1-0.35))
- Increase in cnt after tax = 4,66,807

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WN 2: Increase in BD (₹)

a) Existing BD after tax = 2,50,075
(₹ 2,56,48,750 × 1.5% × (1 - 0.35))

b) proposed BD after tax = 3,66,777
(₹ 2,56,48,750 × 110% × 2% × 0.65)

c) increase in BD after tax = 1,16,702

WN 3: Increase in interest lost (₹)

a) Existing interest lost = 3,46,258
(₹ 2,56,48,750 × 72% × $\frac{45}{360}$ × 15%)

b) proposed interest lost = 5,07,845
(₹ 2,56,48,750 × 110% × 72% × $\frac{60}{360}$ × 15%)

c) increase in interest lost = 1,61,587

2. Conclusion



It is recommended to increase the credit period since the net benefit is positive.

ALTERNATIVE (₹)

I. a. Increase in CNT after Tax = 4,66,807
b. Increase in BD after tax = 1,16,702
c. Increase in PAT due to investment in debtors = 3,50,105

II. Existing debtors = ₹ 2,56,48,750 = 23,08,388
× 72% × 45/360
Proposed debtors = ₹ 2,56,48,750 = 33,85,635
× 110% × 72% × 60/360

increased investment in debtors = 10,77,247.

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III. ROI in debton = 32.50%.

$$\frac{\text{Return}}{\text{Investment}} \times 100$$
$$= \frac{\text{₹ } 3,50,105}{\text{₹ } 10,77,247} \times 100$$

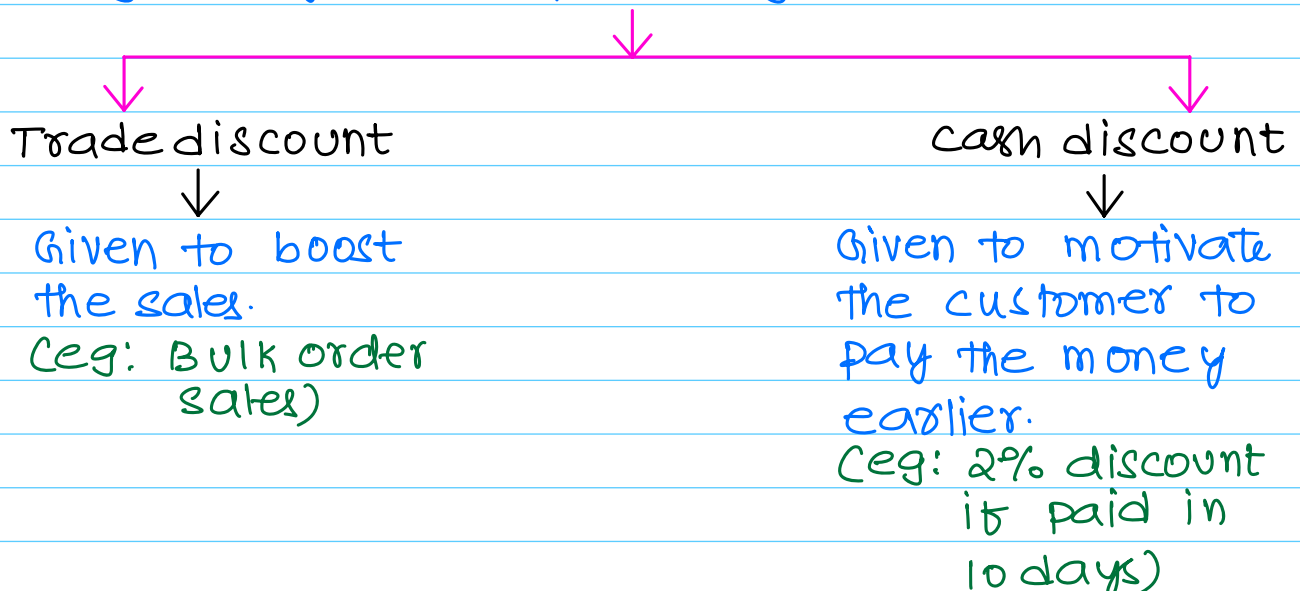
IV. Conclusion:

The ROR for investment in debton is 15% but debton gives a return of 32.50%. Since Return > COC, it is recommended to increase credit period.

Note: If a question gives pre-tax RO, multiply it by $(1-t)$ and make it post-tax and then compare with ROI.

