Notes

318en18

18

COST OF PRODUCTION

Cost analysis is the life line of modern business. It cannot be ignored at any cost for the success of any business organisation. On anlysis of cost is required. A producer can supply/produce the product by organising the factors of produciton. That means the producer has to hire or purchase land, labour, capital, etc. by paying price. So, to produce the product the firm or producer must incur some expenditure and the expenditure so involved is called cost of production. This lesson is aimed at discussing this aspect of production called cost of production.

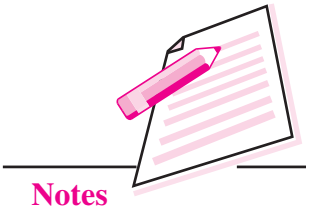
OBJECTIVES

After completing this lesson, you will be able to:

- define cost of production;
- distinguish between the meaning of cost as used in business and as used in economics;
- explain the meaning and importance of various concepts of cost such as, explicit cost, implicit cost and normal profit, fixed costs and variable costs; and
- find out total fixed cost, total variable cost, average fixed cost, average variable cost, average total cost and marginal cost.

18.1 DEFINITION OF COST AND COST FUNCTION

Cost is defined as the expenditure incurred by a firm or producer to purchase or hire factors of production in order to produce a product. As you know, factors of production are land, labour, capital and entrepreneurship. In the production process, the entrepreneur organises land, labour, capital and raw materials to produce output. As a producer he/she has to pay rent for land, wages to labour and interest to procure capital. The producer must also be compensated for his/her



services which is called normal profit. Wages, rent, interest, profit are called factor costs of production. Besides these, the producer also incurs expenditure on raw materials, electricity, water, depreciation of capital goods such as machines and indirect taxes etc. The producer also uses the services of certain factors supplied by his/her own self. The imputed value of such inputs also form the part of cost.

Cost Function

Since the producer who produces output incurs cost, we can say that cost is a function of output. It means that cost of production will increase or decrease, depends on whether level output is increasing or decreasing.

In the lesson on production, you have studied that output depends on factors of production such as labour, capital. Hence cost is related to expenditure on these factors. If the producer hires more amount of factors, cost will automatically increase and vice versa.

18.2 TYPES OF COST

(a) Explicit Costs (Money Costs)

A firm purchases the services of assets like building, machine etc. It pays hiring charges for building, normally termed as rent. It employs workers, accountant manager etc. and pays wages and salaries to them. It borrows money and pays interest on it. It purchases raw material, pays electricity bills and makes such other payments. All such actual payments, on purchasing and hiring different goods and services used in production are called **'explicit costs'.**

Normally, in business, the accountant takes into account only the actual money expenditure as cost. So in business the cost is normally the '**explicit cost'** only.

(b) Implicit costs (Imputed costs) :

Many a times, we find that all inputs are not always bought or hired by the producer from the market. Some of the inputs are provided by the entrepreneur or producer himself. He may use his own building. He may invest his own money in the business. He may be the manager of his own firm. A farmer may cultivate his own land. If a producer had taken a building from another production unit, he would have paid rent. In the same way, if he had borrowed money he would have paid a certain amount of interest. Similarly, if he had engaged a manager he would have paid him a salary. But he is not paying these amounts explicitely i.e. (rent for his building, interest on his money and salary for his services) because he has contributed them for his own business. So market value of these self-owned and self supplied inputs must be calculated. It is, therefore, a cost to the producer. We can make an estimate

Notes

of these costs on the basis of their prevailing market prices. Let us term such costs as **'implicit costs'** (to distinguish them from explicit costs). These are also termed as imputed costs. One example of such cost is the imputed rent of the self owned factory building. It can be taken as equivalent to the actual rent paid for a similar type of building. Similarly, we can find out imputed interest and imputed wages.

In microeconomics, in addition to the paid out cost, imputed cost is also included in the cost of production.

