Subject : .....

No. :

Date : ...../...../.....

1. $Q = f(L,K) = L^{\alpha} K^{\beta}$, $\alpha \beta > 0$

1) $AP_L = \frac{Q}{L} = \frac{L^{\alpha} K^{\beta}}{L} = L^{\alpha-1} K^{\beta}$

2) $AP_M = \frac{Q}{M} = \frac{L^{\alpha} K^{\beta}}{M} = L^{\alpha} K^{\beta-1}$

3) $MP_L = \frac{dQ}{dL} = \alpha L^{\alpha-1} K^{\beta}$

4) $MP_K = \frac{dQ}{dK} = \beta L^{\alpha} K^{\beta-1}$

5) $MRTS = \frac{-dK}{dL} = \frac{MP_L}{MP_K} = \frac{\alpha L^{\alpha-1} K^{\beta}}{\beta L^{\alpha} K^{\beta-1}} = \frac{\alpha K}{\beta L}$

6) $\varepsilon^L = \frac{\frac{dQ}{Q}}{\frac{dL}{L}} = \frac{\frac{dQ}{dL}}{\frac{Q}{L}} = \frac{MP_L}{AP_L} = \frac{\alpha L^{\alpha-1} K^{\beta}}{L^{\alpha-1} K^{\beta}} = \alpha$

7) $\varepsilon^K = \frac{\frac{dQ}{Q}}{\frac{dK}{K}} = \frac{\frac{dQ}{dK}}{\frac{Q}{K}} = \frac{MP_K}{AP_K} = \frac{\beta L^{\alpha} K^{\beta-1}}{L^{\alpha} K^{\beta-1}} = \beta$

8) $\varepsilon^{\phi} = \frac{\frac{dQ}{Q}}{\frac{dK}{K}} = \frac{\frac{dQ}{dK}}{\frac{Q}{K}} = \frac{MP_K}{AP_K} = \frac{\beta L^{\alpha} K^{\beta-1}}{L^{\alpha} K^{\beta-1}} = \beta$

9)

$$\varepsilon^{LK} = \varepsilon^L + \varepsilon^K = \alpha + \beta$$

Subject : ..... No. :
Date : ...../...../.....

2. 設生產函數 $Q = 3K + 2L$

K：資本　L：勞動　Q：產出

(1) 函數呈現固定規模報酬 - ✓

當 L、K 增加 n 倍，nL 和 nK，生產函數

為 $F(nL, nK) = 2(nL) + 3(nK)$

$= n(2L + 3K) = nQ$

故呈現固定規模報酬

(2) X

$MP_L = \frac{dQ}{dL} = 2$，$MP_K = \frac{dQ}{dK} = 3$

資本、勞動的邊際生產力皆固定

故無邊際生產力遞減

(3) ✓

$MRTS = \frac{MP_L}{MP_K} = \frac{2}{3}$

故技術替代率成固定值