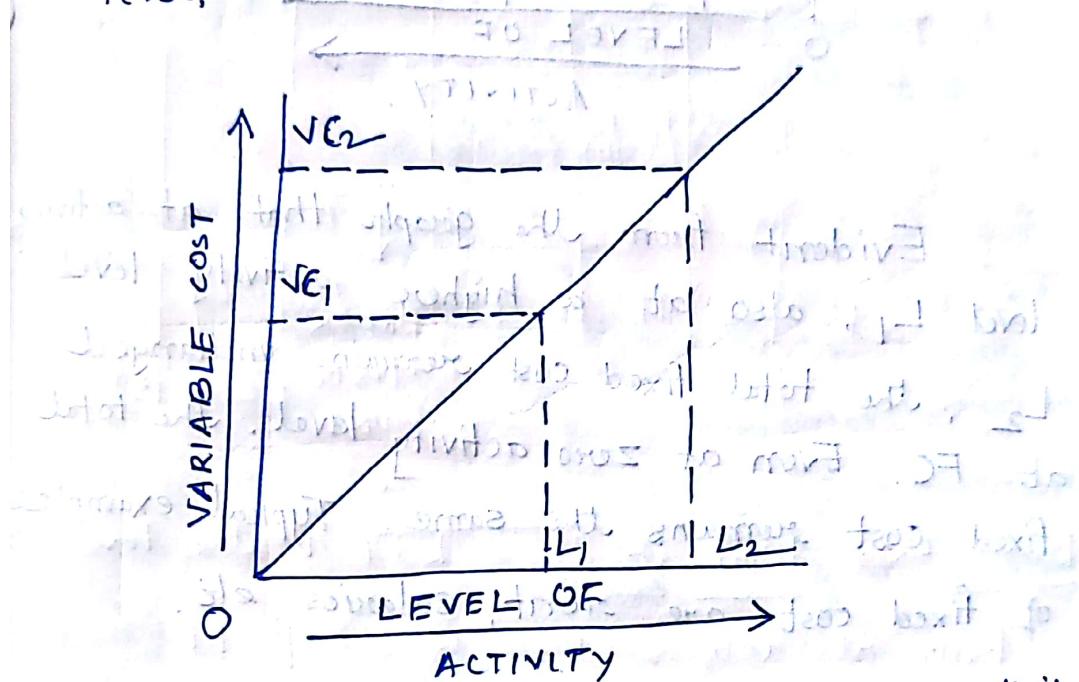


COSTS

04/07/18

There are a no. of types of costs:-

- (i) Variable Costs. - These are costs which vary with the level of activity. Higher, the level of activity, higher would be the total variable cost and vice-versa. At zero activity level, the total variable cost will be zero.



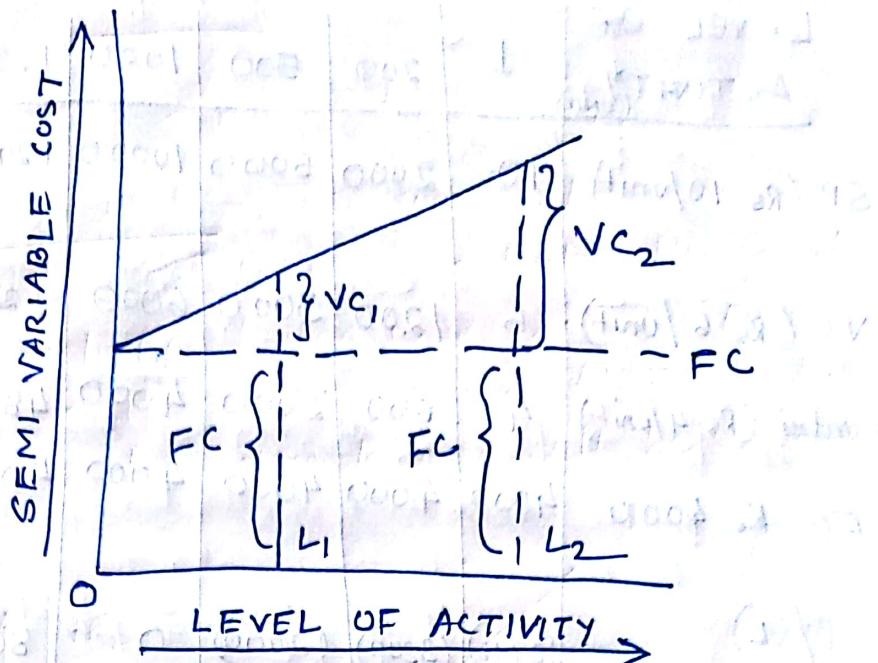
Evident from the graph that, at activity level L_1 , Variable cost is VC_1 , at a higher activity level L_2 , total variable cost is higher at VC_2 . At zero activity level, total variable cost is zero. Typical examples of VC are raw material cost.

- (ii) Fixed Costs: - Costs which remain the same even with changes in the level of activity, whether the level of activity is high or low, the total fixed cost would remain the same. Even at zero activity level, the fixed cost is fully present.



Evident from the graph that at activity level L_1 , also at a higher activity level L_2 , the total fixed cost remains unchanged. Even at zero activity level, the total fixed cost remains the same. Typical examples of fixed cost are rent, salaries, etc.

(iii) Semi-Variable Cost - These are costs which have a variable as well as a fixed component. Cost of electricity in a factory is a typical example. Cost of electricity consumed by productive equipment constitutes the variable component whereas cost of electricity in areas like office lighting, security lighting, etc. constitutes a fixed component. At zero activity level, variable component will be zero and the fixed component will be fully present.



Evident from the graph that at an activity level L_1 , fixed component is FC and the variable component is VC_1 . At a higher activity level L_2 , the fixed component remains unchanged at FC , but the variable component is higher at VC_2 . At zero-activity level, only fixed component FC is present.

$$VC + FC = TC$$

$$SP - TC = P/CL$$

$$SP - VC - FC = P/CL$$

$$SP - VC = \text{Contribution}$$

$$\text{Contribution} - FC = P/CL$$

Contribution Margin level to be stopped.

Contribution Margin is the amount left after fixed costs have been paid.

Contribution Margin is the amount left after fixed costs have been paid.

Contribution Margin is the amount left after fixed costs have been paid.

Contribution Margin is the amount left after fixed costs have been paid.

Contribution Margin is the amount left after fixed costs have been paid.

LEVEL OF ACTIVITY (UNIT)	1	200	500	1000	1200
SP (Rs 10/unit)	10	2000	5000	10000	12000
VC (Rs 6/unit)	6	1200	3000	6000	7200
Contri (Rs 4/unit)	4	800	2000	4000	4800
FC Rs 4000	4000	4000	4000	4000	4000
P/(L)	(3996)	(3200)	(2000)	0	800

BREAK EVEN (B.E.P.) POINT

Break Even Point (BEP) : BEP is the level of activity at which there is no profit, no loss. At any activity level higher than B.E.P. there will be a profit and at any activity level lower than the B.E.P., there will be a loss. It is extremely important for any organization to be aware of its B.E.P., so that efforts can always be made to operate at a level higher than B.E.P., so that profits are attained.