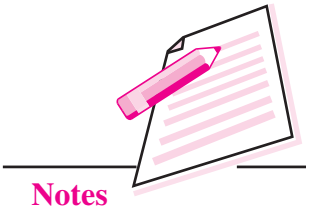
Opportunity cost

Economists define opportunity cost as the value of next best alternative foregone. What does this mean? It is a common practicve that a person makes a list of several activities before adopting a particular one to persue his/her goal. Similarly, in production a producer leaves some alternatives before finally choosing to produce the particular output. So, while finally choosing one, the producer did forego the alternative production. Let us take example of a farmer. He can produce either rice or wheat on a piece of land. If he has decided to produce wheat on this piece of land, he has to forego the produciton of rice for producing wheat. So, value of rice foregone (next best alternative) is the opportunity cost of producing wheat.

18.3 NORMAL PROFIT AS COST OF PRODUCTION

Another component of cost is **'normal profit'.** Normal profit is an additional amount over the monetary and imputed cost that must be received by an entrepreneur to induce him to produce the given product. Normal profit is entrepreneur's opportunity cost and therefore enters into cost of production. Opportunity cost is the value of the opportunity or alternative that is sacrificed. You may be wondering how is it that profit is an element of cost. We will try to convince you.

For that let us first understand the meaning of the term **'normal profit'.** It is nothing but the minimum assured profit in the next best occupation. Normal profit is the reward which an entrepreneur must receive for the risk and uncertainties he bears in the production of a commodity. It can be understood with an example. Suppose there is a publisher who has the option of publishing commerce books or science books. He chooses to publish commerce books because he gets higher return from these. Now, suppose, that the market for science books is more assured but profit is lower. This would mean that the publisher who is publishing commerce books is sacrificing an assured return on science books and is taking a risk. He would be prepared to face the risk only when he thinks that he would be able to get at least the same profit which he would have in any way got from science books. Loss of assured return on science books is then an element of cost for the



publisher who is publishing commerce books instead of science books. It is termed as **'normal profit'** because it is an estimate of the minimum expectations of a producer from a business. So long as he gets this minimum, he will continue to publish commerce books. If, at any stage, he does not get this amount, he will shift to the publication of science books. So, in order that a producer continues to produce a commodity he must get normal profit in addition to recovering his **'explicit cost'** and **'implicit cost'.** We hope you are now convinced that minimum expectation of a producer from a business is also an element of cost.

There are three elements of the total cost of production in micro economics

(a) Explicit costs

(b) Implicit costs and

(c) Normal profits.

In business accounts only explicit costs are treated as cost.

Let us consider an example of the total cost elements for a farmer, He requires following inputs to produce say rice; a piece of land; agricultural workers; tools and implements; tractor and harvester; water, seeds, manures, power, and many other things. He will either provide these inputs himself or he will purchase them from the market. Suppose; some of these inputs he provides himself and some of these he purchases from the market (see the following chart).

Chart Showing the Cost Elements for a Farmer

Total Cost of Production (Rice)

Explicit cost	Cost of self provided inputs or (implicit cost)	Normal Profit
1. Fertilizers	1. His own land	The minimum remuneration which must be earned by the farmer in order to induce him to produce this crop instead of switching over to the production of any other product
2. Insecticides	2. His own well, the water of which he uses for irrigation	
3. Wages for agricultural workers who are employed for sowing and harvesting.	3. His own seeds saved from last crops	
4. Rent for tractor and harvestor	4. His and his family members' labour	
5. Payments of electricity used for pump set, tube-well etc.		

INTEXT QUESTIONS 18.1

1. Fill in the blanks using appropriate word from the choice given in brackets:
   (i) Paid out cost is ..... (explicit cost, implicit cost).
   (ii) Normal profit ..... a part of cost of production in micro economics (is, is not).
2. Some of the cost elements of a publisher are given below. Allocate them into explicit cost and implicit cost : (i) his own labour (ii) expenditure on papers, ink, electricity etc. (iii) expenditure on printing machine (iv) insurance premium (v) payments of wages and salaries to workers (vi) his own building where he prints the books and (vii) expenditure on transport to bring raw material like papers, ink etc.

