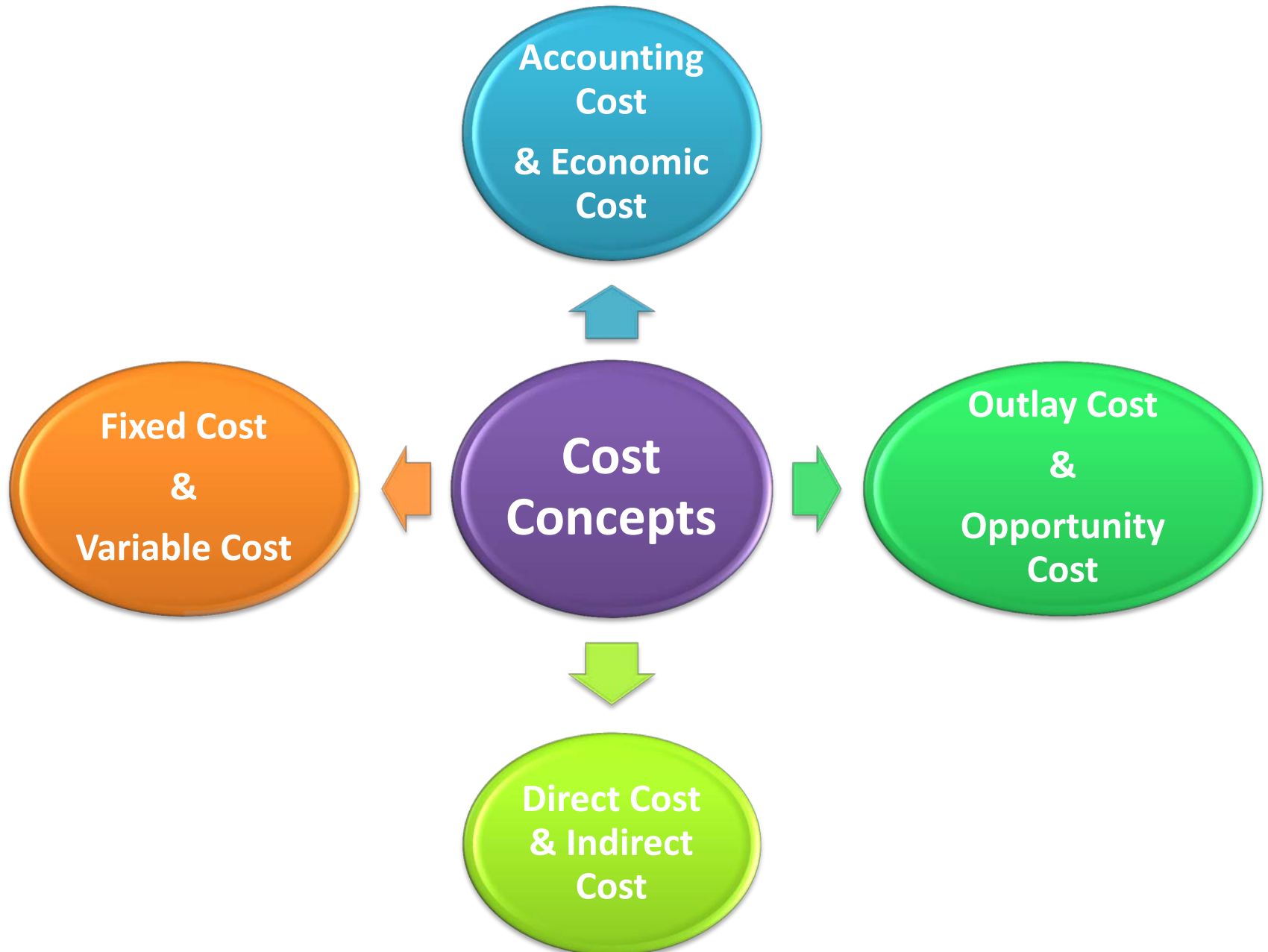


Theory of Cost

General Economics

Cost Analysis

- **Cost Analysis refers to the Study of Behaviour of Cost in relation to one or more Production Criteria like size of Output, Scale of Operations, Prices of Factors of Production.**
- **In other words, Cost Analysis related to the Financial Aspects of Production Relations against Physical Aspects.**



Accounting Costs

- **Accounting Costs are those Costs which are actually incurred & recorded in the Books of Accounts by the Firm in Payment for Various Factors of Production.**
- **For Example, Wages to workers employed; Rent for the Building he hires; Prices of the Raw Materials; Fuel & Power, etc.**
- **Also Called as Explicit Cost.**

Economic Costs

- It includes:
 - The Normal Return on Money Capital invested by the Entrepreneur himself in his own Business. (Implicit Cost)
 - The Wages & Salary not Paid to the Entrepreneur but could have been Earned if the Services had been Sold somewhere else.
- **Economic Cost = Accounting Cost + Implicit Cost**

Outlay Costs

- **Involves Actual Expenditure of Funds**
e.g. Wages, Rent, Interest, etc.
- **Outlay Costs are recorded in the Books of Accounts as it involves Financial Expenditure at some Time.**

Opportunity Costs

- The Opportunity Cost is the Return Expected from the Second Best use of the Resources, which is Foregone for availing the Gains from the Best use of the Resources.
- It is not recorded in the Books of Accounts.
- It is very useful in Long Term Cost Calculations e.g., In calculating the Cost of Higher Education, it is not the Tuition Fee & Books but the earning foregone that should be taken into account.

