

Part I: 選擇題(共 85 分)

請注意：本部份的所有題目，每題只有一個或兩個正確答案。不必提供理由或過程。
共 17 題，每題 5 分。請於試卷內之「選擇題作答區」依序作答。

Note: For each of the following 17 questions, there are only **ONE OR TWO** correct answers.
Each question accounts for 5 points.

1. [Coase Theorem] Which of the following implications can be inferred from the Coase Theorem?
 - (A) At the presence of transaction costs, externalities cannot be internalized.
 - (B) In the absence of transaction costs, the assignment of property rights does not matter for the optimal pollution (if pollution is the form of externality).
 - (C) In the absence of transaction costs, the assignment of property rights does not matter for the wellbeing of the two trade parties.
 - (D) At the presence of transaction costs, Pigou tax can be workable to internalize externality.

2. [Economics of divorce] Following the previous question, the “no-fault unilateral divorce laws” that swept the United States in the 1970s allowed a married person to get divorced without the consent of their spouse, a departure from previous practice based on mutual consent. Suppose in 1970s the probability that a married individual preferred to divorce is 40%, and this figure was not affected by the law changes. We do not know whether a couple could bargain (that is, trade with each other) over the divorce decision, but we are certain that the formation of marriages is independent of subsequent divorce preference. Also, in the absence of transaction costs, the probability that a married couple with only one divorce-preferred partner ended up with a divorce is 50%.
 - (A) Before the law changes, the divorce rate should be 16% if bargaining was not possible.
 - (B) Before the law changes, the divorce rate should be 36% in the absence of transaction costs.
 - (C) After the law changes, the divorce rate should be 48% if bargaining was not possible.
 - (D) After the law changes, the divorce rate should be 40% in the absence of transaction costs.
 - (E) If real data suggested that the law changes have increased the divorce rate by 20%, this implies that there existed no household bargaining over divorce.

3. [Gain from trade] Regarding trade, which of the following statements is (are) true?
 - (A) Given homogeneous preferences (or tastes), trade can still occur when there are differences in productivity.
 - (B) Given homogeneous productivity, trade can still occur when there are differences in preferences.
 - (C) In general, the potential for a large country to gain from international trade is greater than that for a small country.
 - (D) Consider a Robinson Crusoe economy with one consumer, one producer, and two goods. Even when the autarkic and world relative prices are the same, gain from international trade is still possible for this economy.

見背面

4. [Market structure] Consider an industry of two firms, each having marginal costs equal to \$20. The inverse demand curve facing the entire industry is $P(Q) = 60 - Q$, where Q refers to the total output as $Q = q_1 + q_2$. Here, q_1 and q_2 are outputs of firms 1 and 2, respectively.
- (A) The competitive equilibrium level of industry output is 20.
(B) If the two firms collude, the optimal price is \$30.
(C) If the two firms behave as Bertrand competitors, the equilibrium price is \$20.
(D) If firm 1 behaves as a follower and firm 2 behaves as a leader, the Stackelberg equilibrium quantities for firms 1 and 2 are 10 and 20, respectively.
(E) If firm 1 behaves as a follower and firm 2 behaves as a leader, firm 1 makes a larger profit than firm 2 does. This is called the "advantage of the follower".
5. [Collusion] Continued from the previous question. Now suppose the two firms collude and you are a member of The Fair Trade Commission (FTC) contemplating launching an anti-trust case against them. Unfortunately, you do not have information about $p(Q)$ or the marginal costs of firms. In this case, which of the following observations can be used as legitimate evidence that the two firms exercise anti-competition policies?
- (A) There are only two existing firms in the market.
(B) The two firms share the same level of profit.
(C) Synchronized price adjustments between the two firms when cost increases.
(D) The market shares of the two firms are uneven.
(E) None of the above.
6. [Externality] A grassy park can be freely accessed by villagers who raise cows. The cost of purchasing a cow is $c > 0$. When n cows are sent to the park, all the cows can produce $f(n) = 800n - n^2$ units of milk that can be sold at a constant price of \$1 in the market ($0 \leq n \leq 800$). Note that n is assumed to be a continuous variable. Which of the following statements is (are) true?
- (A) If there is no central planner, $(800 - c)/2$ cows will be sent to the park.
(B) The socially optimal number of cows is $(800 - c)$.
(C) Profit is zero for cow owners when the socially optimal outcome is reached.
(D) Profit is positive for cow owners when the socially optimal outcome is reached.
(E) The First Theorem of Welfare Economics does not hold for this example.
7. [Price discrimination] Suppose that a monopolist faces two markets, 1 and 2, with inverse demand functions given by:
- $$p_1 = 100 - y_1$$
- $$p_2 = 50 - y_2/2$$
- respectively. Assume that the monopolist's marginal cost is constant at \$20 per unit.