18.4 PRIVATE AND SOCIAL COSTS

(a) Private Costs

While producing a commodity a firm has to pay for raw material; it has to pay wages of workers; it has to pay rent of building. These are private costs for the firms. Thus private costs are the expenditure of an individual firm in producing a commodity.

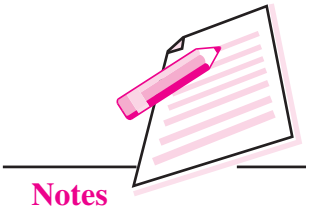
(b) Social Costs

Factories emit large amount of smoke from their chimneys into the atmosphere. This may not figure in the calculation of costs in their records. But the cost to the community may be in the form of additional washing bills for clothes and the money spent by the community on medical bills etc. These costs are social costs.

18.5 MONEY COST VS REAL COST

The explicit cost and the private cost referred above are actually incurred by the producer in money terms. So, they are also called money cost. Wage to labour, rent for building, interest on borrowed funds etc. are paid in monetary units and hence called money cost.

Real cost, on the otherhand, has no definite money value nor it can be measured in monetary terms. A producer makes a lots of sacrifices and toils hard to set up business. The pain, discomfort, stress and strain that he/she undergoes cannot be measured in money. This is called real cost to the producer. The sacrifice, discomfort, disutility, toils and efforts involved in supplying factors of production by their owners make real cost of production.



18.6 NATURE OF COST IN PRODUCTION PROCESS

You have already studied that production process, in the short run, involves fixed and variable factors whereas in the long run all factors are variable. Accordingly, cost of production is calculated depending on whether production is taking place in short run or in the long run.

Cost in the short run: Fixed vs variable cost : In the short run two types of factors are identified. One, fixed factors which cannot be changed and two, variable factors which can be changed to increase output. Fixed costs are those costs which do not change with any changes in the quantity of production or size of output during period. They remain constant during the whole period at any level of output. Whether the production is zero or less or more. Then cost are fixed in nature. Fixed costs are also known as supplementary cost. Let the rent of a factory building paid by the producer is ₹ 1000 per month. Whether the producer produces the output or not, he/she has to pay the rent after hiring the building.

On the other hand variable cost are those cost which vary with the change in the quantity of output or production. They do not remain constant and are variable in nature. There cost increase with increase in output and decrease with a decrease in output. These costs are related to variable factor of production. They are also known as direct cost or prime cost. For example, labour is called variable factor in the short run. So, wage paid to labour is a variable cost. In order to increase output, producer can hire more units of labour. So, the expenditure on wages will increase. If output level is to be reduced, then producer can reduce the amount of labour and accordingly less amount of wage will be paid. So variable cost varies with change in level of output.

18.7 CALCULATION OF FIXED AND VARIABLE COST

TFC Total expenditure on fixed factors is called total fixed cost (TFC)

TVC Total expenditure on variable factors is called total variable cost (TVC)

TC Sum of TFC and TVC is the total cost (TC)

TC = TFC + TVC

(c) Illustration

The concepts of fixed costs and variable costs can be understood better with the help of a schedule and an illustration. Suppose, a firm producing pens incurs the following costs at different levels of output (as given in Table 18.1): You will see that its fixed cost remains constant whereas variable cost changes with every change in level of output. In this schedule, the fixed cost is ₹ 60 and remains the

same at all levels of output. The variable cost is ₹ 60 when the producer is producing 100 pens. It rises to ₹ 100 when he produces 200 pens and to ₹ 150 when he produces 300 pens and so on.

Table 18.1 : Cost Schedule of a Firm

No. of pens in units (1 unit = 100 pens)	Total fixed cost (₹)	Total variable cost (₹)
0	60	0
1	60	60
2	60	100
3	60	150
4	60	260
5	60	390

INTEXT QUESTIONS 18.2

State whether the following statements are true or false:

(i) With increase in the quantity of output fixed costs increase.

(ii) There are no variable costs at zero output

(iii) Expenses incurred on watchmen and property tax are fixed cost.