Direct Costs & Indirect Costs

- **Direct Costs** are Costs that are readily identified and are Traceable to a particular Product, Operation or Plant. E.g., Manufacturing Costs to a Product Line.
- **Indirect Costs** are Costs that are not readily identified and are not Traceable to a particular Product, Operation or Plant. E.g., Electric Power, Salary to Gatekeeper, etc. Although not Traceable but bears Functional Relationship to Production.

Fixed Costs & Variable Costs

- **Fixed Costs** require a Fixed Expenditure of Funds irrespective of the Level of Output e.g. Rent, Interest on Loans, Depreciation, etc.
- **Fixed Cost** does not vary with the Volume of Output within a Capacity Level.
- **Fixed Cost** may disappear on the Complete Shut Down of Business.
- **Variable Costs** are costs that are a Function of Output in the Production Period e.g. Wages & Cost of Raw Materials.
- **Variable Costs** vary Directly or sometimes Proportionately with Output.

Cost Function

- The Cost Function refers to the Mathematical relation between Cost of a Product and the various Determinants of Costs.

$$C = f(Q, T, P_f, K)$$

Where,

C = Total Cost

Q = Quantity Produced i.e. Output

T = Technology

P_f = Factor Price

K = Capital

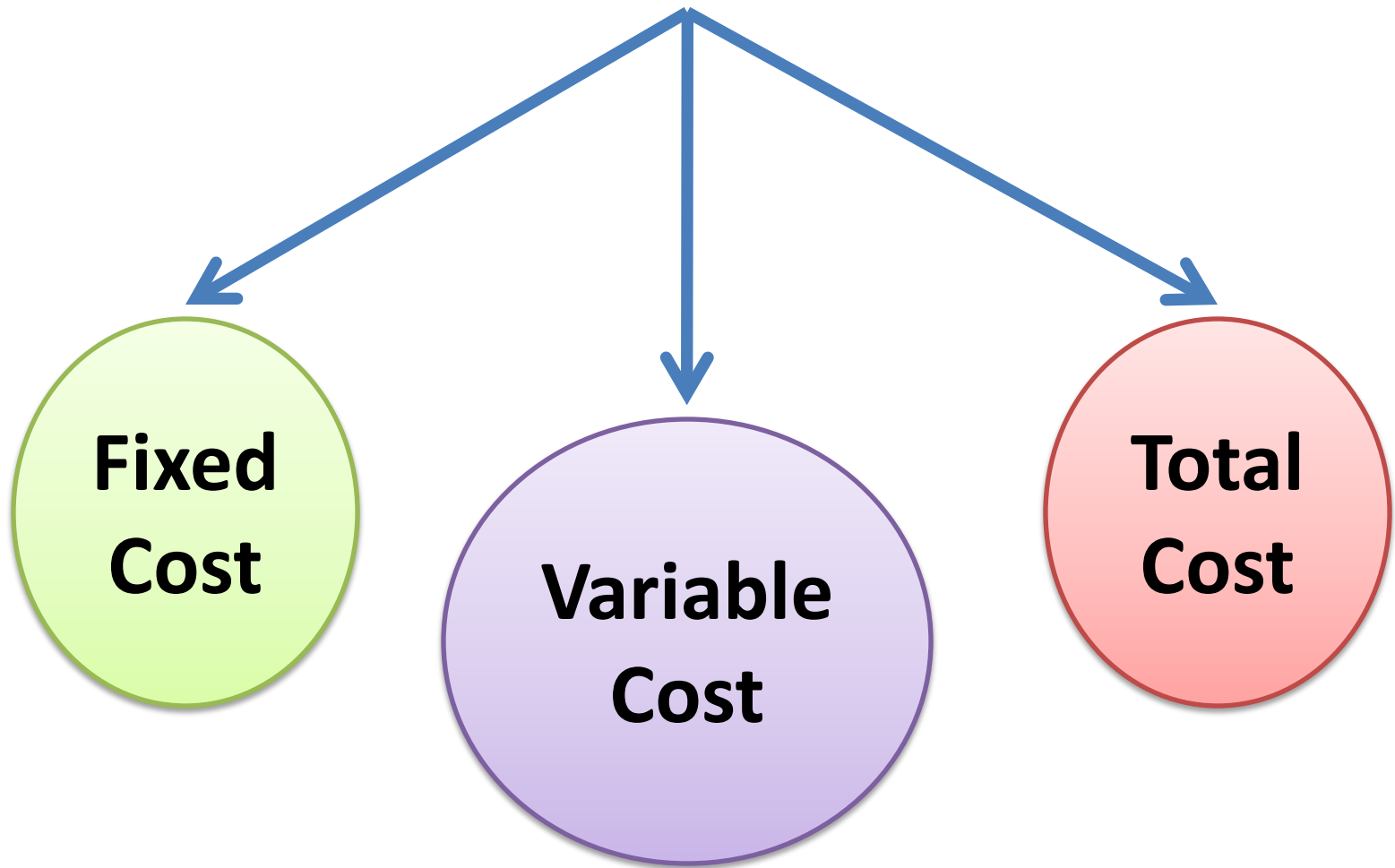
Cost Function

```
graph TD; A[Cost Function] --> B[Short Run Cost Function  
C = f(Q)]; A --> C[Long Run Cost Function  
C = f(Q, T, P_f, K)];
```

