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● 請依題號順序於「選擇題作答區」內作答。

● 單選題，共 25 題，每題 4 分。

1. Suppose that there is a perfectly competitive industry where all firms have the same production technology (i.e., cost function). Furthermore, a representative firm's total cost is $TC(q) = 10 + \frac{1}{2}q^2 - q$, where $q$ is the quantity of output produced by the firm. Which one of the following statements is wrong?
   a. The total cost is minimized at $q = 1$.
   b. The marginal cost is $MC = q - 1$
   c. The firm's production technology exhibits economies of scope.
   d. There is only one incorrect statement.

2. Consider the same setup as in Question 1. What is the long-run market equilibrium price $p^*_{LR}$, and each firm's output quantity $q^*$?
   a. $p^*_{LR} = 2\sqrt{5} - 1, q^* = 2\sqrt{5}$.
   b. $p^*_{LR} = \sqrt{5} - 1, q^* = \sqrt{5}$.
   c. $p^*_{LR} = 3\sqrt{5} - 1, q^* = 3\sqrt{5}$.
   d. None of the above.

3. Recently, electronic cigarettes became popular among teenagers. While they are less harmful than traditional cigarettes, their effect on health can still be serious. Read the following excerpt[1] and choose an appropriate (i.e., economically sound) response.
   *"One way to cut e-cigarette consumption is by imposing a tax. A study by the Centre for Health Economics & Policy Studies at San Diego State University found that a $1 increase in e-cigarette taxes is associated with a 14-26% decrease in vaping among high-school pupils. Unexpectedly, the tax increase seems also to temper teenage alcohol consumption. One in ten teenagers reported binge drinking (four or more drinks for women, or five or more drinks for men, within a few hours at least once in the previous month). According to the study, a $1 increase in e-cigarette taxes is associated with a 10-11% reduction in teenage binge drinking."*
   a. E-cigarettes and alcohol are complementary goods to teenagers.
   b. Taxation would effectively deter teenagers from using e-cigarettes since they tend to have small income.
   c. Since many adult smokers use e-cigarettes to quit traditional cigarettes, the amount of tax on e-cigarettes should be moderate.
   d. There is more than one appropriate response.

[1] The Economist: https://www.economist.com/united-states/2022/12/15/e-cigarette-taxes-may-reduce-teenage-drink-driving-deaths

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4.  Suppose that there is an industry dominated by a monopolist seller, who has a constant marginal cost at 2. You also know that there are two types of consumers. The demand function of type 1 consumers is given by $q_1(p) = \frac{54}{p^3}$ and the demand function of type 2 consumers is given by $q_2(p) = \frac{16}{p^2}$. Assuming that the monopolist can practice the third-degree price discrimination, find the prices and quantities demanded for each type of consumers.

    a. $q_1^* = 2, p_1^* = 3, q_2^* = 4, p_2^* = 2$.

    b. $q_1^* = 2, p_1^* = 3, q_2^* = 1, p_2^* = 4$.

    c. $q_1^* = 9\sqrt{2}, p_1^* = 3\sqrt{2}, q_2^* = 4, p_2^* = 2$.

    d. None of the above.

5.  Determine whether the following statements about monopolistically competitive markets are correct.
    1) Companies in a monopolistically competitive industry are more likely to invest in advertisements than companies in perfectly competitive markets.
    2) Companies in a monopolistically competitive industry make a positive profit in the long-run market equilibrium.
    3) Companies in a monopolistically competitive industry produce at a level that minimizes the average total cost in the long-run market equilibrium.

    a. 1) is correct, but 2) and 3) are wrong.

    b. 2) is correct, but 1) and 3) are wrong.

    c. 1) and 2) are correct, but 3) is wrong.

    d. 1) and 3) are correct, but 2) is wrong.

    e. 2) and 3) are correct, but 1) is wrong.