Question on discount policies

- * Discounts are offered by companies on sales. Suppose, if sales value is ₹100 and discount offered is 2%, then sales value that is actually received will stand at ₹98.
- * There are 2 types of discounts which are generally offered namely —

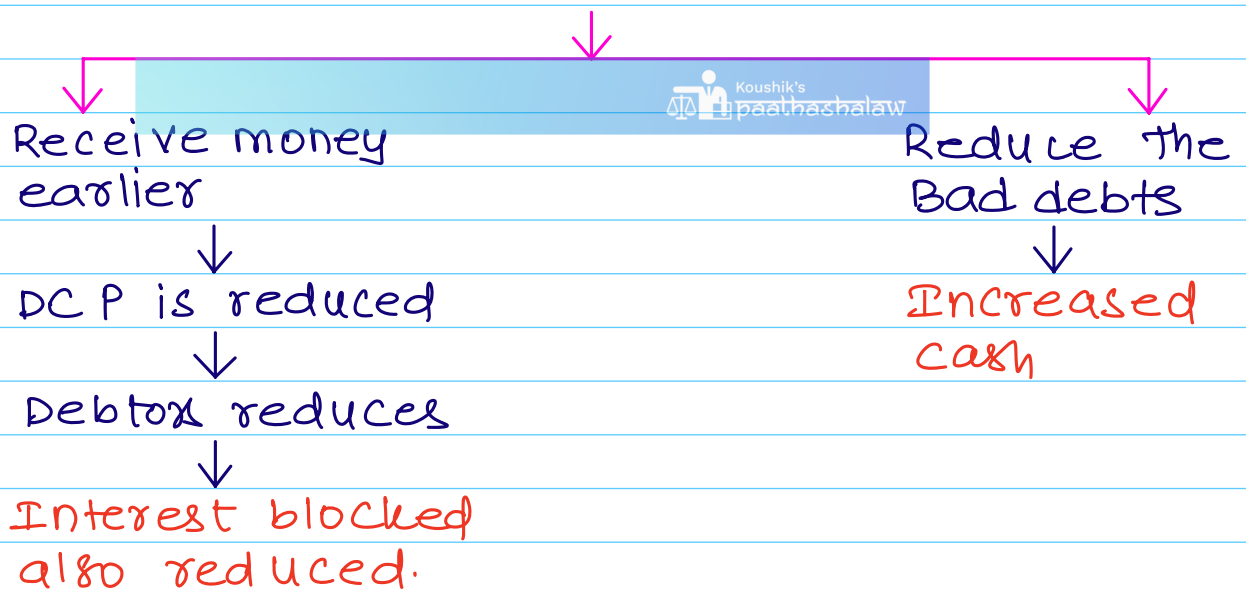


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* In most of the cash discount policies they use a term called "net off". This can be explained as under —

Term	Explanation
2/10 net 40	Normal credit period is 40 days. But, if he pays in 10 days, a discount of 2% will be given.
3/15 net 90	Normal credit period is 90 days. But, if he pays in 15 days, a discount of 3% will be given.

* The advantage of giving a cash discount is as follows —



* The disadvantage of cash discount is the discount itself.

* When a company receives money earlier it can save interest on capital (or) earn a interest on investment. This interest rate should not be compared with discount rate because discount rate is non-annualised and interest is annualised.

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* Hence, annualise discount rate and then compare.

* Annualised cash discount

$$\frac{\text{Cash disc}}{100 - \text{Cash disc}} \times \frac{360}{CP_B - CP_A} \times 100$$

CP_B = Credit period before disc

CP_A = Credit period after disc.

foreg: "2/10 net 40"

$$\begin{aligned} ACD &= \frac{2}{100 - 2} \times \frac{360}{40 - 10} \times 100 \\ &= \frac{2}{98} \times \frac{360}{30} \times 100 \\ &= 24.48\% \text{ p.a.} \end{aligned}$$

* to get ₹98 30 days earlier, we pay 2% cost. Hence, to get it 360 days earlier, ACD is 24.48%.

Question 4. facts

- a. Std credit term = 60 days net.
- b. Cost of capital (CST) = 16% p.a.
- c. proposal to give 2.5% CD if they pay within 7 days under following 3 cases —
 - (i) If original credit term = 60 days
 - (ii) If original credit term = 80 days
 - (iii) If original credit term = 105 days

Solution:

$$ACD = \frac{CD}{100 - CD} \times \frac{360}{CP_B - CP_A} \times 100$$

a. option 1:

$$\begin{aligned} &= \frac{2.50}{97.50} \times \frac{360}{60 - 7} \times 100 \\ &= 17.42\% \text{ p.a.} \end{aligned}$$

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The CD paid to get the money earlier is 17.42% p.a. But, the interest saved is only 16% p.a. Hence, donot give CD.

b. option - 2

$$= \frac{2.50}{97.50} \times \frac{360}{80-7} \times 100$$

$$= 12.64\% \text{ p.a.}$$

The benefit of giving discount is 16% p.a and cost of CD is 12.64% p.a. Hence, it is recommended to give CD.

c. option - c:

$$= \frac{2.5}{97.50} \times \frac{360}{105-7} \times 100$$

$$= 9.42\% \text{ p.a.}$$

The benefit of giving discount is 16% p.a and cost of CD is 9.42% p.a. Hence, it is recommended to give CD.

Questions

facts:

Annual Sales = ₹ 60 crore

Existing credit policy = 1/15 net 40.

General % of customers availing CD = 60%

Avg. collection period = 45 days.

Default rate = 0.50%

proposed alternatives

Credit terms	% taking discount	ACP	Default %
2/10 net 35	80%	20	1.0%
3/10 net 25	95%	14	1.5%

Sales are expected to remain stable and RR is 18%. what strategy company should follow?