- (A) If the monopolist can price discriminate by setting different prices in the two markets, the optimal price and quantity in market 1 are $p_1 = 20$ and $y_1 = 80$.
- (B) If the monopolist can price discriminate by setting different prices in the two markets, the price and quantity in market 1 are $p_1 = 40$ and $y_1 = 60$.
- (C) If the monopolist can price discriminate by setting different prices in the two markets, the price and quantity in market 2 are $p_2 = 15$ and $y_2 = 70$.
- (D) If the monopolist **cannot** price discriminate and must charge the same price for both markets, the optimal price is 30.
- (E) If the monopolist **cannot** price discriminate and must charge the same price for both markets, the optimal price is 40.
8. [Price discrimination] Consider a monopolist facing two markets with different demands, and the monopolist can price discriminate by setting different prices in the two markets. Which of the following statements is (are) true if the monopolist is to maximize its total profit? (Note: answers to the previous question are not necessary here)
- (A) Price is set higher for the market where the demand is more elastic.
- (B) Price is set lower for the market where the demand is more elastic.
- (C) Price is set higher for the market where demanders' average income is higher.
- (D) Exercising price discrimination decreases the monopolist's profit, if compared to the case when the monopolist cannot price discriminate.
- (E) Exercising price discrimination decreases total social welfare, if compared to the case when the monopolist cannot price discriminate.
9. [Labor market] Regarding labor supply, which of the following statements is (are) true?
- (A) If an individual suddenly found that he needed less sleep per night than previously, his consumption will go down if consumption is a normal good.
- (B) A man who earns his entire income in wages will respond more sharply to a rise in the wage than will a man whose income is mostly from property.
- (C) Workers who like their jobs will be more productive at the margin than those who do not as much like their jobs.
- (D) An influx of unskilled immigrants are likely to hurt local unskilled workers, but likely to benefit local skilled workers if the two types of worker are complements.
10. [Game theory] Suppose two roommates, A and B, share a room. Now each of them is to determine whether to purchase a TV that will be placed in the room as a public good. Each roommate's wealth is \$500, and each values the TV at \$100. The cost of the TV is \$150, which will be paid by A (or B) if only A (or B) agrees to buy it. In the case that A and B both agree to purchase it, the cost will be evenly shared. Assume that they cannot collude so each player's decision is made independently, then they are facing the following game:

		B	
		Buy	Buy not
A	Buy	25, 25	-50, 100
	Buy not	100, -50	0, 0

In each cell, the 1st number refers to the payoff of player A, and the 2nd number to B.

- (A) Neither A nor B has incentive to be a free rider.
 - (B) The sufficient condition for the provision of public good is satisfied.
 - (C) The necessary conditions for the provision of public good are not satisfied.
 - (D) The First Theorem of Welfare Economics holds for this example.
 - (E) In this game, collusion (if possible) leads to Pareto efficiency.
11. Consider a consumer who only consumes two goods, x_1 and x_2 . His preference can be represented by the following utility function:
- $$u(x_1, x_2) = x_1^2 + 2x_2.$$
- The prices for x_1 and x_2 are p_1 and p_2 , respectively. Let $p_1 = p$ and $p_2 = 1$. His income is $I > 1$. Denote (x_1^*, x_2^*) the optimal consumption bundle. Which of the following statements is (are) true?
- (A) In the optimum, $x_1^* = p$ and $x_2^* = I - p^2$.
 - (B) When p is sufficiently high, x_1^* can be zero.
 - (C) x_1 is a normal good.
 - (D) When p increases, the income effect on x_1 is always zero.
 - (E) When p increases, the substitution effect on x_1 is always zero.
12. Two kids, Teddy and Tommy, are each endowed with 10 cookies and 10 candies. Teddy loves cookies but does not care about how many candies he has. Tommy loves both cookies and candies, but only cares about their total amount. Which of the following statements is (are) true?
- (A) There is a unique Pareto optimal allocation where Teddy has all the cookies and Tommy has all the candies.
 - (B) The endowment point is on the contract curve.
 - (C) If they trade at a price that they both agree, then in equilibrium, the relative price between one cookie and one candy is 1.
 - (D) After the trade, Teddy will have all the cookies, and Tommy will have all the candies.
 - (E) Trade makes both kids strictly better off.

