

考試科目	經濟學	所別	商學院共同科目	考試時間	2月28日(六)第一節
------	-----	----	---------	------	-------------

Multiple Choice (1 point each)

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

- Suppose that for a particular firm the only variable input into the production process is labor and that output equals zero when no workers are hired. In addition, suppose that when the firm hires 4 workers, the firm produces 50 units of output. If the fixed cost of production is \$8, the variable cost per unit of labor is \$20, and the marginal product of labor for the fifth unit of labor is 4, what is the average total cost of production when the firm hires 5 workers?
 - \$2.
 - \$4.
 - \$5.
 - \$20.
- If soybean farmers know that the demand for soybeans is inelastic, in order to increase their total revenues they should
 - use more fertilizers and weed killers to increase their yields.
 - plant additional acres to increase their output.
 - reduce the number of acres they plant to decrease their output.
 - hire more workers to plow the land.
- The price received by sellers in a market will increase if the government
 - decreases a binding price floor in that market.
 - increases a binding price ceiling in that market.
 - increases a tax on the good sold in that market.
 - stops subsidizing the seller.
- Neither public goods nor common resources are
 - excludable, but only public goods are not rival in consumption.
 - excludable, but only common resources are not rival in consumption.
 - rival in consumption, but only public goods are not excludable.
 - rival in consumption, but only common resources are not excludable.

備

註

- 作答於試題上者，不予計分
- 試題請隨卷繳交。

考試科目	經濟學	所別	商學院共同科目	考試時間	二月八日(六)第一節
------	-----	----	---------	------	------------

5. When producers operate in a market characterized by negative externalities, a tax that forces them to internalize the externality will
- give sellers the incentive to account for the external effects of their actions.
 - increase demand.
 - increase the amount of the commodity exchanged in market equilibrium.
 - restrict the producers' ability to take the costs of the externality into account when deciding how much to supply.
6. As a general rule, profit maximizing producers in a competitive market produce output at a point where
- marginal cost is decreasing.
 - marginal revenue is increasing.
 - marginal cost is increasing.
 - price is less than marginal revenue.
7. When a country allows trade and becomes an exporter of a good, which of the following would NOT be true?
- The price paid by domestic consumers of the good increases.
 - The price received by domestic producers of the good increases.
 - The losses of domestic consumers exceed the gains of domestic producers.
 - The gains of domestic producers exceed the losses of domestic consumers.
8. Price discrimination requires the firm to
- differentiate between different units of its product.
 - engage in arbitrage.
 - separate customers according to their willingness to pay.
 - All of the above.
9. Assuming the oligopolists do not have the opportunity to collude, once they have reached the Nash equilibrium,
- it is always in their best interest to supply more to the market.
 - it is always in their best interest to leave supply unchanged.
 - it is always in their best interest to supply less to the market.
 - it may be their best interest to do any of the above, depending on market conditions.

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	所別	商學院共同科目	考試時間	二月28日(六)第一節
------	-----	----	---------	------	-------------

10. If a firm in a monopolistically competitive market uses advertising to decrease elasticity of demand for its product,
- the firm will eventually have to lower price to remain competitive.
 - it will be able to increase its mark-up over marginal cost.
 - it will increase the well-being of society.
 - it will reduce average total cost.
11. Policy makers should use a variety of fiscal and monetary policy measures to stabilize the economy since
- this will shorten any policy lags.
 - this will always maintain full employment.
 - this will eliminate multiplier uncertainty.
 - there is a chance that errors in estimating one multiplier will be offset by errors in estimating another.
 - None of the above.
12. According to liquidity preference theory, an increase in money demand for some reason other than a change in the price level causes
- the interest rate to fall, so aggregate demand shifts right.
 - the interest rate to fall, so aggregate demand shifts left.
 - the interest rate to rise, so aggregate demand shifts right.
 - the interest rate to rise, so aggregate demand shifts left.
13. One of the assertions that Keynesians make when explaining the severity of the Great Depression in the U.S. is that
- the economic collapse originated from the negative effect that the stock market crash had on individuals' wealth.
 - investment spending responded negatively to huge increases in the real interest rate.
 - vigorous use of expansionary fiscal policy early on could have reduced the severity of the economic downturn.
 - in response to the stock market crash, the U.S. Fed imposed credit controls that were much too restrictive.
 - 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	經濟學	所別	商學院共同科目	考試時間	2月8日(六)第一節
------	-----	----	---------	------	------------

