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THEORY OF PRODUCTION

Q. What is production?

Ans. In economics, production means creation of utility for sale. This is done by transforming a set of inputs into some output of a goods or services.

- a) Production of goods in factories.
- b) Production of services, such as teaching the students.
- (c) Production of agricultural goods.

A production function is a purely technical relation that connects factor inputs & output.

It describes the laws of proportion, that is the transformation of factor inputs into output during any particular period. Production function represents the technology of a firm (business/company) of an industry (eg. steel) or of the economy as a whole.

The production function includes all the technically efficient methods of production.

A "method/or technique of production" is a combination of factor inputs required for the production of a (1) unit of output. A commodity may be produced by various methods of

production. for eg a unit of commodity x may be produced by the following processes/methods/techniques.

	method/Process (P ₁)	Process (P ₂)	Process (P ₃)
Labour (L)	2	3	4
Capital (K)	3	2	1

Schedule - 1

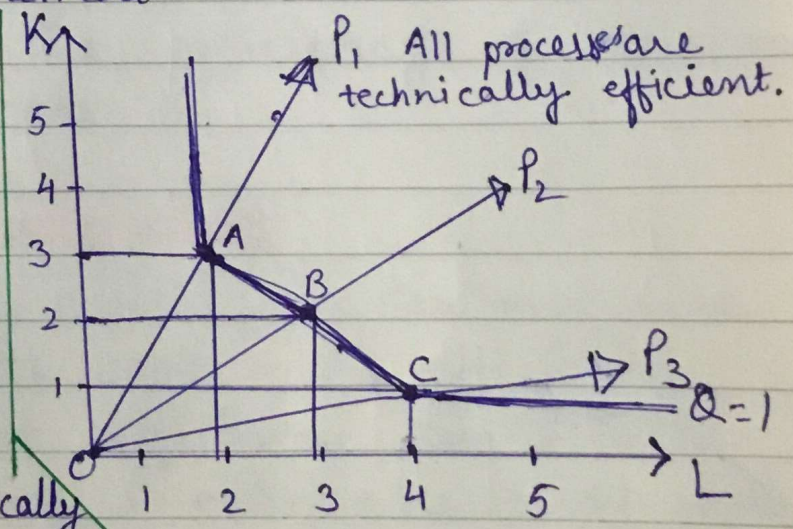
← Labour intensive method.

tech./Process of production

A method is called technically more efficient method if it uses less of at least one factor & no more from the other factors in comparison to other method.

eg-

	A	B
L	[2]	[3]
K	[3]	[3]



Method A is technically more efficient than Method B.

Let both A & B be technically efficient method of production.

Fig 1

which one among the two will be used in the production process at a given time period depends on the price of the factors used (use cheaper method). A technically & economically

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efficient method will be used in the prodn. (cost-saver) process.

PRODUCTION FUNCTION

Production function involve concepts which are useful tools in the field of economics.

The main concepts are-

- 1) The marginal productivity of the factors of Pdn. (i.e. MP_L & MP_K)
- 2) The marginal rate of (Technical) substitutions and the elasticity of substitution ($MRTS_{L,K}$)
- 3) Factor intensity (4) The efficiency of production
- 5) The returns to scale.

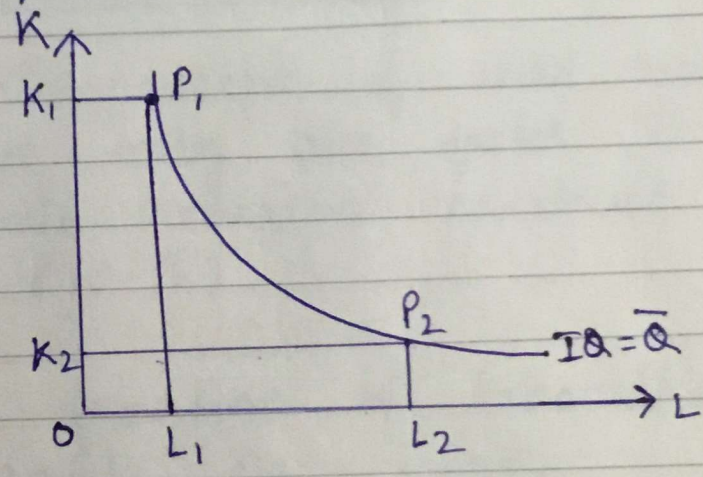
Max possible Pdn.) $X = f(L, K, R, S, v, \rho)$
 $X \equiv$ Output, $L =$ Labour, $K =$ capital, $R =$ Raw materials
 $S =$ Land, $v =$ Returns to scale $\rho =$ efficiency parameter. (management efficiency due to better organizational & entrepreneurial skills.)

Reduced form of function is
 $X = f(L, K, v, \rho)$

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Two firms with identical factor inputs (and the same returns to scale) may have different levels of output due to differences in their entrepreneurial and organisational efficiency.

Factor intensity is the capital labour ratio. The upper part of the isoquant includes a more capital intensive technique & the lower part of the isoquant includes more labour intensive technique.