13. In a perfectly competitive market, there are two types of firms. Type 1 firms have the same cost function $c(q) = 4q - 2q^2 + q^3$, and Type 2 firms have the cost function $c(q) = 5q$, where q is the output. The market demand is $Q = 30 - p$. In the long run, which of the following statements is (are) correct?
- (A) The market equilibrium price is 5 and the total output is 25.
 (B) While both types of firms stay in the market, there are more Type 1 firms.
 (C) Every firm staying in the market produces 2 units.
 (D) There are 27 firms in the market.
 (E) Not every firm staying in the market earns zero profit.
14. Since 2009, our government has reduced the estate tax rate from the highest rate of 50% to a single rate of 10%. We use the following simple model to analyze its effect. Suppose that a person lives for only two periods. He needs to decide the consumption in each period, c_1 and c_2 , and the estate e he leaves to his son in the second period. Suppose that he has income \$1000 in period 1, and no income in period 2. Originally, the interest rate is 2% and the estate tax rate is 50%. His utility function is
- $$u(c_1, c_2, e) = \ln c_1 + \ln c_2 + 0.5 \cdot \ln e.$$
- 0.5 is the measure of how much he cares about his son's welfare. Note that, in order for his son to receive an amount of e after his death, he needs to spend $\frac{e}{1-t}$ in the second period if the estate tax rate is t . Now, other things being equal, consider that the estate tax rate is reduced to 10%. Which of the following statements is (are) true?
- (A) Both the optimal c_1 and c_2 will decrease.
 (B) His savings in the first period will increase.
 (C) The optimal e will increase.
 (D) His utility will remain the same.
 (E) The tax revenue collected by the government, $\frac{e}{1-t} \cdot t$, will decrease.
15. A video game is sold by a monopolist to a continuum of consumers in the market. If a consumer decides to buy the video game, he obtains a utility of $\theta - p$, where θ is the value of the video game, and p is its price. If he decides not to buy it, he obtains a utility of b , $0 < b < 50$, which is a constant and same for every consumer. Furthermore, suppose that θ is uniformly distributed in $[50, 100]$. For simplicity, assume that there is no cost for the monopolist to produce the video game, and thus, he maximizes the total revenue by choosing an optimal p^* . Which of the following statements is (are) true?
- (A) If a consumer who has $\theta = 60$ buys the video game, then whoever with $\theta > 60$ will buy it, too.
 (B) The monopolist sets the price as high as possible such that all the consumers buy the product.
 (C) The optimal price p^* is independent of b .
 (D) The optimal price is $p^* > 50$. Thus, some consumers do not buy the video game.
 (E) The higher b , the lower the monopolist's revenue is.

16. Consider a firm staying in a perfectly competitive industry. It has the following production function:

$$f(L, K, M) = (L + K)^{\frac{1}{2}} M^{\frac{1}{2}},$$

where L is labor, K is capital, and M is materials. In the short run, $M = \bar{M}$ is fixed, while L and K are adjustable. Which of the following statements is (are) true?

- (A) The short-run total cost is concave in the output level.
 (B) The short-run average cost is linear in the output level.
 (C) In the short run, if the required \bar{M} increases, the short-run marginal cost increases as well.
 (D) The long-run marginal cost is a constant.
 (E) The firm enjoys economies of scale when the output level is small, while eventually it suffers diseconomies of scale when the output level is large.
17. A series of presidential primary elections are being held in the United States. We use the following simple model to analyze the effect of a sequential voting procedure. For simplicity, assume that there are only three voters, A, B and C, and three candidates, 1, 2, and 3. The voters' preferences can be characterized by the following rankings:

A	B	C
1	2	3
2	3	1
3	1	2

For example, voter A prefers candidate 1 to candidate 2, and candidate 2 to candidate 3. They vote sequentially in the following order: A votes first, then B votes, and finally C votes. The candidate who receives at least two votes wins. If each candidate receives exactly one vote (a tie), one candidate will be chosen randomly to be the winner. In this case, each candidate can be the winner with equal probability $1/3$ (a tiebreaker). Moreover, if a voter's favorite candidate wins the election, he (voter) obtains a utility of 10. If his second favorite candidate wins, he obtains a utility of 5. If his least favorite candidate wins, he obtains a utility of 0. In a subgame perfect Nash equilibrium, which of the following statements is (are) true?

- (A) There is a tie, and so the winner is determined by the tiebreaker.
 (B) There is no tie. Candidate 1 can be the winner.
 (C) There is no tie. Candidate 2 can be the winner.
 (D) There is no tie. Candidate 3 can be the winner.
 (E) Voters always vote for their favorite candidate.

Part II: 問答題(共 15 分) 請於試卷內之「非選擇題作答區」作答，並應註明作答之題號。

The “Kyoto Protocol” (京都議定書), initially adopted in 1997, is an international agreement which sets binding targets for member countries to reduce their collective emissions of greenhouse gases. However, in 2010, World Bank reported: “It has failed to substantially curb emissions, which have increased by 25 percent since Kyoto was negotiated.” The following simple model is to formalize the difficulty to implement such an agreement.

Suppose that there are only two countries in the world. Country $i \in \{1,2\}$ has the following welfare function:

$$u_i(c_i, P) = c_i - P,$$

where c_i is i 's consumption, and P is the pollution created from the consumption. In order to reduce the pollution, Country i can make an effort a_i to abate the pollution. Now assume that pollution is generated by the following technology:

$$P(C, E) = C(1 - A),$$

where $C = c_1 + c_2$, and $A = a_1 + a_2$. This means that pollution will increase when the total consumption level is higher, but it can be reduced by each country's effort in abatement. Suppose that each country is endowed with an income of $\frac{1}{2}$. Thus, Country i is subject to a resource constraint:

$$c_i + a_i = \frac{1}{2}.$$

Answer the following questions.

1. (4 points) Find out the socially optimal total consumption and total effort levels.
2. (6 points) Consider the situation where each country simultaneously chooses its a_i . What is the Nash equilibrium? How does the equilibrium pollution level differ from the socially optimal one?
3. (5 points) Interpret your finding. Explain why it can be difficult to implement such an agreement aimed to reduce pollution around the world.

試題隨卷繳回