14. Suppose that during the Great Depression long-run aggregate supply shifted left. To be consistent with what happened to the price level and output, what would have had to happen to aggregate demand?
- It would have to have shifted left by less than aggregate supply.
 - It would have to have shifted left by more than aggregate supply.
 - It would have to have shifted right by less than aggregate supply.
 - It would have to have shifted right by more than aggregate supply.
15. During the period referred to as "the Great Moderation"
- there were only mild economic fluctuations despite severe supply shocks.
 - few policy changes were implemented so output stayed close to the full employment level.
 - economic fluctuations were largely contained through effective policy changes.
 - inflation consistently exceeded 4 percent.
 - All of the above.
16. Given a certain rate of nominal money growth, an increase in inflation will cause output growth to
- increase.
 - decrease.
 - remain constant.
 - More information is needed to answer the question.
17. Research by John Taylor on the staggering of wage decisions indicates which of the following actions by the central bank should be taken to reduce inflation?
- a rapid, unannounced reduction in money growth
 - a slow, unannounced reduction in money growth
 - a rapid, announced reduction in money growth
 - a slow, but gradually faster, announced reduction in money growth
18. Which of the following actions by the Federal Reserve will result in an increase in the money supply?
- an increase in federal spending
 - an increase in buying stocks in the open market
 - a decrease in the discount rate
 - an increase in the required reserve ratio

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	所別	商學院共同科目	考試時間	二月28日(六)第一節
------	-----	----	---------	------	-------------

Problems and Short-essay Questions

Please answer the following questions IN SEQUENCE. All questions may be answered in either Chinese or English.

1. John receives NT\$600 per week as an allowance to spend on anything he likes. Because he likes only soda and chips, he spends the entire amount on soda (at NT\$20 per bottle) and chips (at NT\$15 per bag). John always consumes soda and chips in the fixed proportion of one to two. That is, his preference can be represented by the utility function

$$U(s, c) = \min \left\{ s, \frac{c}{2} \right\}.$$

a. (4 points) How many bottles of soda and how many bags of chips will John buy with his NT\$600 allowance in a week?

b. (4 points) Suppose the price of soda were to increase to NT\$30 a bottle. How much of each commodity would be bought?

c. (6 points) By how much should John's allowance be increased to compensate for the increase in the price of soda in part (b)?

d. (6 points) Compare your answers in part (a) and part (b). How much of the decrease in the consumption of soda is attributable to the substitution effect and income effect, respectively?

2. (20 points) There is a small open economy producing two goods, food and cloth. The production function in food industry is represented by the following Cobb-Douglas production technology

$$Q_f = L_f^{\frac{1}{2}} T^{\frac{1}{2}},$$

where L_f is the labor hired in food industry and T is land. The production function in cloth industry is

$$Q_c = L_c^{\frac{1}{2}} K^{\frac{1}{2}},$$

where the subscript c represents cloth and K is capital. Labor is mobile between sectors. Supply of all factors is fixed.

a. Derive the real return of labor, capital and land in terms of each good.

b. How does the standard of living of each factor owner change when the supply of cloth in the international market decreases?

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	所別	商學院共同科目	考試時間	2月28日(六)第一節
------	-----	----	---------	------	-------------

19. A 10% devaluation in the short run will cause

- I. an increase in net exports.
- II. price level to increase by more than 10%.
- III. a real depreciation.
- IV. an increase in unemployment rate.

- A. I, II
- B. III, IV
- C. I, III
- D. I, II, IV

20. An upward-sloping term structure of interest rates indicates:

- A. the real rate of return is lower for short-term bonds than for long-term bonds.
- B. there is an indirect relationship between real interest rates and time to maturity.
- C. the nominal rate is declining as the real rate rises as the time to maturity increases.
- D. the nominal rate is increasing even though the real rate is constant as the time to maturity increases.

