題9 A⇒ $q = \min\{\frac{1}{2}L, \frac{1}{4}K\}$ $w=1, r=2$ 權利金=40

B⇒ $q = \min\{\frac{1}{4}L, \frac{1}{2}K\}$ 權利金=100

總成本 = 生產成本 + 權利金成本

生產成本 = $LTC = wL + rK = L + 2K$

成本極小化

(A) Ⓐ $q = \frac{1}{2}L = \frac{1}{4}K \Rightarrow L^* = 2q, K^* = 4q$

$C = 1\times 2q + 2\times 4q = 10q$, $LTC_A = 10q + 40$

Ⓑ $q = \frac{1}{4}L = \frac{1}{2}K \Rightarrow L^* = 4q, K^* = 2q$

$C = 1\times 4q + 2\times 2q = 8q$, $LTC_B = 8q + 100$

(B) 生產20,

$q=20$, $TC_A = 240$, $TC_B = 260$, Ⓐ

(C) 生產40,

$q=40$, $TC_A = 440$, $TC_B = 420$, Ⓑ

(D) 產量低於?, 買A.

$TC_A < TC_B$, $10q + 40 < 8q + 100$

$2q < 60$

$q < 30$ #

題11. $q = 10L^{\frac{1}{2}}K^{\frac{1}{2}}$, $w=r=10$, K固定K_0

$STC = wL + r\bar{K}$

成本極小化

(A) STC, AC, MC

$q = 10L^{\frac{1}{2}}K^{\frac{1}{2}} \Rightarrow L^* = \frac{q^2}{100K_0}$

$STC = 10\times\frac{q^2}{100K_0} + 10K_0 = \frac{q^2}{10K} + 10K$ #

$SAC = \frac{q}{10K} + \frac{10K}{q}$ #

$SMC = \frac{dSTC}{dq} = \frac{q}{5K}$ #

(B) 反推STC

$\frac{dSTC}{dK} = \frac{-q^2}{10K^2} + 10 = 0 \Rightarrow \bar{K} = \frac{q}{10}$ (找K最小, so做微分)

$STC = q + q = 2q$ #.

題12 $q=20$, AC與AVC差10, $q=40$, 差?

$q=20$, $AC = AFC + AVC$, $AFC = 10$

$AFC = \frac{FC}{q} = \frac{\bar{FC}}{q}$, $FC = 200$

$q=40$, $AFC' = 5$ #.

題13. $MC = 10q$, $FC = 100$, $q=10$, TC?

$TC = FC + VC = 100 + VC$

$MC = \frac{dVC}{dq} = 10q$

$VC = \int MC\, dq = \int_0^{10} 10q\, dq = 5q^2\Big|_0^{10} = 500$

$TC = 100 + 500 = 600$ #.