

國 立 清 華 大 學 命 題 紙

95 學年度\_\_\_\_\_科技管理研究所\_\_\_\_\_系(所)\_\_\_\_\_乙(計財 B)\_\_\_\_\_組碩士班入學考試  
\_\_\_\_\_財務管理\_\_\_\_\_科目代碼\_5504\_共\_9\_頁第\_1\_頁 \*請在【答案卷卡】內作答

**Part I. Multiple Choice Questions (40 points total, 1.6 points each)**

**This part contains 25 multiple choice questions. Please write your answers on the answer sheet provided (NO scantron sheets needed) using capital letters. For example, for question #26 and your answer is A, write "Q26: A" on the answer sheet. Choose the answer that is closest to your result.**

1. Costs associated with the conflicts of interest between the bondholders and shareholders of a corporation is called:  
A) Legal costs  
B) Agency costs  
C) Administrative costs  
D) Bankruptcy costs
2. Mr. Crow has \$100 income this year and zero income next year. The market interest rate is 10% per year. Mr. Crow also has an investment opportunity in which he can invest \$50 today and receive \$70 next year. Suppose Mr. Crow consumes \$20 this year and invests in the project. What much can Mr. Crow consume next year?  
A) \$88  
B) \$103  
C) \$80  
D) \$100
3. The present value of a \$100 per year perpetuity at 10% per year interest rate is \$1000. What would be the present value if the payments were compounded continuously?  
A) \$1000.00  
B) \$1049.21  
C) \$1024.40  
D) None of the above
4. Parcel Corporation is expected to pay a dividend of \$5 per share next year, and the dividends pay out ratio is 50%. If the dividends are expected to grow at a constant rate of 8% forever and the required rate of return on the stock is 13%, calculate the present value of the growth opportunity.  
A) \$23.08  
B) \$64.10  
C) \$100  
D) None of the above

國立清華大學命題紙

95 學年度\_\_\_\_\_科技管理研究所\_\_\_\_\_系(所)\_\_\_\_乙(計財B)\_\_\_\_組碩士班入學考試

財務管理\_\_\_\_\_ 科目代碼\_5504\_共\_9\_頁第\_2\_頁 \*請在【答案卷卡】內作答

5. The following table gives the available projects for a firm.

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	
90	20	60	50	150	40	20	Initial investment
140	70	65	-10	30	32	10	NPV

If the firm has a limit of 210 million to invest, what is the maximum NPV the company can obtain?

- A) 200
  - B) 307
  - C) 283
  - D) None of the above
6. Which of the following cash flows should be treated as incremental flows when deciding whether to go ahead with an electric car?
- A) The cost of research and development undertaken for developing the electric car in the past three years
  - B) The annual depreciation charge
  - C) The reduction in taxes resulting from the depreciation charges
  - D) Dividend payments
7. Stock X has a standard deviation of return of 10%. Stock Y has a standard deviation of return of 20%. The correlation coefficient between stocks is 0.5. If you invest 60% of the funds in stock X and 40% in stock Y, what is the standard deviation of a portfolio?
- A) 10%
  - B) 20%
  - C) 12.2%
  - D) 14.2%
  - E) None of the above
8. Stock A has an expected return of 20% and Stock B has an expected return of 12%. The risk of Stock A as measured by the variance is three times that of Stock B. If the correlation coefficient between the two stocks is zero, what is the expected return on the minimum variance portfolio?
- A) 16%
  - B) 14%
  - C) 12%
  - D) 20%

