

國立清華大學 100 學年度碩士班入學考試試題

系所班組別：計量財務金融學系甲組、乙組

考試科目（代碼）：經濟學(4702、4802)

共 9 頁，第 7 頁 *請在【答案卷、卡】作答

If the price of a pizza is \$2.5, how much consumer surplus does Tom get from his purchase of pizza?

- [A] \$6
- [B] \$7
- [C] \$8
- [D] \$9
- [E] \$10

18. Given the following supply and demand functions:

$$Q^S = 2P$$

$$Q^D = 600 - 2P$$

Suppose that a tax of T is placed on buyers, so the new demand function is

$$Q^D = 600 - 2(P + T)$$

The tax revenue is

- [A] $300 \times T$
- [B] $300 \times T^2$
- [C] $(300 - T) \times T$
- [D] $(300 - T) \times T^2$
- [E] None of the above.

19. Which of the following examples represents a positive externality?

- [A] The exhaust from automobiles.
- [B] Shabby historic buildings.
- [C] Barking dogs.
- [D] Research into new technologies.
- [E] None of the above.

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共 9 頁，第 8 頁

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20. There are three industrial firms in town.

Firm	Initial Pollution Level	Cost of Reducing Pollution by 1 Unit
A	40 Units	\$25
B	60 Units	\$35
C	80 Units	\$40

The government wants to reduce pollution to 120 units, so it gives each firm 40 tradable pollution permits. Firms can buy or sell permits. How much higher would the costs of pollution reduction be if the permits could not be sold.

- [A] 600
- [B] 700
- [C] 800
- [D] 900
- [E] None of the above.

21. Which of the following examples represents public goods?

- [A] A fireworks display
- [B] National defense
- [C] Basic research
- [D] Fighting poverty
- [E] All of the above.

22. Consider the following progressive income tax schedule

Income	Amount of Tax	Percent of Income
\$40,000	\$8,000	20%
\$80,000	\$20,000	25%
\$160,000	\$48,000	30%

- [A] The average tax rates for people earning \$40,000 is 25%.
- [B] The average tax rates for people earning \$80,000 is 30%.
- [C] The marginal tax rate as income rises from \$40,000 to \$80,000 is 30%.
- [D] The marginal tax rate as income rises from \$80,000 to \$160,000 is 40%.
- [E] None of the above.

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共 9 頁，第 9 頁 *請在【答案卷、卡】作答

23. A cost that does not depend on the quantity produced is a

- [A] opportunity cost
- [B] total cost
- [C] fixed cost
- [D] variable cost
- [E] marginal cost

24. A monopoly faces the following demand schedule

Price	50	45	40	35	30	25	20	15	10
Quantity Demanded	0	10	20	30	40	50	60	70	80

The monopoly has fixed costs of 60. The marginal cost of production is 25. What quantity would the profit-maximizing monopoly choose?

- [A] 20
- [B] 30
- [C] 40
- [D] 50
- [E] 60

25. Which of the following statements is false?

- [A] An oligopoly is a market with only a few sellers, each offering a product similar or identical to the others.
- [B] The market for cigarettes is an example of oligopoly.
- [C] Monopolistic competition is a market in which there are many firms selling products that are similar but not identical.
- [D] Markets for novels, movies, and computer games are examples of monopolistic competition.
- [E] Nash equilibrium is the solution to a cooperative game.

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考試科目 (代碼)：統計學(4703)

共 4 頁，第 1 頁 *請在【答案卷、卡】作答

1. For the discrete distribution with $f(x|\theta) = k\theta^x$, $0 < \theta < 1$, and $x=0, 1, 2, \dots$, evaluate k in terms of θ .
 - a. Compute $E(x)$. (10%)
 - b. Compute $\text{Var}(x)$. (10%)

2. The random variables X and Y with the joint probabilities are given as follows:

	Y	-1	0	1	$f_X(X)$
X					
1		0.1	0	0.2	0.3
2		0	0.1	0	0.1
3		0.3	0	0.3	0.6
$f_Y(Y)$		0.4	0.1	0.5	1

- a. Suppose $Z = Y^2$, compute the covariance and correlation coefficient of X and Z . (10%)
 - b. Compute $\text{Var}(X-Z)$. (15%)
3. Let X be $N(\mu, \sigma^2)$. Truncate the density of X to the left at A and to the right at B , that is, X takes only the values between A and B , both being some constant. Compute the mean of the above truncated normal, that is, $E(X|A < X < B)$. (15%)
 4. A tire manufacturer produces tires that have a mean life of at least 25,000 miles when the production process is working properly. Based on past experience, the standard deviation of the tires is 3,500 miles and the tire life is normally distributed. The operations manager stop the process if there is evidence that the population mean tire life is below 25,000 miles. If you select a random sample of 25 tires and you are willing to have an $\alpha = .05$ risk of committing a Type I error, compute the power of the test and the probability of a Type II error if the population mean life is actually 24,900. (15%)

