Answer on Question #74079 – Economics – Microeconomics

Question:

The production function for Baroda Foods Ltd. is:

$$Q = 20 \cdot K^{0.5} \cdot L^{0.5}$$

The initial prices of the input are $W = 20$ and $r = 30$. Under the labor contract with a national union, at least the current employment level of 300 workers must be maintained through the next production period (However, more workers can be hired if necessary).

(a) in the previous production period, the firm produced 4,899 units of output. Assuming efficient production, what was the rate of capital input?

(b) Because of the national recession, the desired level of output for the next production period is only 4,000 units. what is the optimal rate of capital input ?

Solution:

(a) If the firm produced 4,899 units of output, then the rate of capital input is:

$$4{,}899 = 20 \cdot K^{0.5} \cdot 300^{0.5} \Rightarrow$$

$$\Rightarrow K^{0.5} = \frac{4{,}899}{20 \cdot 300^{0.5}} \Rightarrow$$

$$\Rightarrow K = \frac{4{,}899^2}{400 \cdot 300} = 200 \text{ units.}$$

Answer: 200 units.

(b) If the desired level of output is 4,000 units, the optimal rate of capital is:

$$4{,}000 = 20 \cdot K^{0.5} \cdot 300^{0.5} \Rightarrow$$

$$\Rightarrow K^{0.5} = \frac{4{,}000}{20 \cdot 300^{0.5}} = \frac{200}{300^{0.5}} \Rightarrow$$

$$\Rightarrow K = \frac{200^2}{300} = 133 \text{ units.}$$

Answer: 133 units.