6.  A public good requires two different inputs, labor and capital. Individual 1 has endowment of labor, and individual 2 has endowment of capital. The two individuals donate labor and capital to produce the public good. The production function of the public good is given by $f(k, l) = \sqrt{k} + \sqrt{l} + \frac{\sqrt{kl}}{4}$, where $k$ is the amount of capital and $l$ is the amount of labor donated. Individual 1's preferences are represented by the utility function $u_1(y, l) = y - l$ and individual 2's preferences by $u_2(y, k) = y - k$. They choose their donation $l$ and $k$ simultaneously, without observing the other's donation. How much of the public good is produced in the Nash equilibrium?

    a. $\frac{7}{9}$

    b. 1

    c. $\frac{11}{9}$

    d. $\frac{13}{9}$

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7. Consider an industry comprised of 3 firms, each firm choosing an amount of output to produce. Firm $i$'s output level is denoted by $q_i$, for $i = 1,2,3$. The firms' products are identical. The inverse market demand is given by the equation $p(q_1, q_2, q_3) = A - B(q_1 + q_2 + q_3)$, where $A$ and $B$ are positive constants. Furthermore, assume that each firm has the identical marginal cost $c$ and no fixed cost. Assuming that $c$ is small enough, find the market price $p^*$ of the product and the amount of total output $Q^*$ in this industry.

a. $p^* = \frac{A}{4} + \frac{3}{4}c, Q^* = \frac{3}{4}\frac{A-c}{B}$

b. $p^* = \frac{A}{5} + \frac{4}{5}c, Q^* = \frac{4}{5}\frac{A-c}{B}$

c. $p^* = \frac{A}{6} + \frac{5}{6}c, Q^* = \frac{5}{6}\frac{A-c}{B}$

d. $p^* = \frac{A}{7} + \frac{6}{7}c, Q^* = \frac{6}{7}\frac{A-c}{B}$

8. Mr. Tsai has this preference: "I don't like French fries in general. However, if it goes with hamburger, I like French fries. I can enjoy a bowl of French fries per a burger; but I can't eat more French fries than that per each burger. Also, I am willing to trade one (small) unit of burger with one (small) unit of French fries when I have more units of burgers than French fries. This trade ratio is constant for me as long as I have more burgers than French fries" Assume that he can always throw away French fries. Also assume that there is no satiation for burgers. The indifference curve that passes through the consumption bundle with 10 fries and 0 burgers also passes through the bundle with 17 burgers and A fries, where A equals

a. 1
b. 3
c. 5
d. 7

9. Ms. Chen has available 24 hours per day. He has to allocate this amount of time between leisure (denoted by $L$) and work. His utility function $U(C, L) = L \cdot C^2$ depends on leisure and consumption of the composite good (denoted by $C$). Work pays him 2 NTD per hour. Assume that the price of the composite good is 1 NTD. Find the optimal bundle of leisure and consumption.

a. $C^* = 36, l^* = 6$
b. $C^* = 32, l^* = 8$
c. $C^* = 28, l^* = 10$
d. None of the above.

10. Consider a consumer who consumes two goods $x$ and $y$ and his preferences are represented by the utility function $u(x, y) = \sqrt{x} + y$. Assume also that his income is $\frac{1}{10}$ and the price of good $x$ and $y$ are 1. Find the optimal bundle of this consumer.

a. $x^* = \frac{1}{10}, y^* = 0$

b. $x^* = \frac{1}{20}, y^* = \frac{1}{20}$

c. $x^* = \frac{1}{30}, y^* = \frac{1}{15}$

d. $x^* = \frac{1}{40}, y^* = \frac{3}{40}$

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11. Consider the following exchange economy with two goods, $x$ and $y$ and two consumers, $A$ and $B$. The tastes of the two consumers are represented by the following utility functions.

$$u_A(x_A, y_A) = x_A^2 y_A^3, \qquad u_B(x_B, y_B) = x_B^3 y_B^2.$$

Consumer $A$ is endowed with 10 units of good $x$, and consumer $B$ is endowed with 10 units of good $y$. The two consumers cannot consume negative amount of each good. Find the competitive market equilibrium.

a. $x_A^* = 2, y_A^* = 8, x_b^* = 8, y_b^* = 2$
b. $x_A^* = 3, y_A^* = 7, x_b^* = 7, y_b^* = 3$
c. $x_A^* = 4, y_A^* = 6, x_b^* = 6, y_b^* = 4$
d. $x_A^* = 1, y_A^* = 9, x_b^* = 9, y_b^* = 1$

12. Consider an auctioneer who tries to sell an indivisible asset and there are two bidders. The bidders value the asset by $v_i$, for $i = 1,2$. While each bidder exactly knows his valuation, the auctioneer knows that the $v_i$ is independently distributed by the uniform distribution between 0 and 1, for each $i = 1,2$. The auctioneer sells the good via the second price sealed-bid auction, where each bidder simultaneously submits a bid $b_i$ between 0 and 1, for each $i = 1,2$, the highest bidder wins, and the winning bidder pays the lower's (i.e., the second highest) bid. If Bidders submitted the same bid, each bidder wins with probability 1/2. Determine whether the following two statements are correct.