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Solution

1. <u>COST-BENEFIT ANALYSIS</u>	Amount(₹)	
A. <u>BENEFITS</u>	opt-1	opt-2
Reduction in interest lost	₹5,00,000	₹3,00,000
Reduction in Bad debts	-	₹,50,000
Total	₹5,00,000	₹1,00,50,000
B. <u>COSTS</u>		
Increase in CD	60,00,000	1,35,00,000
C. <u>NET BENEFIT</u>	15,00,000	(34,50,000)

WN 1: Reduction in interest lost

- a) Existing interest lost = ₹ 1,35,00,000
 $(₹60cr \times 45/360 \times 18\%)$
- b) Interest lost - option 1 = ₹ 60,00,000
 $(₹60cr \times 20/360 \times 18\%)$
- c) Interest lost - option 2 = ₹ 42,00,000
 $(₹60cr \times 14/360 \times 18\%)$

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WN 2: Increase in CD cost

- a) Existing CD = ₹ 36,00,000
 $(₹60cr \times 60\% \times 1\%)$
- b) CD Cost-1 = ₹ 96,00,000
 $(₹60cr \times 80\% \times 2\%)$
- c) CD Cost-2 = ₹ 1,71,00,000
 $(₹60cr \times 95\% \times 3\%)$

WN 3: Calculation of Bad debts

- a) Existing BD = ₹ 12,00,000
 $(₹60cr \times 40\% \times 0.50\%)$
- b) Bad debts Cost-1 = ₹ 12,00,000
 $(₹60cr \times 20\% \times 1\%)$
- c) Bad debts Cost-2 = ₹ 4,50,000
 $(₹60cr \times 5\% \times 1.5\%)$

2. Conclusion: It is recommended to give a credit term of 2/10 net 35 since, net benefit is higher.

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Question 6: facts :

General credit term = 2/15 net 40

Annual sales = ₹ 35 Lacs.

50% customers pay on 15th day

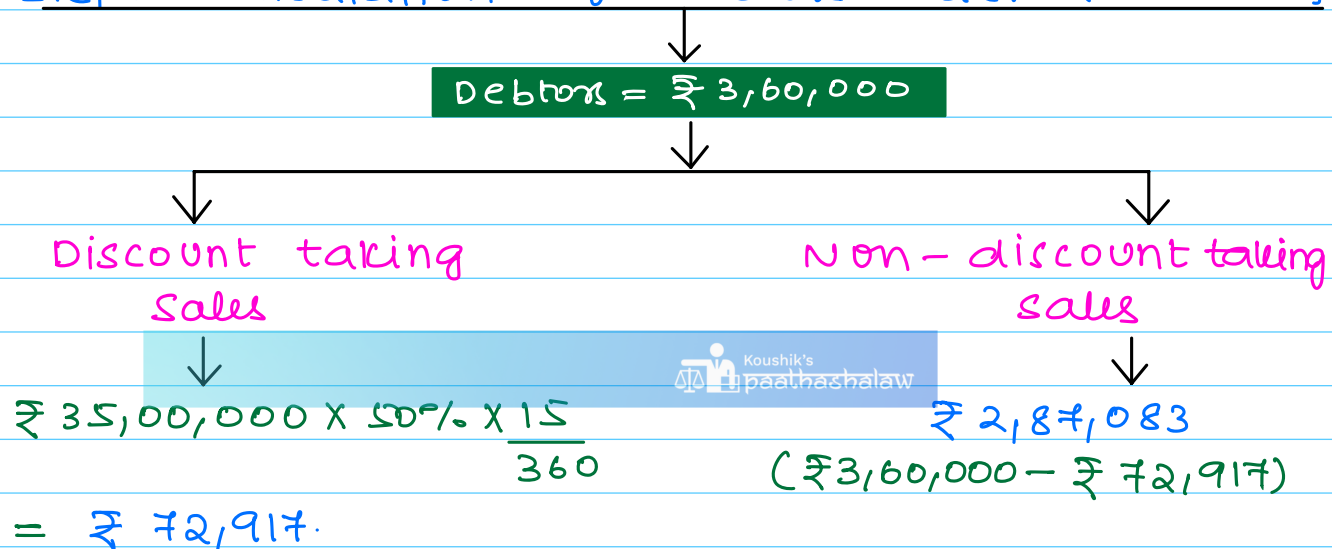
Avg. debtors = ₹ 3.6 Lacs

Required to calculate:-

a. Avg collection period on non-discount sales

b. Annualised cost of discount.

Solution Step 1: Calculation of Debtors under 2 situations



$$\text{Drs} = \text{Sales} \times \frac{\text{DCP}}{360}$$

Step 2: Calc of Avg DCP on non-discount sales

$$\begin{aligned} \text{DCP} &= \frac{\text{Drs}}{\text{Sales}} \times 360 \\ &= \text{DCP} = \frac{₹ 2,87,083}{₹ 17,50,000} \times 360 \\ &= 59 \text{ days.} \end{aligned}$$

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The company may give 40 days credit.
But on an avg the non discount debtor pay only after 59 days.

