

系所組別：經濟學系

考試科目：個體經濟學

考試日期：0222，節次：2

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. (30%) Consider a monopolized industry facing the inverse market demand $P = 630 - 2Q$. The monopolist bears the total cost $c(Q) = Q^2/2$ when producing Q units. Suppose the government is considering to impose a tax on the transaction of the products.

(a.) (5%) If the government charges a specific (quantity) tax so that consumers pay an additional \$30 for every unit purchased, find the amount of tax the government can collect.

(b.) (5%) Instead suppose the government uses the ad valorem (value) tax system so that consumers pay a fixed percentage τ of the price as the tax for every unit purchased. Find the tax rate τ the government should impose if it wants the market output level under τ to be the same as that in question (a).

(c.) (5%) Continue on (b), find the amount of tax the government can collect under that tax rate.

(d.) (5%) If the monopolist acts as a competitive seller, find again the amount of tax the government can collect if it charges a specific tax of \$30 per unit.

(e.) (5%) If the monopolist acts as a competitive seller, find again the tax rate τ the government should impose if it wants the market output level under τ to be the same as that in question (d).

(f.) (5%) Continue on (e), find the amount of tax the government can collect under that tax rate.

2. (20%) A monopolist is selling products to a competitive buyer with the inverse demand $P = 120 - 2Q$. The monopolist bears the total cost $c(Q) = Q^2/2$ when producing Q units.

(a.) (5%) If the monopolist sells with the declining-block prices so that the buyer pays P_1 for each unit of the quantity under Q_1 units and $P_2 \leq P_1$ for each additional unit over Q_1 . Design the optimal P_1 , P_2 and Q_1 for the monopolist.

(b.) (5%) Find the amount of deadweight loss when the monopolist sells with the declining-block prices in question (a).

(c.) (5%) Suppose instead the monopolist uses a two-part tariff $T = A + B \cdot Q$ where A is the lump-sum upfront payment, B is the price the buyer pays for each additional unit and T is the total amount of money the consumer pays in total when buying Q units. Design the optimal A and B for the monopolist.

(d.) (5%) Find the amount of deadweight loss if the monopolist sells with the two-part tariff in question (c).

(背面仍有題目，請繼續作答)

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

3. (10%) Suppose that $Q(p)$ is a linear demand function. We have known that, at price $p=6$, the quantity demanded is 80 and the price elasticity of demand is -3. Find the demand function $Q(p)$.

4. (10%) Let $Q(p)$ be a market demand function, where p is price. The definition of revenue is $R = pQ(p)$. Is the following statement true?

**If the revenue R decreases as price p increases,
then the demand of the good is elastic.**

Explain your answer by calculus.

5. (10%) Let $u(x, y) = x + y$ and $v(x, y) = \sqrt{x} + \sqrt{y}$ be two utility functions. Do both utility functions represent the preferences in the same way? Explain your answer.

6. (20%) A firm uses labor (L) and capital (K) to produce a single output. Its production function is given by $f(L, K) = (\sqrt{L} + \sqrt{K})^2$. Assume the prices of labor and capital are 2 and 3, respectively.

(a) (6%) Find the firm's long-run total cost function.

(b) (8%) Assume the capital is fixed at $K=16$. Find the solution to the firm's short-run cost minimization problem and find the firm's short-run total cost function.

(c) (6%) Find the elasticity of substitution for $f(L, K)$.