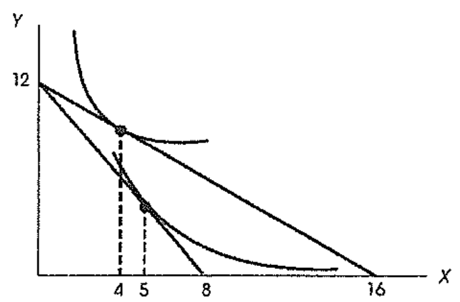
- 請依題號順序於「選擇題作答區」內作答。
- 單選題，共20題，每題5分。

1. Nancy consumes only apples and tomatoes. Her utility function is $U(x, y) = x^2y^8$, where x is the number of apples consumed and y is the number of tomatoes consumed. Nancy's income is \$320, and the prices of apples and tomatoes are \$4 and \$3, respectively. How many apples will she consume?

   (a) 21.33
   (b) 16
   (c) 8
   (d) 48
   (e) None of the above.

2. The following graph shows one's indifference curve for goods X and Y.



   Which of the following statements are correct?

   i. X is a normal good.
   ii. X is a Giffen good.
   iii. Y is a normal good.
   iv. Y is a Giffen good.

   (a) i, ii.
   (b) ii, iii.
   (c) ii, iv.
   (d) i, iii.
   (e) i, iv.

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3. Mark consumes eggplants and tomatoes in the ratio of 1 bushel of eggplants per 1 bushel of tomatoes. His garden yields 30 bushels of eggplants and 10 bushels of tomatoes. He initially faced prices of $10 per bushel for each vegetable, but the price of eggplants rose to $30 per bushel, while the price of tomatoes stayed unchanged. After the price change, he would

   (a) decrease his consumption of eggplants by 7 bushels.
   (b) increase his consumption of eggplants by 7 bushels.
   (c) decrease his eggplant consumption by at least 5 bushels.
   (d) increase his eggplant consumption by 5 bushels.
   (e) decrease his tomato consumption by at least 1 bushel.

4. Herman's utility function is $U(x, y) = x + 8y - \frac{y^2}{2}$, where x is the number of x's he consumes per week and y is the number of y's he consumes per week. Herman has $200 a week to spend. The price of x is $1. The price of y is currently $4 per unit. Herman has received an invitation to join a club devoted to the consumption of y. If he joins the club, he can buy y for $1 a unit. How much is the most Herman would be willing to pay to join this club?

   (a) $33
   (b) $21
   (c) $4.50
   (d) $16.50
   (e) None of the above.

5. There are two types of used cars, high quality and low quality. Buyers cannot distinguish the two types until after they have purchased them. Owners of high-quality cars will sell them if the price is $2,000 or higher. Owners of low-quality cars will sell them if the price is $1,000 or higher. Buyers value a high-quality used car at $4,266 and a low-quality used car at $1,200. Suppose that 30% of used cars are of high quality and 70% of used cars are of low quality. In equilibrium,

   (a) only high-quality used cars will be sold.
   (b) only low-quality used cars will be sold.
   (c) all used cars will be sold.
   (d) no used cars will be sold.
   (e) high-quality used cars will sell for a uniformly higher price than low-quality used cars.

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6. USB flash drives are manufactured by identical firms. Each firm's long-run average and marginal costs of production are given by $AC = q + \frac{100}{q}$ and $MC = 2q$, where q is the number of USB flash drives each firm produces. Supposed that the market demand for USB flash drives is $Q = 8000 - 50P$, where Q is the quantity demanded and P is the price. In long-run equilibrium,

(a) each firm will produce 20 USB flash drives.

(b) the price of USB flash drives will be \$10.

(c) the number of USB flash drives sold in the market will be 6000.

(d) there will be 700 firms in the industry.

(e) each firm will earn the profits of \$100.

7. Fair Sweaters Inc. is the world's only manufacturer of disposable sweaters. After a sweater is made, Fair Sweaters can attach buttons on the right, making it suitable for men, or on the left, making it suitable for women. No man will wear a woman's sweater and no women will wear a man's sweater. Fair Sweaters faces the following demand and marginal cost schedules for its sweaters.

Quantity	Men's Demand Price($)	Women's Demand Price ($)	Marginal Cost ($)
1	10	24	1
2	9	16	1.5
3	8	12	2
4	7	9.5	2.5
5	6	4	3
6	5	0	3.5
7	4	0	4
8	3	0	4.5

(a) In total, Fair Sweaters will produce 8 sweaters.

(b) Fair Sweaters will produce 3 man's sweaters.

(c) The price of man's sweaters will be \$7.

(d) Fair Sweaters will produce 4 woman's sweaters.

(e) The price of woman's sweaters will be \$4.

