MGT 104

Micro Economics

Theory of Production


Coca-Cola
Coca-Cola
Coca-Cola

Theory of Production

Production theory in economics refers to how businesses decide the quantities of outputs to produce in response to demand.

The production function is a figure illustrating the changes in output when a single variable input changes.

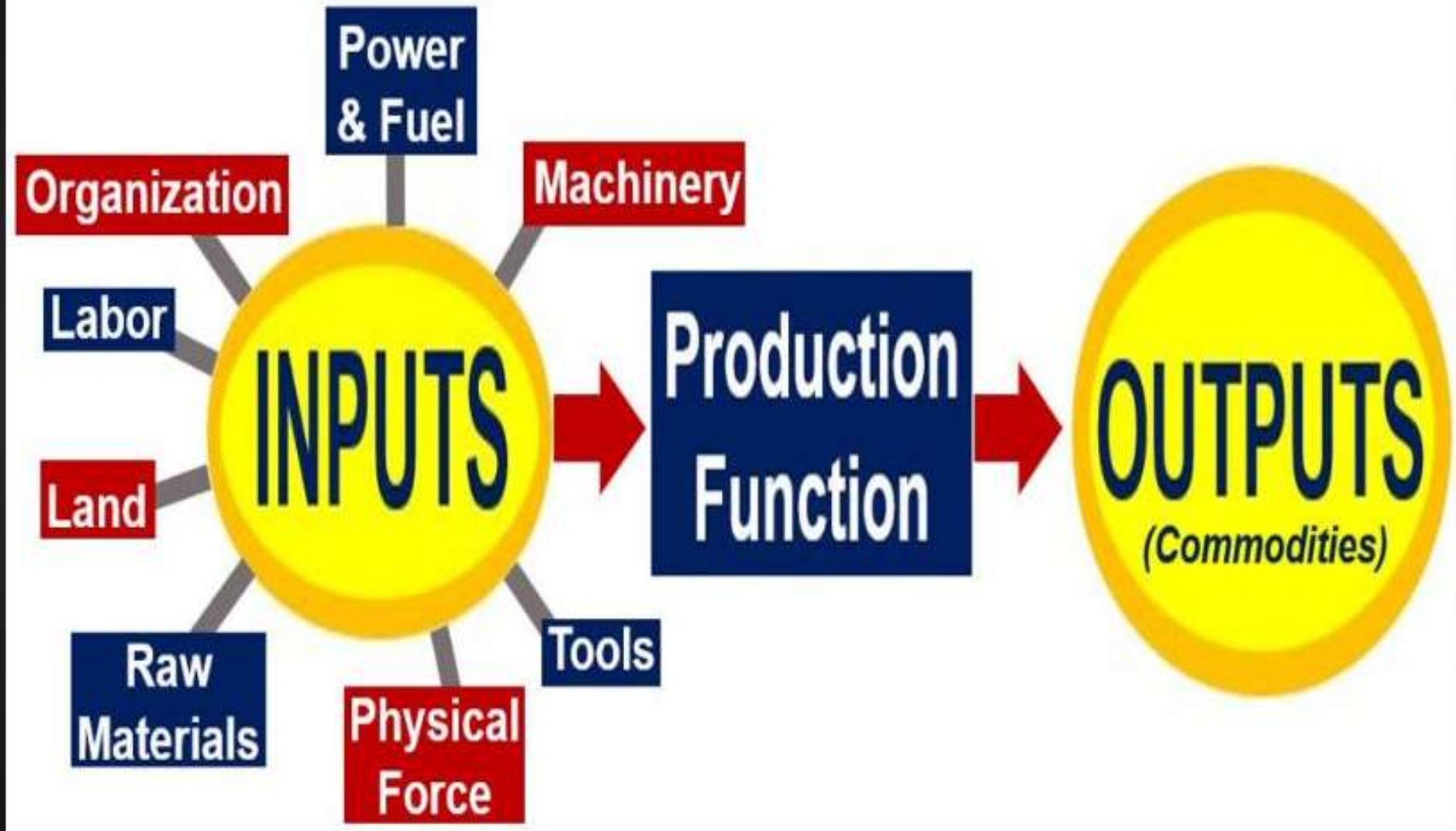
Theory of Production

Theory of production, in economics, an effort to explain the principles by which a business firm decides how much of each commodity that it sells (its "outputs" or "products") it will produce, and how much of each kind of labour, raw material, fixed capital good, etc., that it employs (its "inputs" or "factors of production") it will use.