**Short Run
Cost
Function**
 $C = f(Q)$

**Long Run Cost
Function**
 $C = f(Q, T, P_f, K)$

Short Run Costs



Short Run Fixed Cost (FC)

- Fixed Costs are those costs which are Independent of Output i.e. they do not change with changes in Output.
- They are a “Fixed Amount” incurred by the Firm, irrespective of Output.
- In case of Firm Shut Down for some time, Fixed Costs are to be borne by the Firm.
- For Example, Contractual Rent, Property Tax, Interest on Capital Employed, etc.

Short Run Variable Cost (VC)

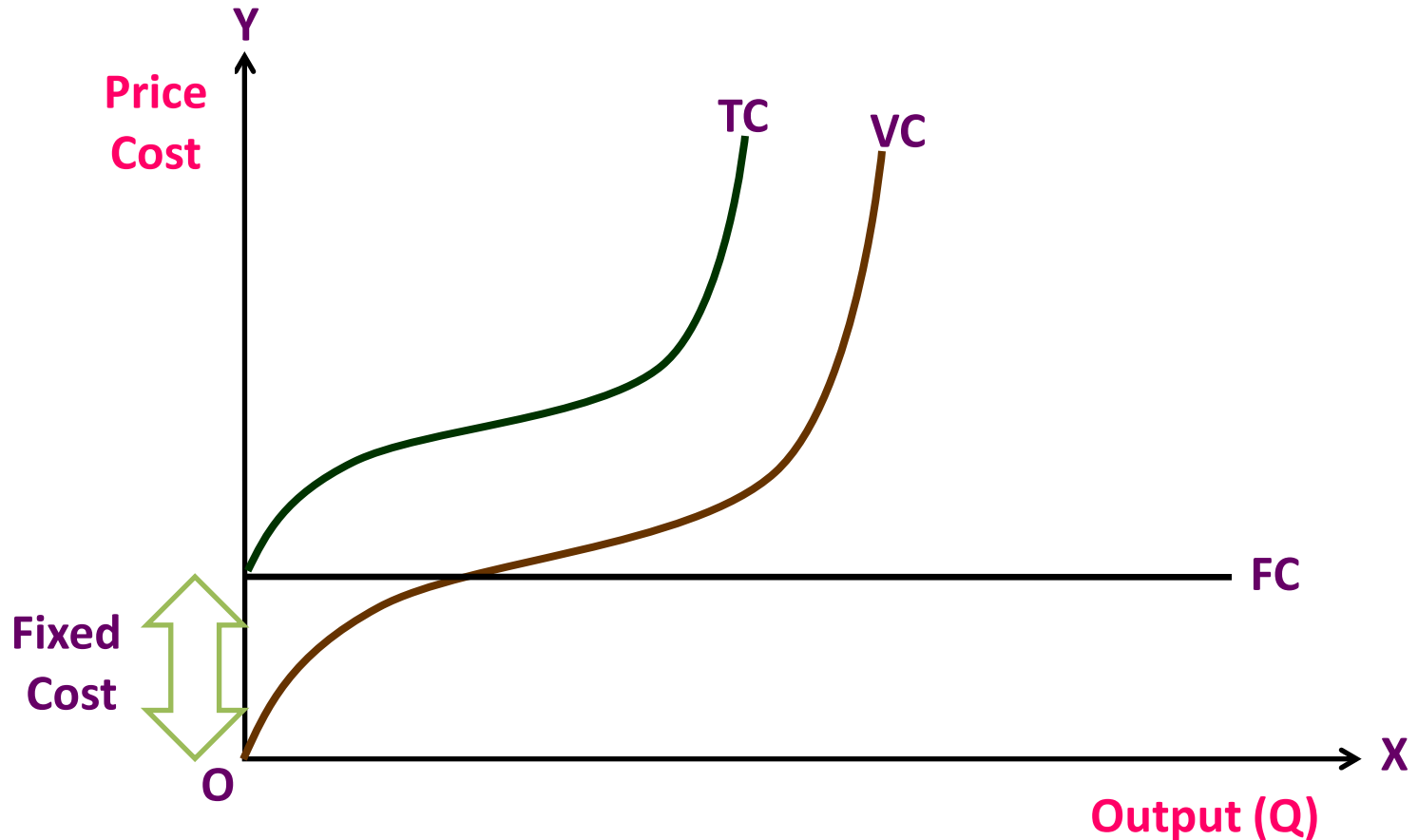
- **Variable Costs are those costs which changes with changes in Output.**
- **Includes Payments such as Wages of Labour, Price of Raw Material, etc.**
- **In case of Firm Shut Down for some time, Variable Costs does not occur and hence avoided by the Firm.**

Short Run Total Cost (TC)