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8. Only one road goes from city A to city B, and along the road you must cross two toll bridges. The number of travellers from city A to city B is given by $Q = 180 - P$, where P is the price of travel; that is, P is the sum of the tolls that travelers have to pay.

   (a) If one monopolist owns both bridges, he will charge \$80 to cross the two bridges.
   (b) If one monopolist owns both bridges, there will be 120 travellers cross the bridges.
   (c) If each bridge is owned by a separate monopolist, each monopolist will charge \$40.
   (d) The consumer surplus is \$4,050 when each bridge is owned by a separate monopolist.
   (e) Consumers are better off when the two bridges are owned by a single monopolist.

9. An apiary is located next to an apple orchard. The apiary produces honey and the apple orchard produces apples. The cost function of the apiary is $C_H(H, A) = H^2/100 - 2A$ and the cost function of the apple orchard is $C_A(H, A) = A^2/100$, where H and A are the number of units of honey and apples produced respectively. The price of honey is \$1 and the price of apples is \$3 per unit. Let A_1 be the output of apples if the firms operate independently, and A_2 be the output of apples if the firms are operated by a single owner so as to maximize total profit.

   (a) $A_1 = 75$ and $A_2 = 150$.
   (b) $A_1 = A_2 = 150$.
   (c) $A_1 = 125$ and $A_2 = 150$.
   (d) $A_1 = 150$ and $A_2 = 250$.
   (e) $A_1 = 50$ and $A_2 = 150$.

10. John and Peter both consume the same goods in a pure exchange economy. John is originally endowed with 9 units of good 1 and 6 units of good 2. Peter is originally endowed with 91 units of good 1 and 14 units of good 2. They both have the utility function $U(x_1, x_2) = x_1^{1/3}x_2^{2/3}$. If we let good 1 be the numeraire, so that $p_1 = \$1$, then what will be the equilibrium price of good 2?

   (a) \$10
   (b) \$20
   (c) \$2
   (d) \$1
   (e) \$5

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For Questions 11 to 16: Consider an overlapping generations economy in which agents live for two periods, t and $t+1$. Let $c_{1,t}$ be household's consumption when young, and let $c_{2,t+1}$ be his consumption when old. An individual born at time t solves the problem:

$$\max_{c_{1,t}, c_{2,t+1}} \log(c_{1,t}) + \beta \log(c_{2,t+1})$$

The notation is obvious except that there are now two subscripts on consumption. The first one gives the age of the consumer (1 for young vs. 2 for old), the second one gives the date (t vs. $t+1$).

Individuals work only when young, supplying labor inelastically and earning a wage w_t. The individual budget constraints are:

$$c_{1,t} + s_t = w_t$$

$$c_{2,t+1} = (1 + r_{t+1})s_t$$

where r_{t+1} is the interest rate from time t to $t+1$. Population N_t grows at rate n so that $N_t = (1+n)N_{t-1}$. A representative firm hires labor and capital and pays them competitively:

$$\max_{K_t, N_t} F(K_t, N_t) - w_t N_t - r_t K_t$$

where the rental price of capital is equal to the interest rate by the no-arbitrage condition, and we have imposed the condition that labor demand equals to labor supply. The production function is:

$$F(K_t, N_t) = K_t^{\alpha} N_t^{1-\alpha}, \quad \alpha \in (0, 1)$$

Assume that there is no depreciation, and investment is

$$I_t = K_{t+1} - K_t$$

Finally, capital at time $t+1$ is financed by the saving of the young at time t:

$$K_{t+1} = N_t s_t$$

11. The representative agent's optimal consumption when young is

(a) $c_{1,t} = (1+\beta)w_t$
(b) $c_{1,t} = \frac{w_t}{1+\beta}$
(c) $c_{1,t} = \beta w_t$
(d) $c_{1,t} = w_t$
(e) None of the above

12. The representative agent's optimal consumption when old is

(a) $c_{2,t+1} = \frac{1+\beta}{\beta} w_t$
(b) $c_{2,t+1} = \frac{1+\beta}{(1+r_{t+1})\beta} w_t$
(c) $c_{2,t+1} = \frac{(1+\beta)(1+r_{t+1})}{\beta} w_t$
(d) $c_{2,t+1} = \frac{(1+\beta)r_{t+1}}{\beta} w_t$
(e) None of the above

13. In equilibrium, what is the goods market-clearing condition at time t?

(a) $N_t c_{1,t} + N_{t-1} c_{2,t} + I_t = F(K_t, N_t)$
(b) $N_t c_{1,t} + N_{t-1} c_{2,t-1} + I_t = F(K_t, N_t)$
(c) $N_t c_{1,t} + N_t c_{2,t} + I_t = F(K_t, N_t)$
(d) $N_t c_{1,t} + N_t c_{2,t-1} + I_t = F(K_t, N_t)$
(e) None of the above