   1) It is a Bayes-Nash equilibrium where each bidder $i$ bids the true valuation. (i.e., $b_i(v_i) = v_i$ for each $i = 1,2$.)
   2) It is a Bayes-Nash equilibrium where bidder 1 always bids 1, and bidder 2 always bids 0. (i.e., $b_1(v_1) = 1$ and $b_2(v_2) = 0$.)

a. Both 1) and 2) are correct.
b. 1) is correct, and 2) is wrong.
c. 1) is wrong and 2) is correct.
d. Both 1) and 2) are wrong.

13. The price of a given basket of goods in Country 1 is 10 karls. The price of the same basket of goods in Country 2 is 25 ritz and is $2 in the United States. Country 1 has an income per capita of 3,200 karls, and Country 2 has an income per capita of 5,500 ritz. Which of the following is TRUE?
   a. The PPP-adjusted income per capita in Country 1 is $3,500.
   b. The PPP-adjusted income per capita in Country 2 is $5,800.
   c. The PPP-adjusted income per capita in Country 1 is higher than that in Country 2.
   d. The PPP-adjusted income per capita in Country 1 is lower than that in Country 2.

14. Which of the following is likely to increase the productivity of workers in an economy?
   a. An increase in the price level
   b. A increase in the exchange rate
   c. An increase in the labor force participation rate in the economy
   d. An increase in the number of years of training that each worker receives

15. A country's unemployment rate fell from 6 percent to 5 percent during a year. If the country's total population, physical capital stock, and output remain unchanged, _____.
   a. its income per capita will fall
   b. its income per worker will fall
   c. its income per capita will increase
   d. its income per worker will increase

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16. The saving rate in France is currently 6 percent. Which event would most likely decrease the current saving rate?
    a. The interest rate in France decreases.
    b. Economists forecast slowing growth in France next year.
    c. The income tax rate in France is expected to increase next year.
    d. French people anticipate strong future growth in France's economy.

17. Which of the following national priorities would be most likely to result in sustained growth?
    a. Building new factories and infrastructure
    b. Encouraging a high birthrate
    c. Increasing the age at which students may leave school
    d. Encouraging new knowledge creation

18. Suppose we know that a nation has experienced sustained growth. What does this mean about the standard of living for the poorest members of that nation?
    a. Their standard of living must have risen.
    b. Their standard of living must have at least stayed constant.
    c. Their standard of living must have fallen.
    d. None of the above statements are correct.

19. If the nominal interest rate in an economy is 6 percent and the rate of inflation in the economy is 4 percent, the real interest rate in the economy is _____.
    a. 2 percent
    b. 24 percent
    c. 1.5 percent
    d. 10 percent

20. Which of the following rises during a recession?
    a. Consumption
    b. Investment
    c. GDP
    d. Unemployment

21. During a recession, real GDP falls. Which of the following also tends to fall?
    a. Real consumption
    b. Real investment
    c. Employment
    d. All of the above

22. The _____ in employment during a recession is smaller if wages are _____.
    a. decline; rigid
    b. increase; rigid
    c. decline; flexible
    d. increase; flexible

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23. A sudden fall in housing prices in Potentia has lowered the confidence of households. Assuming all else equal, this is likely to lead to a(n) _____.
    a. increase in the overall price level
    b. increase in the demand for construction workers
    c. decline in current consumption
    d. fall in the unemployment rate

24. The number of adults not in the labor force of a country equals 6 million, and the number of individuals employed is 5 million. If there are 12 million potential adult workers in the economy, what is the current unemployment rate in this country?
    a. 12.45 percent
    b. 16.67 percent
    c. 21 percent
    d. 8.33 percent

25. If the Fed wants to increase the federal funds rate through open market operations, it will _____.
    a. sell bonds
    b. buy bonds
    c. increase the quantity of required reserves
    d. decrease the interest rate paid on borrowed reserves held at the Fed

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