考試科目	經濟學	系所別	商學院共同科	考試時間	2月3日(五)第二節

I、Multiple Choice (1 point each)

Identify the letter of the choice that best completes the statement or answers the question.

1. John has an income of $\$m$ per week. He consumes only two commodities, x and y. Let p_x be the price of x and p_y be the price of y. If he consumes more than $\bar{X}$ units of x per week, he can use coupons to buy the next Z units of x at a price of $p_x(1-s)$. If he buys more than $\bar{X}+Z$, he has to pay the full price p_x for additional units. His weekly income is greater than $p_x[\bar{X}+(1-s)Z]$. The maximum amount of x that he can buy per week is

A. $\bar{X}+\frac{mZ}{p_x}$.
B. $\frac{m+\bar{X}}{p_x}+Z$.
C. $\frac{m}{p_x}+sZ$.
D. $Z-\frac{(m+p_x)}{1-s}p_x$.

2. Professor Lin gives 3 midterm exams. Only the highest one counts. You are taking his course and have a 60 on your first exam. Let x_2 be your score on the second exam and x_3 be your score on the third exam. If you draw your indifference curves for scores on the second and third exams with x_2 represented by the horizontal axis and x_3 represented by the vertical axis, then your indifference curve through the point $(x_2, x_3) = (50, 70)$ is

A. ㄱ-shaped with a kink where $x_2 = x_3$.
B. three line segments, one vertical, one horizontal, and one running from $(70, 60)$ to $(60, 70)$.
C. a straight line, running from $(0, 70)$ to $(70, 0)$.
D. an L-shaped curve with its point at $(50, 70)$.

3. Consider the utility function to be $\min\{x, yz\}$. The price of x is \$1, the price of y is \$4, and the price of z is \$4. Henri's income is \$20. How many units of x does Henri demand?

A. 5
B. 20/9
C. 2
D. 3

4. Suppose that the production function is $f(x_1, x_2) = (x_1^a + x_2^a)^b + c$, where a, b, and c are positive constants. For what values of a, b, and c does the firm have constant returns to scale?

A. For any values of a if $b < 1$ and $c = 0$.
B. For any values of a and c if $ab < 1$.
C. For any values of a and c if $ab = 1$.
D. For any value of c if $a < 1$ and $b < 1$.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	經濟學	系所別	商學院共同科	考試時間	2月3日(五)第二節

5. Roommate 1's utility function is $3X_1 + G$ and Roommate 2's utility function is X_2G, where G is their expenditures on the public goods they share in their apartment and where X_1 and X_2 are their respective private consumption expenditures. The total amount they have to spend on private goods and public goods is \$30,000. They agree on a Pareto optimal pattern of expenditures in which the amount that is spent on Roommates 1's private consumption is \$5,000. How much do they spend on public goods?

A. \$1,000
B. \$15,000
C. \$7,999
D. \$18,000

6. Consider a monopolistically competitive market in an economy moves from autarky to free trade. Which of the following statements is (are) correct?
(i) The domestic demand curve for a domestic firm will shift to the right.
(ii) The price elasticity of domestic demand that a domestic firm faces will increase in the absolute value.
(iii) The domestic firm's markup will decrease.

A. Only (i)
B. (i) and (ii)
C. (ii) and (iii)
D. (i) and (iii)

7. Which of the following curves is not affected by the existence of diminishing marginal product of input factors?

A. The average fixed cost curve.
B. The average variable cost curve.
C. The marginal cost curve.
D. The variable cost curve.

8. Suppose the shutdown point of a firm in a perfectly competitive market is that the market price is \$10. At the shutdown point, the average total cost of the firm is \$20. What is the average fixed cost?

A. 5
B. 10
C. 15
D. Need more information.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	經濟學	系所別	商學院共同科	考試時間	2月3日(五)第二節

9. The information in the table below shows the total demand for gasoline in a small urban market. Assume that each gasoline provider pays a fixed cost of $100,000 (per year) to operate in the market area and that the marginal cost of providing the gasoline to a household is zero.

