壹、選擇題（共十題，每題三分）

1. You are given a budget of only $1,800,000 to invest in projects. Which projects will you select and in what order will you select them?
   (A) CBFG
   (B) CBFJ
   (C) DEAH
   (D) DEAI
   (E) CBAH

Project	Investment ($)	NPV
A	405,000	18,000
B	600,000	90,000
C	375,000	60,000
D	450,000	6,000
E	525,000	30,000
F	225,000	30,000
G	240,000	27,000
H	600,000	60,000
I	150,000	12,000
J	270,000	30,000

2. NTU Corp. is currently paying dividends of $0.5. These dividends are expected to grow at a 20% rate for the next 5 years and at a 3% rate thereafter. What is the value of the stock if the appropriate discount rate is 12%?
   (A) $ 8.08
   (B) $ 9.43
   (C) $11.17
   (D) $14.22
   (E) $17.32

3. Given the following information for 3 stocks, which stock(s) would you recommend purchasing if the CAPM is followed?
   (A) A and B only
   (B) A and C only
   (C) B and C only
   (D) A, B and C
   (E) A only

	Stock A	Stock B	Stock C	T-Bills	Market Portfolio
Expected Return	0.19	0.15	0.09	0.07	0.18
Variance	0.0200	0.1196	0.0205	0.0000	0.0064
Covariance with Market Portfolio	0.0065	0.0040	0.0015	0.0000	0.0064

4. Suppose you use put-call parity to compute a European call price from the European put price, the stock price, and the risk-free rate. You find the market price of the call to be higher than the price given by put-call parity. Ignoring transaction costs, what trades should you do?
   (A) Buy the stock and the risk-free bonds and sell the put and the call
   (B) Buy the call and the risk-free bonds and sell the put and the stock
   (C) Buy the put and the call and sell the risk-free bonds and the stock
   (D) Buy the put and the stock and sell the risk-free bonds and the call
   (E) None of the above

5. According to the following table summarizing prices of various default-free zero-coupon bonds (expressed as a percentage of face value),
   (A) all yields are over 6%.
   (B) the zero-coupon yield curve has a "V" shape.
   (C) the zero-coupon yield curve is flat.
   (D) the zero-coupon yield curve has a positive slope.
   (E) the zero-coupon yield curve has a negative slope.

Maturity (years)	1	2	3	4	5
Price ($100 face value)	94.52	89.68	85.40	81.65	78.35

6. Weston Tractor is considering a change in its capital structure. Before the change, the firm's stocks sells for $110 per share, and the firm has 1,200 shares outstanding. The firm also is financed with riskless zero-coupon debt maturing in one year, and having a current market value of $10,000. The risk-free interest rate is 10% and Weston Tractor's cash flows next year will be $150,000. The firm plans to repurchase 600 shares of its outstanding stock for $66,000 and will finance the equity repurchase by issuing $66,000 in risk-free debt. Gilson currently owns 120 shares of Weston Tractor stock. If he sells 30 shares of his stock and use the proceeds to buy $3,300 in bonds, how much can he receive from his portfolio next year?
   (A) $9,960
   (B) $13,260

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      (C) $13,280
      (D) $13,590
      (E) $16,910

7. The XYZ Corporation earned $200 million in before tax profits in 2010. Its corporate tax rate is 40 percent. Mark Ready, who owns 20 percent of the firm's shares, has a personal marginal tax rate of 25 percent. From Mark's perspective, what is the effective tax rate on XYZ's profits if its entire after-tax profits are distributed as a dividend?
      (A) 15%
      (B) 40%
      (C) 55%
      (D) 59%
      (E) 65%

8. Diversified Industries is currently selling for $30 a share and pays a dividend of $2 a share per year. Analysts expect the earnings and dividends to grow 4 percent per year into the foreseeable future. The company has 1 million shares outstanding. Richard Roll, the CEO, would like to take the firm private in a leveraged buyout. Following the buyout, the firm is expected to cut operating costs, which will result in a 20 percent improvement in earnings. In addition, the firm will cut administrative fixed costs by $300,000 per year and save $400,000 per year on taxes for the next 10 years. Assuming that the risk-free interest rate is 5 percent, and that Diversified Industries' cost of capital is 10 percent per year, what value would you put on Diversified Industries following the LBO?
      (A) $44.6 million
      (B) $41.4 million
      (C) $40.3 million
      (D) $25.4 million
      (E) $24.3 million

9. HL Associates have plans to start a widget company financed with 40 percent equity and 60 percent debt. Other widget companies are financed with 80 percent equity and 20 percent debt and have equity betas of 1.2. HL's borrowing costs will be 15 percent, the risk-free is 10 percent, and the expected rate of return on the market is 20 percent. The tax rate is 40 percent. What is WACC for HL Associates?
      (A) 9.34%
      (B) 10.20%
      (C) 12.45%
      (D) 16.70%
      (E) 17.32%

10. Tremont Corporation has determined that its optimal capital structure is 40% debt, at which point its weighted cost of capital is 14%. Due to financial problems, the firm has decided to raise the proportion of debt to 50%, which will increase its weighted cost of capital to 16%. What is the effect on the stock price of Tremont? The current dividend is $2 and the long-term growth rate of dividends is expected to be 8%.
      (A) Decrease $9
      (B) Increase $9
      (C) Decrease $8.33
      (D) Increase $8.33
      (E) No effect

