

國立中山大學 105 學年度碩士暨碩士專班招生考試試題

科目名稱：統計學【財管系碩士班】

題號：443003

※本科目依簡章規定「不可以」使用計算機(問答申論題)

共 3 頁第 1 頁

※本科試題共 20 小格，每小格 5 分，共計 100 分。

1. 每一空格答案須全對才給分。
2. 只需填入最後答案，不需寫出計算過程。
3. 無法整除者，最後答案以四捨五入法，請取到小數點後第三位。

答案卷請製作如下：所有答案必須作答到答案本，不可在本試題卷上作答。

(1)	(2)	(3)
(4)	(5)	(6)
(7)	(8)	(9)
(10)	(11)	(12)
(13)	(14)	(15)
(16)	(17)	(18)
(19)	(20)	

◎共 20 格，每一個空格 5 分，共計 100 分。

1. 假設一項特考有 1100 人應考，預定錄取 70 人，已知該項考試的平均成績 $\mu = 195$ 分，標準差 $\sigma = 10$ 分。若該項考試成績的分配未知，試估計總成績為 235 分的某考生是否會被錄取？ (1) (請填是或否)

2. We have information of three assets as follows:

Asset	Expected Return	Volatility (standard deviation)
A	3%	0% (it is zero)
B	14%	25%
C	20%	29%

and correlation matrix,

	A	B	C
A	1	0	0
B	0	1	0.5
C	0	0.5	1

- a. Compute the return of an equally weighted portfolio composed by the three assets? (2)
- b. Compute the variance of an equally weighted portfolio composed by the three assets? (3)

試題隨卷繳回

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3. 設隨機變數 X 具有下列之機率分配

X	0	1	2	3
$f(X)$	$1/2$	$1/4$	$1/8$	$1/8$

令 $Y = X^2 + 2X + 1$ ，請回答下列問題

a. Y 之期望值 $E(Y)$ 為何? (4)

b. Y 之變異數 $V(Y)$ 為何? (5)

4. 市場研究員研討廠商投入的廣告費 (X , 萬元) 對銷售額 (Y , 萬元) 之影響，進而建立迴歸模型， $Y = \beta_0 + \beta_1 X + \varepsilon$ ， ε 為誤差項，今隨機抽取五家廠商，得其廣告費與銷售額之關係表如下所示。並進而求得：($t(0.975, 3) = 3.182$; $t(0.975, 4) = 2.776$)

$$\sum X = 60 \quad \sum Y = 35 \quad \sum XY = 452 \quad \sum X^2 = 752 \quad \sum Y^2 = 285$$

廣告費 X	12	16	8	12	12
銷售額 Y	8	12	4	6	5

a. 求出迴歸方程式 $\hat{Y} = \hat{\beta}_0 + \hat{\beta}_1 X$ 。 (6)

b. 以 $\alpha = 0.05$ 檢定迴歸模型是否與橫軸平行? (7) (請填是或否)

5. 班上共有 15 位同學，其中 10 位同學會在上課前預習，另外 5 位同學則無此習慣。現在在班上隨機抽取 5 位學生，其中至少有 2 位做過課前預習的機率為何? (8) (請用分數表示)

6. Given the following data and information, please construct an ANOVA table.

Sample 1	Sample 2	Sample 3
10	6	14
8	6	13
5	9	10
12	8	17
14	13	16
11		

$$\hat{S}_1^2 = 10 \quad \hat{S}_2^2 = 8.3 \quad \hat{S}_3^2 = 7.5$$

Source	Sum of square	Degree of freedom	Mean square	F-value
迴歸變異	<u>(9)</u>	2	<u>(12)</u>	<u>(14)</u>
殘差變異	<u>(10)</u>	13	<u>(13)</u>	
總變異	<u>(11)</u>	15		

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7. Let X_1, \dots, X_4 be four mutually stochastically independent random variables and let each has the probability density function (pdf) $f(x) = 2x, 0 < x < 1$, zero elsewhere. Let $Y_1 < Y_2 < Y_3 < Y_4$ be the order statistics of X_1, \dots, X_4 , then please find $P(Y_3 \leq \frac{1}{2})$? (15) (請用分數表示)
8. The probability density of continuous variable X is given by
- $$f(x) = \frac{1}{5} - \frac{1}{25}|x-c|, 2 < x < 12$$
- Find
- a. the value of c? (16)
- b. the expected value of X, $E(X)$? (17)
9. 已知 X 服從 Binomial (10, 2), 且 $Y = 10X^2 + 5X + 2$, 求 $E(Y)$? (18)
10. 假設甲、乙兩部機器, 每部每次可生產一個產品, 而且甲的生產速率是乙的 3 倍。甲生產的產品的不良率為 1%, 乙則為 3%。請問:
- a. 產品的平均不良率為何? (19)
- b. 任意選取 2 個產品, 這 2 個產品都是良品的機率是多少? (20)