~~Break Even point~~

BEP has two expressions:

BEP (QUANTITY): This is the level of activity at which there is no profit, no loss

$$(a) \text{BEP (QUANTITY)} = \frac{\text{FIXED COST}}{\text{CONTRIBUTION/UNIT}}$$

(b) BEP (SALES VALUE) - This is the value of sales at which there is no profit no loss.

$$\text{BEP (SALES VALUE)} = \text{BEP (QUANTITY)} \times \text{SP/UNIT.}$$

Q. The selling price per unit of a particular product is Rs 50. The variable cost is Rs 30/unit. The total fixed cost is Rs 4 Lacs. Calculate, (a) BEP (QTY) (b) BEP (SALES VALUE).

$$\text{SP} - \text{VC} = \text{CONTRIBUTION.}$$

$$\therefore \text{CONTRIBUTION} = \text{Rs } (50 - 30) = \text{Rs } 20/\text{unit}$$

$$\text{FC} = \text{Rs } 4,00,000$$

$$\therefore \text{BEP (QTY)} = \frac{4,00,000}{20} = 20,000 \text{ units.}$$

$$\text{BEP (Sales Value)} = \text{Rs } (20,000 \times 50) = \text{Rs } 10,000,00$$

$$g) SP = \text{Rs } 80/\text{Kg.}$$

$$VC = \text{Rs } 50/\text{Kg.}$$

$$FC = \text{Rs } 90,000.00$$

$$\text{BEP (SV)} = \frac{\frac{300,000}{30} - 90,000.00}{80} \times 80$$
$$= \text{Rs } 240,000.00$$

meaning of BEP: It is always ~~an~~ effect of all

organizations to lower its BEP to the maximum extent possible. If the BEP is low, the company can make profits at lower levels of activities.

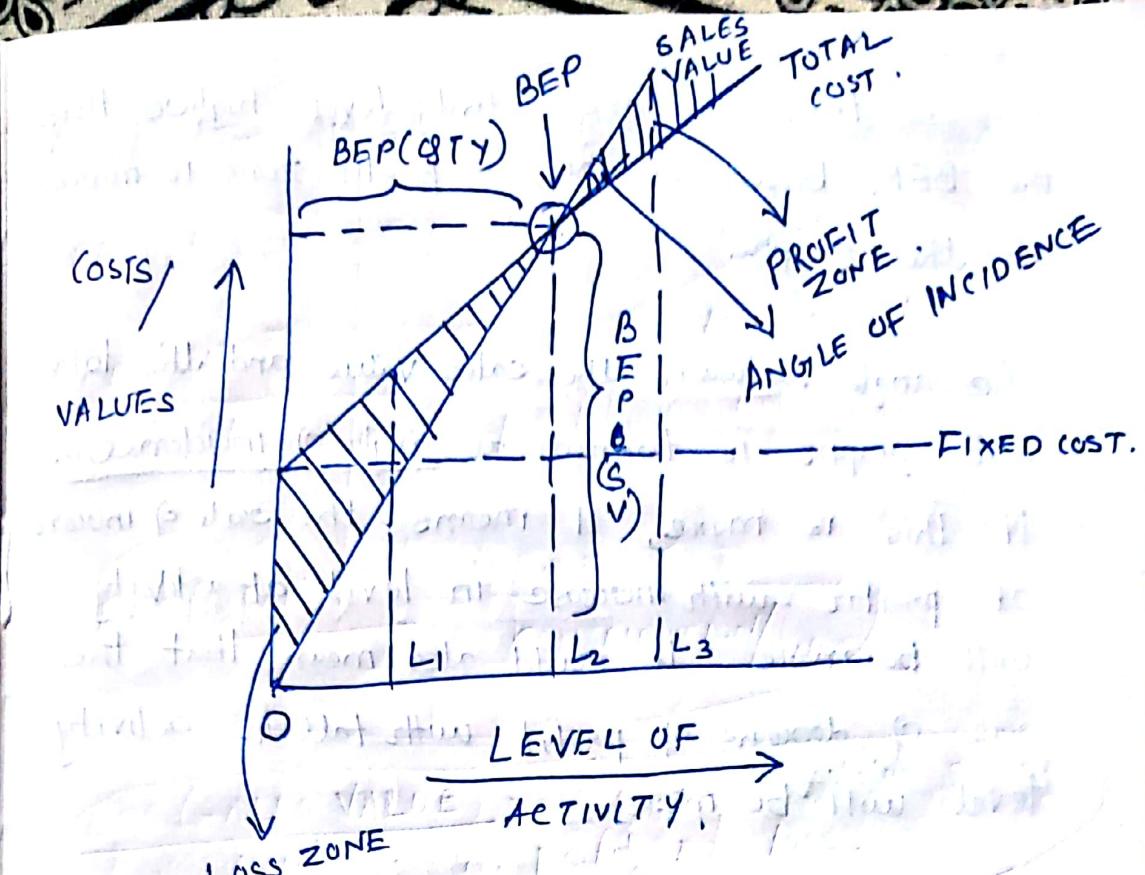
$$\text{BEP (QTY)} = \frac{FC}{SP/\text{UNIT} - VC/\text{UNIT}}$$

The BEP can be reduced by any one or a combination of the following:

(a) Reduce total fixed cost

(b) Increase SP/unit

(c) Decrease VC/unit



Shown above is a graphical representation of various aspects of the BEP. The sales value graph and the total cost graph are shown separately.

At L_2 , the point of intersection of the sales value and total cost graphs, there is no profit, no loss - this is the BEP. The BEP (Quantity) and the BEP (Sales Value) are marked separately on the graph.

At an activity level L_1 , lower than the BEP, the total cost would be more than corresponding sales value and there will be a resultant loss. This is true for any activity level lower than the BEP. Based on this, a loss zone is marked on the graph.

At an activity level L_3 , higher than the BEP, the sales value would be more than corresponding total cost and there will be a resultant profit.

This is true for any activity level higher than the BEP. Based on this, a profit zone is marked on the graph.

The angle between the sales value and the total cost graphs is termed as angle of incidence.

If this is more, it means the rate of increase of profit with increase in level of activity will be more. It could also mean that the rate of decrease of profit with fall in activity level will be more.

The converse would be true for a lower angle of incidence.

VARIANCE ANALYSIS

Variance Analysis is a tool used by the management of organizations to monitor and control actual performance. This is termed by going through the following steps:-

- Standards are set for all major items of cost and income. These serve as benchmarks.
- Actuals are measured and compared against the corresponding standards. The difference between the two is termed as VARIANCE.

Variances can be either favourable or

Adverse, or neutral. Also, also with losses & profits, and other methods.