(iv) Variable costs change with every change in output.

(v) Cost incurred on all the labour is variable.

18.8 CALCULATION OF COST

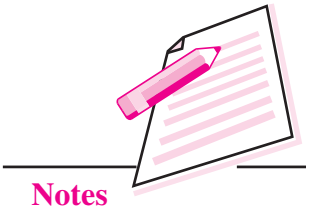
Total cost of a given volume of output is the sum of the explicit and implicit costs and normal profit. In the previous section we have learnt that production costs are classified into fixed cost and variable cost.

These two costs together make total cost

i.e., $TC = TFC + TVC$

where TC stands for total cost, TFC for total fixed cost and TVC for total variable cost.

When a production unit is established but there is no production, total cost is the same as the total fixed cost. As production takes place, variable cost is also incurred and so total cost changes. Total cost increases as the quantity of output



rises, The change in total cost equals the change in total variable cost. This is because total fixed cost remains constant at all quantities of output. Change in total cost is due to changes in variable cost only. The calculation of total cost can be explained through the following example :

Table 18.2 : Cost Schedule of a Pen Producer

No. of pens in units (one unit = 100 pens)	TFC (₹)	TVC (₹)	TC (TFC+TVC) (₹)
0	60	0	60
1	60	60	120
2	60	100	160
3	60	150	210
4	60	260	320
5	60 .	390	450

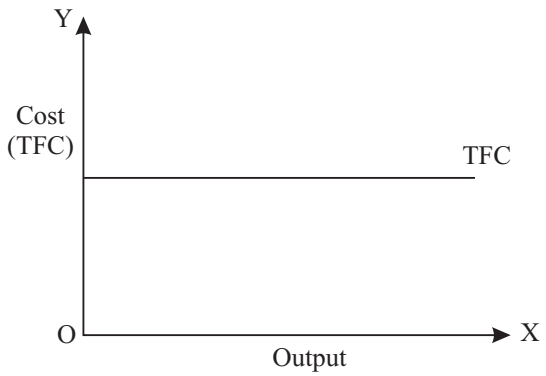


Fig. 18.1

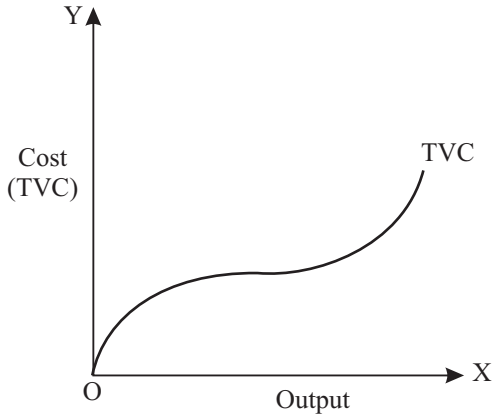


Fig. 18.2

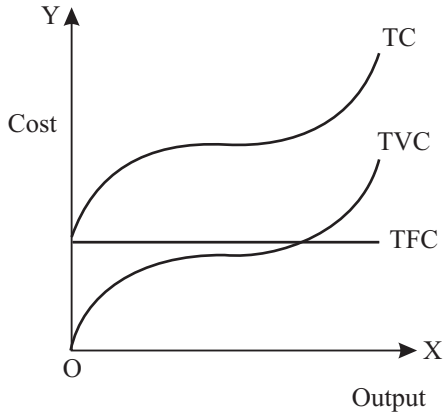


Fig. 18.3

The Table 18.2 shows that total fixed cost is ₹ 60 and remains the same at all quantities of output. The variable cost equals ₹ 60 when one unit is produced, increases to ₹ 100 at 2 units and to ₹ 150 at 3 units and so on. As the total cost is the sum of total fixed cost and total variable cost, it can be obtained by adding them at various quantities of output. For example, when one unit is produced total cost is ₹ 120 (₹ 60 + ₹ 60) and when two units are produced, it works out to be ₹ 160 (₹ 60 + ₹ 100). Thus, we find that total cost varies directly with the level of output.