國立中山大學 105 學年度碩士暨碩士專班招生考試試題

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經濟學 [財管系碩士班] 試題共有兩部份，兩部份總計共 100 分。

總體經濟部分，共五十分

選擇題，單選，第 1~16 題每題三分，第 17 題二分

1. GDP and personal income are different, which of the following drives a difference between the two?
A) depreciation B) transfer payments C) indirect taxes D) direct taxes
2. If actual saving is greater than planned investment, then A) the economy is at its equilibrium output level B) output will rise C) output will fall D) there is planned inventory increase E) there is planned inventory decrease
3. By the most recent yearly statistics available, which developing country's GDP in US\$ is second to China? A) India B) Brazil C) Mexico D) Indonesia E) South Africa
4. Russia's major export is A) oil and gas B) arms C) machinery D) minerals E) electronics
5. In order to reduce its current account deficit, by the expenditure approach a country may do the following except A) reduce government spending B) increase taxes C) increase private savings D) increase private investment
6. One of Keynes' most profound insights was that A) markets allocate resources efficiently, as if by an invisible hand B) comparative advantage allows all nations to gain from trade C) capitalists exploit workers by paying them less than the total value of what they produce D) the same factor that drives long run growth—technological change—also causes business cycles E) the economy can achieve an equilibrium below its capacity
7. Assume fiscal deficit is all financed by issuing debt. For the debt/GDP ratio to remain the same, A) the economic growth needs to be equal to the real interest rate and the budget needs to be balanced B) the budget can be in deficit if the economic growth is smaller than the real interest rate C) the economic growth needs to be equal to the real interest rate D) the budget needs to be balanced
8. Assume the following classical economic model,
 $Y = f(L), dY/dL > 0, d^2Y/dL^2 < 0$
 $L^s = L(W/P), L^d = dY/dL, L^s = L^d, dL^s/d(W/P) > 0$
 $M = kPY$
 $S(Y, i - \pi) = I(i - \pi, Y) + (G - T), \partial I/\partial(i - \pi) < 0, \partial S/\partial(i - \pi) > 0, \partial S/\partial Y > 0, \partial I/\partial Y > 0$
where i indicates the nominal interest rate and π indicates the inflation expectation. Suppose money growth rate rises, A) the real interest rate remains the same B) the real interest rate falls C) the real interest rate rises D) real money balance rises E) real money balance falls
9. By a typical AS-AD model with AD constructed by IS-LM, an increase in autonomous consumption will not make A) the IS curve shift upward B) both the IS curve and the aggregate demand curve shift upward C) the LM curve shift upward D) both the LM curve and the aggregate supply curve shift upward E) induced consumption rise
10. What is not the effect of unexpected deflation? A) Real GDP rises B) Debtor's burden rises C) Wage earners gain purchasing power D) Business firms suffer revenue loss
11. The J-curve theory says that the depreciation of a country's currency may make its trade balance worsen initially. Suppose a country only trade with the U.S. and the country's trade balance is expressed in US\$. The J-curve effect is most significant as A) the prices of its exports and imports are all quoted in US\$ B) the price of its exports is quoted in its own currency and the price of its imports is quoted in US\$ C) the price of its exports is quoted in US\$ and the price of its imports is quoted in its own currency D) the prices of its exports and imports are all quoted in its own currency
12. A country produces \$13 million consumption goods and \$2 million machines and construction in a year. The consumption expenditure is governed by $C = 0.8Y$ and investment expenditure is governed by $I = 0.1Y$. In the national income accounting, investment in the year is A) \$3 million B) \$2 million C) \$1.5 million D) none of above

