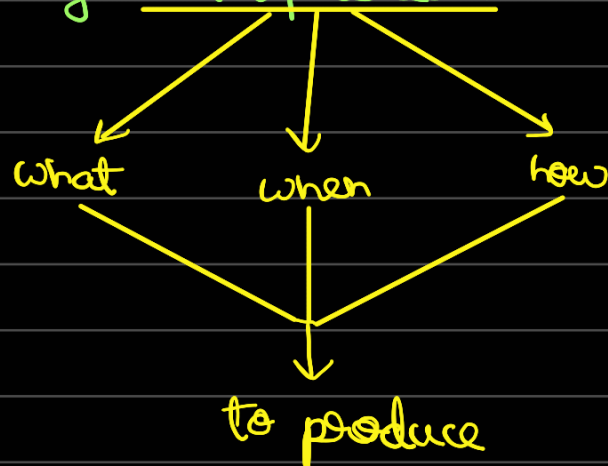


## Day 12

→ Production → Technological Process.  
Decision taken by entrepreneur



→ Factors: Land, labour, capital, entrepreneur.

↓  
"Scale"

$$Q \leq f(L, K)$$

labour ←      → Capital

If  $Q < f(L, K) \rightarrow$  Technically inefficient firm

we will assume  $Q = f(L, K)$  [Technically efficient]

→ Types of  $Q = f(L, K)$

- Linear P/f
- Leontieff P/f
- Cobb Douglas P/f
- Constant elasticity of substitution (CES)

→ cost eff. combo of inputs that produces the output  $Q$  at min. cost.

→ Long run - when all prod. factors can be changed

→ Short run - All prod. factors can't be changed

→ Unrelated to calendar or financial year

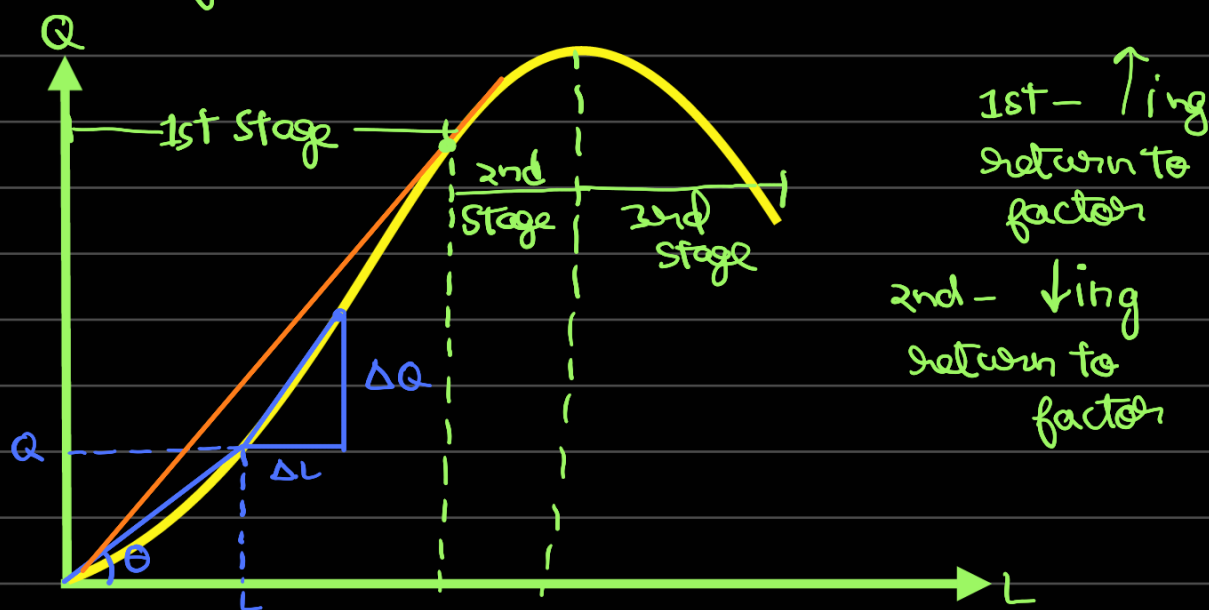
→ Var. prod. factor - can be varied in short run (eg: Labour)

→ Fixed prod. factor - can't be varied in short run (eg: Capital)