Quantity	Quantity (per year)
0	120
3000	90
4000	80
5000	70
6000	60
7000	40
8000	30

Assume any agreement between two firms are not enforceable and two firms compete in quantity. What is the market price under the Nash equilibrium according to the table?

A. 80
B. 70
C. 60
D. 40

10. In a monopolistically competitive market, if the long run marginal cost curve intersects the long run marginal revenue cost curve and long run average cost curve when the marginal cost is $10 and $20 respectively, which of the following choices is a possible long run equilibrium market price?

A. 5
B. 10
C. 15
D. 21

11. How would a decrease in the frictional unemployment affect the long-run Phillips curve?

A. It would shift the long-run Phillips curve right.
B. It would shift the long-run Phillips curve left.
C. There would be an upward movement along a given long-run Phillips curve.
D. There would be a downward movement along a given long-run Philips curve.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	經濟學	系所別	商學院共同科	考試時間	2月3日(五)第二節

12. In the Unites States, the CPI was 80 in 1980 and is 300 today, then $100 today purchases the same amount of goods and services as
A. $26.67 purchased in 1980.
B. $33.33 purchased in 1980.
C. $40.00 purchased in 1980.
D. $80.00 purchased in 1980.

13. If total spending rises from one year to the next, then which of the following could not be true?
A. the economy is producing a smaller output of goods and services, and goods and services are selling at higher prices.
B. the economy is producing a larger output of goods and services, and goods and services are selling at lower prices.
C. the economy is producing a larger output of goods and services, and goods and services are selling at higher prices.
D. the economy is producing a smaller output of goods and services, and goods and services are selling at lower prices.

14. You put money into an account that earns a 3 percent real interest rate. The inflation rate is 2 percent, and the tax rate on your interest income is 20 percent. What is your after-tax real rate of interest?
A. 2.0 percent.
B. 2.4 percent.
C. 3.0 percent.
D. 3.6 percent.

15. Time inconsistency will cause the
A. short-run Phillips curve to be higher than otherwise.
B. short-run Phillips curve to be lower the otherwise.
C. long-run Phillips curve to be farther to the right than otherwise.
D. long-run Phillips curve to be farther left than otherwise.

16. Which of the following policies should be used to close an inflationary GDP gap?
A. A decrease in government purchases.
B. An increases in taxes.
C. A decrease in money supply.
D. All of the above.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	經濟學	系所別	商學院共同科	考試時間	2月3日(五)第二節

17. If a country has a current account balance of -$120 and a capital and financial account balance of $80, there will be _____ in official reserves of _____ .

A. an increase; $40.
B. an increase; $200
C. a decrease; $40
D. a decrease; $200

18. When the central bank in a country decreases the money supply, its

A. price level rises and its currency appreciates relative to other currencies in the world.
B. price level falls and its currency appreciates relative to other currencies in the world.
C. price level falls and its currency depreciates relative to other currencies in the world.
D. price level rises and its currency depreciates relative to other currencies in the world.

19. The Ricardo-Barro effect states that government deficits

A. increase the equilibrium real interest rate, crowding out investment.
B. decrease private saving, the equilibrium real interest rate and investment.
C. increase private saving and have no effect on the equilibrium real interest rate and investment.
D. decrease the equilibrium real interest rate and increase investment.

20. Suppose potential GDP exceeds real GDP in a short-run macroeconomic equilibrium. If aggregate demand does not change, then the

A. short-run aggregate supply curve will shift rightward as the money wage rate decreases.
B. short-run aggregate supply curve will shift leftward as the money wage rate increases.
C. long-run aggregate supply curve will shift leftward as the money wage rate increases.
D. long-run aggregate supply curve will shift leftward as the money wage rate decreases.