(c) The focus of management attention is drawn to variances which are adverse. Appropriate management action is taken to ensure that such adverse variances do not repeat in the future.

$$\text{Contribution-Sales Ratio (CS Ratio)} = \frac{\text{CONTRIBUTION}}{\text{SALES}}$$

Or,

$$\text{Profit-volume Ratio (CPV Ratio)} = \frac{6}{10} = 0.6$$

$$\text{Variable cost - Volume Ratio (VV Ratio)} = \frac{VC}{SALES} = \frac{4}{10} = 0.4$$

$$SP - VC = \text{Contribution}$$

$$10 - 4 = 6$$

$$1 - CS\text{ RATIO} = VV\text{ RATIO}$$

$$1 - VV\text{ RATIO} = CS\text{ RATIO}$$

$$\text{BEP (Sales Value)} = \text{BEP (Quantity)} \times SP/\text{unit}$$

$$\text{BEP (Sales Value)} = \frac{FC}{CS\text{ Ratio}}$$

$$SP/\text{unit} = ₹ 100, VC/\text{unit} = ₹ 70, FC = ₹ 60,000.$$

- Calculate :-
- BEP (Quantity)
 - CS Ratio.
 - VV Ratio
 - BEP (Sales Value)

$$\text{Contribution/unit} = ₹(100 - 70) = ₹30.$$

$$(a) \text{BEP (Quantity)} = \frac{₹60,000}{₹30} = 2000 \text{ units}$$

$$(b) \text{CS Ratio} = \frac{30}{100} = 0.3$$

$$(c) \text{VV Ratio} = (1 - 0.3) = 0.7$$

$$(d) \text{BEP (Sales Value)} = \frac{60,000}{0.3} = ₹20,000$$

$$\text{BEP (Sales Value)} = ₹(2000 \times 100)$$

$$= ₹2,00,000$$

Q $\text{VV Ratio} = 60\%$

At ₹95,000 Sales Value, Profit = ₹12,000

- Calculate : (a) FC
(b) BEP (Sales Value).

$$SP = ₹95,000$$

$$P = ₹12,000$$

$$\text{VV Ratio} = 0.6$$

$$\text{CS Ratio} = (0.4)(0.6) = 0.24$$

$$\therefore \frac{\text{Cont}}{95,000} = 0.4 \Rightarrow \text{Cont} = 95,000 \times 0.4$$

$$= 95,000 \times \frac{4}{10}$$

$$= ₹38,000$$

$$VC = SP - \text{Cont} = ₹(95,000 - 38,000)$$

$$= ₹57,000$$

$$SP - VC - FC = PI(L)$$

$$\Rightarrow 95000 - 57000 - FC = 12000.$$

$$\Rightarrow 95000 - 69000 = FC$$

$$\Rightarrow FC = ₹ 26,000/-$$

$$\therefore BEP (\text{Sales Value}) = \frac{26000}{0.4}$$

$$= ₹ 65,000/-$$

Types of Variances

Some of the variances that are commonly used are : (i) Material variances : Some of the imp variances in this category are

(a) MATERIAL USAGE VARIANCE

$$= \left(\frac{\text{STANDARD QUANTITY}}{\text{ACTUAL QUANTITY}} - 1 \right) \times \text{STANDARD PRICE}$$
$$= (100 - 80) \times 20 = ₹ 400 (\text{F}) \rightarrow \text{Positive (Favorable)}$$

(b) MATERIAL PRICE VARIANCE

$$= \left(\frac{\text{STANDARD PRICE}}{\text{ACTUAL PRICE}} - 1 \right) \times \text{ACTUAL QUANTITY}$$
$$= (200 - ₹ 15) \times 80 = ₹ 1600 \text{ Regs.} \rightarrow (\text{F})$$

(c) MATERIAL COST VARIANCE

$$= \text{MATERIAL USAGE VARIANCE} + \text{MATERIAL PRICE VARIANCE}$$

$$= ₹ (400 + 400) = ₹ 800.$$

$$= \left(\frac{\text{STANDARD QTY}}{\text{ACTUAL QTY}} \times \text{STANDARD PRICE} \right) - \left(\frac{\text{ACTUAL QTY}}{\text{ACTUAL QTY}} \times \text{ACTUAL PRICE} \right)$$

$$= (100 \times 20) - (80 \times 15).$$

$$= ₹ 800 (\text{F})$$

MATERIALSTANDARDACTUALQUANTITY (KG)

100 / 70

80

PRICE (₹/kg)

20 / 25

15

$$(a) (70 - 80) \times 25 = ₹ 250 (A)$$

$$(b) (25 - 15) \times 80 = ₹ 800 (F)$$

$$(c) (-250 + 800) = ₹ 550 (F)$$

QActual & Material Quantity 200 kg.

- Material Qty = 200 kg

- " Price = ₹ 10/kg

Output

= 100 kg

Standard

- Material Qty = 1.5 kg / unit of output

- " Price = ₹ 12/kg

Standard Qty = ~~1.5×100 kg~~

= (1.5 kg / unit \times 100 unit) = 150 kg.

Material usage Variance.

$$= (150 - 200) \times 12 \\ = ₹ 600 (A)$$

Material Price variance

$$= (12 - 10) \times 200 \\ = ₹ 400 (F)$$

Material cost variance. = ₹ 200 (A)

or

$$(150 \times 12) - (200 \times 10) = ₹ 200 (A).$$

(ii) LABOUR VARIANCE : The major variances in this category are :-

$$(a) \text{ LABOUR EFFICIENCY VARIANCE} = \left(\frac{\text{STANDARD LABOUR HOURS} - \text{ACTUAL LABOUR HOURS}}{\text{STANDARD LABOUR HOURS}} \right) \times \text{STANDARD LABOUR RATE}$$

$$(b) \text{ LABOUR RATE VARIANCE} = \left(\frac{\text{STANDARD LABOUR RATE} - \text{ACTUAL LABOUR RATE}}{\text{STANDARD LABOUR RATE}} \right) \times \text{ACTUAL LABOUR HOURS}$$

$$(c) \text{ LABOUR COST VARIANCE} = (\text{LABOUR EFFICIENCY VARIANCE} + \text{LABOUR RATE VARIANCE})$$

$$\text{OR } \left(\frac{\text{STANDARD LABOUR HOURS} \times \text{STANDARD LABOUR RATE}}{\text{ACTUAL LABOUR HOURS} \times \text{ACTUAL LABOUR RATE}} \right) - \left(\frac{\text{ACTUAL LABOUR HOURS} \times \text{ACTUAL LABOUR RATE}}{\text{ACTUAL LABOUR HOURS} \times \text{STANDARD LABOUR RATE}} \right)$$

LABOURSTD.ACTUAL

HOURS 40

50

RATE(₹/hr) 100

105

$$(a) ₹ (40 - 50) \times 100$$

$$= ₹ 1000 \text{ (A)}$$

$$(b) ₹ (100 - 105) \times 50$$

$$= ₹ 250 \text{ (A)}$$

$$(c) ₹ (40 \times 100) - (50 \times 105)$$

$$= ₹ (4000 - 5250)$$

$$= ₹ 1250 \text{ (A)}$$

$$\underline{\text{OR}} \quad ₹ (1000 + 250)$$

$$= ₹ 1250 \text{ (A)}$$

Q. Standard

Material quantity = 2 kg/unit of output = 200 kg

Material price = ₹ 10/kg. ~~= ₹ 2000~~

Labour hours = 1.25 hrs/unit of output = 150 hrs

Labour Rate = ₹ 120/hr. ~~= ₹ 18,000~~

Actual

Output = 100 unit.

Labour hours = 170 hrs. ~~= ₹ 12,700~~

Material Qty = 210 kg.

Material price = ₹ 12/kg. ~~₹ 2520~~

compute all the material and labour variances.