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13. 若比特幣被引進而被台灣部分居民及廠商使用，則 A) 台幣貨幣需求與比特幣貨幣需求之和比原來台幣貨幣需求大 B) 依貨幣學派，台幣貨幣供給不變之下台灣物價會上漲 C) 依貨幣學派，台幣貨幣供給不變之下台幣會升值 D) 台幣貨幣需求與比特幣貨幣需求之和大於台幣貨幣供給與比特幣貨幣供給之和
14. 以一般 IS-LM-BP 模型分析香港，港幣與美國匯率固定，資本完全自由移動。設美國利率提高，則新均衡與原均衡相比，下列有關香港敘述何者錯誤？A) 利率提高 B) 貨幣供給降低 C) 消費支出下降 D) IS 左移
15. 下列對中國最近一年經濟狀況的描述，何者正確？A) 貿易順差，外匯存底增加 B) 貿易順差，外匯存底減少 C) 貿易逆差，外匯存底增加 D) 貿易逆差，外匯存底減少
16. 若 AD 由一般 IS-LM 構成，假設在短期中物價不變而企業根據需求決定產出。有一擴張貨幣政策，則 A) 產量增幅即為 IS-LM 均衡所得增幅 B) 產量增幅小於 IS-LM 均衡所得增幅 C) 產量增幅大於 IS-LM 均衡所得增幅 D) 產量決定於 AS 的斜率
17. 依一般凱因斯模型 $Y = C + I + G + X - M$, $C = C_0 + c(Y - T)$, $X = X_0 + aY^*$, $M = M_0 + mY$, $m < c < 1$, Y^* 為國外所得。當國外所得增加時，下列何者錯誤？A) 本國所得增加 B) 本國進口增加 C) 本國出口增加 D) 本國貿易餘額增加 E) 以上皆非

個體經濟學部分，共五十分。答案 全對才給分。只需要填入最後的完整答案，”請勿”寫出計算過程。答案卷請自行製作如下：

(1)	(2)	(3)
(4)	(5)	(6)
(7)	(8)	(9)
(10)		

個體經濟學：共 10 格，每一格 5 分，共計 50 分。

1. The income elasticity of demand for tea is estimated to be 0.23. If incomes increase by 5%, what effect would this have on the quantity of tea demanded, holding all else constant? Be specific (i.e., give the magnitude as well as direction of change). (1)

2. Domestic Taiwan demand for sugar is $Q^D = 120 - 10P$ and domestic supply is $Q^S = -20 + 10P$.

a. the equilibrium of price and quantity are $P^* = \$7$ and $Q^* = 50$. How much consumer surplus (CS) and producer surplus (PS) are enjoyed in the market? (CS; PS)=? (2)

b. The rest of the world can supply as much as the Taiwan wants at a price of \$3. If Taiwan allowed for free trade, how much sugar would the Taiwan produce and how much does producer surplus gain or lose? (3)

3. A monopolist with marginal costs of \$10 per unit faces a demand curve of $Q^D_1 = 30 - P_1$ in market 1 and $Q^D_2 = 50 - P_2$ in market 2.

a. What are the optimal prices of P_1^* , P_2^* and profits in the two markets if it is impossible for customers to arbitrage across markets? (P_1^* ; P_2^* ; profits) =? (4)

b. Now, suppose that customers' transportation cost of delivering the product from market 1 to market 2 is \$5. Now what are the optimal prices of P_1^* , P_2^* and profits? (P_1^* ; P_2^* ; profits) =? (5)

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4. Suppose the government imposes a person tax of 10% on the first \$40,000 of income and 20% on all income above \$40,000. What are the total tax payment (TP) and the marginal tax rate (MTR) for a person whose income is \$50,000? **(TP; MTR) =? (6)**

5. There are two individuals A and B. They play a dormitory game with the following table described structure. In the table, A's two strategies (L or S) are shown at the left, and B's two strategies (L or S) are shown across the top, the payoffs corresponding to the various strategic choices are shown in the body of table. In the normal form with simple game, A will play L strategy and B will play L strategy choice to meet the Nash criterion (or Nash equilibrium is (L, L))

B's strategies

A's strategies		L	S
	L	7,5	5,4
	S	6,4	6,3

However, we move the dynamic game to illustrate Nash equilibrium with converted into two-period game in this chapter. We assume that A chooses his level first and that B can hear this before turning the stereo on. With this change, B's strategy choices must be phrased in the way that takes in account the information available at the start of period two. There are four strategies covering the possible informational contingencies (L,L ; L,S ; S,L ; S,S). The new table below indicates such an extended set of strategies. Each strategy is stated as a pair of actions indicating what B will do depending on its information. For example, in B's strategy (L, L) represents that B chooses L if A choose L strategy, and B chooses L also if A choose S strategy.

