COST OF PRODUCTION AND REVENUE ANALYSIS

COST OF PRODUCTION:

A firm or producing unit needs different combinations of factors of production i.e. land, labour, capital and organization to produce various quantities of goods and services. The services of these factors are paid in the form of rent, wages and interest by the entrepreneur. Moreover, amount is also paid for raw material, fuel, power, transportation, publicity, taxes etc. Thus cost of production is the sum total of all above mentioned expenses which a firm has to bear for producing a specific quantity of a commodity. Normal profit is also included in it. Cost function can be expressed as under:-

$$C = X_1 . PX_1 + X_2 . PX_2 + X_3 . PX_3 + ... + Xn . PXn$$

Here C = Cost of production

$X_1 , X_2 , X_3 ... Xn$ = Units of various factors of production

$PX_1 , PX_2 , PX_3 ... PXn$ = Rewards (prices) paid to units of factors

It must be remembered that the reward of self owned resources / factors are also included in the cost of production which is known as (Implicit Cost)

CLASSIFICATION OF COST OF PRODUCTION

COST OF PRODUCTION OF ANY FIRM MAY BE CLASSIFIED AS UNDER:-

1. TOTAL COST (T C):-

Total cost includes all types of expenses faced by the firm while producing a specific quantity of a commodity. It includes rent, wages, interest, price of machines, raw material, transportation and publicity expenditure, taxes and duty paid by the firm, normal profit etc.

Total cost can be divided into two parts:-

(a) Fixed Cost (Fc) (b) Variable cost (V C)

Thus T C = F C + V C

(A) FIXED COST (F C):-

It is also known as "Indirect Cost" or "Supplementary Cost". It is permanent in nature and remains constant in the short-period. Fixed cost does not vary with the changes in the units of out put. Firm has to bear this cost even if production is zero or factory is closed. It includes price of land, rent of building, price of machines installed, wages of permanent employee's, interest on debt etc.

(B) VARIABLE COST (V C):-

It is also regarded as "Direct Cost" or "Prime Cost". It changes with the change in the

units of output. The more the units of production the higher the variable cost. Variable cost falls with low level of production and becomes zero at zero production or shut down position of the firm.

Variable cost includes price of raw material, wages to workers, depreciation and maintenance of machines, transportation cost, power and fuel (Gas, electricity, coal etc.) bills, publicity charges, sales tax, excise duty etc.

2. AVERAGE TOTAL COST (ATC OR A C)

It is cost of average per unit output. It is calculated while dividing total cost by total units of output.

$$\text{Thus, Average total cost} = \frac{\text{Total Cost}}{\text{Total Units of Output}}$$

$$\text{ATC or AC} = \frac{TC}{Q}$$

If a firm produces 100 units of commodity X per day and its total cost = Rs. 8000.

$$\text{Then AC} = \frac{8000}{100} = 80 \text{ Rs.}$$

Average Cost (AC) can be divided into two parts:-

(a) Average Fixed Cost (AFC):-

When fixed cost is divided by total units of output, we arrive at average fixed cost.

$$AFC = \frac{\text{Fixex Cost}}{\text{Units of Output}} = \frac{FC}{Q}$$

Suppose FC = 2000 while units of output (Q) of commodity X per day = 100

$$\text{Then AFC} = \frac{FC}{Q} = \frac{2000}{100} = 20 \text{ Rs.}$$

It must be noted that AFC goes on decreasing with the increase in the units of output of the commodity being produced (the reason is unchanged fixed costs).

(b) Average Variable Cost (AVC):-

In order to achieve AVC, variable cost is divided by the units of output.

$$\text{Thus, AVC} = \frac{VC}{Q}$$

For example, VC = 6000 and units of output (Q) = 100

$$\text{Then AVC} = \frac{VC}{Q} = \frac{6000}{100} = 60 \text{ Rs.}$$

As variable cost changes with the variation in the units of output. Thus AVC also varies accordingly, declining initially, reaching at its minimum and then increasing again being U-shaped or saucer shaped (⌣) AVC curve.

3. MARGINAL COST (MC):-

Marginal cost concept is very crucial in Microeconomic theory. Marginal cost (MC) is the extra, or additional cost, of producing one more unit of output. MC can be determined for each additional unit of output by noting the change in total cost which that unit's production entails.

$$\text{Thus MC} = \frac{\text{Change in TC}}{\text{Change in Q}} = \frac{\Delta TC}{\Delta Q} = \frac{dTC}{dQ}$$

Suppose Q = 100 and TC = 8000

Now new Q = 101 and TC = 8075

Thus ΔQ = 1 and ΔTC = 75

$$MC = \frac{75}{1} \text{ OR } 8075 - 8000 = 75$$

Various concepts of costs can be explained in view of time period.