Marginal Productivity of Labour ⇒

$$MP_L = \frac{\Delta x}{\Delta L} = \frac{\partial x}{\partial L}$$

Marginal Productivity of Capital ⇒

$$MP_K = \frac{\Delta x}{\Delta K} = \frac{\partial x}{\partial K}$$

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Marginal Rate of Technical Substitution (MRTS_{L,K})

$$MRTS_{L,K} = \frac{\Delta K}{\Delta L} \Big|_{\text{output constant}}$$

MRTS_{L,K} is the magnitude value of the slope of an Isoquant at a point.

LAW OF VARIABLE PROPORTION (L.V.P)

LVP is the concept of short run period. In the short run only one factor is variable other factor inputs remains constant.

$$\therefore X = f(L, \bar{K})$$

production is function of labour (L) only by keeping (K) capital as fixed.

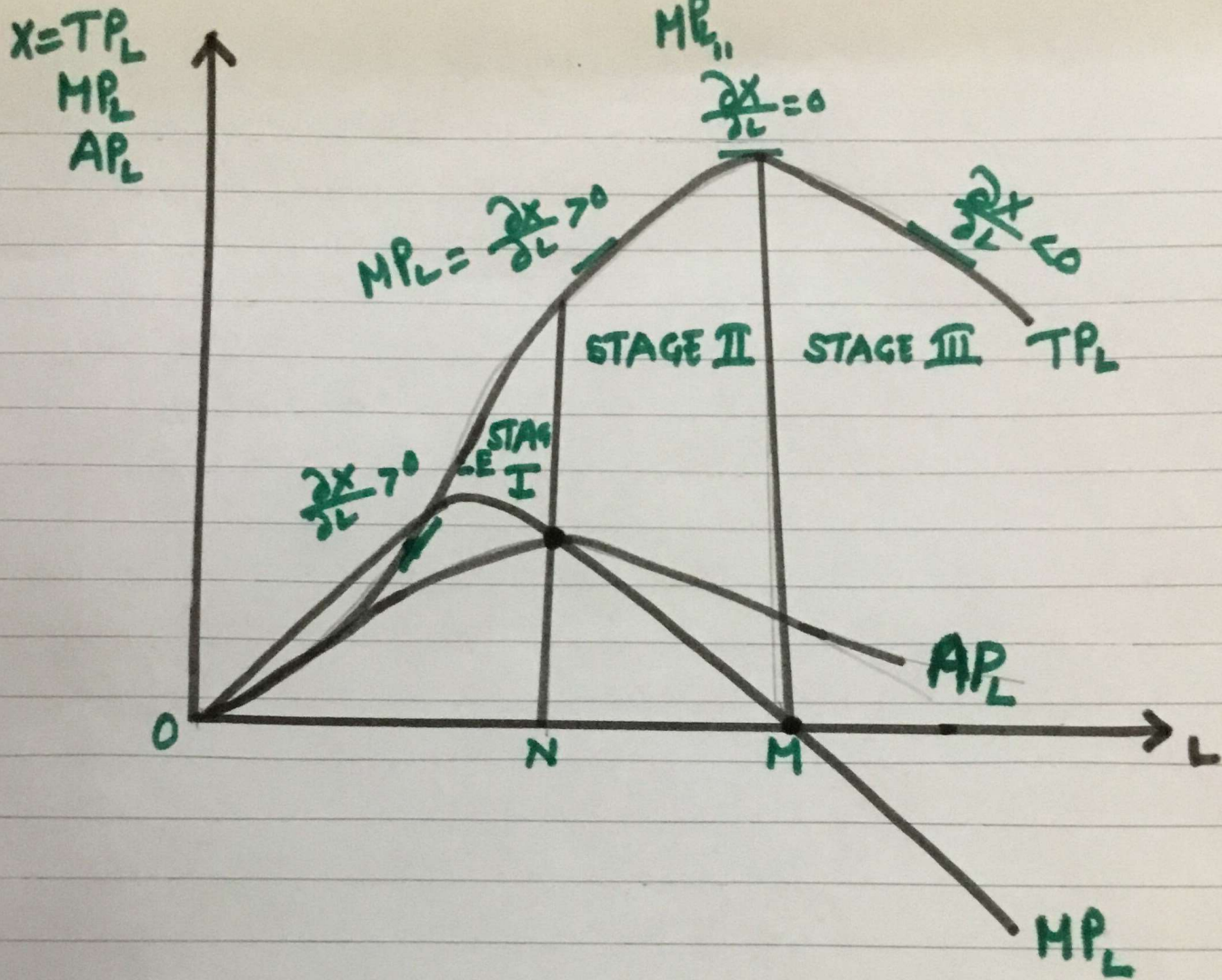
ASSUMPTIONS OF THE LVP

- 1) Production function is related to a particular period of time that is short run (SR).
- 2) Technology remains constant.
- 3) The factors of production are divisible.
- 4) Only one factor input is variable (L) and other factors are kept constant.

Fixed Factor	Variable Factor	Total Product	Average Product	Marginal Product
1	0	0	-	-
1	1	50	50	50
1	2	180	90	130
1	3	330	110	150
1	4	440	110	110
1	5	500	100	60
1	6	540	90	40
1	7	560	80	20
1	8	560	70	0
1	9	540	60	-20

stage I: rows 1-4 (MP values 50, 130, 150)
stage II: rows 5-8 (MP values 60, 40, 20, 0)
stage III: row 9 (MP value -20)

(7)



LAW OF VARIABLE PROPORTION