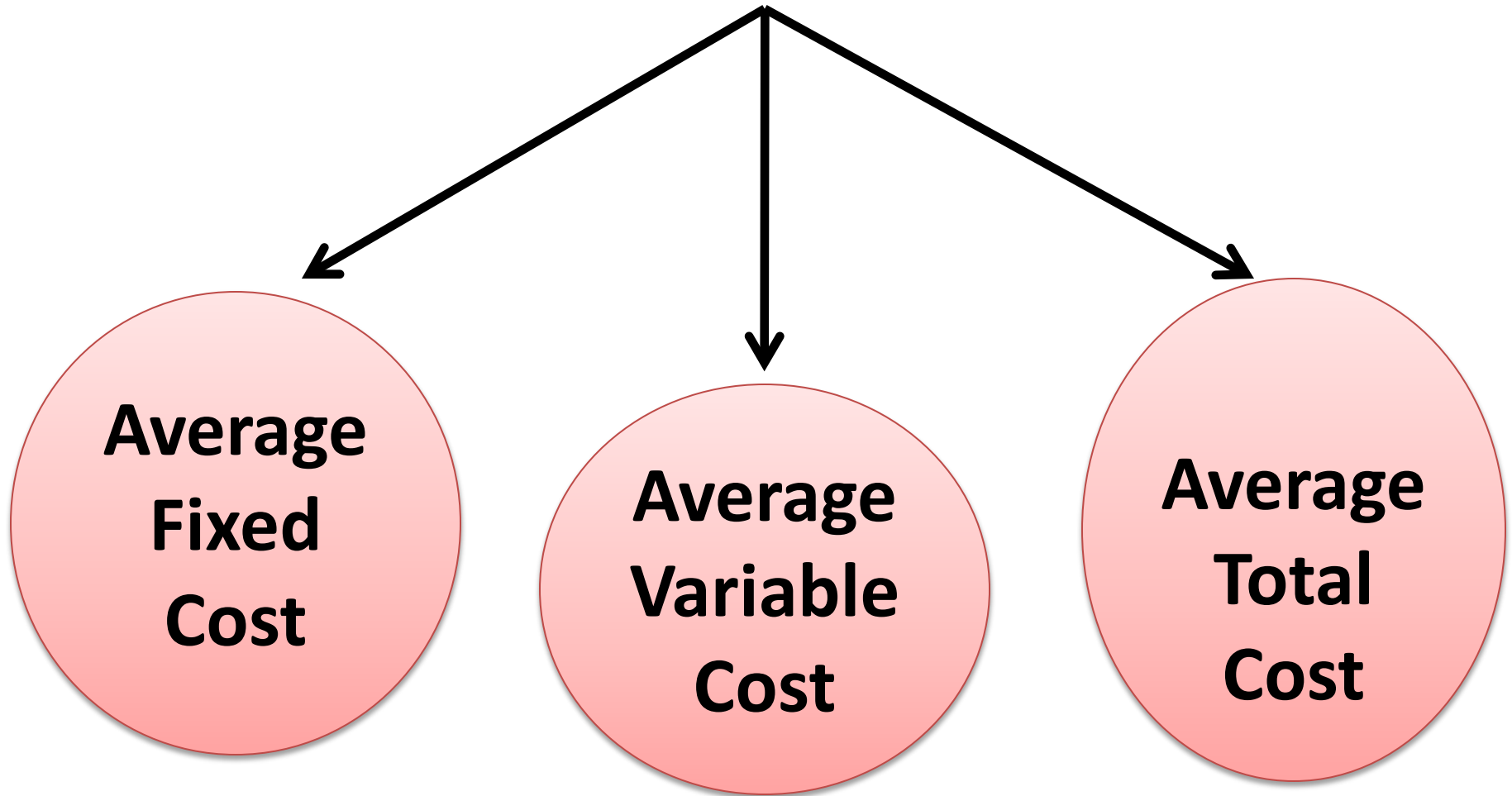
- **Total Cost is defined as the Total Actual Cost that must be incurred to Produce a given Quantity of Output.**
- **Total Costs is the sum of the Total Variable Costs and the Fixed Costs.**

$$TC = TFC = TVC$$

Short Run Total Cost Curves



Short Run Average Costs



Short Run Average Fixed Cost (AFC)

- Average Fixed Cost is Total Fixed Cost (TFC) divided by the Number of Units of Output Produced.

$$AFC = \frac{TFC}{Q}$$

- Referred to as “Fixed Cost per unit of Output”.
- AFC steadily falls as Output Increases meaning thereby, it slopes Downwards but does not touch X- Axis as $AFC \neq 0$

Short Run Average Variable Cost (AVC)

- **Average Variable Cost is Total Variable Cost (TVC) divided by the Number of Units of Output Produced.**

$$AVC = \frac{TVC}{Q}$$

- **Referred to as “Variable Cost per unit of Output”.**
- **AVC normally falls as Output Increases from 0 to Normal Capacity of Output du**

Short Run Average Variable Cost (AVC)

- **AVC normally falls as Output Increases from 0 to Normal Capacity of Output due to occurrence of Increasing Returns.**
- **Beyond Normal Capacity of Output, AVC rises steeply as Diminishing Returns occurs.**
- **AVC first Falls, reaches its Minimum and then rises again.**

Short Run Average Total Cost (ATC)

- Average Total Cost is the Sum Total of Average Variable Cost & Average Fixed Cost.

$$ATC = AFC + AVC$$

- It is referred to as “Total Cost per unit of Output”.
- Behaviour of ATC depends upon the Behaviour of AVC & AFC.