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	所別	商學院共同科目	考試時間	二月28日(六)第一節
------	-----	----	---------	------	-------------

3. a. (8 points) Explain in detail how the Keynesian aggregate supply curve differs from the classical one?

b. (12 points) The aggregate demand model looks very similar to the standard demand model of microeconomics. State three reasons that cause the aggregate demand curve to be negatively sloped. Be sure to elaborate on those reasons carefully! DO NOT just list your reasons.

4. The Swiss National Bank (SNB) made an unexpected announcement on January 15th this year that it would remove its cap on Swiss franc's value vs. the euro, effective immediately. The SNB set a goal of keeping its currency from rising beyond 1.20 francs to the euro since September 2011 and that had been the de facto fixed exchange rate ever since. The Swiss economy has expanded more rapidly than the Eurozone's in recent years and was expected to do so in the near future.

a. (5 points) Please explain the rationale of the SNB to keep the cap in the past three-and-half years and how the SNB can achieve it.

b. (5 points) One reason that the SNB scrapped the peg because the quantitative easing program (QE) the European Central Bank (ECB) was about to launch in the following week. Please explain the effect of the QE program on the SNB and the Swiss franc if the cap was still in place.

c. (5 points) An Italian firm knows that it will have to pay 10 million Swiss francs to a Swiss chemical company 3 months later. The current spot exchange rate is 0.9623 euro per 1 CHF. The three-month forward rate is 0.9660 euro per 1 CHF. If you are the treasurer of the company and you are worried that the euro will depreciate in the next few weeks. What will you do with this only tool and is it a wise decision if the spot exchange rate turns out to be 0.9700 three months later?

d. (5 points) If the exchange rate also has a chance to go to 0.9620 euro per 1 CHF instead of the 0.9660 predicted by the forward rate (i.e. it can go either way), is there still a reason to hedge the exchange risk with a forward contract?

考 試 科 目	財務管理 41213	所 別	金融學系/金融管理組	考 試 時 間	2 月 28 日(六) 第二節
---------	---------------	-----	------------	---------	-----------------

Please answer the following questions in orders. 10 points each question.

1. Explain the difference between systematic and unsystematic risk. Also explain why one of these types of risks is rewarded with a risk premium while the other type is not.
2. Suppose your boss comes to you and asks you to re-evaluate a capital budgeting project. The first evaluation was in error, he explains, because it ignored flotation costs. To correct for this, he asks you to evaluate the project using a higher cost of capital which incorporates these costs. Is your boss' approach correct? Why or why not?
3. Jason is the founder of Company ABC. Recently, the firm decided to issue an IPO with Jason retaining 30 percent ownership of the firm. The IPO agreement contained both a Green Shoe provision and a 6-month lockup agreement. Jason's cost basis per share is \$15. The offering price for the IPO was \$16. On the first day of trading, the market price per share rose to \$28.20 and closed for the day at \$25.60. Now, six months after the IPO release, the stock is valued at \$15.40 a share. Explain who benefited the most during the lockup period, an outside investor or Jason, and why.
4. Explain how a firm loses value during the bankruptcy process from both a creditors and a shareholders perspective.
5. Explain how cash dividends affect individual shareholders differently than an equal amount of funds spent on a repurchase.
6. Explain the conditions that would need to exist for the Treasury yield curve to be downward sloping.
7. Explain why small shareholders should prefer cumulative voting over straight voting.
8. How does the net present value (NPV) decision rule relate to the primary goal of financial management, which is creating wealth for shareholders?
9. Steven earned an average return of 18.6 percent on his investments over the past 20 years while the S&P 500, a measure of the overall market, only returned an average of 15.9 percent. Explain how this can occur if the stock market is efficient.
10. Firms can frequently create synergy by merging and sharing complementary resources with another firm. Give two examples of situations where this would most likely occur.