INTEXT QUESTIONS 18.3

Fill ill the blanks with appropriate words given in the brackets:

(i) Changes in total cost when output varies are due to changes in ..... (fixed cost, variable cost).

(ii) To find total cost we have to ..... total fixed cost and total variable cost (add, multiply)

(iii) Total cost ..... zero at zero output (is, is not).

(iv) When output is zero total cost equals .....(fixed cost, variable cost).

18.9 AVERAGE COST

In this section, we will discuss the concepts of average fixed cost (AFC), average variable cost (AVC) and average total cost (ATC). We make the following schedule showing calculations of these costs:

Table 18.3 : Cost Schedule of a Pen Producer

Output of pens(1 unit = 100 pens)	TFC (₹)	TVC (₹)	TC (TFC+TVC) (₹)	AFC ₹	AVC ₹	ATC (AFC+AVC) (₹)
0	60	0	60	-	-	-
1	60	60	120	60	60	120
2	60	100	160	30	50	80
3	60	150.	210	20	50	70
4	60	260	320	15	65	80
5	60	390	450	12	78	90

(a) Average Fixed Cost (AFC) :

Average fixed cost is obtained by dividing total fixed cost by the number of units of output produced.

$$AFC = \frac{TFC}{\text{Units of output}}$$

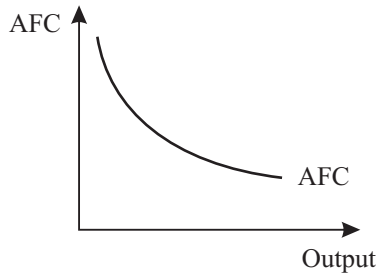


Fig. 18.4

Thus, Average Fixed Cost is per unit fixed cost in producing a commodity or fixed cost per unit of output.

Fixed cost by definition remains fixed whatever is the level of output. Therefore, as production expands the total fixed cost is distributed over a larger numbers of units. As a result average fixed cost falls with every increase in output. For example, the total fixed cost of our producer is ₹ 60 when he produces one unit. Average fixed cost is ₹ 60 (₹ 60 ÷ 1) But if the production is increased to 2 units, average fixed cost is ₹ 30 (₹ 60 ÷ 2). When he produces 3 units it is ₹ 20 (₹ 60 ÷ 3). Therefore, the larger the output the lower will be the average fixed cost.

(b) Average Variable Cost (AVC)

Average variable cost is obtained by dividing the total variable cost by the units of output produced.

$$AVC = \frac{TVC}{\text{Units of output}}$$

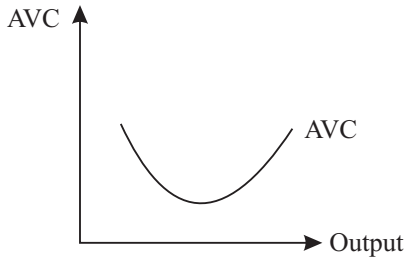


Fig. 18.5

Thus, average variable cost is per unit variable cost in producing a commodity or variable cost per unit of output.

When output of pens is one unit TVC is ₹ 60, so AVC will be ₹ 60 (₹ 60 ÷ 1). TVC at 2 units of pens is ₹ 100. So AVC at 2 units of output of pens is ₹ 50 (₹ 100 ÷ 2) and so on.

(c) Average Total Cost (ATC) :

ATC is obtained by dividing the Total Cost (TC) by the total units of output:

$$ATC = \frac{TC}{\text{Units of output}}$$

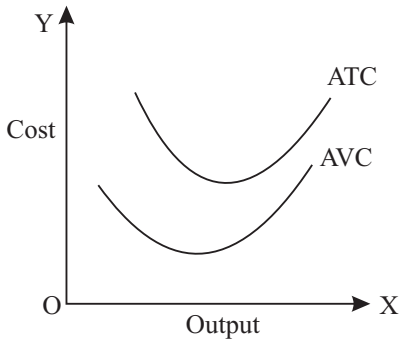
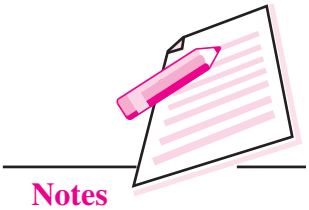


Fig. 18.6

Thus, total cost is the per unit total cost in producing a commodity or cost per unit of output.