Short Run Average Total Cost (ATC)

- Since in beginning, Both AFC & AVC Falls, therefore, ATC Curve also falls.
- When $AVC \uparrow$, $AFC \downarrow$, ATC continues to fall as $AFC > AVC$.
- As Output Increases, $AVC \uparrow$ and thus $AVC > AFC$ and hence $ATC \uparrow$.
- ATC is a “U” Shaped Curve.

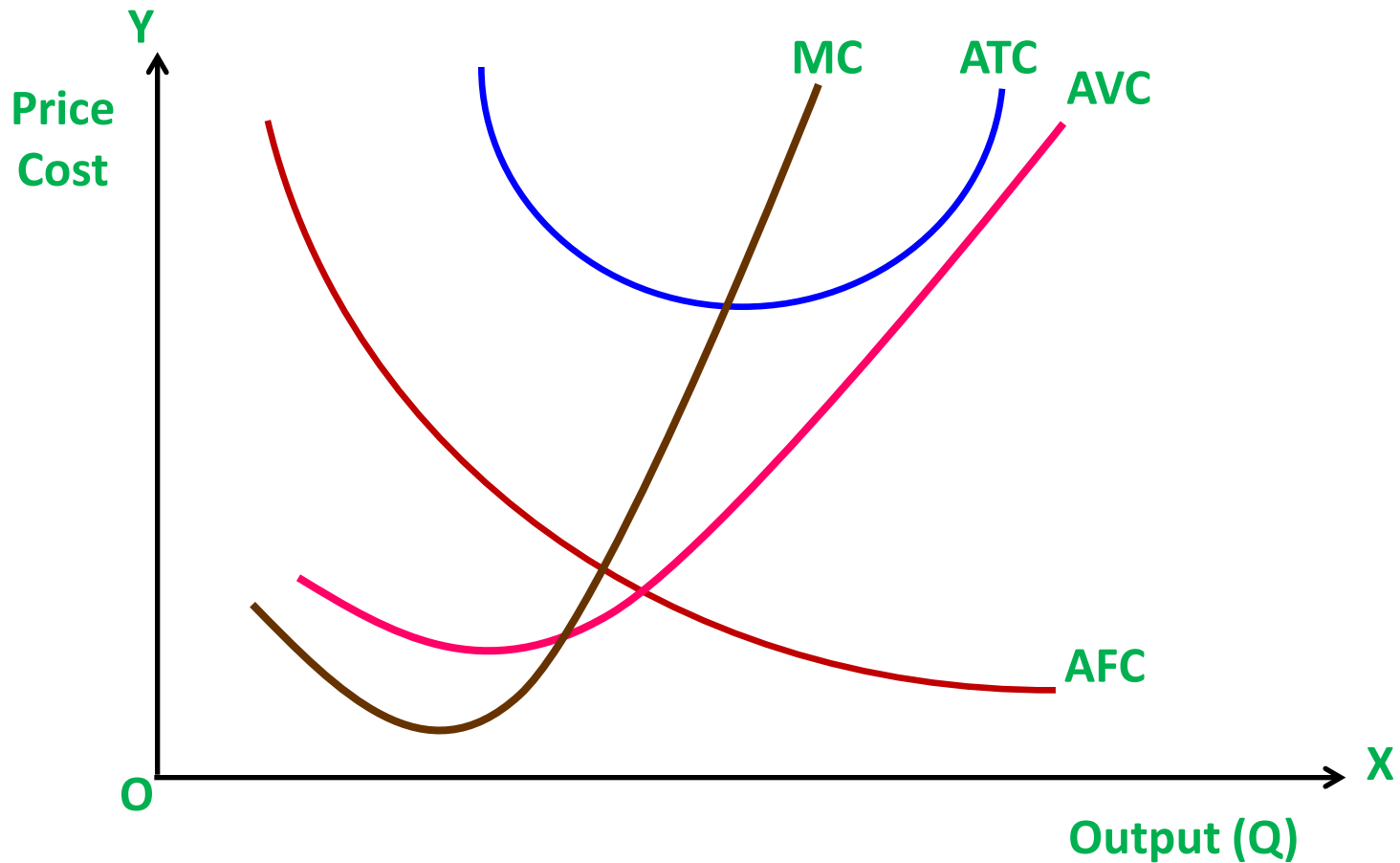
Short Run Marginal Cost (MC)

- Marginal Cost is the addition made to the Total Cost by Production of an Additional Unit of Output.

$$MC = TC_n - TC_{n-1}$$

- Marginal Cost is Independent of Fixed Cost.
- As Marginal Product first rises, reaches maximum & then declines, thus, Marginal Cost first declines, reaches minimum & then rises.
- MC curve of a Firm is “U” Shaped.

