

Class - B.Com 1.

Subject: Business Economics
and Environment

Paper : 1

Unit : III

Topic : Conditions for Equilibrium

Lecture

sequence No: 4

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Conditions for Equilibrium of firm

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There are two essential or second order conditions for the equilibrium of the firm:

[Explain in brief the condition of Producer's Equilibrium]

- ① The first condition is that the slope of the iso-cost line must equal the slope of the isoquant curve. The slope of the iso-cost line is equal to the ratio of the price of labour to the price of capital i.e. K/L .

The slope of the isoquant curve is equal to the marginal rate of technical substitution of technical substitution of labour and capital $MRTS_{LK}$ which is, in turn, equal to the ratio of the marginal product of labour to the marginal product of capital MP_L / MP_K .

Thus the equilibrium condition for optimality can be written as:-

- ② The second condition is that at the point of tangency, the isoquant curve must be convex to the origin. In other words, the marginal rate of technical substitution of labour for capital ($MRTS_{LK}$) must be diminishing at the point of tangency for equilibrium to be stable. If it cannot be the point of equilibrium, for the isoquant IQ_1 is concave where it is tangent to the isoquant IQ_2 , is concave where

your writing partner

it is tangent to the iso-cost line GH .

A point S , the marginal rate of technical substitution between the two factors increase if moves to the right or left on the curve IS . Moreover, the same output-level can be produced at a lower cost CD or EF and there will be a corner solution either at C or F .

If it decides to produce at EF cost, it can produce the entire at C or F . If it decides to produce at EF cost entire output with only OF labour.

If on the other hand, it decides to produce at a still lower cost CD , the entire output can be produced with only OC capital.

Output Maximisation for a given cost

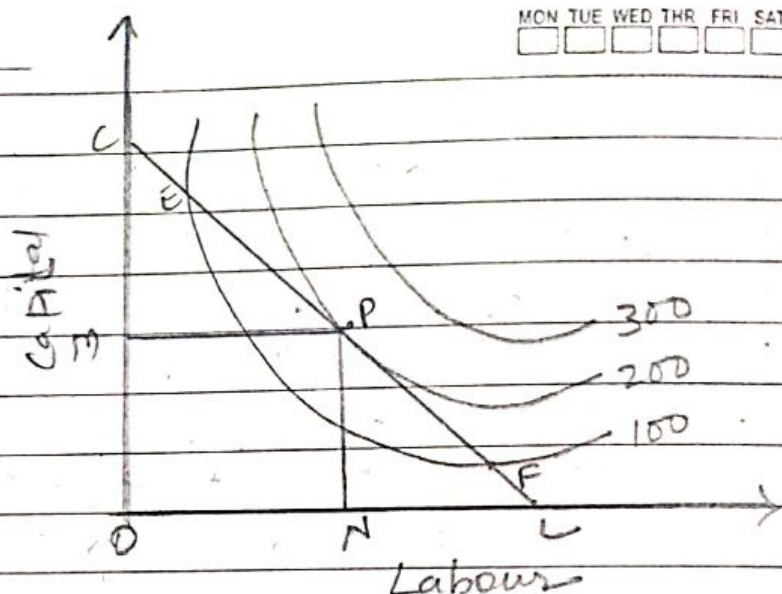
The firm also maximises its profit by maximising its output gives its cost outlay and the prices of the two factors. This analysis is based on the

- ① The firm is in equilibrium at point P where the isoquant curve 200 is tangent to the iso-cost line CL in fig.

At this point the firm is maximising its output level of 200 units by employing the optimal combination of OM of capital and ON of labour, given its cost outlay CL . But it cannot be at points E or F on the iso-cost line CL , since both points give a smaller quantity of output, being on the isoquant 100.

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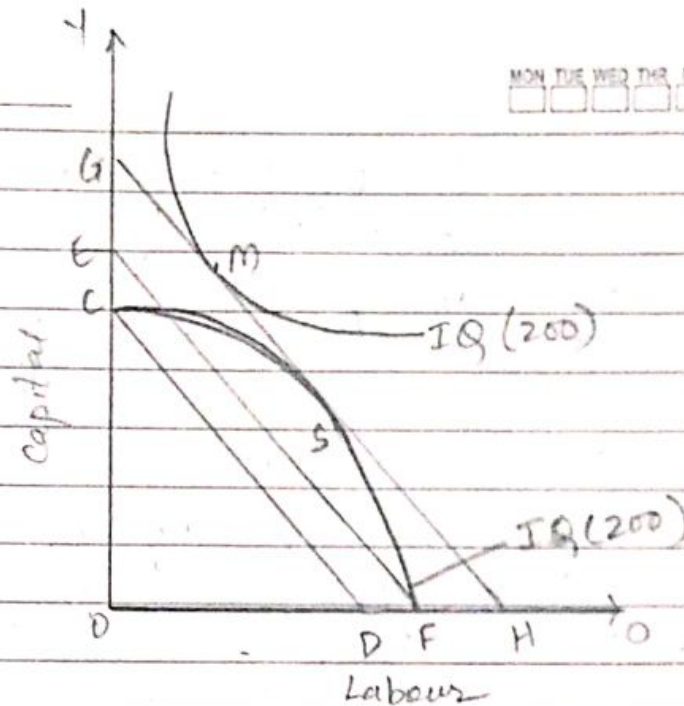
The firm can reach the optimal factor combination level of maximum output by moving along the iso-cost line CL from either point E or F to point P. This movement involves no extra cost because the firm remains on the same iso-cost line.

The firm cannot attain a higher level of output such as isoquant 300 because of the cost constraint. Thus the iso-cost line CL. It implies that $w/p = MP_L / MP_K = MRTS_{LK}$

- ② The second condition is that the iso-quant curve must be convex to the origin at the point of tangency with the iso-cost line, as explained above in terms of fig:

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Expansion Path:

Meaning:

In economics, an expansion path (also called a scale line) is a curve in a graph with quantities of two input, typically physical capital and labour, plotted on the axis. The path connects optimal input combinations as the scale of production expands.

"The expansion path is the locus of different points of firm's equilibrium when it changes its total outlay to expand output while relative factor price remain constant".

We know that the production function of the firm

$$q = f(x, y)$$

gives us the isoquant map of the firm one iso-quant (IQ) for each particular level of output, and the cost equation of the firm.

$$C = r_x X + r_y Y$$

give us the family of parallel iso-cost lines (ICLs) given the prices of the input r_x and r_y , one ICL for one particular level of cost. The IQ-map and the family of ICLs have been given in fig. If we now join the point of origin O and the points of tangency E_1, E_2, E_3 etc. between the IQs and the ICLs by a curve then this curve (OK in fig) would give us what is known as the expansion path of the firm.

The expansion path is so called because if the firm decides to expand its operations, it would have to move along this path. Let us note that the firm may expand in two ways

First, it may want to expand by successively increasing its level of cost or its expenditure on the inputs X and Y i.e. by using more and more of input, and consequently, by producing more of its output.