一、淨零排放

1. 如何透過課徵碳稅（tax）降低碳排放？請繪圖標示並輔以文字詳細加以說明。(15%)

2. 如何透過限額與交易（cap-and trade）制度降低碳排放？請繪圖標示並輔以文字詳細加以說明。(15%)

3. 試比較透過課徵碳稅降低碳排放與透過限額與交易制度降低碳排放，兩者對碳排放結果之差異、以及碳稅稅率與碳排放配額之市場價格之差異？請繪圖標示並輔以文字詳細加以說明。(20%)

二、Let us consider a pure exchange economy with two agents, a and b, and two goods, 1 and 2. Let the initial endowments for the two agents be, respectively, $e_a = \begin{bmatrix} 1 & 0 \end{bmatrix}$, $e_b = \begin{bmatrix} 0 & 1 \end{bmatrix}$. The two agents would like to exchange part of the goods they own, at some price which we want to determine. Let us assume a Cobb-Douglas utility function for the two agents: $u_a(x_{1a}, x_{2a}) = x_{1a}^{\alpha} x_{2a}^{1-\alpha}$, $u_b(x_{1b}, x_{2b}) = x_{1b}^{\beta} x_{2b}^{1-\beta}$, where x_{ij} is the consumption of good $i = 1, 2$ by agent $j = a, b$, and $\alpha, \beta \in (0,1)$ are parameters specifying the preferences of the two agents.

Let p_1 and p_2 be the prices of the two goods, 1 and 2, respectively.

1. Find the optimal solutions for agents a and b. (10%)

2. Derive the relationship between p_1 and p_2. (15%)

三、Suppose that $f(k) = k^{0.3}$ in intensive form. Suppose that the depreciation rate is 10%, the savings rate is 20%, and population grows at a constant rate of 5%.

1. Find output and capital per capita on a steady-state growth path. (5%)

2. Find the wage and interest rates on a competitive steady-state growth path. (10%)

3. An extraterrestrial benefactor offers to supply any additional capital necessary to move the economy to the golden rule equilibrium. How much is needed? (10%)

試題隨卷繳交