B's strategies

A's strategies		L, L	L,S	S,L	S,S
	L	7,5	7,5	5,4	5,4
	S	6,4	6,3	6,4	6,3

a. Find the Nash equilibrium in this game (use A and B strategy to show the answer). **(7)**

b. Find the subgame perfect equilibrium in this game (use A and B strategy to show the answer). **(8)**

6. Assume the demand function of a monopolist is given by $P=100-0.5(q_1+q_2)$. It owns two factories, and the function of total cost is assumed by $C_1=5q_1$ for factory 1 and $C_2=0.5q_2^2$ for factory 2, respectively, where q_1 is the output of factory 1 and q_2 is the output of factory 2.

a. Find the optimal output level for each factory under Cournot model consideration. **$(q_{1c}^*; q_{2c}^*) = ?$ (9).**

b. If factory 1 and 2 they work together as cooperation, find the optimal output level for each factory. **$(q_{1w}^*; q_{2w}^*) = ?$ (10)**

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Part 1: Single-choice questions , 2 % per each

1. Two countries, the U.S. and England, produce only one good, wheat. Suppose the price of wheat is \$3.25 in the U.S. and is £1.35 in England. According to the law of one price, what should the \$:£ spot exchange rate be? (A) \$2.4074 (B) \$2.1925 (C) \$2.4731 (D) \$2.7214
2. On August 1, 2006, Zimbabwe changed the value of the Zim dollar from Z\$101/U.S.\$ to Z\$250/U.S.\$. By what percent has the U.S. dollar appreciated relative to the Zim dollar? (A) 59.6% (B) 147.52% (C) 56.9% (D) 145.72%
3. Which one of the following economic policies would the international financial markets tend to reward? (A) Increased tariffs (B) Reduced government ownership of private firms (C) A system of government currency controls (D) More government protection of infant-industries
4. A firm with a corporate-wide debt/equity ratio of 1:2, an after-tax cost of debt of 7%, and a cost of equity capital of 15% is interested in pursuing a foreign project. The debt capacity of the project is the same as for the company as a whole, but its systematic risk is such that the required return on equity is estimated to be about 12%. The after-tax cost of debt is expected to remain at 7%. What is the project's weighted average cost of capital? (A) 9.25% (B) 12.33% (C) 12.66% (D) 10.33%
5. What is the value of a 9-month call with a strike price of \$45 given the Black-Scholes Option Pricing Model and the following information? Stock price \$48; Exercise price \$45; Time to expiration 0.75; Risk-free rate 5%; $N(d_1) = 0.718891$; $N(d_2) = 0.641713$; $2.71828^{-0.05 \times 0.75} = 0.9632$. (A) \$2.03 (B) \$4.86 (C) \$6.69 (D) \$8.81
6. By rewarding executives with large option positions, corporations: (A) cause the executives to hold highly undiversified portfolios. (B) put the firm in a risky position to pay off the options. (C) cause the value of the stock to fall because the options are theft. (D) are really valueless because most options are never exercised.
7. The call option on a dividend paying stock compared to a non-dividend paying stock is: (A) more valuable because of the extra dividend payment. (B) equal in value because cash dividends are paid on stock only. (C) less valuable because cash dividends are paid on stock only. (D) less valuable if the dividend paying stock is in-the-money while the non-dividend paying stock is out-of-the-money.
8. Derivatives can be used to either hedge or speculate. These actions: (A) increase risk in both cases. (B) decrease risk in both cases. (C) spread or minimize risk in both cases. (D) offset risk by hedging and increase risk by speculating. (E) offset risks by speculating and increase risk by hedging.
9. To protect against interest rate risk, the mortgage banker should: (A) buy futures, as this position will hedge losses if rates rise. (B) sell futures, as this position will hedge losses if rates rise. (C) sell futures, as this position will add to his gains if rates rise. (D) buy futures, as this position will add to his gains if rates rise.
10. Which of the following money-market securities has no active secondary market? (A) Certificates of deposit (CD's) (B) Commercial paper (C) Banker's acceptances (D) Treasury bills