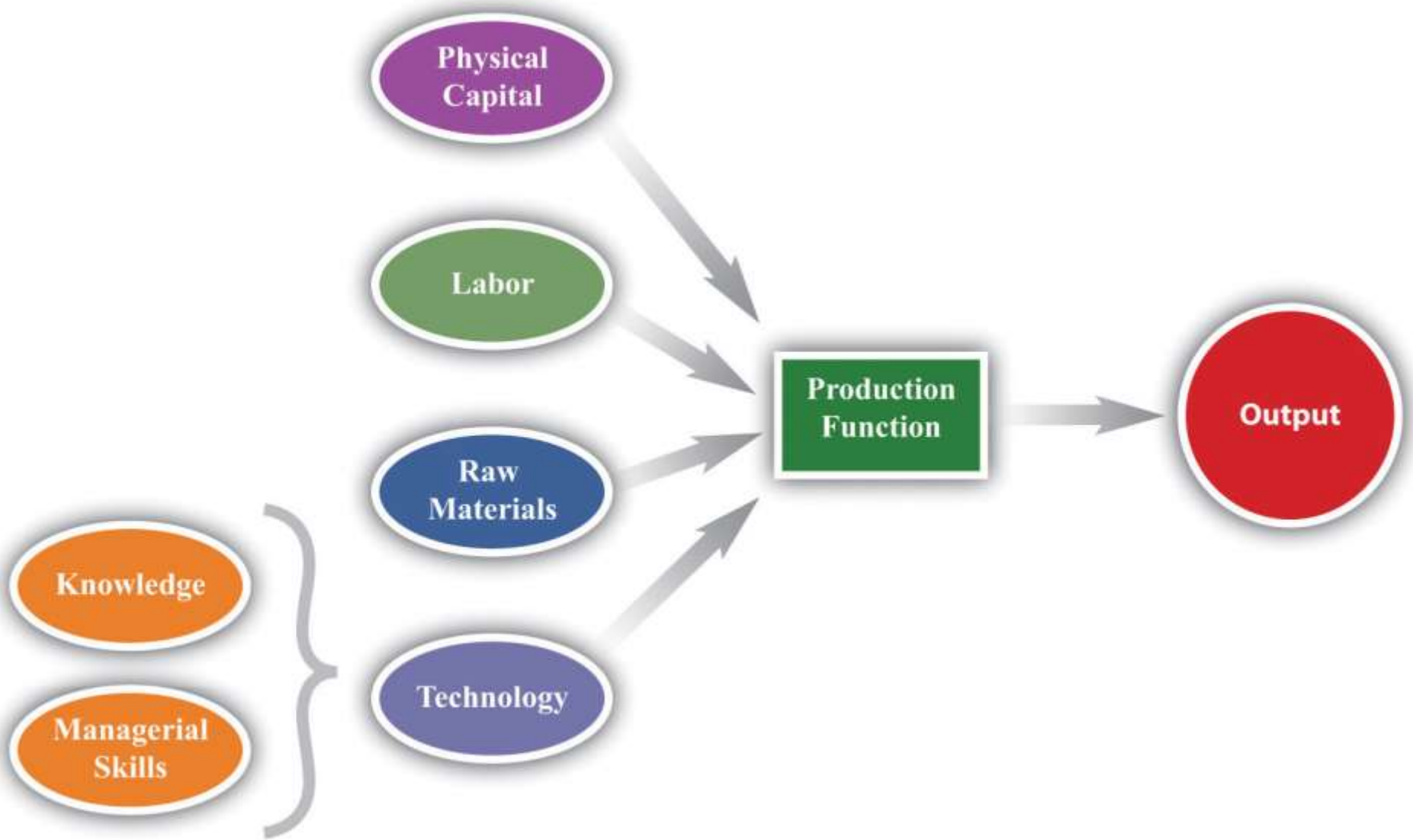
Theory of Production

The theory involves some of the most fundamental principles of economics.

These include the relationship between the prices of commodities and the prices (or wages or rents) of the productive factors used to produce them and also the relationships between the prices of commodities and productive factors, on the one hand, and the quantities of these commodities and productive factors that are produced or used, on the other.


Power & Fuel
Organization
Machinery
Labor
INPUTS
Production Function
OUTPUTS
(Commodities)
Land
Raw Materials
Physical Force
Tools

Production Function



The Production Function

An equation that expresses the relationship between the quantities of factors employed and the amount of product obtained.

