PART I

A. Answer the following questions.   Your answer should provide brief and clear explanation.

1. Suppose the production function for good q is given by $q = 3 \times K + 2 \times L$ where K and L are capital and labor inputs.   Consider the following statements about this function:

   I. the function exhibits constant returns to scale
   II. the function exhibits diminishing marginal productivities to all inputs
   III. the function has a constant rate of technical substitution

   Which of the above statements is true? (12 points)

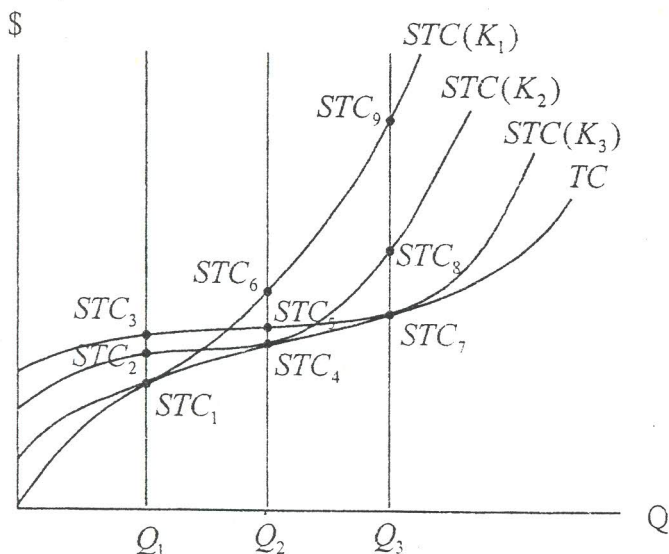2. The following are two questions concerning efficiency and equity.

   (1) To reach an economically efficient output level, the size of an excise tax imposed on a firm generating a negative externality should be（5 points）

      a.   the firm's marginal cost
      b.   the social marginal cost
      c.   the difference between the social marginal cost and the firm's marginal cost
      d.   the sum of the social marginal cost and the firm's marginal cost.

   (2) "Any voluntary system of trading will result in an equitable allocation of available resources."   True or False? (5 points)

B. Essay problems

3. Use the isoquant map to explain why the short-run total cost curves shown in the figure below are not the minimal costs for producing the various output levels.   Only at the point where STC curves tangent to the TC curve will the total costs on the STC curves be the minimal costs.   Be sure to mark (K_1, K_2, K_3), (Q_1, Q_2, Q_3) as well as $STC_1 - STC_9$ on your isoquant map.（6 points）

4. A carrot monopolist can produce at constant average costs of $AC = 5$. The firm faces weekly market demand curve for carrots given by

$$Q = 53 - P.$$

(1) Calculate the profit-maximizing price-quantity combination for this monopolist. Also calculate the monopolist's profits. （4 points）

(2) Suppose that a second firm enters the carrot market. Let q_A be the output of firm A and q_B be the output of firm B. On the assumption that firm B has the same cost as firm A, calculate the Cartel and Cournot equilibrium price-quantity combination for the market as well as profits for each firm. （8 points）

5. Suppose the government decides to impose a specific tax on an increasing-cost industry. Evaluate the following statements.

(1) In the short run, market price rises, but both individual firm's and industrial output levels decrease. We will observe the same direction of changes even in the long run. （8 points）

(2) Tax burden will be borne by all the consumers in the market. （2 points）

PART II

申論題

6. (二十五分) 一位房屋所有人打算為他價值一千萬的房屋買地震保險。有某家保險公司提供了每年千分之一費率的地震房屋全倒保險；房屋所有人每投保一萬元的保險費為十元，在一年保險期內如遇地震而房屋全倒則房屋所有人可獲一萬元的賠償。假設該房屋每年因地震而房屋全倒的機率為千分之一，如果房屋所有人為一風險趨避者 (risk averter)。請以一個經濟模型討論此房屋所有人的均衡保險行為。如果該房屋曾經過結構補強，每年因地震而房屋全倒的機率為千分之零點九。當面對與前述相同的保險合約時，此房屋所有人的均衡保險行為為何？請比較兩者均衡的差異。

7. (二十五分) 在兩個消費者 A 與 B 及兩種商品 x 與 y 純粹交易的一般均衡模型下，消費者的原始財富分別為 (x_A^0, y_A^0) 及 (x_B^0, y_B^0)。並令商品 x 與 y 的價格分別為 p_x 及 p_y，消費者 A 與 B 的效用函數分別為 $u_A(x_A, y_A)$ 及 $u_B(x_B, y_B)$ 請定義完全競爭均衡及柏瑞圖有效率分配 (Pareto Efficient Allocation)。請討論達到完全競爭均衡及柏瑞圖有效率分配的條件，並以 Edgeworth Box 圖形討論之。何謂福利經濟學第一基本定理 (First Fundamental Theorem of Welfare Economics)，並討論此一定理會成立的原因。