The total cost of producing one unit of pen is ₹ 120. Therefore, ATC is ₹ 120 (₹ 120 ÷ 1).

Total cost of 2 units of output is ₹ 160. So ATC is ₹ 80 (₹ 160 ÷ 2). As total cost is the sum of TFC and TVC, average total cost is the sum of AFC and AVC. So we can also find out ATC by adding AFC and AVC :



ATC = AFC + AVC

$$\frac{TC}{\text{Units of output}} = \frac{TFC}{\text{Units of output}} + \frac{TVC}{\text{Units of output}}$$

Check up from the schedule that ATC can also be calculated in this manner.

INTEXT QUESTIONS 18.4

Fill in the blanks with appropriate words given in the brackets:

(i) Average cost is ..... (cost per unit, cost incurred on additional unit).

(ii) To find total cost we have to ..... average cost by quantity of output (multiply, divide).

(iii) Average fixed cost ..... with the increase in output (falls, rises).

(iv) Average total cost is the sum of ..... and .....

(average fixed cost, average variable cost, variable cost, fixed cost).

18.10 MARGINAL COST

The concept of marginal cost is a very important concept in micro economics. The importance of this concept will be more clear to you when you read lesson No. 20 on 'Maximisation of Profits'. The word marginal should be taken to mean additional. For example, Marginal cost of producing a level of output is the addition to the total cost or total variable cost caused by producing an extra unit of output.

$$MC_N = TC_N - TC_{N-1}$$

or

$$MC_N = TVC_N - TVC_{N-1}$$

To explain how it is calculated, look at the following Table.

Table 18.4

Output of pens (1 unit = 100 pens)	Total cost (₹)	Marginal cost (₹)
0	60	–
1	120	60
2	160	40
3	210	50
4	320	110
5	450	130

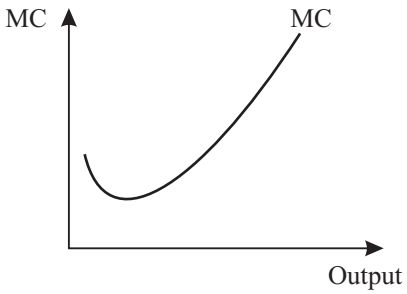


Fig. 18.7

When output level is zero, total cost is ₹ 60. As one unit of pen is produced by the producer the total cost rises to ₹ 120. So the marginal cost of producing one unit of output is ₹ 60 (₹ 120-₹ 60). When it produces 2 units his total cost increases to ₹ 160; the marginal cost at 2 units of output is ₹ 40 (₹ 160-₹ 120). This has been calculated by deducting total cost of 1 unit from total cost of 2 units. Marginal cost at one unit of output is ₹ 60. This we got by deducting total cost of zero unit from total cost of one unit.

It should be kept in mind that marginal cost is dependent on the variable cost only. It is not affected by fixed cost because fixed cost remains constant. As output expands, changes in total cost are due to changes in variable cost only. So, marginal cost can also be calculated if only total variable costs are known to us. For example, take the following Table 18.5 showing TFC, TVC and TC. When we calculate MC from either TC or TVC we get the same result. Calculate yourself and the check the result.

Table 18.5

Output of pens (1 unit = 100 pens)	Total cost (₹)	TFC (₹)	TVC (₹)	MC (₹)
0	60	60	0	–
1	120	60	60	60
2	160	60	100	40
3	210	60	150	50
4	320	60	260	110
5	450	60	390	130

INTEXT QUESTIONS 18.5

Fill in the blanks:

(i) Marginal cost is the ..... cost incurred on additional unit of output.

(ii) Marginal cost equals the change in total cost or the change in ..... per unit change in output.

