Marginal Costing:

The CIMA (Charted institute of Management Accountants), London, defines the term marginal cost as follows

Marginal cost is the amount at any given volume of output by which aggregate costs are changed if the volume of output is increased or decreased by one unit. In this context a unit may be a single article, a batch of articles, an order, a stage of production capacity or department. It relates the change in output in the particular circumstance under consideration.

In general marginal costing is the ascertainment of marginal costs and of the effect on profit of changes in volume or type of output by differentiating between fixed costs and variable costs. In this technique of costing only variable costs charged to operations, process or products, leaving all indirect costs to be written off against profits in the period in which they arise.

Marginal costing is difference from direct costing. Direct costing is the practice of charging all direct costs operations, processes or products, leaving all indirect costs to be written-off against profit in the period in which they arise. Thus, in direct costing some fixed costs could be considered to be direct costs in appropriate circumstances but fixed cost in never taken in marginal cost.

Features of marginal costing:

The following are the features of the marginal costing

➢ It is the technique of costing used to ascertain the marginal cost and to know the impact of variable cost on the volume of output.

➢ All costs are classified into fixed and variable cost on the basis of variability; even semi fixed is segregated into fixed and variable cost.

➢ Valuation of stock of work in progress and finished goods is done on the basis of marginal costing.

➢ CVP or BEP is one of the integral parts of Marginal costing.

Break Even Analysis or Cost, volume, Profit (CVP) Analysis

Break even analysis is a logical extension of marginal costing. It is based on the principles of classifying operating cost into fixed and variable. Now days it has become a powerful instrument in the hands of policy makers to maximize profits.

Definition of BEP Analysis: Is a calculation of the approximate sales volume required to just cover cost, below which production would be unprofitable and above which it would

be profitable. BEP analysis focuses on relationship between fixed cost, variable cost and profit.

Break even point: It represents point where total revenue equals to total cost.

OBJECTIVES OF BEP/CVP ANALYSIS:

➢ This analysis helps to forecast profit fairly accurately as it is essential to know the relationship between profits and costs on one hand and volume on the other.

➢ This analysis is useful in setting flexible budgets which indicates costs at various levels of activity

➢ This analysis also assists in formulating price policies.

➢ This analysis helps the management in

➢ policy making

Graphical representation of BEP analysis
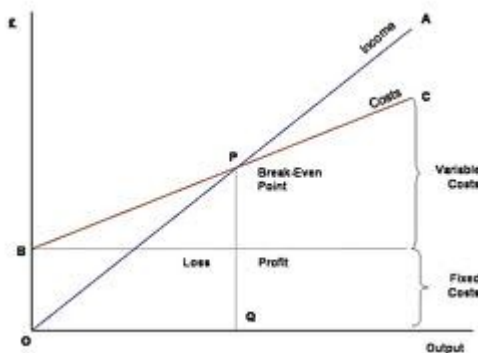
CVP analysis establishes the relationship between costs, volume of output and profits; it studies the effect on profit or changes in volume of output and cost. In order to understand mathematical relationship between cost, volume and profit, it is required to understand the following concepts which can be treated as elements of cost volume profit analysis.

1. Marginal Cost Equation
2. Contribution Margin
3. Profit/volume (P/V) Ratio
4. Break even point
5. Margin of safety

Marginal Cost Equation

Let us assume

S – Sales, V – Variable Cost, F – Fixed cost, P – Profit and C – Contribution

The Basic form of Marginal cost equation is

Sales – Variable cost = Fixed cost $\pm$ Profit

1. $S - V = F \pm P$
2. $C = S - V$, then
3. $C = F \pm P$

Contribution Margin: Contribution is the difference between the sales and the marginal cost of sales and it contribute towards fixed expenses and profit.

Contribution = Selling price – Marginal cost   OR

Contribution = Fixed expenses $\pm$ Profit/Loss   OR

Contribution – Fixed expenses = Profit

In marginal costing contribution is very important as it helps to find out the profitability of a product, department or division, to have better product mix, for profit planning and to maximize the profits and a concern.

Profit / Volume (P/V) Ratio

The profit/volume ratio is one of the most important ratios for studying the profitability of operations of a business and establishes the relationship between contribution and sales. This ratio is calculated as under

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \quad (\text{i.e. C/S}) \text{ or}$$

$$= \frac{\text{Fixed expenses} \pm \text{profit}}{\text{Sales}} \quad \text{or}$$

$$= \frac{S - V}{S} \quad \text{or}$$

$$= \frac{\text{Changes in profits or Contributions}}{}$$

Change in sales

Break even point: A business is said to be break even when its total sales are equal to its total cost. It is a point of no profits no loss. At this point contribution equal to fixed cost.