Ⅱ. Problems and Short-essay Questions

1. Consider the following utility function.

$$u(x_1, x_2) = \begin{cases} 3x_1 + x_2 & \text{if } x_1 > 2x_2, \\ \frac{7}{5}x_1 + \frac{21}{5}x_2 & \text{otherwise.} \end{cases}$$

A. (7 points) Calculate the marginal rate of substitution.

B. (6 points) (9,1) and (c,6) sit on the same indifference curve. What is the value of c?

C. (7 points) Let m stand for the consumer's income. Please calculate the demand function as a function of p_1, p_2, and m.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	經濟學	系所別	商學院共同科	考試時間	2月3日(五)第二節

2. Suppose Firm A is the only seller of Product A in a closed economy. The firm faces the following demand, marginal revenue, and marginal cost curves.

$$\text{Demand: } P = 70 - Q$$
$$\text{Marginal Revenue: } MR = 70 - 2Q$$
$$\text{Marginal Cost: } MC = 10 + Q$$
$$\text{Total cost: } TC = 210 + 10Q + 0.5Q^2$$

A. (4 points) Please calculate the efficient loss due to the monopoly.

Suppose the government of the economy decides to open the market to the world. The world price of Product A is \$30.

B. (4 points) How many units of Product A will the economy export or import in the short run?

C. (4 points) How many units of Product A will the economy export or import in the long run?

D. (8 points) In the long run, if the government wants to maintain that both the domestic producer and foreign importers coexist in the domestic market, the government should tax or subsidize the importers? What is the minimum value of the per-unit tax or the per-unit subsidy to achieve this goal?

3. Consider an economy where the representative consumer has a utility function $U = CF$ over clothing C and food F, and has an income of \$40.

A. (8 points) Suppose in year one (the base year), the prices of clothing and food are $p_C^1 = 2$ and $p_F^1 = 2$, respectively. What is the consumer's optimal consumption bundle? How much utility does the consumer receive from this bundle?

B. (6 points) Suppose in year two, the prices of clothing and food become $p_C^2 = 2.5$ and $p_F^2 = 10$, and the consumer's income increases in proportion to the consumer price index (CPI). What is the consumer's optimal consumption bundle?

C. (6 points) What is the minimum income in year two that enables the consumer to achieve the same level of utility as in year one? How much does the CPI overstate actual inflation due to the *substitution bias*?

4. In an economy, autonomous consumption expenditure is \$100 billion, investment is \$300 billion, and government expenditure is \$150 billion. The marginal propensity to consume is 0.90 and net taxes are \$150 billion. Exports are \$450 billion and imports are \$550 billion. Assume that net taxes and imports are autonomous and the price level is fixed.

A. (5 points) What is the value of consumption multiplier?

B. (10 points) Calculate the equilibrium aggregate expenditure.

C. (5 points) If government expenditure increases by \$200 million, what is the change in the economy's equilibrium real GDP?

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	財務管理	系所別	財務管理學系	考試時間	2 月 3 日(五) 第 三 節

Part I. Multiple Choice Questions (36%, 4% each)

1. (4%) In response to the high inflation rate, the Fed has raised the federal fund rate by 425 basis points in 2022. Bank of Alpha also increases the interest rate of its saving account to an APR of 4.04% which is compounded semiannually. If an investor put $10,000 into the saving account of Bank of Alpha, how much can the investor obtain from the saving account after six months?
   (A) $10,000
   (B) $10,404
   (C) $10,200
   (D) $10,202
   (E) None of the above

2. (4%) Comparing two otherwise equal firms, the beta of the common stock of an unlevered firm is _____ than the beta of the common stock of a levered firm when the corporate tax is absent.
   (A) equal to
   (B) significantly greater
   (C) slightly greater
   (D) less
   (E) None of the above

3. (4%) Kenneth holds 10 shares of The Dan Inc. stock. Currently, there are 1,000 shares of The Dan Inc. outstanding at $20 per share. The Dan Inc. will issue additional 200 shares at $32 per share. The existing shareholders have a priority to buy new shares corresponding to their original ownership at $32 per share. Kenneth will _____ new shares if he cares about the gain/loss of his investment; and will _____ new shares if he cares about the dilution of his ownership of The Dan Inc.
   (A) buy; not buy
   (B) buy; buy
   (C) not buy; buy
   (D) not buy, not buy
   (E) None of the above