(iii) Output increases from 3 units to 4 units. As a result TC rises from ₹ 19.60 to ₹ 24.50. MC is .....

18.11 RELATIONSHIP BETWEEN AC, AVC AND MC

The relationship between AC, AVC and MC can be illustrated with the help of the table 18.6 and diagram 18.8.

Output (Units)	TVC (₹)	AVC (₹)	MC (₹)
0	0	–	–
1	6	6	6
2	10	5	4
3	15	5	5
4	24	6	9
5	35	7	11

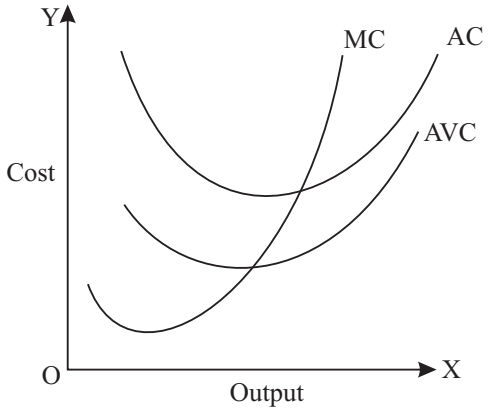


Fig. 18.8

(a) Relationship between AC and MC

(i) When MC is less than AC, AC falls with increase in the output

(ii) When MC becomes equal to AC, AC becomes minimum and constant.

(iii) When MC is more than AC, AC rises with increase in the output.

(b) Relationship between AVC and MC

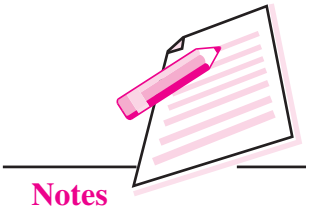
(i) When MC is less than AVC, AVC falls with increase in the output

(ii) When MC becomes equal to AVC, AVC becomes minimum and constant.

(iii) When MC is more than AVC, AVC rises with increases in the output

WHAT YOU HAVE LEARNT

- In Micro Economics, cost is the sum of (a) explicit cost (b) implicit cost and (c) normal profit. It is different from cost used in business which includes only explicit cost.
- Explicit cost is the cost of inputs hired and purchased from the market. It is also called money cost.
- Implicit cost is the cost of the inputs which are owned and supplied by the entrepreneur himself in the production of a commodity. It is equal to the opportunity cost of these inputs.
- Normal profit is the minimum supply price of the entrepreneur which he must get in order to remain in the present business.
- Private cost is the cost which a firm has to incur in the production of a commodity.
- Social cost is the cost to the society as a whole for producing a commodity in the form of air-pollution, water-pollution and noise pollution etc.
- Fixed costs are the costs which do not change with change in the level of output.
- Variable costs are the costs that directly vary with changes in the level of output.
- Total cost is the sum of Total Fixed Cost (TFC) and Total Variable Cost (TVC).
- Average Fixed Cost is the per unit fixed cost of the output produced. It goes on decreasing with increase in output.
- Average Variable Cost (AVC) is the per unit variable cost of output produced.
- Average Total Cost (ATC) is the sum of the AFC as AVC.
- Marginal Cost (MC) is the addition to TC/TVC by the production of an additional unit of the product.



TERMINAL EXERCISE

1. What is implicit cost? How is it different from explicit cost?
2. What is explicit cost? Distinguish it from implicit cost.
3. Explain the concept of 'normal profit'. Justify that it is an element of cost in micro economics.
4. Explain the various elements of cost in micro economics.
5. Differentiate between the concepts of cost as used in business and in micro economics.
6. Distinguish between fixed cost and variable cost with suitable examples.
7. Explain the relationship between output and average fixed cost.
8. Distinguish between AFC and AVC and describe how these are calculated.
9. Explain the term 'marginal cost'. Show with the help of an example how is it calculated.
10. Which cost, fixed or variable, determines marginal cost? Give reasons.
11. Classify the following expenditure into explicit cost and implicit cost:
    (a) A farmer growing seeds and using them for cultivation
    (b) Use of chemical fertilizers by a farmer.
    (c) Use of the services of a tractor owned by the farmer
    (d) Farming by the farmer who owns the land
    (e) Unpaid family labour used on farms
    (f) Transport charges
    (g) Interest on borrowings
    (h) Wages paid
    (i) Use of own building for production
    (j) Excise duty.
12. Classify the following expenditure into fixed cost and variable cost :
    (a) Rent of the factory building
    (b) Wages to watchman
    (c) Annual licensing fee of factory premises
    (d) Raw material
    (e) Rent of the agricultural land

