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科目：個體經濟學原理與實習

共六頁之第一頁

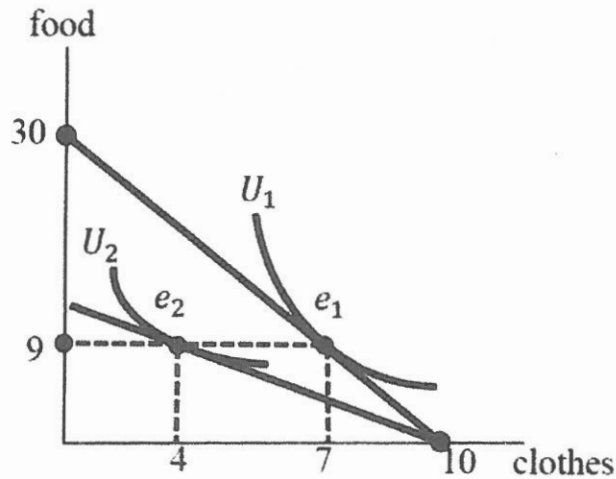
第一部分：選擇題(共 50 分)。請於試卷內之「選擇題作答區」依序作答。

請注意：每題只有一個或兩個正確答案，答案全對才給分。不必提供理由或過程。

共 10 題，每題 5 分。

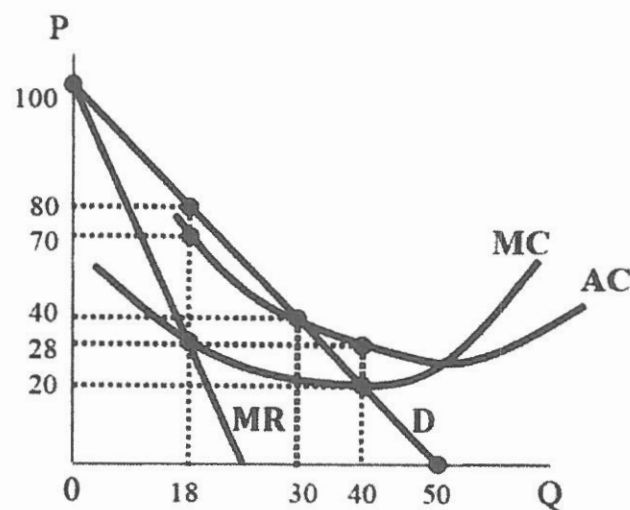
1. Ted is an employee of a food company, from which he earns \$40,000 per month. He is considering quitting his current job and then working full time in his own catering business. If he does so, he needs to invest his savings of \$500,000 into the business. Currently, the annual interest rate is 1.2%. He also needs to hire a sous chef, whose monthly salary is \$20,000.
Which of the following statements is (are) True?
(A) There is no opportunity cost because his decision is not realized yet.
(B) The opportunity cost of running the catering business is \$40,000 per month.
(C) The opportunity cost of running the catering business is \$60,500 per month.
(D) The opportunity cost of running the catering business is \$566,000 per month.
(E) It is worthwhile to quit his job.
2. Mary consumes two goods, x_1 and x_2 . Her preference can be represented by the following utility function:
$$u(x_1, x_2) = x_1 + 2x_2.$$
Suppose that the prices of x_1 and x_2 are p_1 and p_2 , respectively. Currently, $p_1 = 2$ and $p_2 = 3$. She has income Y .
Which of the following statements is (are) TRUE?
(A) Because x_1 is cheaper, she will spend all her money on x_1 .
(B) She will buy 20 units of x_1 .
(C) If her income is doubled, other things being the same, she will buy more of both goods.
(D) If p_1 decreases from 2 to 1, other things being the same, she will buy more x_1 because it is cheaper than before.
(E) She always uses up all her income.
3. Which of the following statements regarding various market structures is (are) TRUE?
(A) In a perfectly competitive market with homogenous firms, the equilibrium market price is such that every firm earns zero profit.
(B) The price set by a monopoly is NOT always higher than its marginal revenue when there is price discrimination.
(C) In an oligopolistic market, every firm can always enjoy a positive profit.
(D) In monopolistically competitive market, the demand curve facing every firm is horizontal.
(E) In monopolistic, oligopolistic and monopolistically competitive markets, every firm can always enjoy some market power in that the equilibrium price is set higher than the marginal cost.