備註	作答於試題上者，不予計分。 試題請隨卷繳交。

考試科目	財務管理	系所別	財務管理學系	考試時間	2 月 3 日(五) 第 三 節

4. (4%) Based on the previous question, if The Dan Inc. finds the market reaction to the SEO is not good. The Dan Inc., therefore, decides to lower the offering price to $8 per share. Kenneth will _____ new shares if he cares about gain/loss of his investment; and will _____ new shares if he cares about the dilution of his ownership of The Dan Inc.
   (A) buy; not buy
   (B) buy; buy
   (C) not buy; buy
   (D) not buy, not buy
   (E) None of the above

5. (4%) The divisor of a price-weighted index will be adjusted lower if
   I. a low-price stock is included in the index instead of a high-price stock.
   II. cash dividends are paid by one of the component stocks.
   III. one of the component stocks experiences a stock split.
   (A) I only
   (B) I and II
   (C) I and III
   (D) II and III
   (E) I, II, and III

6. (4%) A stock has an 7% of excess return. The beta of the security is 1.2, and the market excess return is 6%. If the risk-free rate is 2%, the stock is _____ and will be plotted _____.
   (A) overpriced; above the security market line
   (B) overpriced; below the security market line
   (C) underpriced; above the security market line
   (D) underpriced; below the security market line
   (E) underpriced; either above or below the security market line depending on its covariance with the market

備註	作答於試題上者，不予計分。 試題請隨卷繳交。

考試科目	財務管理	系所別	財務管理學系	考試時間	2 月 3 日(五) 第 三 節

7. (4%) In 2021, WSH Balanced Fund earned a higher rate of return than its benchmark portfolio did. The weights and performance of each asset class for WSH Balanced Fund and its benchmark portfolio are in the following.

	WSH Balanced Fund		Benchmark Portfolio	
	Weight	Rate of Return	Weight	Rate of Return
Bonds	20%	3%	40%	5%
Stocks	80%	18%	60%	15%

The contribution of asset allocation across markets to the total excess return was

(A) 0%
(B) 1%
(C) 2%
(D) 3%
(E) 4%

8. (4%) CMC Corporation announced a new product yesterday, and the stock price of CMC Corporation experienced a rate of return of 5%. The market index also increased by 5% yesterday. If the market is efficient, this implies that

(A) the market treated CMC's announcement as good news.
(B) the market treated CMC's announcement as bad news.
(C) the market was neutral about CMC's announcement.
(D) we cannot determine the market reaction to CMC's announcement unless the risk-free rate is given.
(E) None of the above.

9. (4%) Which one of the following portfolios is least possible to be on the efficient frontier?

Portfolio	Risk Premium	Standard Deviation
P1	9%	0.04
P2	5%	0.0049
P3	15%	0.16
P4	12%	0.0225

(A) P1
(B) P2
(C) P3
(D) P4
(E) None of the above

備註	作答於試題上者，不予計分。 試題請隨卷繳交。

考試科目	財務管理	系所別	財務管理學系	考試時間	2 月 3 日(五) 第 三 節

Part II. Calculations and Essays (64%)

1. The insurance company, HHI, has an obligation which will pay $201,000 three years from now. To meet the obligation, HHI applies the immunization technique to construct a portfolio with two zero-coupon bonds. Specifically, HHI holds 100 units of one-year zero-coupon bond with $1,000 par value and 100 units of five-year zero-coupon bond with $1,000 par value. Any cash flow obtained before the third year will be reinvested at the prevailing market interest rate. The current market interest rate is 5%. Please answer the following questions.

   (1) (4%) How long is the duration of the portfolio?

   (2) (4%) How much does HHI cost in constructing the portfolio?

   (3) (4%) If the market interest rate increases to 6% right after HHI constructed the portfolio, what is the holding period rate of return for the portfolio at the end of the third year?

2. Ted is a hedge fund manager managing a $300 million portfolio with an alpha of 1% per month and a beta of 1.5. The S&P 500 index today is 2,000. Ted expects the market will fall within one month and wants to hedge the portfolio. There are two hedge strategies Ted can apply.

   Strategy 1: Ted is to sell all shares of the portfolio and put all of the proceeds into one-month T-bill which provides 0.5% monthly rate of return.