Step 3: Annualised Cash discount

$$ACD = \frac{CD}{100 - CD} \times \frac{360}{CP_B - CP_A} \times 100$$

$$= \frac{2}{98} \times \frac{360}{59 - 15} \times 100$$

$$= 16.70\%$$

Notes:

- * Those who wanted to take discount of 2% will pay on 15th day.
- * Those who do not want discount may not necessarily pay on 40th day since that 40 days is a discount related credit policy and every customer need not pay by that date.
- * Company is making a sale of ₹35,00,000. out of that, ₹17,50,000 worth sales money is blocked for 15 days. on the balance of ₹17,50,000 sales, money is blocked for 59 days. on an average debtor is ₹3,60,000.

Question 7

facts:

- a. Current situation = Pay after 45 days
- b. proposed discount policy = Pay in 10 days.
- c. Expected credit sales availing discount = 40%.
- d. Sales are unaffected by discount = ₹16,00,000
- e. Cost of ST finance = 11%
- f. Savings in admin costs due to giving discount = ₹4,450

Required:

To calc maximum discount that can be offered.

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Solution

* Here in this question, we are required to calculate CD rate at which it is indifferent b/w giving discount and not giving discount.

* Assumption of ICAI:

In question, they mentioned that sales are unaffected by discount is ₹16 Lac. This means, whether discount is given/not given the sales are not going to get affected. Therefore, the ₹16L is assumed as Total Sales and not non-discount sales.

* The benefit of giving CD is —

- a) savings in administration costs of ₹4,450.
- b) money will be received 35 days earlier and hence there is a savings of interest.



* Cost of CD is discount itself.

Step 1: Benefit of CD

a. Reduction in interest lost on debtors	₹ 6,845
$(₹16,00,000 \times 40\% \times 35/360 \times 11\%)$	
b. Savings in admin costs	= 4,450
Total benefit	= 11,295

Step 2: Cost of CD

Cash discount

$$(₹16,00,000 \times 40\% \times x/100)$$

Step 3: Indifference point

we will be indifferent when benefit = costs

$$\therefore ₹16,00,000 \times 40\% \times x/100 = ₹11,295$$

$$\Rightarrow ₹6,40,000 \times x/100 = ₹11,295$$

$$\Rightarrow x = \frac{₹11,295 \times 100}{₹6,40,000} = 1.76\%$$

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maximum discount company can offer is 1.76% beyond which costs > benefits.

Question 8: facts:

Present sales (year) = 10,000 units @ ₹300/u
 V.C.P.U = ₹200/u
 Fixed costs = ₹3,00,000 p.a.
 Existing credit period = 1 month.
 Proposed credit period = 2 months (or) 3 months
 Company's estimates:

Particulars	Existing	Proposed	
Credit policy	1m	2m	3m
Increase in sales	—	15%	30%
% Bad debts	1%	3%	5%

Other info:

- a) F.C will increase by ₹50,000 if sales increase is beyond 25% of present level.
 b) Expected pre-tax return = 20%

Required to calculate

most paying credit policy to company.

Solution 1. COST-BENEFIT ANALYSIS

(₹)

Particulars	option -1 (2m)	option -2 (3m)
<u>A. BENEFIT</u>		
Increase in contribution	1,50,000	3,00,000
<u>B. COSTS</u>		
a. Increase in B.D	73,500	1,65,000
b. Increase in interest loss on debtors	48,334	1,09,167
c. Increase in F.C.	—	50,000*
Total Cost	1,21,834	3,24,167
C. NET BENEFIT (A-B)	26,166	(24,167)

* given

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WN-1: Increase in contribution ₹

- a. Existing contribution = 10,00,000
(10,000 U X ₹100)
- b. Contribution (opt-1) = 11,50,000
(10,000 U X 115% X ₹100)
- c. Contribution (opt-2) = 13,00,000
(10,000 X 130% X ₹100)

WN-2: Increase in BD ₹

- a. Existing BD = 30,000
(10,000 U X ₹300 X 1%)
- b. BD (opt-1) = 1,03,500
(10,000 X ₹300 X 115% X 3%)
- c. BD (opt-2) = 1,95,000
(10,000 X ₹300 X 130% X 5%)

WN-3: Increase in interest lost

S1: Calc of total cost (₹)

Particular	Existing	opt-1	opt-2
Variable cost	20,00,000 (10,000 U X 200)	23,00,000 (11,500 U X 200)	26,00,000 (13,000 U X 200)
Fixed cost	3,00,000	3,00,000	3,50,000
Total cost	23,00,000	26,00,000	29,50,000

S2: Calc of int lost ₹

- a) Existing interest lost = 38,333
(₹23,00,000 X 1/12 X 20%)
- b) Interest lost (opt-1) = 86,667
(₹26,00,000 X 2/12 X 20%)
- c) Interest lost (opt-2) = 1,47,500
(₹29,50,000 X 3/12 X 20%)

2. Conclusion: option - 1 is recommended since it has positive benefits.

CASH MANAGEMENT

Introduction :-

- * In this chapter we will learn
 - a. Boumal model and
 - b. miller orr model
- * Boumal model is identical to that of EOQ model whereas miller ore model is cash budget approximation concept.
- * cash budget preparation is not covered here since there is a dedicated chapter in costing paper namely "**Cash Budgets**" in Budgetary control chapter.