Material Variances

$$(a) \text{₹} (200 - 210) \times 100 = \text{₹} 1000 \text{ (A)}$$

$$(b) \text{₹} \left(\frac{10 - 12}{200} \right) \times 210 = \text{₹} 420 \text{ (A)}$$

$$(c) \text{₹} (200 \times 12) - \left(\frac{210 \times 12}{2520} \right) = \text{₹} 109200 \text{ (A)} - 520 \text{ (A)}$$

OR

$$\text{₹} (20,000 + 10,920) \text{ (A)} = \text{₹} 129,200 \text{ (A)}$$

Labour Variances

$$(a) \text{₹} (150 - 170) \times 120 = \text{₹} 2400 \text{ (A)}$$
$$(b) \text{₹} \left(\frac{120 - 170}{150} \right) \times 170 = \text{₹} 1700 \text{ (F)}$$
$$(c) \text{₹} (150 \times 120) - \left(\frac{170 \times 187}{170} \right) = \text{₹} 42900 \text{ (A)}$$

OR

$$\text{₹} (2400 - 1700) \text{ (A)} = \text{₹} 700 \text{ (A)}$$
$$\text{₹} (36000 + 11900) \text{ (A)} = \text{₹} 47900 \text{ (A)}$$

Budget

A budget is a financial or quantitative statement prepared prior to a definite period of time of the policy to be pursued during that period for the purpose of attaining a given objective.

Benefits of Budget :-

- (1) It helps in giving a systematic look into the future.
- (2) It helps in coordinating the complex and diverse operations of a business.
- (3) It serves as a medium of communication of the plans of the company to all concerned.
- (4) It helps in motivating people at all levels in the organization.
- (5) It helps in controlling and monitoring actual performance.

Types of Budgets :-

- (1) Operating Budgets :- These are budgets which are directly related to the operations of a business. It includes budgets like Production, sales, purchase budgets etc.
- (2) Capital Budget :- This includes items of capital expenses and income. It would include items like purchase of machinery, building, furniture etc.

(3) Cash Budget :- These would include all items of expenses and income which have cash or bank involvement.

(4) Master Budget :- This is a ~~concise and~~ summarized budget which gives the overall picture of all the above mentioned budgets. This is meant for the top level of the organization.

(5) Projected Balance Sheet :- This is the balance sheet prepared at the end of the budget period based on the figures of all the above mentioned budgets.

S The following figures are available for a company:

Month	Sales	Purchase	Payroll Expenses	Other Expenses
June	2,50,000/-	60,000/-	40,000/-	12,000/-
July	3,00,000/-	80,000/-	40,000/-	14,000/-
August	3,25,000/-	1,25,000/-	40,000/-	15,000/-
September	3,60,000/-	1,50,000/-	40,000/-	18,000/-
October	4,00,000/-	1,80,000/-	40,000/-	20,000/-

Additional Information

- (1) 20% of sales are received in cash and the balance payment is received after 2 months.
- (2) All purchases are made on one month credit.
- (3) Payroll expenses are paid with a gap of one month.
- (4) Interest of ₹ 15,000/- to be received in October.
- (5) All other expenses are paid in the same month.
- (6) Machinery worth ₹ 50,000/- to be purchased in September.

(7) Expected cash balance end July ₹ 60,000/-

Based on these information, prepare a cash budget for the period Aug - Oct.

	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>
<u>OPENING BALANCE</u>	60,000/-	1,90,000/-	2,69,000/-
<u>INFLOWS</u>			
CASH SALES	65,000/-	72,000/-	80,000/-
COLLECTION FROM CREDIT SALES	2,00,000/-	2,40,000/-	2,60,000/-
INTEREST RECEIVED	-	-	15,000/-
	3,25,000/-	5,02,000/-	6,24,000/-
<u>OUTFLOWS</u>	TOTAL [A]		
PURCHASES	80,000/-	1,25,000/-	1,50,000/-
PAYROLL EXPENSES	40,000/-	40,000/-	40,000/-
OTHER EXPENSES	15,000/-	18,000/-	20,000/-
MACHINERY PURCHASE		50,000/-	-
	R200		
	TOTAL [B]	1,35,000/-	2,33,000/-
	CLOSING BALANCE (A-B)	1,90,000/-	2,69,000/-

08/08/18.

Flexible Budget

A flexible budget is prepared for different levels of activities.

The benefits of preparing a flexible budget are as follows :-

- 1) It gives an idea of what the performance of a company will be like at different levels of activity.
- 2) It helps in exercising more effective control over actual performance.

<u>ACTIVITY LEVEL (UNITS)</u>	<u>1000</u>	<u>2000</u>	<u>2500</u>	<u>500</u>
<u>COST</u>	<u>₹</u>	<u>₹</u>	<u>₹</u>	<u>₹</u>
RAW MATERIAL	2,00,000/-	4,00,000/-	5,00,000/-	1 L
FUEL COST	50,000/-	1,00,000/-	12,5,000/-	25 K
OTHER VARIABLE COST	40,000/-	80,000/-	1,00,000/-	20 K
RENT	80,000/-	80,000/-	80,000/-	80 K
SALARIES	60,000/-	60,000/-	60,000/-	60 K
SELLING COST (40% VARIABLE)	10,000/- 4000/- 6000/-	14,000/- 8000/- 6000/-	16000/- 10000, 6000/-	8000/-
DISTRIBUTION COST (30% FIXED)	20,000/- 14000/- 6000/-	34000/- 28000 6000/-	41,000/- 35,000, 6000/-	13000/-
	4,60,000/-	7,68,000/-	9,22,000/-	3,06,000/-

<u>ACTIVITY LEVEL</u>	<u>10,000</u>	<u>20,000</u>	<u>25,000</u>	<u>1500</u>
<u>COST</u>	<u>₹</u>	<u>₹</u>	<u>₹</u>	<u>₹</u>
<u>RAW MATERIAL</u>	1,80,000/-	2,00,000/-	2,50,000/-	15000/-
<u>FUEL COST</u>	40,000/-	80,000/-	1,00,000/-	6000/-
<u>OTHER VARIABLE COST</u>	20,000/-	40,000/-	50,000/-	3000/-
<u>RENT</u>	60,000/-	60,000/-	60,000/-	60000/-
<u>SALARIES</u>	80,000/-	80,000/-	80,000/-	80000/-
<u>SELLING COSTS</u>	30,000/-	32,000/-	33,000/-	2830/-
<u>ADMINISTRATION COST</u>	20,000/- 10,000/- 10,000/- 6000/-	28,000/- 14,000/- 14,000/- 6000/-	28,000/- 16,000/- 16,000/- 6000/-	3602800/- 6600/- 600/-
	340,000/-	5,06,000/-	5,89,000/-	1,98,900/-

002	0022	0002	0001	ACTIVITY LEVEL (Units)
				Cost
		<u>SELLING COSTS</u>		

$\text{VARIABLE COMPONENT} = \frac{(32000 - 30000)}{(20000 - 10000)}$

$= ₹ 0.2/\text{unit}$

$\text{RENT} = \frac{(14000 - 10000)}{(20000 - 10000)}$

$= ₹ 0.4/\text{unit}$

$\text{SALARIES} = \frac{(80000 - 60000)}{(20000 - 10000)}$

$= ₹ 2000/\text{unit}$

$\text{TOTAL VARIABLE COST} = ₹ 10000/\text{unit}$

Steps in Recording Accounting Transactions

1) Identify the accounts.

2) Classify the accounts.

(a) Real accounts:- It includes "real items" like furniture, machinery, building, cash etc.

(b) Personal accounts :- It includes persons for e.g. ~~Co.~~ ^{Co}. A, Co. B, Mr. X, Mrs Y etc.

(c) Nominal accounts :- It includes expenses and income for e.g. ~~ex~~ purchase, salaries, wages, rent, sales etc.

