

本試題是否可以使用計算機： 可使用， 不可使用（請命題老師勾選）

考試日期：0302，節次：2

1. A consumer has a utility function of the form $U(x, y) = x^a + y^b$, where a and b are nonnegative. What additional restrictions on the values of the parameters a and b are imposed by each of the following assumptions? 【20%】
 - a. Preferences are quasilinear and convex, and x is a normal good.
 - b. Preferences are homothetic.
 - c. Preferences are homothetic and convex.
 - d. Goods x and y are perfect substitutes.

2. With some services, e.g., checking accounts, phone services, or pay TV, a consumer is offered a choice of two or more payment plans. One can either pay a high entry fee and get a low price per unit of service or pay a low entry fee and a high price per unit of service. Suppose you have an income of \$100. There are two plans. Plan A has an entry fee of \$20 with a price of \$2 per unit. Plan B has an entry fee of \$40 with a price of \$1 per unit of using the service. Let x be expenditure on other goods and y be consumption of the service. 【30%】
 - a. Write down the budget equation that you would have after you paid the entry fee for each of the two plans.
 - b. If your utility function is xy , how much y would you choose in each case?
 - c. Which plan would you prefer? Explain.

3. Patience has the utility function $U(c_1, c_2) = c_1^{1/2} + 2 \cdot c_2^{1/2}$, where c_1 is her consumption in period 1 and c_2 is her consumption in period 2. She will earn 100 units of the consumption good in period 1 and 100 units of the consumption good in period 2. She can borrow or lend at an interest rate of 10%. 【15%】
 - a. Write an equation that describes Patience's budget.
 - b. If Patience neither borrows nor lends, what will be her marginal rate of substitution between current and future consumption?
 - c. If Patience does the optimal amount of borrowing or saving, what will be the ratio of her period 2 consumption to her period 1 consumption?

4. A competitive firm has a production function described as follows. "Weekly output is the square root of the minimum of the number of units of capital and the number of units of labor employed per week." Suppose that in the short run this firm must use 16 units of capital but can vary its amount of labor freely. 【20%】
 - a. Write down a formula that describes the marginal product of labor in the short run

(背面仍有題目,請繼續作答)

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as a function of the amount of labor used. (Be careful at the boundaries.)

- b. If the wage is $w = \$1$ and the price of output is $p = \$4$, how much labor will the firm demand in the short run?
 - c. What if $w = \$1$ and $p = \$10$?
 - d. Write down an equation for the firm's short-run demand for labor as a function of w and p .
5. A baseball team's attendance depends on the number of games it wins per season and on the price of its tickets. The demand function it faces is $Q = N(20 - p)$, where Q is the number of tickets (in hundred thousands) sold per year, p is the price per ticket, and N is the fraction of its games that the team wins. The team can increase the number of games it wins by hiring better players. If the team spends C million dollars on players, it will win $0.7 - \frac{1}{C}$ of its games. Over the relevant range, the marginal cost of selling an extra ticket is zero. 【15%】
- a. Write an expression for the firm's profits as a function of ticket price and expenditure on players.
 - b. Find the ticket price that maximizes revenue.
 - c. Find the profit-maximizing expenditure on players and the profit-maximizing fraction of games to win.