Notes

(f) Seeds

(g) Fertilizers

(h) Interest on borrowings

(i) Excise duty

(j) Transport charges.

13. Calculate total cost, average total cost, average fixed cost, average variable cost and marginal cost on the basis of the following information:

Output (units)	TFC	TVC
0	60	0
1	60	50
2	60	90
3	60	180
4	60	300

14. Calculate (i) TFC and TVC (ii) AFC and AVC and (iii) MC from the following data :

Output (units)	TC
0	180
1	300
2	400
3	510
4	720
5	1000

15. Suppose that TFC is ₹ 120, find out

TC, TVC and MC from the following data :

Output (units)	ATC (₹)
1	240
2	160
3	~140
4	160
5	180

16. Fill in the blanks :

Output (units)	TC	TFC	TVC	MC
0	12	-	-	-
1	20	-	-	-
2	24	-	-	-
3	30	-	-	-
4	44	-	-	-

17. Complete the following table :

Output (units)	Total fixed cost	Total cost	ATC	Marginal cost	AFC
0	8			–	8
1				12	
2				10	
3				8	
4				6	
5				5	

ANSWERS TO INTEXT QUESTIONS

18.1

1. (i) explicit cost
   (ii) is
2. Explicit cost: (ii) (iii) (iv) (v) and (vii)
   Implicit cost: (i) and (vi)

18.2

(i) False (ii) True (iii) True (iv) True (v) False

18.3

(i) variable cost (ii) add (iii) is not (iv) fixed cost

Notes

18.4

(i) cost per unit (ii) multiply (iii) falls (iv) average fixed cost, average variable cost

18.5

(i) additional (ii) Total variable cost (iii) ₹ 4.90

Terminal Exercise

1. Read section 18.3 (b)
2. Read section 18.3 (a)
3. Read section 18.3 (c)
4. Read section 18.3
5. Read section 18.3
6. Read section 18.5
7. Read section 18.7 (a)
8. Read section 18.7 (a, b)
9. Read section 18.8
10. Read section 18.8
11. Explicit costs : b, f, g, h, j
    Implicit costs : a, c, d, e, i
12. Fixed cost: a, b, c, e, h
    Variable cost: d, f, g, i, j
13.

Total Cost (₹) TFC+TVC	AFC	AVC	ATC	MC
60	-	-	-	-
110	60	50	110	50
150	30	45	75	40
240	20	60	80	90
360	15	75	90	120

14.

Output (units)	TC ₹	TFC ₹	TVC ₹	AFC ₹	AVC ₹	MC ₹
0	180	180	0	-	-	-
1	300	180	120	180	120	120
2	400	180	220	90	110	100
3	510	180	330	60	110	110
4	720	180	540	45	135	210
5	1000	180	820	36	164	280

15.

Output (units)	ATC	TC	TFC	TVC	MC
1	240	240	120	120	120
2	160	320	120	200	80
3	140	420	120	300	100
4	160	640	120	520	220
5	180	900	120	780	260

16.

Output (units)	TC ₹	TFC ₹	TVC ₹	MC ₹
0	12	12	0	-
1	20	12	8	8
2	24	12	12	4
3	30	12	18	6
4	44	12	32	14

17.

Output (units)	Total fixed cost	Total cost	Marginal cost	ATC	AFC
0	8	8	-	-	-
1	8	20	12	20	8
2	8	30	10	15	4
3	8	38	8	12.66	2.66
4	8	44	6	11.00	2.00
5	8	49	5	9.80	1.60