3) Apply the golden rules

(a) for Real accounts : Debit what comes in, credit what goes out.

(b) for personal accounts : Debit the receiver, credit the giver.

(c) for Nominal accounts : Debit all expenses and losses, credit all income and gains

Purchase of raw materials from Co. A, Payment made by cheque This ~~A/c~~ a/c is DR.

Selling of goods to Co. C on credit This a/c's CR.

29/08/18

- 1) Purchase of furniture in Cash
 Furniture A/c DR,
 Cash A/c CR.
- 2) Payment of Rent in Cash,
 Rent A/c ... DR
 Cash A/c ... CR
- 3) Purchase of building, payment made by cheque.
 Building A/c ... DR
 Bank A/c ... CR
- 4) Purchase of Raw Materials, payment made in Cash.
 Purchase A/c ... DR
 Cash A/c ... CR

JOURNAL

<u>Date</u>	<u>Particulars</u>	<u>LF</u>	<u>DR (₹)</u>	<u>CR (₹)</u>
01.01.18	Bank A/c.... DR To Capital A/c (being capital brought in by Cheque)		2,00,000/-	2,00,000/-
02.01.18	Cash A/c.... DR To Bank A/c (being cash withdrawn from bank)		40,000/-	40,000/-
04.01.18	Furniture A/c... DR To Bank A/c. (being purchase of furniture)		20,000/-	20,000/-
06.01.18	Purchase A/c.... DR To Cash A/c (being purchased raw materials from Co. A)		5,000/-	5,000/-
08.01.18	Co. B A/c.... DR To Sales A/c (being sale of goods to Co. B)		2,000/-	2,000/-

DateTransactions

₹

01/01/18 1000.00	Capital brought in by Cheque	2,00,000/-
02/01/18 1000.00	Cash withdrawn from bank	40,000/-
04/01/18 1000.00	Purchase of furniture Payment made by cheque	20,000/-
06/01/18 1000.00	Purchase of Raw materials from Company A in cash	5,000/-
08/01/18 1000.00	Sale of goods to Co. B on credit	2,000/-

BANK A/c

Dr.

DATE	TRANSACTION	AMOUNT (₹)	STATE
01-03-18	Sale of goods to Co. B by Cheque	2,00,000/-	To State Dr.

Journalise the above transactions.
* LF stands for ledger Folio.

DATE	TRANSACTION	AMOUNT (₹)
01-03-18	Sale of goods to Co. B by Cheque	2,00,000/-
02-03-18	Cash withdrawn from bank	30,000/-
05-03-18	Purchase of raw materials from Co. B payment made by Cheque	15,000/-

Date	Particulars	LF	DR (₹)	CR (₹)
01.03.18	Bank Sales A/c... DR to Bank A/c (being sales of goods to Co. B)		2,00,000/-	2,00,000/-
02.03.18	Cash A/c... DR to Bank A/c (being cash withdrawn from bank)		30,000/-	30,000/-
05.03.18	Purchase A/c... DR to Bank A/c (being purchase of raw materials)		15,000/-	15,000/-

Dr.

BANK A/C

CR

DATE	PARTICULARS	₹	DATE	PARTICULARS	₹
01.03.18	TO SALES	2,00,000/-	02.03.18	BY CASH	30,000/-
01.04.18	TO BAL B/D	1,55,000/-	05.03.18	BY PURCHASE	15,000/-

Dr.

SALES A/C

Cr

DATE	PARTICULARS	₹	DATE	PARTICULARS	₹
31.03.18	TO BANK	2,00,000/-	01.03.18	BY BANK	2,00,000/-
31.03.18	TO BALANCE C/D	2,00,000/-	01.04.18	BY BALANCE B/D	2,00,000/-

CASH A/C					
DR DATE	PARTICULARS	₹	CR DATE	PARTICULARS	₹
12.03.18	TO BANK	30,000/-	31.02.18	BY BALANCE C/D	30,000/-
		30,000/-			30,000/-
01.04.18	TO BALANCE B/D	30,000/-			

PURCHASE A/C					
DR DATE	PARTICULARS	₹	CR DATE	PARTICULARS	₹
15.03.18	TO BANK	15,000/-	31.03.18	BY BALANCE B/D	15,000/-
		15,000/-			15,000/-
01.04.18	TO BALANCE B/D	15,000/-			

C/D is carried down

TRIAL BALANCE.

ACCOUNT	DR (₹)	CR (₹)
1. BANK A/c.	1,55,000/-	
2. SALES A/c		2,00,000/-
3. CASH A/c	30,000/-	
4. PURCHASE A/c.	15,000/-	
<u>TOTAL</u>	<u>2,00,000/-</u>	<u>2,00,000/-</u>

Items in the Dr. column are either expenses

or assets.

Items in the Cr. column are either incomes or liabilities

Sources of Capital

Source of capital — debt and equity share capital. There are a no. of sources from which a company can raise capital. These sources can be broadly classified into two groups — Debt capital and Equity share capital.

The major differences between these two sources of capital are as follows:-

Debt Capital

- 1) This is taken in the form of loans from various sources.
- 2) Interest is payable on such capitals.
- 3) Interest has to be paid no matter what the performance of the company is. No matter whether a company makes a profit or loss, interest has to be paid.
- 4) The rate of interest is fixed. No matter what profit or loss, the company makes, the rate of interest would be the same.

Equity Share Capital

- 1) This is raised through the selling of equity shares.
- 2) Dividend is payable.
- 3) Dividend on equity share capital has to be paid only if the profits of the company are adequate to permit such dividend payment.
- 4) The rate of dividend depends upon the performance of the company. If profits are small, the rate would be low, if large profits are made, the rate would be high. If no profits are made, dividend may not be paid at all.

Debt Capital

- 5) A company has to pay back the original amount of the loan (principal amount) by the end of the loan period.
- 6) A company gets income tax benefit on the interest paid.
- 7) In case, the company cannot continue with its operations, it can shut down and go into liquidation. In such case, the assets of the company are sold off and the debt holders are paid off first.

Equity share capital

- 5) A company can retain the equity share capital for as long as it wants to. It is at no stage, obligated to pay back the amount.
- 6) Dividend is paid from profits after tax. As such, the company gets no income tax benefit for the dividend paid.

- 7) In case of liquidation, the equity share holders are paid off only to the extent that remains after paying off the debt holders.

In the long run, for an averagely well performing company, debt capital is the more risky but cheaper source of capital, whereas equity share capital is the less risky but more expensive source.

19/09/18

Capital Expenditure

Capital expenditure is an expenditure benefit of which is derived over a prolonged period of time. Since such expenditures give long term benefits, they are usually "one-time" expenditure.

Importance of Capital Expenditure :-

A capital expenditure has to be dealt with very carefully by an organization mainly because, (a) the benefits are derived over a prolonged period of time. Should anything go wrong, the burden of the mistake has to be carried over such prolonged period. (b) the amount involved is usually very high. Should anything go wrong, the financial impact would be very high.

Capital Expenditure Evaluation

Considering the importance of capital expenditure a proposal for a capital expenditure is prepared and evaluated before the expenditure is actually made. If on such evaluation, it is seen that the expenditure is worth making, only then is the expenditure actually made - else the proposal is rejected.