It states the amount of product that can be obtained from each and every combination of factors.

The Production function signifies a technical relationship between the physical inputs and physical outputs of the firm, for a given state of the technology.

$$P = f(a, b, c, \ldots\ldots z)$$

The Production Function

$$P = f(a, b, c, \ldots\ldots z)$$

Where a,b,c ....z are various inputs such as land, labor ,capital etc. Q is the level of the output for a firm.

If labor (L) and capital (K) are only the input factors, the production function reduces to –

$$P = f(L, K)$$

Production Function describes the relationship between inputs and outputs. It is a tool that analysis the qualitative input – output relationship and also represents a firm or the economy as a whole.

The Production Function

Assume a firm has the following production function:

$$Q = L^{0.5} \times K^{0.5}$$

Where:

- Q is the output,
- L is the amount of labor used,
- K is the amount of capital used.

The Production Function

2. Calculate the output produced with 4 units of labor and 9 units of capital:

Substitute $L = 4$ and $K = 9$ into the production function:

$$Q = 4^{0.5} \times 9^{0.5}$$

$$Q = 2 \times 3 = 6$$

So, the firm produces 6 units of output with 4 units of labor and 9 units of capital.

The Production Function

Data Set:

Labor (L)	Capital (K)	Output (Q) = $L^{0.5} \times K^{0.5}$
1	1	
2	4	
3	9	
4	16	
5	25	
6	36	

1. Calculate the output for each combination:

Row 1 (L = 1, K = 1):

$$Q = 1^{0.5} \times 1^{0.5} = 1 \times 1 = 1$$

Row 2 (L = 2, K = 4):

$$Q = 2^{0.5} \times 4^{0.5} = \sqrt{2} \times \sqrt{4} = 1.414 \times 2 = 2.828$$

Row 3 (L = 3, K = 9):

$$Q = 3^{0.5} \times 9^{0.5} = \sqrt{3} \times \sqrt{9} = 1.732 \times 3 = 5.196$$

Row 4 (L = 4, K = 16):

$$Q = 4^{0.5} \times 16^{0.5} = \sqrt{4} \times \sqrt{16} = 2 \times 4 = 8$$

Row 5 (L = 5, K = 25):

$$Q = 5^{0.5} \times 25^{0.5} = \sqrt{5} \times \sqrt{25} = 2.236 \times 5 = 11.180$$

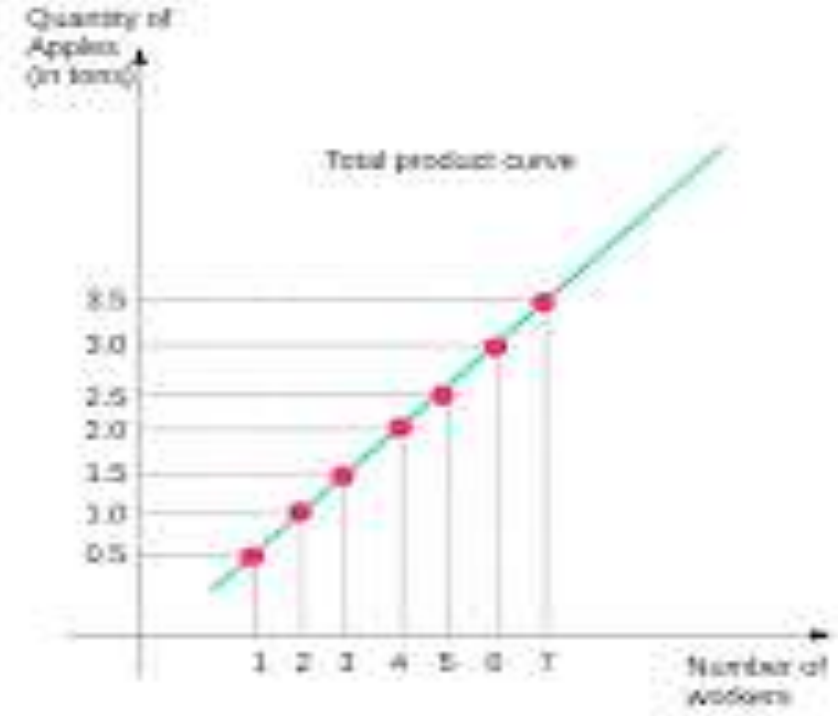
Row 6 (L = 6, K = 36):

$$Q = 6^{0.5} \times 36^{0.5} = \sqrt{6} \times \sqrt{36} = 2.449 \times 6 = 14.694$$