國 立 清 華 大 學 命 題 紙

95 學年度\_\_\_\_\_科技管理研究所\_\_\_\_\_系(所)\_\_\_\_\_乙(計財B)\_\_\_\_\_組碩士班入學考試

科目\_\_\_\_\_財務管理\_\_\_\_\_ 科目代碼\_5504\_共\_9\_頁第\_3\_頁 \*請在【答案卷卡】內作答

9. A firm's equity beta is 0.8 and the debt beta is 0.3. If the market value of debt is \$40 million and that of equity is \$160 million, what is the beta of the assets of the firm?
- A) 0.7  
B) 0.8  
C) 1.1  
D) None of the above
10. Financial Calculator Company proposes to invest \$9 million in a new calculator making plant. Fixed costs are \$2 million a year. A financial calculator costs \$8 per unit to manufacture and can be sold for \$24 per unit. If the plant lasts for 4 years and the cost of capital is 20%, what is the break-even level of annual rates? (Assume no taxes.)
- A) 342,290 units  
B) 217,500 units  
C) 125,000 units  
D) None of the above
11. Goldsmith labs recover gold from printed circuit boards. It has developed new equipment for the purpose. The following data is given.
- (1.) Equipment costs \$250,000  
(2.) It will cost 100,000 per year to run  
(3.) It has an economic life of 5 years and is depreciated using straight-line method  
(4.) It will recover 1000 ounces of gold per year  
(5.) The current price of gold is \$300 per ounce and it expected to increase at a rate 4% per year for the foreseeable future  
(6.) The tax rate is 30%  
(7.) The cost of capital is 8%
- What is NPV of the equipment?
- A) \$580,400  
B) \$520,510  
C) \$470,400  
D) None of the above

國立清華大學命題紙

95 學年度\_\_\_\_\_科技管理研究所\_\_\_\_\_系(所)\_\_\_\_乙(計財 B)\_\_\_\_組碩士班入學考試

財務管理\_\_\_\_\_科目代碼\_5504\_共\_9\_頁第\_4\_頁 \*請在【答案卷卡】內作答

12. A lawyer works for a firm that advises corporate firms planning to sue other corporations for antitrust damages. He finds that he can "beat the market" by short selling the stock of the firm that will be sued. This finding is in violation of the:
- A) Weak form market efficiency
  - B) Semi-strong form market efficiency
  - C) Strong form market efficiency
  - D) None of the above
13. The possibility that the highest bidder in an auction may have overbid is known as:
- A) green mail
  - B) winner's curse
  - C) bookrunner
  - D) a general cash offer
14. If both dividends and capital gains are taxed at the same ordinary income tax rate, the effect of tax is different because:
- A) Capital gains are actually taxed, while dividends are taxed on paper only
  - B) Dividends are taxed when distributed while capital gains are deferred until the stock is sold
  - C) Both dividends and capital gains are taxed every year
  - D) Both A and C
15. Health and Wealth Company is financed entirely by common stock which is priced to offer a 15% expected return. The common stock price is \$40/share. The earnings per share is expected to be \$6. If the company repurchases 25% of the common stock and substitutes an equal value of debt yielding 6%, what is the expected value of earnings per share after refinancing? (Ignore taxes.)
- A) \$6.00
  - B) \$7.20
  - C) \$7.52
  - D) None of the above

國 立 清 華 大 學 命 題 紙

95 學年度\_\_\_\_\_科技管理研究所\_\_\_\_\_系(所)\_\_\_\_乙(計財 B)\_\_\_\_組碩士班入學考試

科目\_\_\_\_\_財務管理\_\_\_\_\_ 科目代碼\_5504\_共\_9\_頁第\_5\_頁 \*請在【答案卷卡】內作答

16. If a firm borrows \$50 million for one year at an interest rate of 9%, what is the present value of the interest tax shield? Assume a 35% tax rate.
- A) \$50.00 million
  - B) \$17.50 million
  - C) \$1.575 million
  - D) \$1.445 million
  - E) None of the above
17. The MM Corp. is planning construction of a new warehouse for its single manufacturing plant. The initial cost of the investment is \$1 million. Efficiencies from the new facility are expected to reduce after-tax costs by \$100,000 for each of the next 15 years. The corporation has a total value of \$60 million and has outstanding debt of \$40 million. What is the NPV of the project if the firm has an after-tax cost of debt of 3% and a cost equity of 9%? (Ignore taxes.)
- A) \$37,970
  - B) \$60,401
  - C) \$69,901
  - D) None of the above
18. A call option has an exercise price of \$150. At the final exercise date, the stock price could be either \$100 or \$200. Which investment would combine to give the same payoff as the stock?
- A) Lend PV of \$100 and buy two calls
  - B) Lend PV of \$100 and sell two calls
  - C) Borrow \$100 and buy two calls
  - D) Borrow \$100 and sell two calls
  - E) None of the above
19. Suppose Waldo's stock price is currently \$50. In the next six months it will either fall to \$40 or rise to \$80. What is the current value of a six-month call option with an exercise price of \$50? The six-month risk-free interest rate is 2% (periodic rate).
- A) \$2.40
  - B) \$15.00
  - C) \$8.25
  - D) \$8.09

