

4. 生產函數 $Q = 10L^{0.5}K^{0.5}$, 且 $w=r=10$

$$(A) Q = 10L^{0.5}K^{0.5} \Rightarrow L^* = \frac{Q^2}{100K}$$

$$STC = 10L^* + 10K = \frac{Q^2}{10K} + 10K$$

$$AC = \frac{Q}{10K} + \frac{10K}{Q}, MC = \frac{Q}{5K}$$

$$(B) \frac{\partial STC}{\partial K} = \frac{-Q^2}{10K^2} + 10 = 0 \Rightarrow K^2 = \frac{Q}{10}, \text{代入 } STC$$

$$TC = STC(K=\bar{K}) = \frac{Q^2}{10 \times \frac{3}{10}} + 10 \times \frac{Q}{10} = Q + Q = 2Q$$

7. $TC = Q^3 - 12Q^2 + Q + 50$

$$(A) AFC = \frac{FC}{Q} = \frac{50}{Q} = 5$$

$$(B) AVC = Q^2 - 12Q + 1 \Rightarrow \frac{dAVC}{dQ} = 2Q - 12 = 0, Q = 6$$

(C) 根據生產及成本的對偶性, $AVC \uparrow \Rightarrow APC \downarrow$

$$\therefore Q \geq 6$$

$$(D) MC = 3Q^2 - 24Q + 1 \Rightarrow \frac{dMC}{dQ} = 6Q - 24 = 0 \Rightarrow Q = 4, MC \uparrow \Rightarrow MPL \downarrow$$

$$\therefore Q \geq 4$$