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(A) 41211	所 別	金融學系金融管理組	考 試 時 間	2 月 28 日(六)第 3 節
---------	-----------------	-----	-----------	---------	------------------

- Hypothesis testing involves a set of procedures to decide whether a statistical hypothesis should be rejected.
 - (10%) Explain in words what p -value is and why we reject the null hypothesis when the p -value is less than the size of the test.
 - (5%) In some applications, the distribution of test statistic could be non-standard, i.e. not a known distribution. Describe how you would construct the associated probability table for statistical inference in this situation.
- Consider a linear model $Y_i = \beta X_i + u_i$, $i = 1, 2, \dots, n$ and $u_i|X_i \sim N(0, \sigma^2)$.
 - (5%) The sample moment condition $\sum_{i=1}^n \hat{u}_i = 0$ might be used to estimate β . Use this moment condition to derive an estimator for the unknown parameter β .
 - (5%) Another sample moment condition $\sum_{i=1}^n \hat{u}_i X_i = 0$ might also be used to estimate the model. Use this moment condition to derive another estimator for β .
 - (10%) Which one of the above is a better estimator? Prove your answer.
- Let $X_1, X_2, \dots, X_n$ denote a random sample of size $n \geq 2$ from $N(\mu, \sigma^2)$.
 - (10%) Let $\bar{X}$ be the sample average of X . Show that $n(\bar{X} - \mu)^2 / \sigma^2$ is independent of $\sum_{i=1}^n (X_i - \mu)^2 / \sigma^2$.
 - (10%) Let $S^2 = (1/n) \sum_{i=1}^n (X_i - \bar{X})^2$. Derive the distribution of nS^2 / σ^2 and its parameter(s).
 - (10%) Let $Y_1, Y_2, \dots, Y_n$ be another random sample of size n with $E(Y_i) = \mu_Y$ and $Var(Y_i) = \sigma_Y^2$. Find the constant a such that $S_Y^2 = (1/n) \sum_{i=1}^n (Y_i - \bar{Y})^2 \xrightarrow{p} a$.
- Consider a multivariate linear model $Y_i = \mathbf{X}_i' \boldsymbol{\beta} + u_i$ where $\boldsymbol{\beta}$ is a $k \times 1$ vector of coefficients, $i = 1, 2, \dots, n$. The value of Y_i is either 0 or 1 and $E(u_i | \mathbf{X}_i) = 0$.
 - (10%) Show that $Var(u_i | \mathbf{X}_i)$ must be heteroskedastic, i.e., not a constant.

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(A) 41211	所 別	金融學系金融管理組	考 試 時 間	2 月 28 日(六)第 3 節
---------	-----------------	-----	-----------	---------	------------------

(b) (5%) Is linear model appropriate for statistical analysis in this case? Explain.

5. Consider a random variable $X_{t+1} = \beta G_{t+1}^{-\gamma}$ and $\ln G_{t+1} = g + \epsilon_{t+1}$ where g , β and γ are all constants and $\epsilon_{t+1} \sim N(0, \sigma^2)$ is independent over time.

(a) (10%) Is the process for $\ln G_{t+1}$ stationary? Prove your answer.

(b) (10%) Let $Y_{t+1} = 1/E(X_{t+1})$. Express $\ln Y_{t+1}$ as a function of β , γ , g and σ^2 .



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 4/22B	所 別	金融學系/財務工程組	考 試 時 間	2 月 28 日(六) 第一節
I. Explain the following terms briefly (24 points, each 4 points) 1. Majority voting 2. Additional paid-in capital 3. Floating-rate preferred stock 4. CAPM 5. Unique risks 6. Cyclical stocks II. Computational Question (30 points, each 6 points) 1. Company X has 2 million shares of common stock outstanding at a book value of \$2.00 per share. The stock trades for \$3.00 per share. It also has \$2 million in face value of debt that trades at 90% of par. What is its ratio of debt to value for WACC purposes? 2. What would you estimate to be the required rate of return for equity investors if a stock sells for \$40.00 and will pay a \$4.40 dividend that is expected to grow at a constant rate of 5%? 3. What proportion of a firm is equity financed if the WACC is 14%, the after-tax cost of debt is 7.0%, the tax rate is 35%, and the required return on equity is 18%? 4. An investor was expecting an 18% return on her portfolio with beta of 1.25 before the market risk premium decreased from 8 to 6%. Based on this change, what return will now be expected on the portfolio? 5. What return should be expected from investing in the market portfolio that is expected to yield 18% if the investment includes all of the investor's funds plus 30% of additional funds borrowed at the risk-free rate of 6%? III. Short answer questions (12 points, each 6 points) 1. In addition to the tax shield offered by the federal government, debt has a lower required rate of return than equity. Why is it not common to see firms that have much larger debt components in their capital structure? 2. Why does diversification reduce risk?					