國 立 清 華 大 學 命 題 紙

95 學年度\_\_\_\_\_科技管理研究所\_\_\_\_\_系(所)\_\_\_\_\_乙(計財B)\_\_\_\_\_組碩士班入學考試  
\_\_\_\_財務管理\_\_\_\_\_科目代碼\_5504\_共\_9\_頁第\_6\_頁 \*請在【答案卷卡】內作答

20. A project is worth \$12 million today without an abandonment options. Suppose the value of the project is \$18 million one year from today with high demand and \$8 million with low demand. It is possible to sell off the project for \$10 million if the demand is low. Calculate the value of the abandonment option if the discount rate is 5% per year.
- A) \$1.03 million.
  - B) \$2 million
  - C) \$1.9 million.
  - D) None of the above.
21. A convertible bond is selling for \$993. It has 15 years to maturity, \$1,000 face value, and pays 8% coupon interest annually. Similar straight bonds (non-convertible) are priced to yield 8.5%. The conversion ratio is 20. The stock is currently selling for \$45. Calculate the convertible bond's option value.
- A) \$34.52
  - B) \$93.00
  - C) \$7.00
  - D) None of the above
22. Third National Bank has made 10-year, \$25 million fixed-rate loan at 12%. Annual interest payments are \$3 million, and all principal will be repaid in year 10. The bank wants to swap the fixed interest payments into a floating-rate annuity. If the bank could borrow at a fixed rate of 10% for 10 years, what is the notional principal of the swap?
- A) \$40 million
  - B) \$20 million
  - C) \$25 million
  - D) \$30 million
23. Suppose that the G company knows that it must pay £7 million for goods that it will receive in Britain. The current exchange rate is \$1.75/£. The risk that the corporate treasurer faces is that:
- A) The pound exchange rate falls in a month's time to \$1.50/£
  - B) The pound exchange rate rises in a month's time to \$2.00/£
  - C) The pound exchange rate does not change from its current position
  - D) The pound exchange rate falls in a month's time to \$1.25/£

國立清華大學命題紙

95 學年度\_\_\_\_\_科技管理研究所\_\_\_\_\_系(所)\_\_\_\_\_乙(計財 B)\_\_\_\_\_組碩士班入學考試

科目\_\_\_\_\_財務管理\_\_\_\_\_ 科目代碼\_5504\_共\_9\_頁第\_7\_頁 \*請在【答案卷卡】內作答

24. As a defensive maneuver, a firm issues deep-discount bonds that are redeemable at par in the event of an unfriendly takeover. These bonds are an example of:
- A) Greenmail
  - B) A "scorched earth" policy
  - C) A poison pill
  - D) Crown jewels
  - E) A poison put
25. Guild Inc. and Rosen Inc. have decided to merge. Both companies have debt outstanding and this debt will become a claim against the new firm. Other things equal, which of the following statements is true?
- A) The total market value of the two companies' debt is increased because risk is reduced
  - B) The total market value of the two companies' equity is increased because risk is reduced
  - C) If Guild is more highly levered than Rosen, then, other things equal, Guild's bondholders will lose from the merger
  - D) If Rosen is less risky than Guild then, other things equal, Rosen's bondholders will gain from the merger.

**Part II. Problem (10 points total). Please write your answers on the answer sheet provided.**

Suppose Toyota announces the 12% APR (Annual Percentage Rate) financing for 24 months on their new '06 Camrys or a terrific cash back deal. This means that the dealer is offering two options: financing or cash back. If you are planning on buying a car and see the announcement. The price on the car is currently \$16,000 and you can earn an effective annual interest rate of 10% on your money market account.

- a) What are your monthly payments if you choose to finance through the dealer? (4 points)
- b) What is the monthly rate of return on your money market account? (3 points)
- c) How large does the "terrific cash back deal" have to be for you to ignore financing (through the dealer)? (3 points)

國立清華大學 命題紙

95 學年度 科技管理研究所 系(所) 乙 組碩士班入學考試

科目 財務管理 科目代碼 5504 共 9 頁第 8 頁 \*請在【答案卷卡】內作答

Part III.