Discounted Cash Flow (DCF)

A cash flow in future is worth less in future for the following reasons:-

- (a) Inflation - This is the fall in the purchasing power of money along with the passing of time.
- (b) Risk - There is always an element of risk associated with any future event.

In view of this, a future cash flow has to be appropriately reduced to bring it down to its present value. This process is referred to as Discounting of Cash Flow and the reduced present value is known as ~~the~~ DISCOUNTED CASH FLOW.

Methods of Capital Expenditure Evaluation

There are a no. of methods which can be broadly categorized into two groups -

Non DCF methods and DCF methods.

~~the~~ Non DCF Methods

These methods do not consider discounting of cash flows. The important methods in this category are

- (a) Payback Period Method (PPM)
- (b) Average Rate of Return (ARR)

DCF Methods

These methods consider discounting of cash flows. The important methods in this category are:

- (a) Net Present Value (NPV)
- (b) Benefit-Cost Ratio (BCR)

or, Profitability Index (PI)

(c) Net Benefit Cost Ratio (NBCR)

(d) Internal Rate of Return (IRR)

PAYBACK PERIOD METHOD

Payback Period is the period of time over which the initial investment of a project is recovered. Projects with shorter payback period are preferred as the initial investment is recovered faster and therefore the risks are reduced.

CASH FLOW (₹ LAKH)

<u>YEAR</u>	<u>PROJECT 'A'</u>	<u>PROJECT 'B'</u>
0	<u>100</u>	<u>100</u>
1	<u>20</u>	<u>20</u>
2	<u>30</u>	<u>20</u>
3	<u>50</u>	<u>30</u>
4	<u>50</u>	<u>30</u>
5	<u>50</u>	<u>110</u>
	<u>200</u>	<u>210</u>

Going by the Payback Period Method, Project A is preferred as it has a shorter payback period (3 years) compared to project B (4 years).

Considering both the projects over an entire life of 5 years each, it is seen that project B is better in the long run as

it gives a return of ₹ 210 Lacs, compared to ₹ 200 Lacs for project A. Project B would however be rejected simply because it has a longer payback period — this is a serious drawback of the method.

Advantages -

- (1) It focusses on faster recovery of initial investment and therefore ends at reducing risk.
- (2) It provides quick evaluation of an investment.

Disadvantages -

- (1) No discounting of cash flow is done.
- (2) Projects which yield better returns in the long run may be rejected simply because they have longer payback period.

AVERAGE RATE OF RETURN (ARR)

$$ARR = \frac{\text{AVERAGE PROFIT AFTER TAX (PAT)}}{\text{INVESTMENT}} \times 100\%.$$

$$\text{INVESTMENT} = ₹ 100 \text{ LAKH}$$

<u>YEAR</u>	<u>PAT (₹ LAKH)</u>	<u>ARR ??</u>
1	10	10 / 100 = 10%
2	15	25 / 100 = 25%
3	25	25 / 100 = 25%
4	30	35. ∴ ARR = $\frac{24}{100} \times 100 = 24\%$
5	40	45 / 100 = 45%
	120	Avg PAT = $\frac{150}{5} = ₹ 30 \text{ L}$ ARR = $\frac{30}{200} \times 100 = 15\%$

Advantages

- (1) The evaluation is carried out over the entire life of the project.

Disadvantages

- (1) No discounting of cash flow is done.

26/09/18

Net Present Value

$$CF_0 + \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \frac{CF_4}{(1+k)^4} + \dots + \frac{CF_n}{(1+k)^n}$$

$K = \text{Discounting Rate}$, if say $k = 10\%$



$$\frac{1}{(1+0.1)^1} \times CF_1$$



$$1.000 \times CF_0 + \frac{1}{(1.1)^1} \times CF_1 + \frac{1}{(1.1)^2} \times CF_2 + \dots + \frac{1}{(1.1)^n} \times CF_n$$



$$NPV = \underbrace{1.000 \times CF_0}_{\text{Investment}} + \underbrace{0.909 \times CF_1}_{\text{Discounting factor at } 10\%} + \underbrace{0.826 \times CF_2}_{\text{Discounting Rate}} + \dots + \underbrace{0.751 \times CF_3}_{\dots}$$

Discounting factor at 10%
Discounting Rate.

Present value of benefits.

$$NPV = PV_B - I$$

Project is acceptable when NPV is greater than 0
Projects with higher NPV are preferred.

Advantages :-

- (1) Discounting of cash flow is done.
- (2) Evaluation is carried out over the entire life of the project.

Disadvantages :-

- (1) It is rather difficult to determine an appropriate value for the discounting rate.

Q. The initial investment of a project is ₹ 200 lakhs. Expected life of the asset is 5 years. The cash inflows for the five years are ₹ 70 lakhs, ₹ 90 lakhs, ₹ 130 lakhs, ₹ 150 lakhs, ₹ 190 lakhs respectively. The discounting factors for the five years are 0.9, 0.8, 0.7, 0.6, 0.5. Based on this, calculate NPV and comment on whether the investment is worthwhile or not.

YEAR	CASH FLOW (₹ LAKH)	DISCOUNTING FACTOR	DISCOUNTED CASH FLOW. (DCF) (₹ LAKH)
0	200	1.0	200 $I = 200$
1	70	0.9	63 $PVB =$
2	90	0.8	72 $411.$
3	130	0.7	91 $NPV =$
4	150	0.6	90 $411 - 200$
5	190	0.5	95 $= ₹ 211$

Project is acceptable as $NPV > 0$.

Q) Initial investment = ₹ 100 Lakhs.
 Expected life = 5 yrs
 Cash inflows = ₹ 30 lakhs, ₹ 50 lakhs,
 ₹ 90 lakhs, ₹ 110 lakhs,
 ₹ 120 lakhs. respectively.

Discounting Rate = 12%.

Calculate NPV and comment whether the project is acceptable or not.

$$DF = \frac{1}{(1+DR)^n}$$

<u>YEAR</u>	<u>CASH FLOW (₹ LAKH)</u>	<u>Discounting Factor</u>	<u>Discounted Cash Flow (₹ LAKH)</u>
0	100	1.000	100.] I = 100
1	30	0.893	27.79] PVB =
2	50	0.797	40.85 269
3	90	0.712	64.] NPV =
4	110	0.635	70 ₹(269-100) Lakhs
5	120	0.567	68.] = ₹ 169 Lakhs

Project is acceptable, since $NPV > 0$.

$$\text{BENEFIT COST RATIO (BCR)} = \frac{PVB}{I} = 2.69 \text{ } *$$

$$\text{NET BENEFIT COST RATIO (NBCR)} = \frac{PVB - I}{I} = 1.69 \text{ } **$$

* Project is acceptable as $BCR > 1$.

** Project is acceptable as $NBCR > 0$.

$$\text{Check : } NBCR = BCR - 1.$$

$$\Rightarrow 1.69 = 2.69 - 1.$$

Higher the BCR and higher the NBCR, more acceptable a project is.

Advantages, Disadvantages of BCR and NBCR
same as those of NPV.

Q. Initial Investment = ₹ 100 lakhs.
Life = 3 yrs.

Discounting Rate = 15%.

Cash inflows = ₹ 20, ₹ 30, ₹ 50 lakhs.

Calculate NPV, BCR, NBCR, comment on project is acceptable or not.