貳、是非題（共五題，每題二分）

1. According to investment decision rules, the NPV will be positive if the cost of capital estimate is more than the IRR.
2. Prior to its maturity date, the price of a zero-coupon bond is always greater than its face value.
3. In the Fama-French three-factor asset pricing model, the excess market return is a systematic risk factor, while SMB and HML are unsystematic risk factors.
4. "A manager seeking to boost the price of her firm's stock should make investments that increase the present value of the firm's free cash flows" is one of the implications of the efficient market hypothesis for corporate managers.
5. Because no assumption on the risk preferences of investors is necessary to calculate the option price using either the Binomial Model or the Black-Scholes formula, the models must work for any set of preferences, including risk-neutral investors.

參、計算與問答題（共七題，配分如各題所示，計算題答案須寫計算過程，否則不予計分）

1. Consider a firm with three divisions and use the following information with the Fama-Fench-Carhart four-factor model. The risk-free rate of interest is 3%. Calculate the required returns for the three divisions and the overall value of the firm. （十五分）

The Fama-Fench-Carhart four-factor model: $r = R_f + \beta_1(R_m - R_f) + \beta_2 \cdot SMB + \beta_3 \cdot HML + \beta_4 \cdot PR1YR$

	Average annual Return (%)	Division 1 Factor Betas	Division 2 Factor Betas	Division 3 Factor Betas
$R_m - R_f$	4.68	0.712	0.937	0.782
SMB	2.04	-0.103	-0.214	0.224
HML	6.36	0.124	0.154	0.123
$PR1YR$	7.12	0.276	-0.147	0.247

接次頁

Free cash flow ($mm)	450	525	600
Expected growth rate	4.0%	2.5%	3.0%

2. The current stock price of NTU Corp. is 150. The information about the trading details for its options is shown in the following table. One would like to short sell 1000 units of Call 1 and neutralize Delta and Gamma. What hedging strategy should he or she adopt? (十分)

Contract	Time to Maturity	Strike Price	Premium	Delta	Gamma
Call 1	6 months	145	14	0.57	0.014
Call 2	6 months	155	12	0.51	0.016

3. A gold mine has reserves of 35,000 troy ounces of gold. For simplicity, assume the following schedule for extraction, ore purification, and sale of the gold ore:

Extraction and Sale Date	Troy Ounces
Today	15,000
One year from now	10,000
Two years from now	10,000

Also assume the following:
- The mine, which will exhaust its supply of gold ore in two years, is assumed to have no salvage value.
- There is no option to shut down the mine prematurely.
- The current price of gold is $5 per troy ounce.
- Today's forward price for gold settled one year from now is $5.20 per troy ounce.
- Today's forward price for gold settled two years from now is $5.50 per troy ounce.
- The cost of extraction, ore purification, and selling is $2 per troy ounce now and at any point over the next two years.
- The risk-free return is 5 percent per year.

What is the value of the gold mine? (五分)

4. Chrysler is considering a project that has a cost of capital of 12 percent if it is financed entirely with equity. The project is expected to generate unlevered cash flows in the next four years as follows:

Cash Flows (in $ millions) at End of			
Year 1	Year 2	Year 3	Year 4
$100	$100	$2,000	$2,000

Since the project generates large tax deductions in the first two years, Chrysler will initially finance the project exclusively with equity. However, at the start of year 3 the firm will repurchase some of its equity and borrow $500,000 million to finance the project for the last two years of its life. The borrowing (and discount) rate at this time will be 10 percent per year and the corporate tax rate will be 40 percent. What is the present value of the project, given this plan for debt financing? (六分)

5. ABC Corporation has decided to acquire the use of a machine costing $660,000. If purchased, the machine will be depreciated on a straight-line basis to a residual value of zero. The machine's estimated life is six years, and the company's tax rate is 40 percent. The company's alternative to purchasing the machine is to lease it for six years. A lessor has offered to lease the machine to the company for $150,000 annually, with the first payment to be made today and with five additional payments to be made at the start of each of the next five years. Assume that the risk-free rate is 10 percent. Use the *equivalent-loan method* to calculate the internal rate of return (IRR) on the differential cash flows between the lease and the buy decision. (八分)

6. Write down the various distortions in investment strategies that might arise because of conflicts of interest between equity holders and debt holders. [*Note:* Answer should be less than 6 lines, and otherwise get zero point for this question.] (八分)

7. Consider the following value model:

$$P_t = \theta(1-\delta)E_t \sum_{j=0}^{\infty} \delta^j D_{t+j},$$

where P_t is the stock price at time t, D_t is the dividend paid at the end of period t, θ is a proportionality factor, δ is a discount factor, and E_t denotes an expectation formed at the end of period t. The change in dividend at time t is defined as $\Delta D_t = D_t - D_{t-1}$. Show that the spread S_t, defined as $P_t - \theta D_t$, can be express as the present value of future expected dividend changes (ΔD_{t+j}). (八分)

試題隨卷繳回