1. (20 points) Assume that the mean-variance opportunity set is constructed from only two risky assets, A and B. Their variance-covariance matrix is given below:

$$= \begin{bmatrix} 0.0081 & 0 \\ 0 & 0.0025 \end{bmatrix} \quad \sigma_A^2 = 0.0081, \quad \sigma_B^2 = 0.0025$$

Asset A has an expected return 30%, and asset B has an expected return of 20%.

Suppose investor I chooses his "market portfolio" to consist of 75% in asset A and 25% in asset B; investor J chooses a different "market portfolio" with 50% in asset A and 50% in asset B. That is:

Weights chosen by I are: [0.75 0.25]

Weights chosen by J are: [0.50 0.50]

Though the two investors choose different index portfolios, both portfolios are efficient. In addition, investors I and J have homogeneous expectations, therefore they perceive the same risk-return combination and require the same expected return on both assets A and B. Define that zero-beta portfolio is the minimum variance portfolio which has zero covariance with the index portfolio and thus will be used to construct the security market line

Answer the following questions:

- Given these facts, what  $\beta$  will each investor calculate for asset A? (5 points each)
  - Compute the zero-beta portfolio for investor I. (5 points)
  - Based on the security market line derived by investor I, what is the expected return for a security with  $\beta$  equal to 1.25. (5 points)
2. (10 points) Consider a firm with current value of \$5,000,000 and outstanding debt of \$4,000,000 that matures in 10 years. The firm's asset rate-of-return variance is 0.5. The interest on the debt is paid at maturity, and the firm has a policy of not paying cash dividends.

Determine the change in the prices of the firm's debt and equity if there is an unanticipated rise in the rate of inflation of 5%, which raises the riskless nominal rate from 5% to 10%. (5 points each) (Hint: You can use option pricing model to solve this question. Black-Scholes formula is provided as follows, but not the detailed definition of each variable in the formula:

$$c = SN(d_1) - Xe^{-r_f T} N(d_2), \quad d_1 = \frac{\ln(S/X) + r_f T}{\sigma\sqrt{T}} + \frac{1}{2}\sigma\sqrt{T}, \quad d_2 = d_1 - \sigma\sqrt{T}$$



國 立 清 華 大 學 命 題 紙

95 學年度 科技管理研究所 系(所) 乙 組碩士班入學考試

科目 財務管理 科目代碼 5504 共 9 頁第 9 頁 \*請在【答案卷卡】內作答

- 3 (10 points) Suppose that the government passes a law that prohibits lending at more than 5% interest, but normal market rates are higher due to inflation. You have a customer who wants to borrow at 20% and can put up her \$100,000 store as collateral. Rather than refusing her request you decide to create a five-year contract with the following terms: You hold title to the store and receive the right to sell her store at  $\$Y$  at the end of five years. If you decide to sell, she must buy. In return you give her \$80,000 in cash (the amounts she wants to borrow) and the right to buy the store from you for  $\$Y$  at the end of five years.
- (a) To evaluate how this contract can provide you with a 20% annual rate of return on the \$80,000, which of the following model can be applied, and explain your reason:
- (i) Efficient market theory
  - (ii) Capital Asset Pricing Model
  - (iii) Put-Call Parity
  - (iv) Interest Rate Parity Theorem
- (5 points)
- (b) Determine the value of  $\$Y$  so that this contract can provide you with a 20% annual rate of return on the \$80,000. (5 points)
4. (10 points) Security A pays \$12 if state 1 occurs and \$20 if state 2 occurs. Security B pays \$24 if state 1 occurs and \$10 if state 2 occurs. Security prices for A and B are \$22 and \$20, respectively. A state security (pure security)  $i$  is defined as a security that pays \$1 in the state  $i$  if state  $i$  occurs and pays nothing in other states. Assume that there are two state securities in this problem set-up. Answer the following questions.
- (a) What are the prices for the two state securities (pure securities)? (3 points each)
  - (b) What is the price for a risk-free security with payoff \$8? (4 points)