<u>Year</u>	<u>Cash flow (₹ lakhs)</u>	<u>D.F</u>	<u>DCF (₹ lakhs)</u>
0	100	1.00	100] I = ₹ 100 lakhs
1	20	0.869	17] PVB = ₹ 73 lakhs
2	30	0.756	23] NPV = PVB - I = ₹ 27 lakhs.
3	50	0.657	33]

Project is not acceptable since $NPV < 0$.

$$BCR = \frac{73}{100} = 0.73$$

Project is not acceptable, since $BCR < 1$.

$$NBCR = \frac{-27}{100} = -0.27$$

Project is not acceptable as $NBCR < 0$.

Internal Rate of Return (IRR)

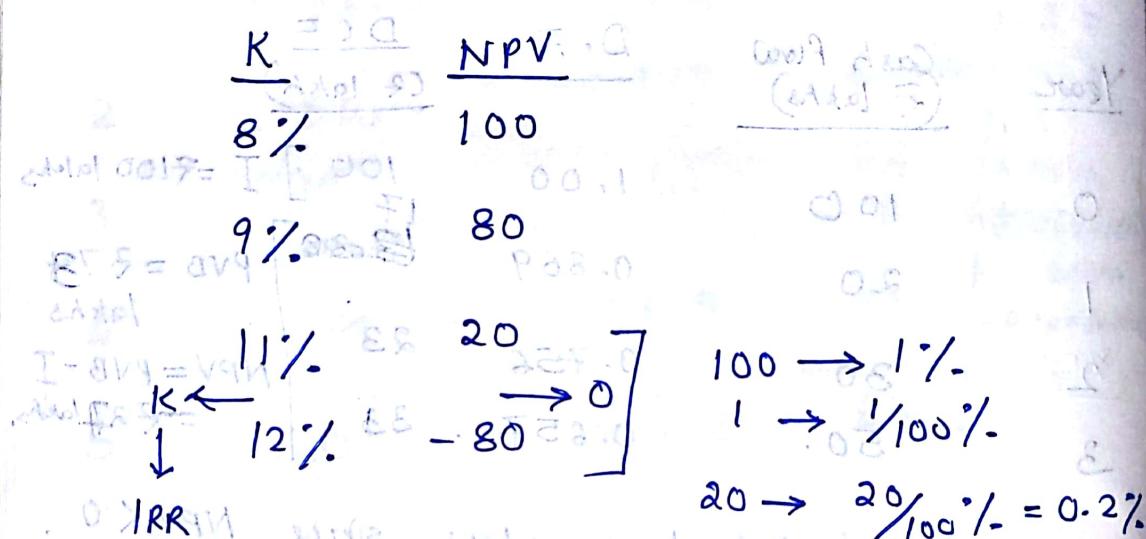
IRR is the value of the discounting rate at which NPV is 0.

Concept is illustrated through the figures below:-

$$NPV = \frac{1}{(1+k)^0} \times CF_0 + \frac{1}{(1+k)^1} \times CF_1 + \frac{1}{(1+k)^2} \times CF_2 + \dots$$

$$\underbrace{\qquad\qquad\qquad}_{I} \qquad\qquad\qquad \underbrace{\qquad\qquad\qquad}_{NPV = PVB - I}$$

$$NPV = PVB - I$$



Projects with higher IRR are preferred.

For evaluating projects, based on IRR, a cut off rate is set. A project is considered to be acceptable if the IRR is more than the cut off rate.

$$IRR = (11 + 0.2)\%$$

$$100 \rightarrow 1\%$$

$$80 \rightarrow \frac{80}{100}\% = 0.8\%$$

IRR =

$$(12 - 0.8)\% = 11.2\%$$

03/10/18

WEIGHTED AVERAGE COST OF CAPITAL (WACC)

There are a no. of sources from which a company can raise capital. Each of these sources would have a different cost associated with it. Depending upon the amounts, they are taken from these different sources and the different costs associated with each of these sources, the overall cost of capital would vary - these overall cost of capital is termed as WEIGHTED AVERAGE COST OF CAPITAL.

SOURCE OF CAPITAL	AMOUNT (₹)	AFTER TAX COST PERCENTAGE
Equity Share capital	5,00,000	20%
15% Preference Share Capital	4,00,000	15%
10% Loan	1,00,000	10%

Based on these information, calculate WACC.

Method 1

Sources of Capital	Amount	After Tax Cost (%)	Cost (₹)
Equity Share CAPITAL	5,00,000	20	1,00,000
15% Preference Share Capital	4,00,000	15	60,000
10% Loan	1,00,000	10	10,000
	10,00,000		1,70,000
$\therefore \text{WACC} = \frac{(1,70,000)}{10,00,000} \times 100$			(17)%

Method - 2

Sources of Capital	Amount (₹)	After Tax cost (%)	Proportion in overall capital	WACC (%)
Equity share Capital	5,00,000	20	0.5	10
15% Preference Share Capital	4,00,000	15	0.4	6
10% loan debentures	1,00,000	10	0.1	1
	10,00,000		1.0	(17)

Q.

Sources of Capital	Amount (₹)	After Tax cost (%)	WACC (%)
Equity share Capital	10,00,000	15%	
12% Preference Share Capital	5,00,000		
debentures			
10% debentures	5,00,000		
Retained earnings	1,00,000	*	

Calculate WACC.

* Cost of Retained Earnings to be considered to be the same as Equity share capital.

0.01	0.1	0.00001	0.01
0.00001			

$$WACC = (0.01 \times 0.00001) = 0.00001$$

Method 1

Sources of Capital	Amount (£)	After Tax Cost (%)	Cost (£)
Equity share capital	10,00,000	15	1,50,000
12% preference share capital	5,00,000	12	60,000
10% debentures	4,00,000	10	40,000
Retained earnings	1,00,000	15	15,000
	20,00,000		2,65,000

$$WACC = \left(\frac{2,65,000}{20,00,000} \times 100 \right) \%$$

shortest = 13.25% (approx) = the greater

Method - 2

Sources of Capital	Amount (£)	After Tax Cost (%)	Prop. in overall capital	WACC (%)
Equity share capital	10,00,000	15	0.5	7.5
12% preference share capital	5,00,000	12	0.25	3.00
10% debentures	4,00,000	10	0.2	2.00
Retained earnings	1,00,000	15	0.05	0.75
	20,00,000		1.00	13.25

X 0.5 = short rate approx

0.075 = shorted

PRETAX - POSTTAX Relationship

In certain cases, pretax costs for various sources of capital are available. Additionally, income tax rate is also available.

In such situations, the after tax costs of all the sources have to be first determined and Weighted Average Cost of Capital (WACC) has to be calculated always based on after-tax cost.

The formula linking pre-tax and post-tax costs is as follows :-

$$\text{Post tax cost} = \text{Pre tax cost} (1 - t)$$

where, t = income tax rate in decimals.

It is to be noted that the pre and post tax costs of all forms of share capital are the same. The impact of income tax is only on all forms of debt capital (for e.g.: loans, debentures etc.)

Source	Amount (₹)	Pre tax cost (%)
Equity share Capital	5,00,000	20.000000%
15% preference Share Capital	2,00,000	21.000000%
10% debentures	3,00,000	10.000000%

$$\text{Income tax rate} = 40\%$$

Calculate WACC.