1. Basics

- * Suppose, a company raise capital of ₹10cr. Out of that ₹10cr, ₹8cr is invested in fixed Assets. In that balance ₹2cr, ₹1.8cr is blocked in stock, Debtor etc. The balance of ₹20L is held as cash.
- * Every asset must have a use. For example, P&M is an asset used to generate sales and make profit. Stock of RM/FGs promote sales.
- * What is the use of keeping idle resource i.e. cash?

1. motive - 1: Transaction motive

- a. Daily there will be inflows and outflows.
- b. company has to settle its outflows (say creditors) on a timely basis. That means, company can't wait for its inflows to settle its outflows because inflows and outflows rarely matches.
- c. Hence, every company has to maintain a cash balance to settle its payables.

2. motive - 2: compensatory motive

- a) There are various customers with a bank namely —
- General a/c customers
 - High-valued customers
- b) High-valued customers are those who make huge transactions using the bank and who maintains huge a/c balances.
- c) For those 'HVC' banks offer free services like payroll payments, payment of electricity bills on due dates without charging any extra fees.
- d) All those free services are provided since they maintain huge minimum balance in the accounts giving huge interest to banks.
- e) Banks stop giving these free services once a/c is closed (or) balance is withdrawn.

3. motive - 3: Precautionary motive

companies maintain cash balances to meet any unforeseen contingencies.

4. motive - 4: speculative motive

companies also maintain cash balance for taking advantage of certain speculative events like sudden discounts announced on RM etc where the advantage can be taken only if they have cash on that date.

2. Boumal model

- * Beginning of the year, a company estimates annual cash requirement say ₹12,00,000 ($C = ₹12,00,000$) to meet expenses.
- * However, maintaining physical cash balance is not recommended since they donot generate any interest/return.
- * Therefore, companies maintain their cash in marketable securities such that till they are put to use they generate return and then utilised accordingly.
- * Whenever company needs cash, they will sell marketable securities (Marketable Securities are those securities which are convertible to cash immediately) and get the cash needed.

Advantage

- * No unwanted blockage of cash
- * No risk of pilferage/theft etc.

Dis-advantage

- * No clear prediction as to how much cash is needed.
- * Heavy txn costs to sell m.s for multiple times.

- * TO overcome this, Boumal made an optimum txn level at which we have minimum txn. costs.

If we sell ms in small lots

↓ Adv

Less opp cost of loss of interest

Dis Adv ↓

High txn costs due to more txns

If we sell ms in bigger lots

↓ Adv

Low txn costs due to less txn

Dis Adv ↓

High opp costs of loss of interest.

* Hence, this model emphasizes on "optimum transaction size" at which interest loss and txn costs set at minimum and it is represented by following formula —

$$OTS = \sqrt{\frac{2CT}{I}}$$

where —

C = Annual cash req

T = TXN cost / txn

I = Interest cost (₹/%)

ICAI - style illustration

I. * Project annual cash usage : ₹ 37,50,000
(flow is uniform throughout the year)

* Company periodically sells marketable securities to meet the cash requirement.

* Marketable securities earn = 12% p.a.

* Cost of txn in marketable sec = ₹ 40 / txn

Use Boumal model to calc —

* Optimal txn size.

* Avg cash balance.

* Transfer required during year.

Solution

I. Annual cash req (C) = ₹ 37,50,000

I = 12%

t = ₹ 40 / txn

$$\begin{aligned} \text{optimum txn size} &= \sqrt{\frac{2CT}{I}} \\ &= \sqrt{\frac{2 \times 37,50,000 \times 40}{0.12}} \\ &= ₹ 50,000 \end{aligned}$$

The Company require ₹ 37,50,000 of cash to meet its annual expenses. It mobilises this cash by selling m-sec. Every time it sells ₹ 50,000 worth msec.

$$\begin{aligned}\text{II. Average cash balance} &= \frac{1}{2} \times \text{OTS} \\ &= \frac{1}{2} \times ₹ 50,000 \\ &= ₹ 25,000.\end{aligned}$$

$$\begin{aligned}\text{III. No. of. transfers req} &= \frac{₹ 37,50,000}{₹ 50,000} \\ &= 75 \text{ txns.}\end{aligned}$$

II. Question :

Annual cash req = ₹ 10,00,000

Types of m.sec company has _____

1. Lot size : ₹ 50,000
2. Lot size : ₹ 1,00,000
3. Lot size : ₹ 2,00,000
4. Lot size : ₹ 2,50,000
5. Lot size : ₹ 5,00,000

* Cost of conversion/lot
= ₹ 1,000
* Int = 5% p.a.