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共 4 頁，第 2 頁 *請在【答案卷、卡】作答

5. A fast food company uses two management-training methods. Method 1 is a traditional method of training and Method 2 is a new and innovative method. The company has just hired 31 new management trainees. 15 of the trainees are randomly selected and assigned to the first method, and the remaining 16 trainees are assigned to the second training method. After three months of training, the management trainees took a standardized test. The test was designed to evaluate their performance and learning from training. The sample mean score and sample standard deviation of the two methods are given below. The management wants to determine if the company should implement the new training method. Is there evidence at $\alpha = .05$ to conclude that the new training method is more effective than the traditional training method? (10%) (Upper tail Area:

$$t_{0.05,29} = 1.699, t_{0.025,29} = 2.0452, t_{0.01,29} = 2.4620, t_{0.05,30} = 1.673, t_{0.025,30} = 2.0423, \\ t_{0.01,30} = 2.4527)$$

Method 1 mean=69, Standard deviation=3.4

Method 2 mean=72, Standard deviation=3.8

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共 4 頁，第 3 頁 *請在【答案卷、卡】作答

6. Three years ago, a major hotel chain purchased a large number of heating and air-conditioning units from three major manufacturers, A, B and C. The accounting department of the hotel chain kept records on their repair and replacement costs over the last 3 years. The manager of the purchasing department randomly selected 6 brand A, 7 brand B, and 6 brand C heating and air-conditioning unit records. The repair and replacement costs in dollars are summarized in the following table. At $\alpha = .05$, can it be concluded that there is a significant difference in repair costs among the three brands? (15%)
(Upper tail Area :

$$\chi_{0.05,1}^2 = 3.841, \chi_{0.05,2}^2 = 5.991, \chi_{0.05,3}^2 = 7.815, \chi_{0.05,4}^2 = 9.488$$

$$\chi_{0.025,1}^2 = 5.024, \chi_{0.025,2}^2 = 7.378, \chi_{0.025,3}^2 = 9.348, \chi_{0.025,4}^2 = 11.143)$$

Brand A	Brand B	Brand C
\$ 80	\$100	\$140
\$250	\$170	\$280
\$150	\$430	\$100
\$ 70	\$290	\$100
\$220	\$370	\$340
\$300	\$420	\$250
	\$350	

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考試科目(代碼)：財務管理(4704)

共__7__頁，第__1__頁 *請在【答案卷、卡】作答

一、是非題(20%)，每題 2 分-若答案為是，請選擇 A；若答案為否，請選擇 B

1. When a warrant and a traded call option are both issued by the company, and when they are exercised, the number of shares increases.
2. You can think of the debt holders as owning the firm and having sold a call option with a strike price equal to the required debt payment.
3. In perfect capital markets, the stock price falls by the amount of the dividend when a dividend is paid. On the other hand, an open market share repurchase has no effect on the stock price, and the stock price is the same as the cum-dividend price if a dividend were paid instead.
4. According to Modigliani and Miller Proposition I, firm can try to push up its stock price through a leverage recapitalization in which the firm borrows money and repurchases shares.
5. It is a way to gain control over firms even then shareholders do not own more than half the shares is to issue dual class shares in which companies have more than one class of shares and one class has superior voting rights over the other class.
6. According to empirical researches on mergers and acquisitions, on average, the shareholders of acquired firms give benefits from M&A, and on the other hand, the effect of M&A on acquiring stockholders is less clear.
7. Price changes are not really random, but are caused by the arrival of unpredictable information.
8. The problem of asymmetric information occurs when investors know more about the firm than the managers do.
9. When a company founder decides to sell equity to outside investors for the first time, it is common practice for private companies to issue common stock rather than preferred stock to raise capital.
10. Short-term debt is often less costly than long-term debt, and the major reason for this is that short-term debt exposes the borrowing firm to less risk than long-term debt.

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二、單選題(80%)，每題 4 分

1. Talyer Inc. recently hired you as a consultant to estimate the company's WACC. You have obtained the following information.
- Talyer's bonds mature in 25 years, have a 7.5% annual coupon, a par value of \$1,000, and a market price of \$936.49.
 - The company's tax rate is 40%.
 - The risk-free rate is 6.0%, the market risk premium is 5.0%, and the stock's beta is 1.5.
 - The target capital structure consists of 30% debt and 70% equity.
- Talyer uses the CAPM to estimate the cost of equity, and it does not expect to have to issue any new common stock. What is its WACC?
- A. 9.89% B. 10.01% C. 10.35% D. 10.64% E. 10.91%
2. The flow-to-equity (FTE) approach in capital budgeting is defined to be the:
- discounting all cash flows from a project at the overall cost of capital.
 - scale enhancing discount process.
 - discounting of the levered cash flows to the equity holders for a project at the required return on equity.
 - the dividends and capital gains that may flow to shareholders of any firm.
 - discounting of the unlevered cash flows of a project from a levered firm at the WACC.
3. Zara Co. is considering a new project whose data are shown below. The equipment that would be used has a 3-year tax life, would be depreciated by the straight line method over the project's 3 year life, and would have zero salvage value. No new working capital would be required. Revenues and other operating costs are expected to be constant over the project's 3-year life. What is the project's NPV?
- | | |
|---|----------|
| WACC | 10% |
| Net investment cost (depreciable basis) | \$65,000 |
| Straight line depreciation rate | 33.33% |
| Sales revenues | \$70,000 |
| Operating costs excluding depreciation | \$25,000 |
| Tax rate | 35% |
- A. \$22,156.24 B. \$23,791.14 C. \$24,354.87
D. \$25,189.71 E. \$26,599.05