考 試 科 目	財務管理 4122B	所 別	金融學系/財務工程組	考 試 時 間	2 月 28 日(六) 第一節
---------	---------------	-----	------------	---------	-----------------

IV. Questions (34 points)

1. Calculate the nominal return (4 points), real return (4 points), and risk premium (5 points) for the following common stock investment:

Purchase price	\$60.00 per share
Dividend	\$3.50 per year
Sales price	\$73.00 per share
Treasury bill yield	8.5%
Inflation rate	7.5%

2. Show the breakdown of stock price between a firm's assets that are already in place (5 points) and its present value of growth opportunities (5 points), assuming: next year's expected earnings equal \$5.00, 13% required rate of return, 17% return on equity, and 45% plowback ratio.

3. a. Calculate the net present value of the following project for discount rates of 0, 50, and 100% (6 points):

C_0		C_1		C_2
\$ (6,750.00)	+	\$ 4,500.00	+	\$18,000.00

b. What is the IRR of the project (5 points)?

Discount rate-1	0.00%
Discount rate-2	50.00%
Discount rate-3	100.00%

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 B 41021	所 別	金融學系	考 試 時 間	2 月 28 日 (六) 第二節
---------	----------------	-----	------	---------	------------------

1. Assume that T is a continuous random variable with probability density function (p.d.f.) $f(t)$ and cumulative distribution function (c.d.f.) $F(t) = \Pr(T < t)$, which gives the probability that the event has occurred by duration t . It will often be convenient to work with the complement of the c.d.f, the survival function

$$S(t) = \Pr\{T \geq t\} = 1 - F(t) = \int_t^{\infty} f(x)dx \quad (1.1)$$

which gives the probability of being alive just before duration t , or more generally, the probability that the event of interest has not occurred by duration t .

The distribution of T can also be given by the hazard function, or instantaneous rate of occurrence of the event, defined as

$$\lambda(t) = \lim_{dt \rightarrow 0} \frac{\Pr\{t \leq T < t+dt \mid T \geq t\}}{dt} \quad (1.2)$$

The numerator of this expression is the conditional probability that the event will occur in the interval $[t, t+dt)$ given that it has not occurred before, and the denominator is the width of the interval. Dividing one by the other we obtain a rate of event occurrence per unit of time. Taking the limit as the width of the interval goes down to zero, we obtain an instantaneous rate of occurrence.

The conditional probability in the numerator may be written as the ratio of the joint probability that T is in the interval $[t, t+dt)$ and $T \geq t$ (which is, of course, the same as the probability that t is in the interval), to the probability of the condition $T \geq t$. The former may be written as $f(t)dt$ for small dt , while the latter is $S(t)$ by definition. Dividing by dt and passing to the limit gives the useful result

$$\lambda(t) = \frac{f(t)}{S(t)} \quad (1.3)$$

which is another definition hazard function. More explicitly, the rate of occurrence of the event at duration t equals the density of events at t , divided by the probability of surviving to that duration without

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 B 4/22/	所 別	金融學系	考 試 時 間	2 月 28 日(六)第二節
---------	----------------	-----	------	---------	----------------

experiencing the event.