Required :

- a. To prepare table indicating which lot size will have to be sold by company.
- b. To calc economic lot size.

Solution

a)

@ 5%

lot size	No. of. tm.	Avg CB	Int cost	TXN cost	Total cost
50,000	20	25,000	1,250	20,000	21,250
1,00,000	10	50,000	2,500	10,000	12,500
2,00,000	5	1,00,000	5,000	5,000	10,000
2,50,000	4	1,25,000	6,250	4,000	10,250
5,00,000	2	2,50,000	12,500	2,000	14,500

Optimum lot size = ₹ 2,00,000 since the total cost is lowest in this lot

b) Economic lot size using Boumal model

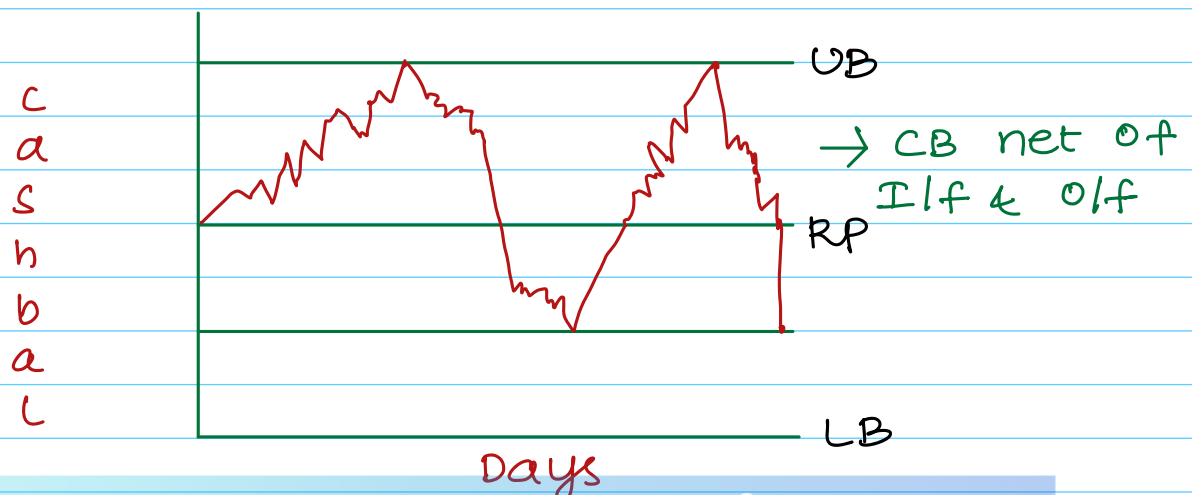
$$C = \sqrt{\frac{2CT}{I}}$$

$$C = ₹ 10,00,000, T = ₹ 1,000, I = 5\%$$

$$= \sqrt{\frac{2 \times 10,00,000 \times 1000}{0.05}}$$

$$= ₹ 2,00,000$$

Miller-Orr model



UB = Upper bound, LB = Lower bound
RP = Return point.

- * A treasury mgr should invest in m-sec if he has surplus cash in hand and should sell m-sec if he has a short fall in cash.
- * Miller-Orr model helps the treasury mgr to understand the timing of his investment and sale and the quantum.
- * When CB touches UB, he should invest so much cash in m-sec that the balance falls to RP and when CB touches LB, he should dispose/sell m-sec so that the balance reaches RP.

Formulae

1. $UB = LB + \text{spread}$.
2. $RP = LB + \frac{1}{3} \text{ spread}$.
3. $\text{Spread} =$

$$3 \times \sqrt[3]{\frac{3/4 \times TC \times CFV}{I/\text{day}}}$$

TC = Txn Cost
CFV = Cash flow variance per day
I/day = Int per day

Illustration

a. min. CB = ₹ 10,000

b. CFV = ₹ 62,50,000

c. Interest = 0.025% / day

d. Txn cost for each sale/buy = ₹ 20.

Calc Optimal LB & UB and analyse.

Step 1: Calc of spread

$$\text{Spread} = 3 \times \sqrt[3]{\frac{3/4 \times T \times C \times CFV}{I/\text{day}}}$$