Short Run Average & Marginal Cost Curves



Various Costs

Units of Output	TFC	TVC	TC	AFC	AVC	ATC	MC per unit
0	150	0	150	-	-	-	-
6	150	50	200	25.0	8.33	33.33	$50/6 = 8.33$
16	150	100	250	9.38	6.25	15.63	$50/10 = 5.00$
29	150	150	300	5.17	5.17	10.34	$50/13 = 3.85$
44	150	200	350	3.41	4.55	7.95	$50/15 = 3.33$
55	150	250	400	2.73	4.55	7.27	$50/11 = 4.55$
60	150	300	450	2.50	5.00	7.50	$50/5 = 10.00$

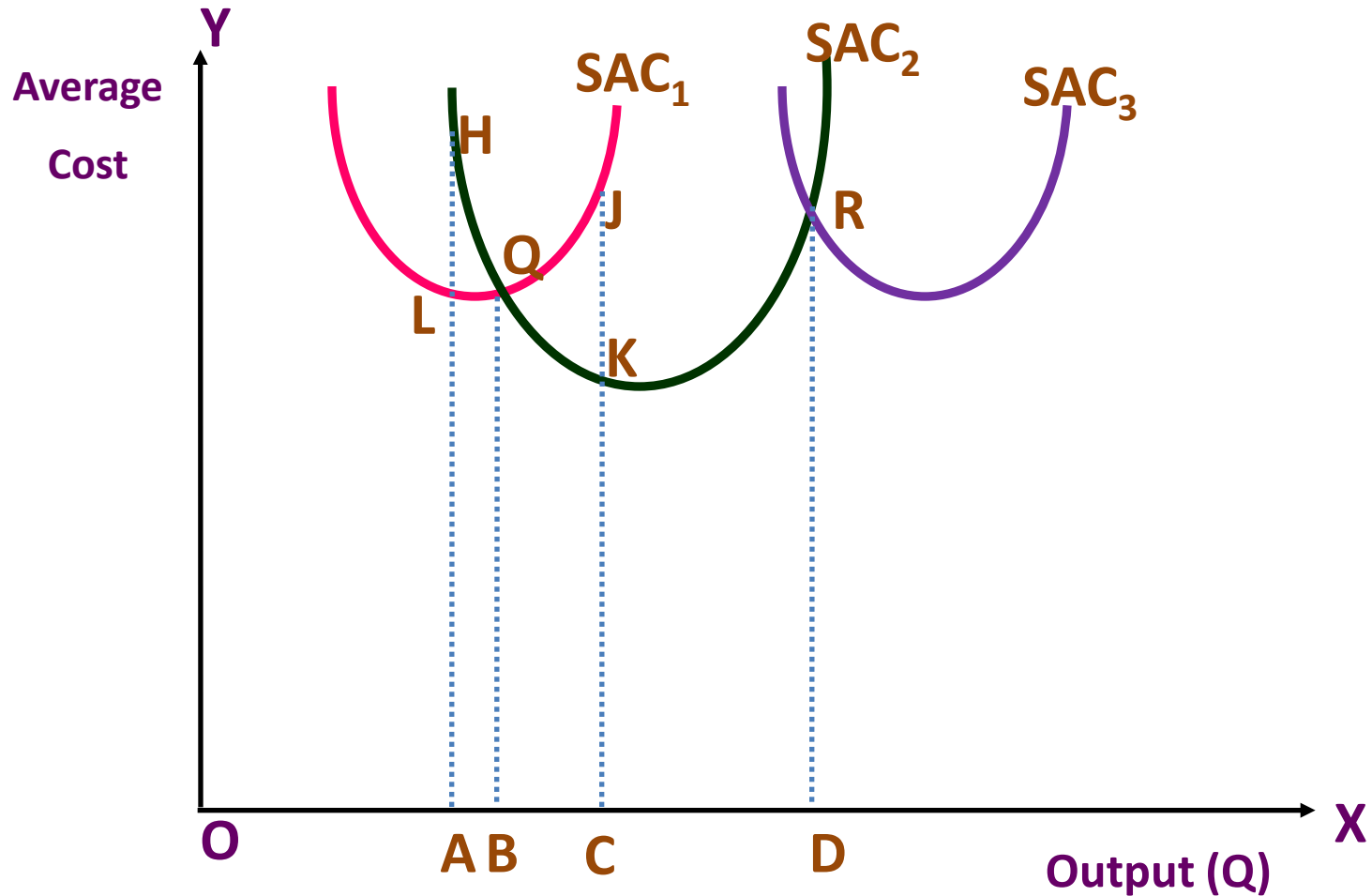
Relationship of MC & AC

- When Marginal Cost is below Average Cost, it is pulling Average Cost down.
- When Marginal Cost is above Average Cost, it is pulling Average Cost up.
- When Marginal Cost just equals Average Cost, Average Cost is neither rising nor falling & is at its Minimum. Hence, at the bottom of a U-shaped Average Cost, $MC = AC = \text{Minimum AC}$.