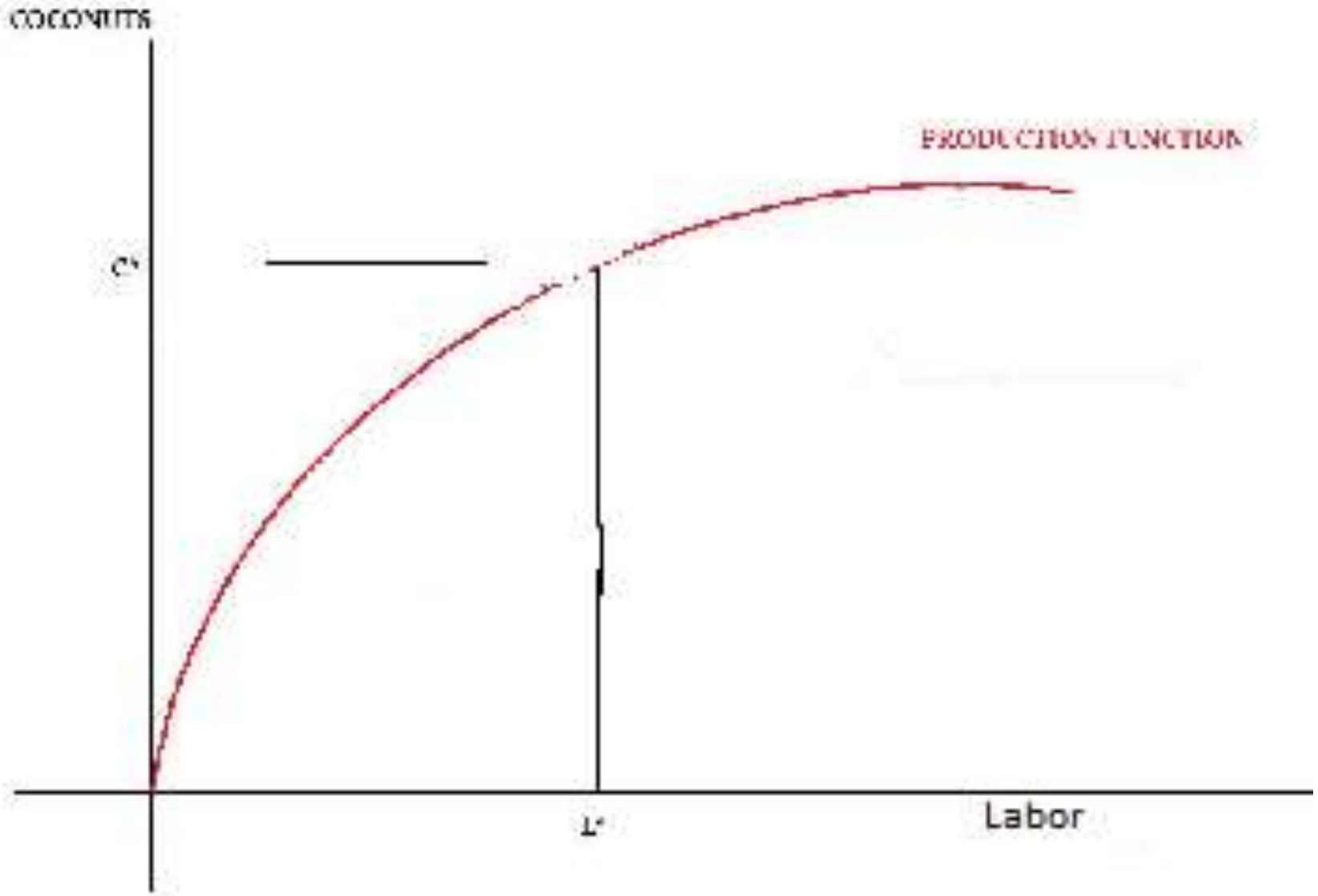
Final Data Set with Output:

Labor (L)	Capital (K)	Output (Q)
1	1	1.000
2	4	2.828
3	9	5.196
4	16	8.000
5	25	11.180
6	36	14.694

Production Function Curve



Production Function Curve



Production Function Curve