The BEP can be calculated by the following formula

$$\text{BEP (in units)} = \frac{\text{Total fixed expenses}}{\text{Selling price per unit} - \text{Marginal cost per unit}} \quad \text{OR}$$

$$= \frac{\text{Total Fixed expenses}}{\text{Contribution per unit}}$$

$$\text{BEP (in total sales volume)} = \frac{F \times S}{S - V} \quad \text{OR}$$

$$= \frac{\text{Fixed cost}}{\text{P/V Ratio}}$$

Calculation of out put or sales value at which a profit is earned

The formula for the calculation of output to earn a certain amount of profit is as follows

$$\text{Sales} = \frac{\text{Fixed expenses} + \text{desired profit}}{\text{Selling price per unit} - \text{Marginal cost per unit}} \quad \text{OR}$$

$$= \frac{\text{Fixed expenses} + \text{desired profit}}{\text{Contribution per unit}} \quad \text{OR}$$

$$= \frac{\text{Fixed expenses} + \text{desired profit}}{\text{P/V ratio}}$$

Margin of safety: Margin of safety is the difference between the actual sales and the sales at break even point. One of the assumptions of marginal costing is that output will coincide sales, so margin of safety is also the excess production over the break even point's output. Sales or output beyond the break even point is known as margin of safety because it gives some profit, at break even point only fixed expenses are recovered.
Formula for calculating M/S

Margin of safety (M/S) =   Actual sales – Break even sales   OR

$$= \frac{\text{Profit}}{\text{P/V Ratio}} \quad \text{OR}$$

$$= \frac{\text{Profit}}{\text{Contribution per unit}}$$

PROBLEMS IN MARGINAL COSTING

Problem 1
From the following data, calculate:
1. BEP Sales
2. No. of units that must be sold t earn a profit of Rs. 60,000 per year.

Selling price	Rs 20 per unit
Variable Manufacturing cost	Rs 11per unit
Variable selling cost	Rs 3 per unit
Fixed factory over head	Rs 5, 40,000 per year
Fixed selling cost	Rs 2 52,000 per year

Sol:

BEP (Sales) = $\dfrac{\text{Fixed cost}}{\text{P/V}}$

Fixed cost = Fixed Factory Overhead + Fixed selling Cost
= 5, 40,000+2, 52,000 = 7, 92,000

P/V Ratio = $\dfrac{\text{Contribution per unit}}{\text{Sales Price per unit}}$

= 1 - $\dfrac{\text{Variable cost p.u}}{\text{Selling Price p.u}}$

Variable cost per unit = Variable Manufacturing cost p.u + Variable selling cost p.u
= 11 +3 = 14 Rs
There fore,
P/V = 1 – 14/20 = 1-0.7 = 0.3= 30%

2. **No of units to be sold to earn desired profit** = $\dfrac{\text{Fixed cost + desired profit}}{\text{Contribution per unit}}$

Contribution p.u = selling p.u – variable cost p.u = 20-14 = 6
There fore,

$$\underline{7, 92,000 + 60,000} = 1, 42, 00 \text{ units}\_$$

Unit required to be sold =   6

Problem 2: Assuming that the cost structure and selling price3s remain the same in periods I and II fin out:
  a) P/V ratio
  b) Fixed cost
  c) BEP for sales
  d) Profit when sales are of Rs. 1, 00,000
  e) Sales required earning a profit of Rs. 20,000
  f) Margin of safety at a profit or Rs. 15,000
  g) Variable cost in Period II

Period	Sales in Rs	Profit in Rs
I	1,20,000	9,000
II	1,40,000	13,000

Sol:

a).   P/V Ratio $= \dfrac{\text{Changes in Profit}}{\text{Changes in Sales}} \times 100$

$= \dfrac{13{,}000 - 9{,}000}{1{,}40{,}000 - 1{,}20{,}000} \times 100$

$= \dfrac{4{,}0000}{20{,}000} \times 100 = 0.2 \text{ or } 20\%$

b). Fixed cost = (Sales X P/V) – Profit
           = (1, 00,000 X 20/100) – 9,000 = 15,000 Rs

C). Break even point (in sales) $= \dfrac{\text{Fixed Cost}}{\text{P/v ratio}}$

$= \dfrac{15{,}000}{20\%} = 75{,}000 \text{ Rs}$

d). Profit = (Sales X P/V) – Fixed cost

       = (1,00,000 X 20/100) – 15,000 = Rs 5,000

e). Sales $= \dfrac{\text{Fixed expenses + desired profit}}{\text{P/V ratio}}$

$$= \frac{15,000 + 20,000}{20\%}$$

f). Margin of safety $= \dfrac{\text{Profit}}{\text{P/V Ratio}}$

$$= \frac{15,000}{20\%} = 75,000 \text{ Rs}$$

g). Variable cost in Period II = (1 − P/V Ratio) X Sales

$$= \frac{80}{20\%} \text{ X } 1\,40,000 = 1,12,000$$