Note from Equation (1.1) that $-f(t)$ is the derivative of $S(t)$. This suggests rewriting Equation (1.3) as

$$\lambda(t) = -\frac{d}{dt} \log S(t). \quad (1.4)$$

- (a) If we now integrate from 0 to t and introduce the boundary condition $S(0) = 1$ (since the event is sure not to have occurred by duration 0), please find the survival function $S(t)$. (5%)

This result shows that the survival and hazard functions provide equivalent characterizations of the distribution of T . Given the survival function, we can always differentiate to obtain the density and then calculate the hazard using Equation (1.4). Given the hazard, we can always integrate to obtain the cumulative hazard and then exponentiate to obtain the survival function using the answer of problem (a). For example, the simplest survival distribution is obtained by assuming a constant risk over time, so the hazard is $\lambda(t) = \lambda$ for all t .

- (b) Please find the survival function with the previous example. (5%)
(c) Please find the probability density function and the mean of T with the previous example. (10%)

2. Consider a Brownian motion process $\{B(t), t \geq 0\}$. $B(0) = 0$ and $B(t)$ is normal with mean 0 and variance t , where its density function is given by

$$f_t(b) = \frac{1}{\sqrt{2\pi t}} e^{-b^2/2t},$$

and the process $B(t)$ has stationary and independent increments, where $B(t_1)$, $B(t_2) - B(t_1)$, ..., $B(t_n) - B(t_{n-1})$ for $t_1 < \dots < t_n$ are independent and $B(t_k) - B(t_{k-1})$ is normal with mean 0 and variance $t_k - t_{k-1}$. Let the dynamics of the stock price be $S(T) = S(0) \exp\left\{(r - \frac{1}{2}\sigma^2)T + \sigma B(T)\right\}$ under the risk neutral measure at time $t_n = T$.

- (a). Please find the covariance of $B(t)$ and $B(s)$, $Cov(B(t), B(s))$. (5%)

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 B 41221	所 別	金融學系	考 試 時 間	2 月 28 日 (六) 第二節
---------	----------------	-----	------	---------	------------------

- (b). Please find the mean of the discounted stock price, $\exp\{-rT\} S(T)$, with the risk-neutral measure at the time T . ($E(\exp\{-rT\} S(T))$). (10%)
- (c). Please compute $E(\exp\{-rT\} K 1_{\{S(T) > K\}})$ and $E(\exp\{-rT\} S(T) 1_{\{S(T) > K\}})$ under the risk neutral measure where $1_{\{\cdot\}}$ denotes the indicator function and K is a constant number. (20%)
- (d). How to estimate the volatility of the stock (σ) when you have data of the stock price every year? (5%)

3. A stochastic process $\{X(t), t \geq 0\}$ is said to be a compound Poisson process if it can be represented as

$$X(t) = \sum_{i=1}^{N(t)} Y_i, \quad t \geq 0$$

where $\{N(t), t \geq 0\}$ is a Poisson process, and $\{Y_i, i \geq 1\}$ is a family of independent and identically distributed random variables which are also independent of $\{N(t), t \geq 0\}$. Suppose that the only 'abnormal' vibrations in stock price due to the arrival of important new information about the stock and the important information arrives only at discrete points in time. The new information follows a Poisson process with arrival rate λ . If Y_i denotes the (down or up) size of the stock return when the new information happens, $i = 1, 2, \dots$, are independent and identically distributed from normal density with mean μ and variance σ^2 .

Assume that the stock price at the time T is $S(T) = S(0) \exp\{X(t)\} = S(0) \exp\left\{\sum_{i=1}^{N(t)} Y_i\right\}$. (This component is modeled by a 'jump' process, $\exp\{X(t)\}$, reflecting the impact of the information.)

- (a). Please find the mean of $S(T)$ at the time T , $E(S(T))$. (10%)
- (b). Please compute $E(1_{\{S(T) > K\}})$ and $E(S(T) 1_{\{S(T) > K\}})$ where $1_{\{\cdot\}}$ denotes the indicator function and K is a constant number. (20%)
- (c). How to estimate λ , μ and σ^2 when you have data of the stock price every year? (10%)

備

註

一、作答於試題上者，不予計分。
二、試題請隨卷繳交。