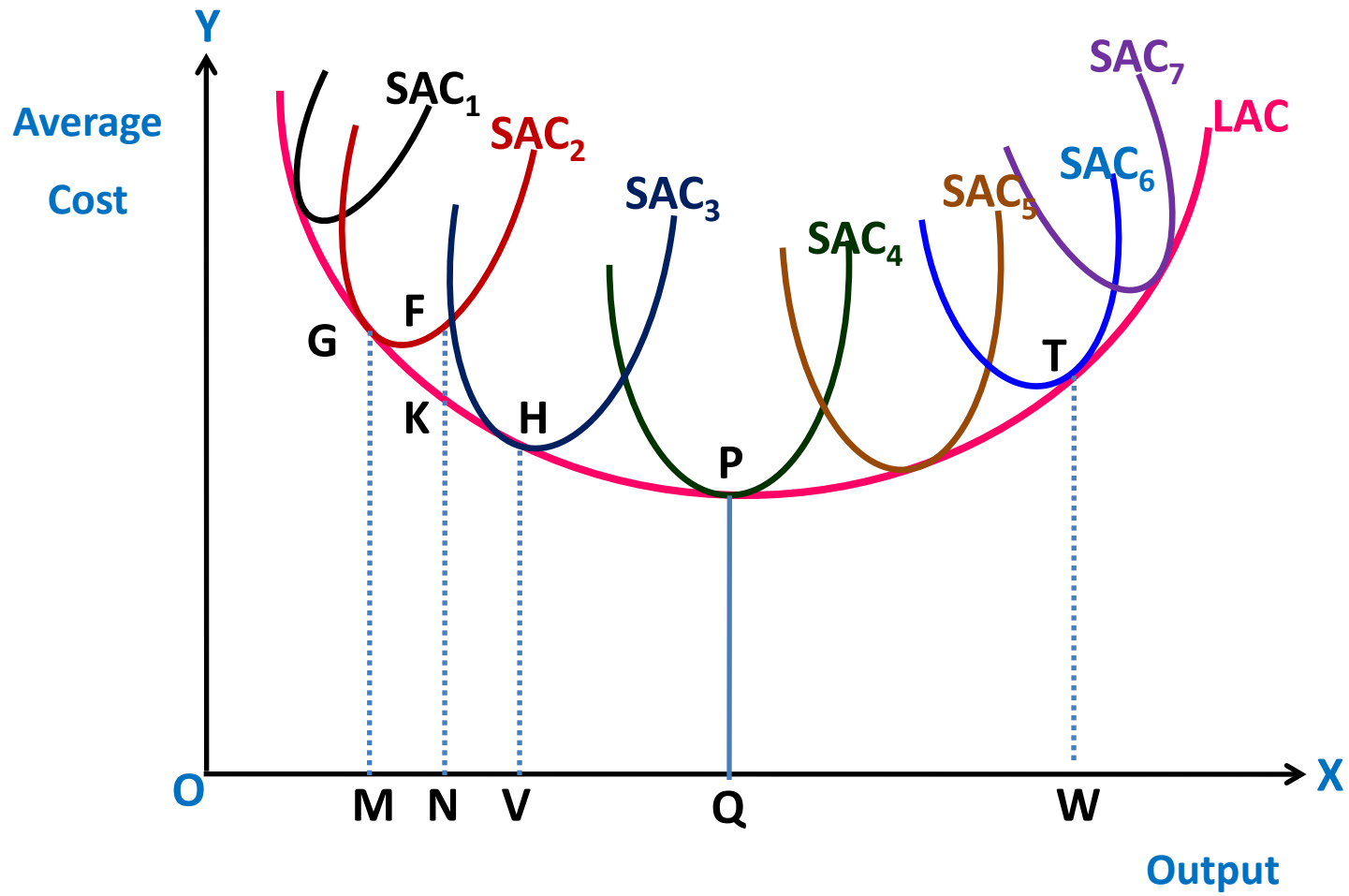
Long Run Average Cost Curve

- Long Run is a period of Time during which the Firm can vary all of its Inputs.
- The Firm moves from one plant to another in Long Run. To Increase the Output, Firm acquires Big Plant & vice versa.
- Long Run Cost of Production is the least possible Cost of Producing any given level of Output when all Individual Factors are Variable.
- The Minimum Point on LRAC Curve is the “Minimum Efficient Scale”.

Short Run Average Cost Curves deriving Long Run Average Cost Curves



Long Run Average Cost Curve



Long Run Average Cost Curve

- Long Run Cost Curve depicts the Functional relationship between Output & the Long Run Cost of Production.
- It envelopes the set of U-Shaped Short-Run Average Cost Curves Corresponding to different Plant Sizes.
- LRAC Curve is “U-Shaped”, reflecting Economies of Scale (or Increasing Returns to Scale) when Negatively Sloped and Diseconomies of Scale (or Decreasing Returns to Scale) when Positively Sloped.

Long Run Average Cost Curve

- Every Point on the Long Run Average Cost Curve is a Tangency Point with some Short Run AC Curve.
- LAC Curve is not a Tangent to the minimum points of the SAC Curves.
- LAC Curve is called as “Planning Curve” as a Firm Plans to Produce any Output in the Long Run by choosing a Plant on the Long Run Average Cost Curve corresponding to the given Output.

Q1

Which Cost Increases with the Increase in Production?

- a) Average Cost.**
- b) Marginal Cost.**
- c) Fixed Cost.**
- d) Variable Cost.**

Q2

Which of the following Cost Curves is never 'U' shaped?

- a) Average Cost Curve.**
- b) Marginal Cost Curve.**
- c) Average Variable Cost Curve.**
- d) Average Fixed Cost Curve.**

Q3

Total Cost in the Short Run is classified into Fixed Cost & Variable Cost. Which one of the following is a Variable Cost?

- a) Cost of Raw Materials.**
- b) Cost of Equipment.**
- c) Interest payment on past Borrowings.**
- d) Payment of Rent on Building.**

Q4

In the Short Run, when the Output of a Firm Increases, its Average Fixed Cost:

- a) Increases.**
- b) Decreases.**
- c) Remains Constant.**
- d) First declines & then rises.**

Q5

Which of the following is also known as 'Planning Curve'?