$$= 3 \times \sqrt[3]{\frac{3/4 \times 20 \times 62,50,000}{0.025\%}}$$

$$= ₹ 21,646$$

Step 2: Calc of UB

LB + spread

$$= ₹ 10,000 + ₹ 21,646$$

$$= ₹ 31,646$$

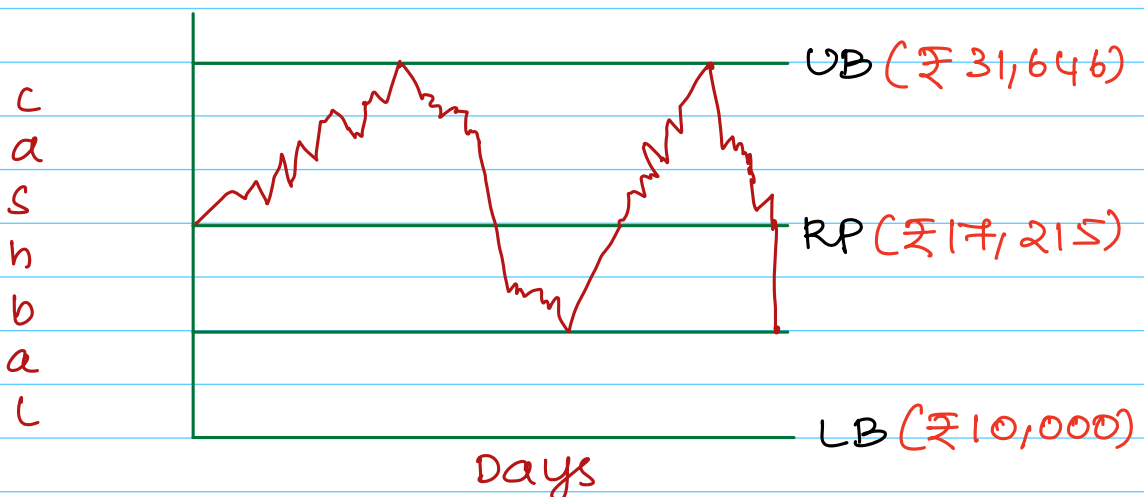


Step 3: Calc of RP

LB + $\frac{1}{3}$ spread

$$= ₹ 10,000 + (\frac{1}{3} \times 21,646)$$

$$= ₹ 17,215.$$



INVENTORY / MATERIALS MANAGEMENT

Introduction :-

- * This chapter is all about the management of raw material stocks in a company/ a business.
- * concepts in this chapter might be already covered in costing with a chapter called "materials".
- * Here, in this chapter wrt Fm paper, EOQ is the only concept that will be tested. Hence, in this chapter (Fm), we will critically analyse EOQ concept along with formula derivation.

I. BASICS

1. whenever we discuss about raw materials (Rm), the following 4 costs are closely associated with it namely —

- ordering costs
- Holding costs
- Purchase costs
- Stock out costs.

2. Analysis on each type of cost is as under

Type of cost	Analysis on type of cost
1. ordering cost	a. Everytime we order Rm, we incur some cost which is called as ordering cost. b. <u>Examples of ordering costs</u> * cost of Tenders and Quotations advertisement. * Legal expenses in tenders. * freight charges * Packing, unpacking, inspection costs etc.

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c. However, one should understand that all these costs are not incurred on per unit basis but on total purchase activity i.e. on overall basis.

d. If a company makes an order it incurs ordering costs once. If it makes an order 10 times in a year, ordering cost is also incurred 10 times.

2. Holding Cost

a. Holding cost is also called as carrying cost.

b. Holding cost is the cost incurred for storing the RM.

c. Examples are as under

* Warehouse / store room rent.

* Insurance costs.

* Theft, pilferage and obsolescence

* Loss of interest / opportunity cost.

d. more stock of RM, Bigger should be the warehouse, bigger the warehouse, higher the rents and higher the rents, higher will be the holding costs.

e. more the RM stock, more amount of risk it is subject to. more the risk, more the policy premium. more the policy premium, more the holding costs.

f. more the RM stock, lesser the vigilance. Lesser the vigilance, lesser the controls. Lesser the controls, Higher the chances of theft etc.

g. most important holding cost is loss of interest. Because, it a

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storeroom has 10,000 units of Rm stock, of ₹10/unit, it should be understood as ₹1,00,000 blocked in the stock which is idle. If the same money is in bank, it would generate interest.

3. Purchase Cost

a. When a company wants Rm say, 'X', of 10,000 kgs, it has to buy it from a vendor.

b. It is the most evident cost.

c. Purchase cost is incurred on every unit purchased and not on per order.

d. Purchase cost includes all the money spent such as ———

- * GST

- * Customs duty

- * Loading etc.

4. Stock out cost

a. Apart from all direct related costs as aforesaid there is another cost called as "stock out cost".

b. Stock out cost is a cost that is incurred due to not keeping the stock.

c. Examples are as follows

- * Loss of profit due to inability to produce and sell products.

- * Late delivery charges arising due to inability of company to produce finished product.

II. Economic order Quantity (EOQ)

Let us understand EOQ concept taking a numerical illustration:

Estimated annual RM consumption = 1,20,000 units

Ordering cost/order = ₹100

Order qty/size = 10,000 units

Holding cost p.u p.a = ₹6

Analysis

- * we prepare budgets before real time execution.
- * In this question, this year company budgeted that it need 1,20,000 units of RM.
- * Every time we purchase, there is an ordering cost of ₹100/order.
- * Every unit we maintain there is a cost of ₹6/unit.
- * How much quantity should be purchased each time?

<u>Situation</u>	<u>Remarks</u>
1. Purchase the annual requirement in bigger lots	<u>Advantages</u> Low ordering cost because, when materials are purchased in bulk, the number of times the purchase is made reduces thereby it reduces ordering cost. <u>Dis-advantage:</u> High holding cost as they carry huge stocks in their stores.