14. Let k_t be the capital-labor ratio: $k_t = \frac{K_t}{N_t}$, the steady-state capital-labor ratio k^* is

(a) $k^* = \left[\frac{(1+\beta)(1-\alpha)A}{(1+n)\beta}\right]^{\frac{1}{1-\alpha}}$
(b) $k^* = \left[\frac{\beta(1+\beta)A}{(1+n)(1-\alpha)}\right]^{\frac{1}{1-\alpha}}$
(c) $k^* = \left[\frac{\beta(1-\alpha)A}{(1+n)(1+\beta)}\right]^{\frac{1}{1-\alpha}}$
(d) $k^* = \left[\frac{(1+\beta)A}{(1+n)(1-\alpha)}\right]^{\frac{1}{1-\alpha}}$
(e) None of the above

15. Now consider a pension system in which the government collects a premium x_t from young households, and gives a pension z_{t+1} to old households. In a fully funded system the government invests this money x_t on financial markets where it is used, just as private savings, to finance capital accumulation. Suppose that it has the same rate of return as private saving,

$$z_{t+1} = (1 + r_{t+1})x_t$$

The new life-time budget constraint under the pension system is

(a) $c_{2,t+1} = (1 + r_{t+1})(w_t - c_{1,t})$
(b) $c_{2,t+1} = (1 + r_{t+1})(w_t - c_{1,t} - x_t)$
(c) $c_{2,t+1} = (1 + r_{t+1})(w_t - c_{1,t}) + z_{t+1}$
(d) $c_{2,t+1} = (1 + r_{t+1})(w_t - c_{1,t} + z_{t+1} - x_t)$
(e) None of the above

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16. Hence, when comparing with the benchmark results for the economy without a pension system, the introduction of a fully funded pension system

    (a) causes a decrease in current saving and consumption
    (b) causes a decrease in current saving but an increase in current consumption
    (c) does not affect current saving and consumption
    (d) does not affect current saving but causes a decrease in current consumption
    (e) does not affect current consumption but causes a decrease in current saving

For Questions 17 to 18: Consider a representative agent economy in which the household lives for two periods and solves the following problem

$$\max_{c_t, c_{t+1}} \log(c_t) + \beta \log(c_{t+1})$$

Suppose that money is the only asset for transferring income over time. The household has endowment y_t in period 1, and uses money M_t to transfer assets to the future, thus facing the budget constraints:

$$p_t c_t + M_t = p_t y_t$$
$$p_{t+1} c_{t+1} = M_t$$

where p_t and p_{t+1} denote the prices at time t and $t+1$, respectively.

17. The household's real balance demand is

    (a) $\frac{\beta}{1+\beta} y_t$
    (b) $\frac{p_t \beta}{1+\beta} y_t$
    (c) $\frac{1+\beta}{\beta} y_t$
    (d) $\frac{p_t(1+\beta)}{\beta} y_t$
    (e) None of the above

18. What is the velocity of money in this economy?

    (a) $(1+\beta)\beta$
    (b) $1+\beta$
    (c) $\frac{\beta}{1+\beta}$
    (d) $\frac{1}{1+\beta}$
    (e) None of the above

For Questions 19 to 20: Consider the following growth model. Output is given by

$$Y(t) = K(t)^{\alpha}[A(t)L(t)]^{1-\alpha}, \quad \alpha \in (0,1)$$

Capital and knowledge accumulation are as follows:

$$\dot{K}(t) = \frac{dK(t)}{dt} = sY(t) \tag{1}$$

$$\dot{A}(t) = \frac{dA(t)}{dt} = Y(t)^{\beta}, \quad \beta \in (0,1) \tag{2}$$

where $s \in (0,1)$ denotes the saving rate. The population grows at rate n:

$$\frac{\dot{L}(t)}{L(t)} = n$$

19. Equation (2) for the accumulation of knowledge is best described by

 (a) Technological adoption
 (b) Learning by doing
 (c) R&D activities
 (d) Creative destruction
 (e) None of the above

20. Let $g_A(t) = \frac{\dot{A}(t)}{A(t)}$ and $g_K(t) = \frac{\dot{K}(t)}{K(t)}$ be the growth rates of knowledge and capital, respectively. The steady state growth rates (g_A^*, g_K^*) are:

 (a) $(g_A^*, g_K^*) = \left(\frac{\beta}{1-\beta}n, \frac{1}{1-\beta}n\right)$
 (b) $(g_A^*, g_K^*) = \left(\frac{1}{1-\beta}n, \frac{\beta}{1-\beta}n\right)$
 (c) $(g_A^*, g_K^*) = \left(\frac{\beta}{1-\beta}n, (1-\beta)n\right)$
 (d) $(g_A^*, g_K^*) = \left(\frac{1-\beta}{\beta}n, \frac{1}{1-\beta}n\right)$
 (e) None of the above

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