→ Firm's decision on long run: Labour and Capital

Returns to Scale

→ Return to factor (Short run) -



Too much labour → Technology can't sustain  
 $\Rightarrow \frac{dQ}{dL} < 0$

→ Productivity of labour -

Amount of output produced per unit labour

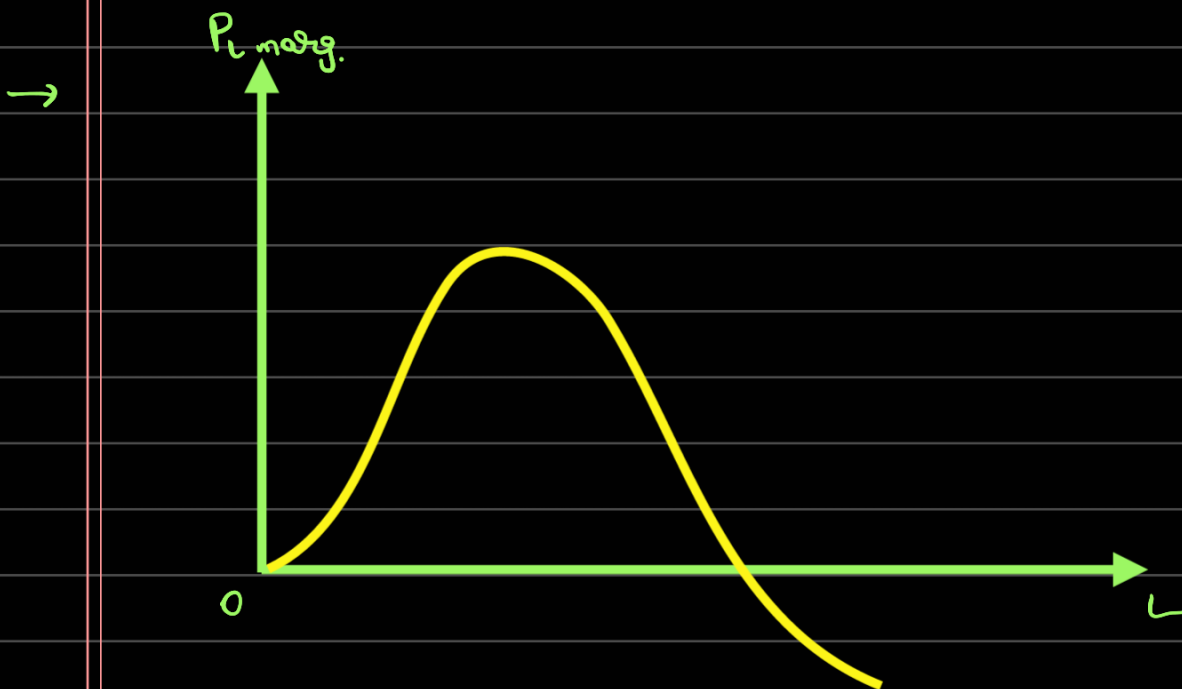
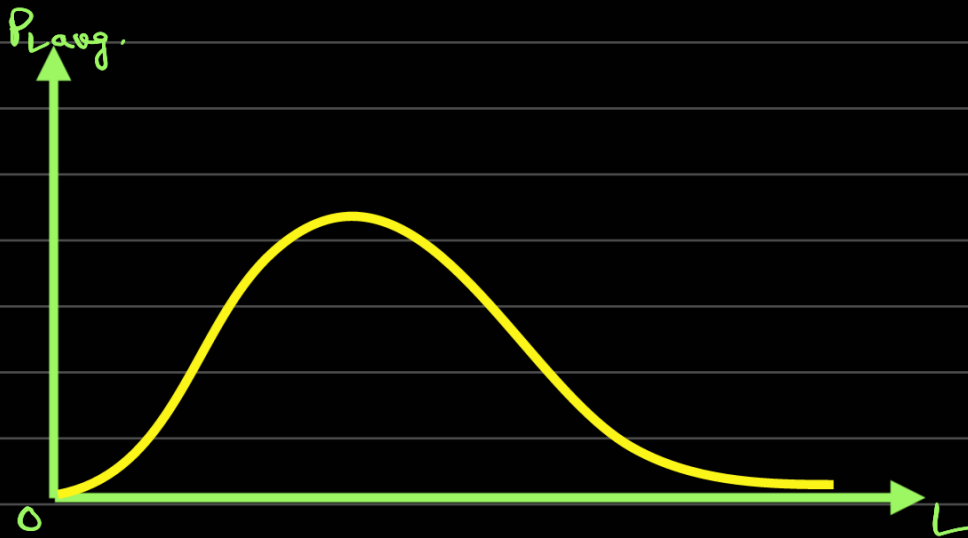
... of output produced

$$P_{Lavg} = \frac{Q}{L} = \tan \theta$$

→ marginal product of labour.

$$P_{Lmag.} = \frac{\Delta Q}{\Delta L} . \text{ If } \Delta L \rightarrow 0 \text{ it is } \frac{dQ}{dL}$$

→ Avg. Prod. -



→  $AP_L = \frac{Q}{L}$

$$\Rightarrow \frac{dAP_L}{dL} = \frac{L \frac{dQ}{dL} - Q}{L^2}$$

$$= \frac{1}{L} \left( \frac{dQ}{dL} - \frac{Q}{L} \right) = \frac{1}{L} (MP_L - AP_L)$$

$AP_L \rightarrow$  Increasing if  $MP_L > AP_L$

Decreasing if  $MP_L < AP_L$

$MP_L = AP_L \rightarrow AP_L$  at max.

$\rightarrow$  1st stage: when  $MP_L > AP_L$

$\rightarrow$  2nd stage:  $MP_L = AP_L$  to  $Q \rightarrow \max$

$\rightarrow$  3rd stage: Rest of graph.