   Strategy 2: Ted keeps the existing portfolio and sells 900 S&P 500 futures contracts (the futures contract has a multiplier of $250 and will mature in 30 days).

   (1) (2%) Please show the alpha and the beta of Ted's holding if Ted chooses the first strategy.

   (2) (2%) Please show the alpha and the beta of Ted's holdings if Ted chooses the second strategy.

   (3) (6%) If the S&P 500 increases by 8% next month, please show the rate of return of the hedge fund for the second strategy.

備註	作答於試題上者，不予計分。 試題請隨卷繳交。

考試科目	財務管理	系所別	財務管理學系	考試時間	2 月 3 日(五) 第 三 節

3. Here are some financial records for Company NCCUC:
   Price per share = $30
   Number of shares outstanding = 2,000,000 shares
   Profit margin = 25%
   Total debt = $30,000,000
   Debt-to-equity ratio = 0.6
   Earnings per share = $2
   Payout ratio = 40%
   Please calculate the followings.
   (1) (3%) Rate of return on equity
   (2) (3%) Retained earnings
   (3) (3%) Total asset turnover
   (4) (3%) Market-to-book ratio

4. Kathy is a mutual fund manager. Due to the covid-19 pandemic, the analyst report shows that ABC Corporation may not achieve the target earnings in the following two years, and therefore the stock of ABC Corporation will be underperformed in 2013. However, Kathy believes ABC Corporation is a good investment target in the long term. She decides to buy stock of ABC Corporation and apply a protective put strategy to avoid potential losses in the short term. Given the information on the stock and stock options for ABC Corporation below, please answer the following questions.

Underlying: ABC Corporation	Close Price
Stock	$100.00
Call (X = $100), T = 1 year	$1.75
Call (X = $120), T = 1 year	$0.70
Put (X = $100), T = 1 year	$2.00
Put (X = $80), T = 1 year	$0.50

   (1) (4%) Please help Kathy to construct a protective put strategy.
   (2) (6%) Please show the rate of return for the strategy if the rate of return for stock price on the expiration date is 20%, 0%, and -20%.
   (3) (5%) Please plot the profits of the strategy when the stock price on the expiration date is between $60 and $140.

備註	作答於試題上者，不予計分。 試題請隨卷繳交。

考試科目	財務管理	系所別	財務管理學系	考試時間	2 月 3 日(五) 第 三 節

5. Bill tries to construct a portfolio by Meta stock and Amazon stock. The expected rate of returns for Meta and Amazon are 12% and 8%, respectively. The standard deviations for Meta and Amazon are 0.4 and 0.2, respectively. The correlation between the returns of Meta and Amazon is 0.30. The 1-month T-bill yields a rate of 5%. Given the information on the two stocks, please answer the following questions.

(1) (4%) Bill wants to use Meta stock and Amazon stock to construct a portfolio with the highest Sharpe ratio. What are the expected return and standard deviation of the portfolio?

(2) (5%) The utility of Bill's investment can be calculated by $U = E(r) - \frac{1}{2}A\sigma^2$, where A is the degree of risk aversion. Please graphically show Bill's optimal choice.

(3) (6%) If Bill's degree of risk aversion is four ($A = 4$), what are the expected return and standard deviation of Bill's optimal choice?

備註	作答於試題上者，不予計分。 試題請隨卷繳交。

國立政治大學　112　學年度 碩士班暨碩士在職專班 招生考試試題

考試科目	統計學	系所別	財管所	考試時間	2月 3日(五) 第4節

簡答題 [100pts]