4. The following figure shows a consumer's preference over clothes and food and the budget line. His current choice is at point e_1 . However, something is about to change, and his choice will be e_2 after the change. Other things remain unchanged.



Which of the following statements is (are) TRUE?

- (A) The price of food is changing from 2 to 4.
 - (B) We do not have enough information to know how much his income is.
 - (C) The price of clothes before the change is 3.
 - (D) Food is a normal good.
 - (E) There is no substitution effect caused by the change in terms of clothes.
5. The following figure shows the demand curve (D) facing a monopoly and its marginal revenue curve (MR). The average cost curve (AC) and marginal cost curve (MC) used by the monopoly are also shown. Which of the following statements is (are) TRUE?



- (A) The monopoly produces 40 units of the products.
- (B) The price set by the monopoly is lower than 70.
- (C) The monopoly makes a profit of 936.
- (D) The monopoly enjoys economies of scale at the optimal output level.
- (E) In order to lower the deadweight loss caused by the monopoly, it is best for the government to impose a regulation such that the price is set to 20.

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6. A researcher investigates the market of computers in some city and obtains the following information regarding the demand and supply functions:

$$\text{Demand: } Q_D = 700 - 20P + 10Y + 50C,$$

$$\text{Supply: } Q_S = 100 + 40P - 10C,$$

where:

Q_D : the quantity demanded of computers,

Q_S : the quantity supplied of computers,

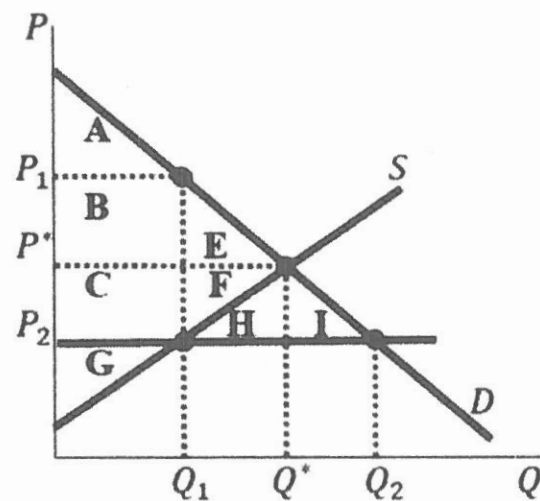
P : the price of computers,

Y : the average income of consumers,

C : Dummy variable for COVID-19. $C = 1$ represents the periods of time when there is COVID-19, and $C = 0$ represents those periods with no COVID-19.

Which of the following outcomes is (are) FALSE?

- (A) Under the same income level, the pandemic causes the equilibrium price to increase.
 (B) Under the same income level, the pandemic causes the equilibrium quantity to decrease.
 (C) Other things being equal, the higher the income level, the higher the equilibrium price is.
 (D) If $Y = 30$ during the entire period of investigation, the equilibrium price is 16 under the pandemic period.
 (E) If $Y = 30$ during the entire period of investigation, the equilibrium quantity is 500 when there is no COVID-19.
7. A market is currently in the equilibrium (P^*, Q^*) as shown in the figure. The government plans to impose a price ceiling P_2 on this market. Which of the following statements is (are) TRUE?



- (A) The quantity sold after the policy is implemented is Q_1 .
 (B) There is an excess supply under this policy.
 (C) Consumers are better off due to this policy because they can pay less.
 (D) The producer surplus after the policy is implemented is equal to the area G.
 (E) The deadweight loss caused by this policy is equal to the areas E + F + H + I.

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8. Three agents, Al, Bill and Carl, plan to build a parking lot. If the parking lot is successfully built, it will be a public good for all of them. After some survey, each of them provides the information regarding the maximum amount of money they are willing to pay for each size of the parking lot. The marginal cost to construct the parking lot is 10,000 per square meter (m^2).

What is the socially optimal size that maximizes the total surplus of all persons?