Source of Capital	Amount (₹)	Pre tax Cost (%)	Post tax cost (%)	Cost (₹)
Equity share capital	5,00,000	20	20	1,00,000
15% preference share capital	2,00,000	15	15	30,000
10% debentures	3,00,000	10	6	18,000
	10,00,000			1,48,000

$$WACC = \left(\frac{1,48,000}{10,00,000} \times 100 \right) \% \\ = 14.8 \%$$

Source of Capital	Amount (₹)	Pre tax Cost (%)	Post tax cost (%)	Prop. in overall capital	Wacc (%)
Equity share capital	5,00,000	20	20	0.5	10.0
15% preference share capital	2,00,000	15	15	0.2	3.0
10% debentures	3,00,000	10	6	0.3	1.8
	10,00,000			1.0	14.8

$$WACC = \left(0.5 \times \frac{1,00,000}{10,00,000} + 0.2 \times \frac{30,000}{10,00,000} + 0.3 \times \frac{18,000}{10,00,000} \right) = 14.8\%$$

Method - 2

Source	Amount (₹)	Pre tax (%)	Post tax (%)	Prop. in overall am.	Wtage (%)
Equity share Capital	10,00,000	25%	25	0.5	12.5
20% pref. share capital	4,00,000	20%	20	0.2	4
15% loan	5,00,000	15%	9	0.25	2.25
Retained earnings	1,00,000	25%	25	0.05	1.25
	20,00,000			1.0	20

Income tax rate = 40%

calculate WACC.

Method - 1

Source	Amount (₹)	Pre tax (%)	Post tax (%)	Cost (₹)
Equity share capital	10,00,000	25	25	2,50,000
20% pref. share capital	4,00,000	20	20	80,000
15% loan	5,00,000	15	9	45,000
Retained earnings	1,00,000	25	25	25,000
	20,00,000			4,00,000

$$WACC = \left(\frac{400,000}{20,00,000} \times 100 \right) \% = 20\%$$

Income tax rate = 40%

Calculate WACC.

PRESENT VALUE

$$\text{Present value (PV)} = \frac{\text{FUTURE VALUE (FV)}}{(1+r)^n}$$

where r = discounting rate
 n = no. of years.

Q What is the present value of an amount of Rs 5000/- after 3 years, considering a discounting rate of 10%?

$$P.V = \frac{5000}{(1+\frac{10}{100})^3} = \frac{5000}{(1+0.1)^3} = \frac{1}{(1.1)^3} \times 5000 \\ = (0.751 \times 5000)$$

Amount invested will be Rs 3757/- after 3 years at 10% interest rate.

Q FV = ? 9000, n = 6 yrs, r = 12%.

$$PV = \frac{9000}{(1+0.12)^6} = ? 4559.$$

$$FV = PV (1+r)^n$$

r = Rate of interest / Rate of compounding.

Q What will be the Future Value of Rs 10000 now be after 3 years with an interest rate of 10% compounded annually?

$$FV = ₹ 10,000 \left(1 + \frac{0.1}{1}\right)^3 \\ = ₹ 10,000 \times 1.331 \\ = ₹ 13,310/-$$

Q PV = ₹ 12,000, r = 14%, n = 5 yrs.

$$FV = ₹ 12,000 (1+0.14)^5 = ₹ 23,105/-$$

Q What will the Future Value of ₹ 10,000/- be after 3 years @ an interest rate of 10% compounded semi-annually.

$$FV = ₹ 10,000 \times$$

$$FV = PV \left(1 + \frac{r}{2}\right)^{2n}$$

$$= ₹ 10,000 \left(1 + \frac{10}{2}\right)^{2 \times 3}$$

$$= ₹ (10,000 \times 1.3401)$$

$$= ₹ 13,401/-$$

ANNUITY

Annuity means - deposit of the same amount at regular intervals.

PRESENT VALUE

Q What would be present value of an annual annuity of ₹ 5000/- for 3 years at a discounting rate of 10%?

$$PV_A = \frac{5000}{(1+0.1)^1} + \frac{5000}{(1+0.1)^2} + \frac{5000}{(1+0.1)^3}$$

$$= \frac{1}{(1.1)^1} \times 5000 + \frac{1}{(1.1)^2} \times 5000 + \frac{1}{(1.1)^3} \times 5000$$

$$= 5000 \left(\frac{1}{(1.1)^1} + \frac{1}{(1.1)^2} + \frac{1}{(1.1)^3} \right)$$

$$= 5000 (0.909 + 0.826 + 0.751)$$

$$= ₹ 12430/-$$

$$= ₹ 12430/-$$

$$Q) PVA = 4000 \left(\frac{1}{(1.08)} + \frac{1}{(1.08)^2} + \frac{1}{(1.08)^3} + \frac{1}{(1.08)^4} \right)$$

$$= ₹ 13,248/-$$

FUTURE VALUE

$$FVA = \frac{\text{AMOUNT}}{\text{ANNUITY}} \left(\frac{(1+r)^n - 1}{r} \right)$$

Q) what will be the future value of an annuity of ₹ 30,000/- be after 30 years at an interest rate of 11%?

$$FVA = 30,000 \left(\frac{(1+0.11)^{30} - 1}{0.11} \right)$$

$$= ₹ 59,70,626.33$$

Q) A person company has to repay a big loan of ₹ 500 Lakhs after 6 years. The interest rate available is 14%. If the company plans to invest in an annuity over this period of time and repay the loan, what would be the annual annuity amount be?

$$FVA = \text{Annuity Amt} \left(\frac{(1+r)^n - 1}{r} \right)$$

$$\Rightarrow \text{Annuity Amt} = \frac{₹ 500 \text{ Lakhs}}{\frac{(1+0.14)^6 - 1}{0.14}}$$

$$= ₹ 58.58 \text{ Lakhs}$$

Q Mr X dreams of buying a car after 5 years when it will be worth ₹ 20 lakhs. To realize his dream, Mr X proposes to invest in annual annuity, rate of interest available being 12%. What would be the annual annuity amount?

$$\text{Ans} \ FVA = A \cdot A_{\text{annuities}} \left(\frac{(1+r)^n - 1}{r} \right)$$

$$\Rightarrow A = \frac{\text{₹ } 20 \text{ L}}{\left(\frac{(1+0.12)^5 - 1}{0.12} \right)} = \text{₹ } 3.15 \text{ lakhs.}$$

$$\left(\frac{1 - (1 + 0.12)^5}{0.12} \right) \text{ ₹ } 200,000 = \text{₹ } 3.15$$

$$= \text{₹ } 3.15 \times 200,000 = \text{₹ } 630,000$$

So annual payment is ₹ 630,000.

There is another unit, namely profit after tax of ₹ 300,000.

Annual profit after tax of ₹ 300,000 is obtained by deducting interest, plus some non-taxable items of ₹ 100,000 from total annual profit before unit tax.

$$\left(\frac{1 - (1 + 0.12)^5}{0.12} \right) \text{ Total profit after tax} = \text{₹ } 3.15$$

$$\frac{\text{Total profit after tax} - \text{Interest of ₹ } 300,000}{1 - (1 + 0.12)^5} = \text{Total profit after tax} \times \frac{1}{1 - (1 + 0.12)^5}$$

$$= \frac{\text{₹ } 3.15 \times 200,000 - \text{₹ } 300,000}{1 - (1 + 0.12)^5}$$

$$= \frac{\text{₹ } 3.15 \times 200,000 - \text{₹ } 300,000}{1 - (1 + 0.12)^5}$$