1. [5pts] When are two outcomes independent? Explain in terms of the rules of probability.
2. [5pts] What are the similarities and differences between the application of Chebyshev's theorem and the Empirical rule?
3. [5pts] What is the purpose of measuring correlation?
4. [5pts] What is the advantage of using ANOVA to test for differences among treatment means rather than testing all possible pairs of treatment means?
5. [5pts] What is the purpose of using a blocking variable in a two-way ANOVA?
6. [5pts] For a nonparametric test based on ranking the data, if a majority of the ranks are based on ties, what is the likely outcome of a hypothesis test? Why?
7. [5pts] It is known that the length of a certain product X is normally distributed with $\mu = 20$ inches and $\sigma = 4$ inches. For the probability $P(X > 28)$ related to $P(X < 16)$, which one is smaller?
8. [5pts] Suppose that for a certain baseball season, winning percentage, y, and on-base percentage, x, are linearly related by the least squares regression equation $\hat{y} = 2.9x - 0.48$. For this baseball season, the lowest on-base percentage was 0.310 and the highest was 0.362. Would it be a good idea to use this model to predict the winning percentage of a team whose on-base percentage is 0.156? Why or why not?
9. [5pts] Maggie computes a 95% confidence interval for p and obtains the interval [0.50,0.75]. Maggie's boss says, "Give me a 95% confidence interval for p − q." Calculate the answer for Maggie. Note. The probability for success is p and for fail is q here. p + q = 1.
10. [15pts] Carl selects one random sample from a population and calculates three confidence intervals for p. His intervals are below.

A	B	C
$\hat{p} \pm 0.08$	$\hat{p} \pm 0.04$	$\hat{p} \pm 0.072$

Match each confidence interval to its level, with levels chosen from: 80%, 90%, 95%, 98%, and 99%.

Note: Clearly, two of these levels will not be used. You do **not** need to explain your reasoning.

11. [5pts] Let P(A∩B)=0.3, and P(A∩B')=0.15, and P(A'∩B)=0.35. Compute P(A'∩B').
12. [5pts] A new blood test is being developed to screen patients for cancer. Positive results are followed up by a more accurate (and expensive) test. It is assumed that the patient does not have cancer. Describe the null hypothesis, the Type I and Type II errors for this situation, and explain which type of error is more serious.
13. [5pts] X ~ U(4, 10). Find the 30th percentile.
14. [5pts] A "friend" offers you the following "deal." For a $10 fee, you may pick an envelope from a box containing 100 seemingly identical envelopes. However, each envelope contains a coupon for a free gift.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

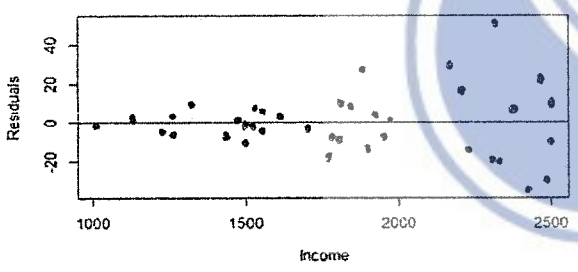
考試科目	統計學	系所別	財管所	考試時間	2月 3日(五)第4節

- Ten of the coupons are for a free gift worth $6.
- Eighty of the coupons are for a free gift worth $8.
- Six of the coupons are for a free gift worth $12.
- Four of the coupons are for a free gift worth $40.

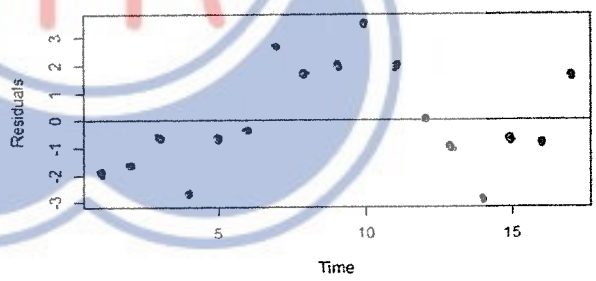
Based upon the financial gain or loss over the long run, should you play the game? Why?

15. [5pts] How many correct statements are below?
    A. A sample of convenience is a random sample.
    B. A statistic is a number that is a property of the population.
    C. You should always throw out any data that are outliers.
    D. Big data can be considered as a population.
16. [5pts] Given: uniform, exponential, normal distributions. Match each to a statement below.
    A. mean = median ≠ mode
    B. mean > median > mode
    C. mean = median = mode
17. [10pts] Suppose you have cross-section data and estimate the following model
    Consumption = β0 + β1Income + ε.
    You obtain the following residual plots. What is the assumption that is likely being violated for each plot?

A.



B.



備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。