- a) Long Run Average Cost Curve.**
- b) Short Run Average Cost Curve.**
- c) Average Variable Cost Curve.**
- d) Average Total Cost Curve.**

Q6

The Cost of one thing in terms of the alternative given up is known as:

- a) Production Cost.
- b) Physical Cost.
- c) Real Cost.
- d) Opportunity Cost.

Q7

With which of the following is the Concept of Marginal Cost closely related ?

- a) Variable Cost.**
- b) Fixed Cost.**
- c) Opportunity Cost.**
- d) Economic Cost.**

Q8

Which of the following statement is correct?

- a) When Average Cost is rising, Marginal Cost must also be rising.**
- b) When Average Cost is rising, Marginal Cost must be falling.**
- c) When the Average Cost is rising, Marginal Cost is above the Average Cost.**
- d) When Average Cost is falling, Marginal Cost must be rising.**

Q9

Which of the following is an example of an “Explicit Cost”?

- a) The wages of a Proprietor could have made by working as an employee of a large firm.**
- b) The income that could have been earned in alternative uses by the resources owned by the Firm.**
- c) The Payment of Wages by the Firm.**
- d) The Normal Profit earned by the Firm.**

Q10

Which of the following is an example of an “Implicit Cost”?

- a) Interest that could have been earned on Retained Earnings used by the Firm to finance Expansion.
- b) The Payment of Rent by the Firm for the Building in which it is housed.
- c) The Interest Payment made by Firm for funds Borrowed from a Bank.
- d) The Payment of Wages by the Firm.

Q11

Marginal Cost is defined as:

- a) The Change in Total Cost due to a One Unit Change in Output.**
- b) Total Cost divided by the Output.**
- c) The Change in Output due to one Unit Change in an Input.**
- d) Total Product divided by the Quantity of Input.**

Q12

Which of the following is true of the relationship between the Marginal Cost Function & the Average Cost Functions?

- a) If MC is greater than ATC, the ATC is falling.**
- b) The ATC curve intersects the MC curve at minimum MC.**
- c) The MC Curve intersects the ATC curve at minimum ATC.**
- d) If MC is less than ATC, then ATC is increasing.**

Q13

Which of the following statements is true of the relationship among the Average Cost Functions?

a) $ATC = AFC - AVC.$

b) $AVC = AFC + ATC.$

c) $AFC = ATC + AVC.$

d) $AFC = ATC - AVC.$

Q14

Which of the following is not a determinant of the Firm's Cost functions?

- a) The Production Function.**
- b) The Price of Labour.**
- c) Taxes.**
- d) The Price of the Firm's Output.**

Q15

Which of the following statements is correct concerning the relationships among the Firm's Functions?

- a) $TC = TFC - TVC.$
- b) $TVC = TFC - TC.$
- c) $TFC = TC - TVC.$
- d) $TC = TVC - TFC.$

Q16

**Suppose Output increases in the Short Run.
Total Cost will:**

- a) Increase due to an Increase in Fixed Costs only.**
- b) Increase due to an Increase in Variable Costs only.**
- c) Increase due to an Increase in both Fixed and Variable Costs.**
- d) Decrease in the Firm is in the Region of Diminishing Returns.**

Q17

Which of the following statements concerning the Long-Run Average Cost Curve is False?

- a) It represents the Least-Cost Input Combination for producing each level of Output.**
- b) It is derived from a Series of Short Run Average Cost Curves.**
- c) The Short Run Cost Curve is at Minimum Point of the Long-Run Average Cost Curve represents the Least-Cost Plant Size for all levels of Output.**
- d) As Output Increases, the Amount of Capital Employed by the Firm Increases along the Curve.**

Q18

The Negatively sloped (i.e. falling) part of the Long-Run Average Total Cost Curve is due to which of the following?

- a) Diseconomies of Scale.
- b) Diminishing Returns.
- c) The difficulties encountered in coordinating the many activities of large Firm.
- d) The increase in productivity that results from Specialization.

Q19

The Positively sloped (i.e. rising) part of the Long-Run Average Total Cost Curve is due to which of the following?

- a) Diseconomies of Scale.
- b) Increasing Returns.
- c) The Firm being able to take advantage of Large-Scale Production Techniques as it expands its output.
- d) The increase in productivity that results from Specialization.

Q20

A Firm's Average Total Cost is Rs.300 at 5 units of Output & Rs.320 at 6 units of Output. The Marginal Cost of Producing the 6th unit is:

- a) Rs.20
- b) Rs.120
- c) Rs.320
- d) Rs.420

Q21

A Firm producing 7 units of Output has an Average Total Cost of Rs.150 & has to pay Rs.350 to its Fixed Factors of Production whether it produces or not. How much of the Average Total Cost is made up of Variable Costs?

- a) Rs.200
- b) Rs.50
- c) Rs.300
- d) Rs.100

Q22

A Firm has a Variable Cost of Rs.1000 at 5 units of Output. If Fixed Costs are Rs.400, what will be the Average Total Cost at 5 units of Output?

- a) Rs.280
- b) Rs.60
- c) Rs.120
- d) Rs.1400

THE END

Theory of Cost