$$f(K,L) = 4K^{3/4}L^{1/4}$$

$$MP_L = \frac{\partial f(\cdot)}{\partial L} = \frac{1}{4}4K^{3/4}L^{\frac{1}{4}-1} = K^{3/4-\frac{3}{4}}L^{-1/4} = KL^{-1/4}$$

$$MP_K = \frac{\partial f(\cdot)}{\partial K} = \frac{3}{4}4K^{\frac{3}{4}-1}L^{1/4} = 3K^{-1/4}L^{1/4}$$

$$MRTS_{LK} = \frac{w}{r}$$

$$MRTS_{LK} = \frac{MP_L}{MP_K} = \frac{K^{3/4} L^{-3/4}}{3 K^{-1/4} L^{1/4}} = \frac{1}{3} \frac{K^{3/4} K^{1/4}}{L^{1/4} L^{3/4}}$$

$$MRTS_{LK} = \frac{1}{3} \frac{K}{L} = \frac{2}{10}$$

$$\frac{K}{L} = 3 \frac{2}{10} = \frac{3}{5} \Rightarrow 0.6 : 1$$

$$K = \frac{3}{5} L$$

$$\min \; w_1 x_1 + w_2 x_2$$

$$st \quad y = x_1^{\alpha} x_2^{1-\alpha}$$

USE OPTIMAL CONDITION

$$MRTS_{12} = \frac{w_1}{w_2}$$

$$MRTS_{12} = -\frac{MP_1}{MP_2}$$

$$MP_1 = \frac{\partial f(\,)}{\partial x_1} = \alpha x_1^{\alpha-1} x_2^{1-\alpha}$$

$$MP_2 = \frac{\partial f(\,)}{\partial x_2} = (1-\alpha) x_1^{\alpha} x_2^{1-\alpha-1} = (1-\alpha) x_1^{\alpha} x_2^{-\alpha}$$

$$MRTS_{12} = \frac{MP_1}{MP_2} = \frac{\alpha X_1^{\alpha-1} X_2^{1-\alpha}}{(1-\alpha) X_1^{\alpha} X_2^{-\alpha}}$$

$$MRTS_{12} = \frac{\alpha}{1-\alpha} \frac{X_2^{1-\alpha} X_2^{\alpha}}{X_1^{\alpha} X_1^{1-\alpha}} = \frac{\alpha}{1-\alpha} \frac{X_2}{X_1}$$

$$MRTS_{12} = \frac{w_1}{w_2}$$

$$\frac{\alpha}{1-\alpha} \frac{X_2}{X_1} = \frac{w_1}{w_2} \Rightarrow \boxed{X_2 = \frac{1-\alpha}{\alpha} \frac{w_1}{w_2} X_1}$$

$$x_2 = \frac{1-\alpha}{\alpha}\frac{w_1}{w_2}x_1 \qquad y = x_1^{\alpha} x_2^{1-\alpha}$$

$$y = x_1^{\alpha}\left[\frac{1-\alpha}{\alpha}\frac{w_1}{w_2}x_1\right]^{1-\alpha} = x_1^{\alpha}\left(\frac{1-\alpha}{\alpha}\frac{w_1}{w_2}\right)^{1-\alpha} x_1^{1-\alpha}$$

$$y = \left(\frac{1-\alpha}{\alpha}\frac{w_1}{w_2}\right)^{1-\alpha} x_1$$

$$x_1^* = \left(\frac{1-\alpha}{\alpha}\frac{w_1}{w_2}\right)^{\alpha-1} y$$

$$x_1^* = \left(\frac{\alpha}{1-\alpha}\frac{w_2}{w_1}\right)^{1-\alpha} y$$

$$x_2 = \frac{1-\alpha}{\alpha}\frac{w_1}{w_2}\left(\frac{1-\alpha}{\alpha}\frac{w_1}{w_2}\right)^{\alpha-1} y$$