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11. The target cash balance is reached when: (A) the interest on any marketable security throw-off is maximized. (B) the interest foregone from not investing in an equivalent amount of Treasury bills is minimized. (C) the value of cash liquidity equals interest foregone on an equivalent amount of Treasury bills. (D) the liquidity value is greater than interest foregone on an equivalent amount of Treasury bills.
12. When a firm sells its accounts receivables to a financial institution, it is called: (A) captive financing. (B) collateralization. (C) securitization. (D) legalization.
13. If Microsoft were to acquire U.S. Airways, the acquisition would be classified as a _____ acquisition. (A) horizontal (B) longitudinal (C) conglomerate (D) vertical (E) complementary resources.
14. A proposed acquisition may create synergy by: I. increasing the market power of the combined firm. II. improving the distribution network of the acquiring firm. III. providing the combined firm with a strategic advantage. IV. reducing the utilization of the acquiring firm's assets. (A) I and III only (B) II and III only (C) I and IV only (D) I, II, and III only (E) I, II, III, and IV.
15. The management of Magic Mobile Homes has proposed to reorganize the firm. The proposal is based on a going-concern value of \$2 million. The proposed financial structure is \$750,000 in new mortgage debt, \$250,000 in subordinated debt and \$1,000,000 in new equity. All creditors, both secured and unsecured, are owed \$2.5 million dollars. Secured creditors have a mortgage lien for \$1,500,000 on the factory. The corporate tax rate is 34%. How much should the unsecured creditors receive? (A) \$500,000 (B) \$667,000 (C) \$750,000 (D) \$1,000,000 (E) None of the above.
16. The current spot rate is C\$1.400 and the one-year forward rate is C\$1.344. The nominal risk-free rate in Canada is 4 percent while it is 8 percent in the U.S. Using covered interest arbitrage, you can earn an extra _____ profit over that which you would earn if you invested \$1 in the U.S. (A) \$.0001 (B) \$.0033 (C) \$.0040 (D) \$.0833 (E) \$.0840
17. From a tax-paying investor's point of view, a stock repurchase: (A) is equivalent to a cash dividend. (B) is more desirable than a cash dividend. (C) has the same tax effects as a cash dividend. (D) is more highly taxed than a cash dividend. (E) creates a tax liability even if the investor does not sell any of the shares he owns.
18. The Tinslow Co. has 125,000 shares of stock outstanding at a market price of \$93 a share. The company has just announced a 7-for-3 stock split. What will the market price per share be after the split? (A) \$38.27 (B) \$39.86 (C) \$40.40 (D) \$46.18 (E) \$55.80
19. Brad's Boat Company, a company in the 40% tax bracket, has riskless debt in its capital structure which makes up 30% of the total capital structure, and equity is the other 70%. The beta of the assets for this business is .9 and the equity beta is: (A) 0.54 (B) 0.90 (C) 1.13 (D) 1.20 (E) 1.49
20. The Webster Corp. is planning construction of a new shipping depot for its single manufacturing plant. The initial cost of the investment is \$1 million. Efficiencies from the new depot are expected to reduce costs by \$100,000 forever. 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 6% and a cost equity of 9%? (A) \$428,571 (B) \$444,459 (C) \$565,547 (D) \$1,000,000

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21. If the WACC is used in valuing a leveraged buyout, the: (A) WACC remains constant because of the final target debt ratio desired. (B) flotation costs must be added to the total UCF. (C) WACC must be recalculated as the debt is repaid and the cost of capital changes. (D) tax shields of debt are not available because the corporation is no longer publicly traded.
22. Given the following information, leverage will add how much value to the unlevered firm per dollar of debt? Corporate tax rate: 34%; Personal tax rate on income from bonds: 20%; Personal tax rate on income from stocks: 50%. (A) \$-0.050 (B) \$-0.188 (C) \$0.367 (D) \$0.588
23. The capital structure chosen by a firm doesn't really matter because of: (A) taxes. (B) the interest tax shield. (C) the relationship between dividends and earnings per share. (D) the effects of leverage on the cost of equity. (E) homemade leverage.
24. The cost of capital for a firm, R_{WACC} , in a zero tax environment is: (A) equal to the expected earnings divided by market value of the unlevered firm. (B) equal to the rate of return for that business risk class. (C) equal to the overall rate of return required on the levered firm. (D) is constant regardless of the amount of leverage. (E) All of the above.
25. Assuming the CAPM or one-factor model holds, what is the cost of equity for a firm if the firm's equity has a beta of 1.2, the risk-free rate of return is 2%, the expected return on the market is 9%, and the return to the company's debt is 7%? (A) 10.4% (B) 10.8% (C) 12.8% (D) 14.4%

Part 2: Questions (50 %)

1. How does the market react to unexpected dividend changes? All things considered, would you expect a risky firm with significant but high uncertain growth prospects to have a low or a high dividend? (10%)
2. What are the possible reasons why the price of stock drops on the announcement of a new equity issue and why the price of stock increases on the announcement of share repurchase? (10%)
3. The capital budgeting question is probably the most important issue in corporate finance. Please describe how to make a capital investment decision? (Hint: You must describe investment criteria, how to identify and organize the relevant cash flows and how to decrease the forecasting risk.) (10%)
4. During the last decade, U.S. corporates are holding record-high amounts of cash. The related phenomenon has also emerged in Taiwan, especially in high technology corporates. Why are corporates holding so much cash? Please explain. (10%)
5. Please respond to the following statement:
"Market efficiency means that it doesn't matter how you invest your money because the efficiency of the market will protect you from making a mistake." (10%)