1. SHORT PERIOD COST:-

Short run is a period of time in which size of the plant cannot be changed. No new entry is possible constant factors being unchanged, fixed cost remains the same. In view of an increase in the demand of output. Production and supply can be increased up to a certain limit. Such a limit depends upon the excess capacity of the plant, changes of an extra shift and availability of the stock of product.

Short period relationship among FC, VC, TC, AFC, AVC, ATC and MC has shown in the following table.

1	2	3	4	5	6	7	8
Units of output (Q)	FC	VC	TC 2+3	AFC	AVC $\frac{3}{1}$	ATC $\frac{4}{1}$	MC
0	20	–	20	–	–	–	–
1	20	60	80	20	60	80	60
2	20	100	120	10	50	60	40
3	20	130	150	6.6	43.3	50	30
4	20	150	170	5	37.5	42.5	20
5	20	160	180	4	32	36	10
6	20	180	200	3.3	30	33.3	20
7	20	210	230	2.9	30	32.9	30
8	20	250	270	2.5	31.2	33.7	40
9	20	300	320	2.2	33.3	35.5	50
10	20	360	380	2	36	38	60

MAIN POINTS OF THE PREVIOUS SCHEDULE:-

1. Column No. 1 shows units of output.
2. Column No. 2 shows fixed cost which remains unchanged from Zero output to the last unit of output.
3. In Column No. 3 variable cost has been shown, which rises at decreasing rate upto 5th

units of output, after being minimum, it starts rising at increasing rate.

4. Column No. 4 shows total cost (TC) which is the sum of Column No. 2 and 3. TC = FC + VC.

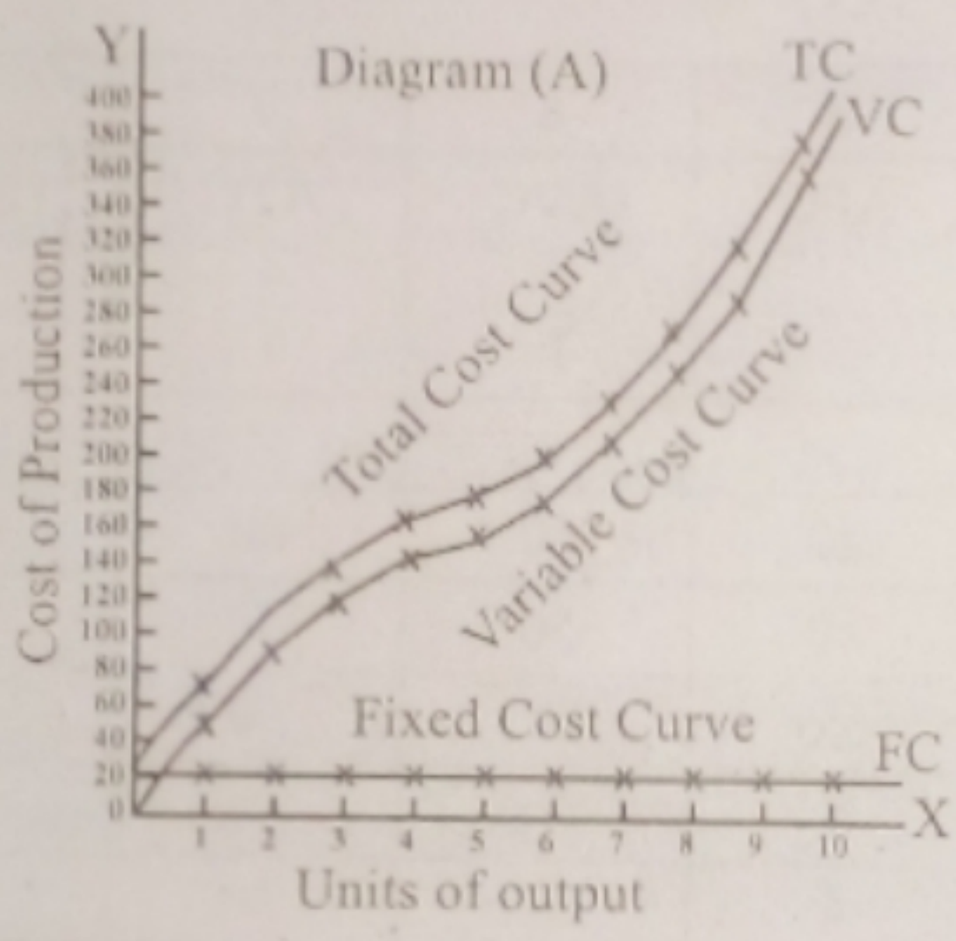
5. In Column No. 5 average fixed cost (AFC) is calculated by $\frac{FC}{Q}$ $\left(\frac{\text{Column No. 2}}{\text{Column No. 1}}\right)$