$$a \qquad a^{\alpha-1}$$

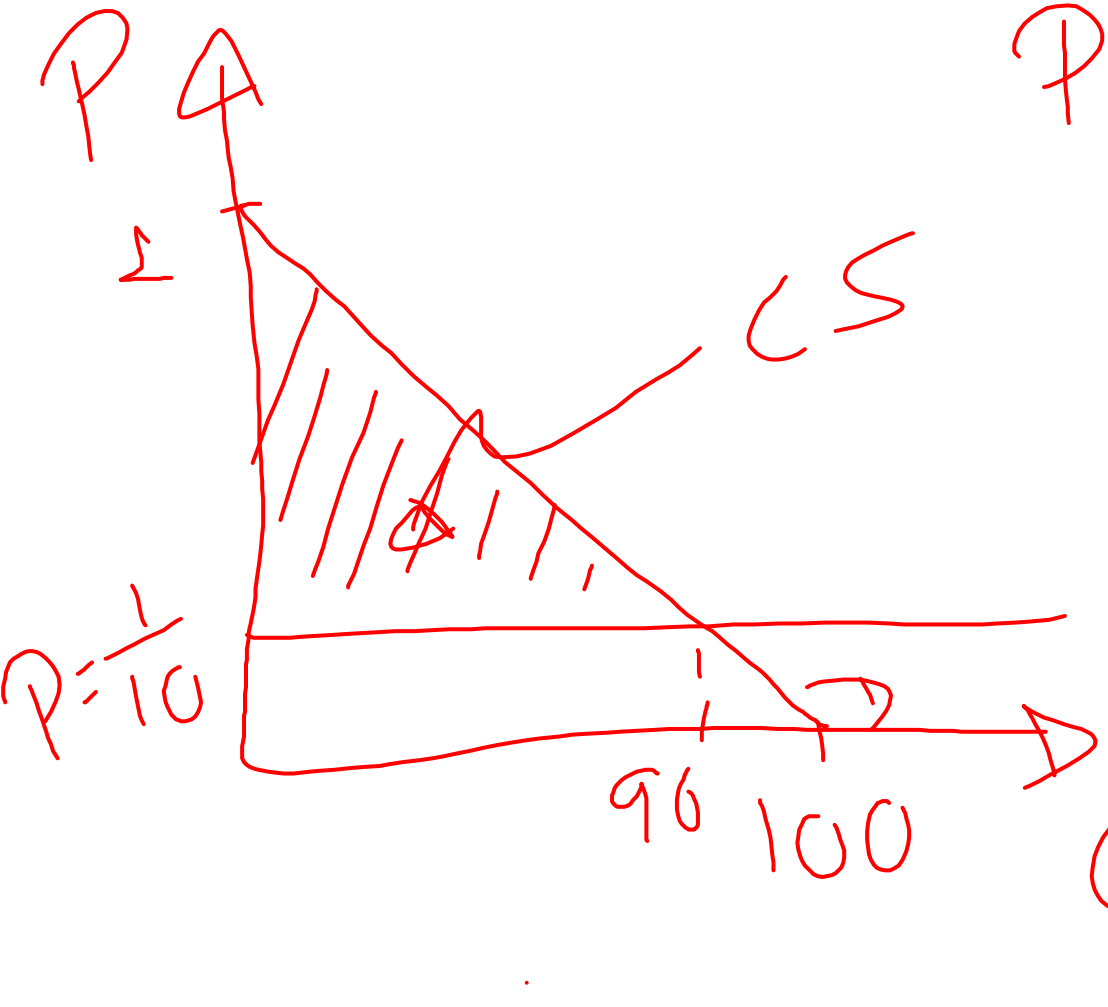
$$x_2^* = \left(\frac{1-\alpha}{\alpha}\frac{w_1}{w_2}\right)^{\alpha} y$$

$$MR = MC$$

OPTIMAL CONDITION

PERFECT COMPETITION

$P = MR \Rightarrow \boxed{P = MC}$



$P = 1 - \frac{1}{100}Q$ ⇐ inv. demand eq