國立臺北大學108學度碩士班一般入學考試試題

系（所）組別：經濟學系

科　　目：個體經濟學

☐可 ☑不可使用計算機

I. True or False and Explain (50%)

Evaluate each of the following statements as true or false. Explain your answer briefly but thoroughly.

1. The compensating variation and the equivalent variation are mostly not the same.
2. The supply curve under perfect competition is always positively sloped.
3. A cost-minimizing producer may operate in any region where isoquants slope downward.
4. Sunk costs are fixed costs.
5. Leontief utilities violate the "more is better" assumption.
6. The elasticity of demand is never greater than zero.
7. Economic rent may be the same as economic profit.
8. The tangent condition always holds in finding optimal choices.
9. When demand and supply change simultaneously, the changes in equilibrium price and equilibrium quantity are not determinate without knowing the relative magnitude of the shocks.
10. Shephard's lemma relates the demand functions to the indirect utility function.

II. The production function of Firm A is

$$q^A = \min\{2L, 2K\}.$$

Firm A is a price taker at the factor market. The unit price of L is 1, and the unit price of K is $r > 0$. The inverse demand at the product market is $p = 1 - Q$, where p is the market price and Q the market quantity.

1. _____ (3%) What is the cost function of Firm A?
2. _____ (4%) If Firm A is a monopoly firm at the product market, what is its profit-maximizing output?

Another firm, Firm B, faces the same input prices as Firm A, but produces the same product with a different product function,

$$q^B = (\sqrt{L} + \sqrt{K})^2.$$

3. _____ (4%) What is the cost function of Firm B?
4. _____ (4%) Suppose that Firm A and Firm B engage in Bertrand competition and simultaneously choose their own price. Find out the equilibrium market price and profit of the two firms.

III. A monopoly firm, Firm C, has a constant marginal cost \$2. A potential entrant, Firm D, is considering whether to enter into the market. Entry requires a fixed cost $\$f$, with $0 < f < 1/2$. By paying f, Firm D can enter into the market and offer the same product as Firm C at a lower (constant) marginal cost $\$1/2$. (Firms have no other cost.)

There is only one consumer in the market, who purchases at most one unit of the product. The consumption value of the product is \$4.

Consider the following game: Firm D first decides whether to spend f to enter into the market. If Firm D does not enter, then Firm C maintains its monopoly and charges the monopoly price; but if Firm D enters, the two firms engage in Bertrand competition and simultaneously offer a price to the consumer, who then makes the purchasing decision.

In this part of questions, note that: (i) A consumer does not face any budget constraint. He makes the purchasing decision to maximize consumer surplus; and if he doesn't buy, consumer surplus is zero. (ii) Upon indifference between the offer of the two firms, a consumer will buy from Firm D. (iii) Firm D will enter and make a sale as long as its profit is not strictly negative.

1. _____ (3%) In a subgame perfect equilibrium, what is the market price and consumer surplus?

Sometimes a monopoly firm tries to "lock in" a customer by exclusive dealing. That is, the monopolist offers to sell its product at a price and maybe pays the consumer some "sign-up" bonus. In exchange, the consumer promises to only buy from the monopoly firm.

Suppose that Firm C offers such a contract to the consumer: If the consumer signs the contract, Firm C will pay the consumer a sign-up bonus $\$x$ and promise a selling price $\$p^C$. After signing the contract, the consumer can only purchase from Firm C (that is, there is no breach of contract). Assume that, upon indifference, the consumer will sign the contract.

Firm D observes the content of the contract and the consumer's decision to accept or reject the contract, and then makes its entry decision. Other aspects of the game remain the same.

2. _____ (2%) For the consumer to accept the contract, what condition should p^C and x satisfy?

3. _____ (2%) True or False: There is no contract, (p^C, x), such that the consumer will accept, and Firm C will make a strictly positive profit.

In fact, an exclusive dealing contract often contains a "penalty clause:" After signing the contract, if the consumer still wants to buy from other firms, he can do so by paying a penalty to the monopoly firm. In this case, of course, he also needs to pay the actual seller.

Suppose that Firm C modifies the contract offer to the consumer: There is no sign-up bonus, and its price is p^C. If, after signing the contract, the consumer wants to buy from other firms, he needs to pay Firm C an amount of d. Other aspects of the game remain the same.

4. _____ (3%) Suppose that the consumer has signed the contract, and Firm D has entered into the market. When Firm D sets its price at $\$p^D$, what condition should p^C, d, and p^D satisfy for the consumer to breach the contract and purchase from Firm D?

5. _____ (6%) To maximize profit, what value of the penalty d should Firm C choose? And what is its optimal profit?

Lastly, games played by consumers may also affect the competitive effect of exclusive dealing. Suppose now that there are three identical consumers, E, F, and G. Each consumer purchases at most one unit of product, and enjoys the consumption value ($4).

For the next two questions, suppose that Firm D faces a higher entry cost, $3 < f < 9/2$. But the marginal cost of the two firms remains the same as before.

Consider the following exclusive dealing contract. Firm C simultaneously offers the same conditions to all three consumers: The price (p^C) is $4, the sign-up bonus (x) is $0.01, and the penalty (d) is $10. Consumers simultaneously decide whether to accept the contract. Then, Firm D observes the content of the contract and how many consumers have signed, and makes entry decision accordingly. Other aspects of the game remain the same.

6. _____ (6%) Describe the best response of consumer E as a function of the acceptance or rejection decision of other two consumers.

7. _____ (3%) Find out all the pure strategy Nash equilibrium of the game played by consumers.

IV. Consider a series of two-person two-commodity exchange economy. In each case, the two agents have the same endowments: each has one unit of good 1, and one unit of good 2. We normalize the price of good 2 to $p_2 = 1$, and look for the competitive equilibrium, that is, both agents are price takers. Find out all, if any, of the equilibrium price of good 1, p_1^*, according to the utility function specified in each case (where x_j^i denote Agent i's consumption of good j).

1. _____ (4%) Agent H has a utility function $u^H = \min\{x_1^H, x_2^H\}$; Agent I has a utility function $u^I = \min\{x_1^I, x_2^I\}$.

2. _____ (3%) Agent J has a utility function $u^J = \min\{x_1^J, x_2^J\}$; Agent K has a utility function $u^K = \max\{x_1^K, x_2^K\}$.

3. _____ (3%) Agent L has a utility function $u^L = \max\{x_1^L, x_2^L\}$; Agent M has a utility function $u^M = \max\{x_1^M, x_2^M\}$.