2. Purchase of annual requirement more frequent in smaller lots

Advantages

Low holding cost as they carry less stock in the stores.

Dis-advantages

High ordering cost because when materials are purchased in small lots, the order frequency is high and entails to high ordering cost

* "That quantity ordered at which the total ordering cost and holding cost is minimum is best order quantity which is called as "Economic order quantity".

* EOQ is optimum order quantity, at which costs are minimum.

calculations

1. ordering cost

a. ordering cost = No. of orders $\times$ ordering cost per order

b. No. of orders = $\frac{\text{Annual consumption}}{\text{ordering qty}}$

$$\downarrow$$
$$\frac{C}{OQ}$$

c. ordering cost = $\frac{C}{OQ} \times O$

d. No. of orders = $\frac{1,20,000 \text{ U}}{10,000 \text{ U}}$
= 12 orders.

e. ordering cost = $\frac{C}{OQ} \times O$
= 12 order $\times$ ₹100
= ₹1,200

a. Holding cost

a. H.C is a composite cost. That means it is influenced by 2 factors namely —

* cost/unit

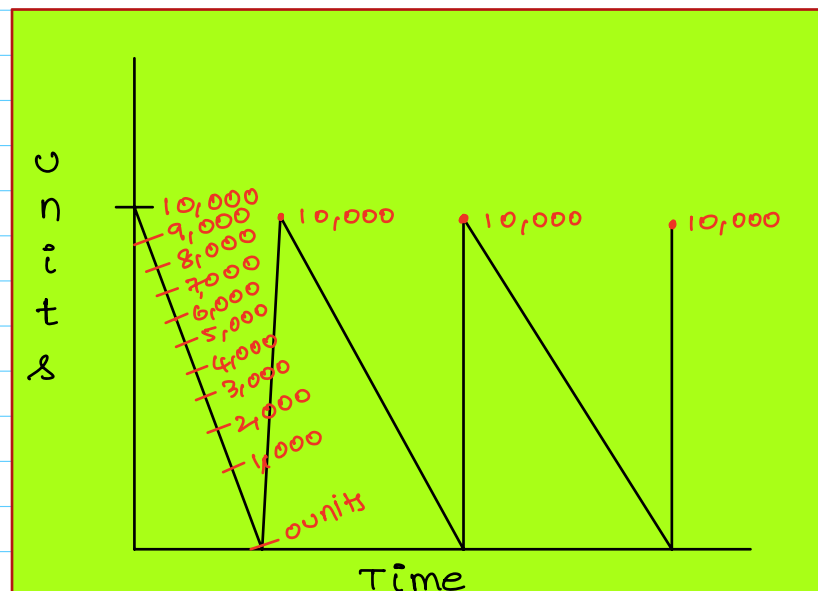
* Time held

b. In the given case, company purchases only 10,000 units at one time. Like this, it makes its order for 12 times in a year.

c. Even then, H.C can't be apportioned to all 10,000 units because, during the consumption process, we can't see all 10,000 units all throughout a month.

d. At some point of time it may be 10,000 units, at some point of time it may also be "0". Therefore, consumption for the purposes of H.C calculation is average consumption.

e. This can be explained as under —



a. $HC = \text{Average inventory held} \times HC p.u.p.a$

b. $AVG. Inv = \frac{1}{2} \times OQ$

$$= \frac{1}{2} \times 10,000$$

$$= 5,000 \text{ units}$$

aka inv. HC
(hence, I)

c. $HC = \frac{1}{2} \times OQ \times I$ ($I = HC p.u.p.a$)

$$= \frac{1}{2} \times 10,000 \times 6$$

$$= ₹ 30,000$$

3. Economic order Qty (EOQ)

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

$C = \text{Annual consumption}$

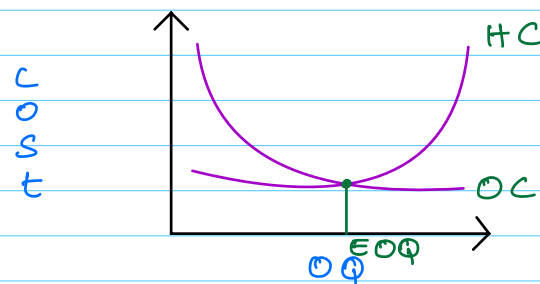
$O = \text{ordering cost/order}$

$I = HC p.u.p.a$

$$= \sqrt{\frac{2 \times 1,20,000 \times 100}{6}}$$

$$= 2,000 \text{ units}$$

Derivation



At EOQ (point of intersection)

$$OC = HC$$

$$\frac{C}{EOQ} \times O = \frac{1}{2} \times EOQ \times I$$

$$\Rightarrow \frac{CO}{EOQ} = \frac{1}{2} \times EOQ \times I$$

$$\Rightarrow CO = \frac{1}{2} \times EOQ^2 \times I$$

$$\Rightarrow 2CO = EOQ^2 \times I$$

$$\Rightarrow \frac{2CO}{I} = EOQ^2$$

$$\Rightarrow EOQ = \sqrt{\frac{2CO}{I}}$$

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