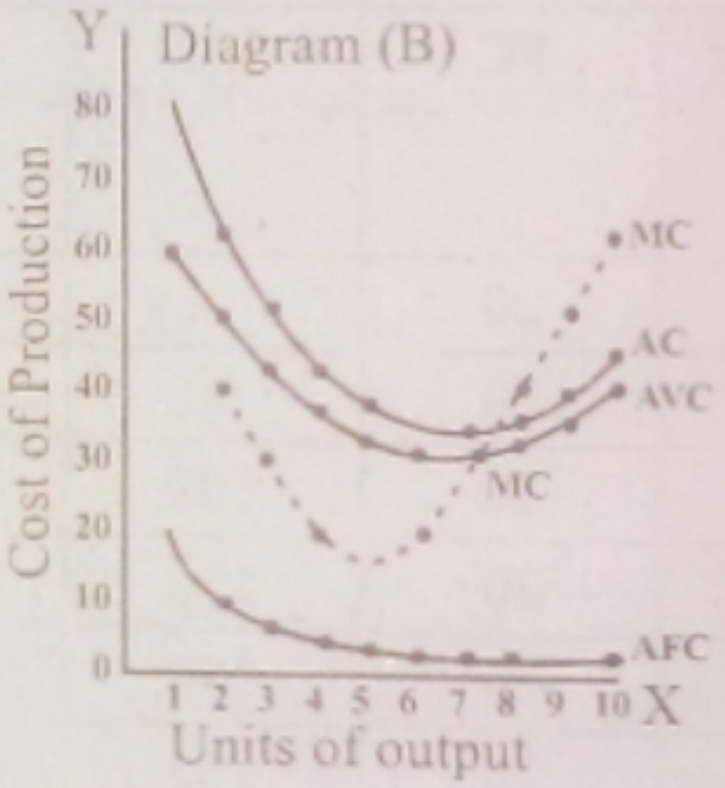
6. Column No. 6 shows average variable cost (AVC) as $\frac{VC}{Q}$ $\left(\frac{\text{Column No. 3}}{\text{Column No. 1}}\right)$

7. In Column No. 7 ATC is indicated as Column $\frac{4}{1}$.

8. Column No. 8 shows marginal cost (MC) which has been calculated as under:-
TC of Column No. 2–1 , 3-2 , 4–3 , ... , 10–9
Thus MC = 80 – 20 = 60, 120 – 80 = 40 , 150 – 120 = 30 and so on.

DIAGRAPHIC REPRESENTATION OF SHORT-RUN COST CURVES.





EXPLANATION:-

DIAGRAM (A) SHOWS THE FOLLOWING COST CURVES:-

(a) Fixed cost curve (FC) is parallel to x-axis which shows that fixed cost of a producing unit does not change with the change in output level.

(b) Variable cost curve (VC) starts from zero. At this point firm is not functioning and there is no output but after it as the output level goes on increasing variable cost curve (VC) also rises upward to the right.

(c) Total cost curve (TC) starts from 20 (FC at Zero output) and goes on rising upwardly with the increase in output level.

TC curve remains above VC curve and difference at every level of output is equal to FC (20) as TC = VC + FC or FC = TC – VC. Thus TC moves parallel to VC while sloping up ward to right.

DIAGRAM (B) EXHIBITS THE FOLLOWING COST CURVES:-

(a) AFC is the average fixed cost curve of a producing unit. As AFC = $\frac{FC}{Q}$, Thus FC remaining unchanged an increase in output (Q) results decline in AFC and it's curve is sloped downward to the right.

(b) Average variable cost curve (AVC) initially starts falling. After touching its minimum level, it rises and becomes closer to the AC curve.

(c) Average cost curve (AC) also falls touching its minimum level starts rising upwardly with the increase in output level, while falling or rising, it remains above average variable cost curve (AVC).

(d) Marginal cost curve (MC) also falls at initial stages, then with the further increase in output level it starts moving upward to right. It falls as well as rises more sharply than AC and AVC curves. While falling it remains below these curves but when it intersects AC and AVC curves at their minimum points, it becomes above AVC and AC curves because of a sharp rise in it.

The fall in AC, AVC and MC is the result of the application of he law of increasing returns while the rise in these curves is due to law of decreasing returns. As it is the short-run analysis thus AC, AVC and MC are U-shaped.