Agent Size (m^2)	Al	Bill	Carl
60	4000	8000	6000
70	3000	6500	4500
80	2000	5000	3000
90	1500	4000	2500
100	500	2500	1000

- (A) 60.
 (B) 70.
 (C) 80.
 (D) 90.
 (E) The parking lot will not be built.
9. A local labor market is currently in the equilibrium. However, some shock is about to happen which can change the equilibrium. Which of the following shocks can cause both wage and employment to decrease in this labor market?
 (A) The development of AI reduces firms' usage of human workers.
 (B) The price of the good produced by this labor rises.
 (C) More women enter this labor market.
 (D) The government imposes a minimum wage requirement on this market.
 (E) The ongoing pandemic makes more firms to drop out the market.
10. Two firms, Firm 1 and Firm 2, simultaneously consider whether to enter a market or not. If they both do, they will compete in Cournot fashion and produce identical products. The market demand is:

$$P = 100 - 2Q.$$

These two firms use the following total cost functions:

$$\text{Firm 1: } TC(q_1) = 10q_1,$$

$$\text{Firm 2: } TC(q_2) = 10q_2 + F.$$

The only difference between these two firms is that Firm 2 needs to pay an extra fixed cost $F > 0$ after entering the market.

Which of the following statements regarding the equilibrium outcome is (are) TRUE?

- (A) These two firms always produce the same output level.
 (B) Firm 1 always earns a higher profit than Firm 2 does.
 (C) The price of Firm 1's product is higher than that of Firm 2's.
 (D) Both firms will enter the market.
 (E) If $F = 500$, then the equilibrium market price is lower than 50.

第二部分：計算分析題(共 50 分)。請於試卷內之「非選擇題作答區」作答。

請注意：本部份題目，須詳述計算過程並說明理由，否則酌予扣分。

1. [25%] Jean-Jacques Rousseau, a famous philosopher, once told a story in his book called “stag hunt.” This question tries to construct a game to model his story.

Two hunters, Hunter 1 and Hunter 2, try to hunt a stag (or a deer) or a hare (or a rabbit). Hunting a stag is a two-person job, while only one person is needed to catch a hare. They simultaneously decide either to “hunt the stag” (labeled as the strategy “S”) or to “hunt the hare” (labeled as the strategy “H”). If the two hunters hunt the stag together, they can successfully catch it and share the reward of x equally, in which case each hunter obtains $x/2$. If one hunts the stag and the other hunts the hare, then the former obtains nothing because he cannot hunt the stag by himself, and the latter can catch the hare and obtain a reward of y . If they hunt the hare together, they can definitely catch it and share the reward equally, in which case each hunter obtains $y/2$. We assume that $x > y > 0$.

The feature of this game is that it is a “safer” choice to “hunt the hare” because it guarantees that each hunter can have some reward, while it requires the other hunter’s cooperation to receive some reward when hunting the stag. Thus, there is a conflict between safety and social cooperation.

Answer the following questions:

- [3%] Suppose that these two hunters make the decision simultaneously. Write down the normal form of this game.
- [5%] Is there any dominant strategy for each hunter? If yes, find the strategy. If no, explain why not.
- [6%] Find the pure-strategy Nash equilibrium of this game. (Note: your answer should depend on x and y)
- [5%] Based on what you have found in question c., judge whether the following statement is true or false: “In the Nash equilibrium, both hunters will NOT cooperate with the other even though it is better for them to do so. Thus, this is a problem similar to the prisoner’s dilemma.” Explain your answer.
- [6%] Now suppose that Hunter 1 can make the decision first. After observing his action, Hunter 2 then decides either to hunt the stag or to hunt the hare. Find the (pure-strategy) subgame perfect Nash equilibrium. How is the equilibrium outcome different from what you found in c.? Explain your finding.

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2. [25%] A market for coffee in some local area is perfectly competitive. There are 20 homogeneous firms using the following total cost function:

$$TC(q) = 5 + 10q + q^2.$$

The market demand function is:

$$Q = 200 - 5P.$$

Answer the following questions:

- [6%] Find the average cost function, the average variable cost function, and the marginal cost function for each firm. Draw a figure to show the relationship of these curves.
- [4%] What is each firm's supply curve in the short run? Draw a figure to show it.
- [6%] Find the market equilibrium price and output.
- [4%] How many units of coffee does each firm sell? How much profit does it earn?
- [5%] Consider the following new situation. The demand for coffee is decreasing because more people work for home. Other things remain unchanged. How will this new trend affect the equilibrium price and output in the coffee market and each individual firm's decision? Provide an economic explanation for your finding.