注意：考試開始鈴響前，不得翻閱試題，

並不得書寫、畫記、作答。

國立清華大學 113 學年度碩士班考試入學試題

系所班組別：經濟學系

科目代碼：4601
考試科目：個體經濟學

一作答注意事項一

[Please show your work in details.]

1. George has a Cobb-Douglas utility function, $U = Y^{0.5} + 5N$, where Y denotes his labor income and N denotes his hours of leisure, and he has 24 hours each day to allocate between work, L, and leisure, N.

   a. [5 points] Write down George's labor supply function, $L(w)$, if George has a wage rate of w?

   b. [5 points] Derive George's compensated labor supply function.

   c. [10 points] The government imposes a tax rate of t on labor income. Derive the condition for the relationship between the wage elasticity of labor supply and tax rate under which tax revenue rises with tax rates. Evaluate whether a higher tax rate on George's labor income would lead to more tax revenue based on the above condition when $t = 0.25\%$ and $w = 800$.

2. The production function is, $q = L^{0.5}K^{0.5}$, where L is the amount of labor and K is the amount of capital. Suppose $p_L = 10$ and $p_K = 10$ and the market demand is, $p = 25 - 0.25Q$.

   a. [8 points] Suppose $\bar{K} = 16$ and there are 20 identical firms in the market in the short run. What are the equilibrium price and each firm's profit in the short run?

   b. [4 points] Derive the long-run cost function?

   c. [8 points] What is the market equilibrium price in the long run? How many firms are there in the market in the long run equilibrium?

3. [10 points] Suppose that the demand curve for rice is $Q^d = 390 - 5p$ and the supply curve is $Q^s = 10p$. If the government imposes an ad valorem tax of 25% on the net-of-tax prices sellers receive, what effect does this policy have on consumer surplus, producer surplus and social welfare?

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[Please show your work in details.]

4. Suppose a monopoly producer is also a monopsony in the labor market. The inverse demand function for the output is $p = 200 - Q$. The production function is $Q = 2L$, and the labor supply curve is $w = 10 + L$.

  a. [5 points] Derive the firm's labor demand curve.

  b. [10 points] How many units of labor does the firm hire? What wage is paid per unit?

  c. [5 points] Illustrate part (b) on a graph of the labor market with all relevant curves. Label the areas representing the consumer surplus, producer surplus and the deadweight loss.

5. Suppose the inverse demand function for pizza in a small isolated town is given by $p = 10 - Q$. There are only two firms, A and B. Each has a cost function: $TC = 2 + Q$.

  a. [10 points] Determine the equilibrium quantities of each firm if firm A is the Stackelberg leader and firm B is the follower. Also calculate the profit for each firm.

  b. [10 points] If the two firms form a cartel and share the market, what would be the quantity and profit for each firm?

6. [10 points] Consider a pure exchange economy with two consumers (1 and 2) and two goods (X and Y). Suppose that there are totally 100 units of X and 100 units of Y. Consumer 1 has the utility function $U(X_1, Y_1) = X_1^2 Y_1$, while consumer 2 has utility function $U(X_2, Y_2) = X_2 Y_2$. Derive the contract curve.