

第一部分

- Which of the following are continuous random variables? (複選, 4 分)
 - Number of cases of a rare blood disease per 100,000 people
 - The time required to transport a shipment of supplier to a buyer
 - The number of telephone calls per minute at a small business
 - The transaction price for a single-family residence sold in Taiwan
- Select the correct statements X and Y are random variables, a and b are constants. (複選, 4 分)
 - $\text{Var}(X+Y)=\text{Var}(X)+\text{Var}(Y)+\text{Cov}(X,Y)$
 - If X and Y are independent, $\text{Cov}(X,Y)=0$
 - If $\text{Cov}(X,Y)=0$, X and Y are independent
 - If $X=aY+b$, $\text{Var}(X)=a\text{Var}(Y)+b$
 - If X and Y are independent, $E(XY)=E(X)E(Y)$
- 有關統計假設檢定，下列敘述何者為誤？(複選, 4 分)
 - 顯著水準乃是衡量真實虛無假設被接受的機率
 - 型二誤差乃是衡量為假的虛無假設被接受的機率
 - 檢定力是衡量真實的虛無假設被接受的機率
 - 型一誤差乃是衡量為假的對立假設被拒絕的機率
 - 檢定力乃是衡量為假的對立假設被拒絕的機率
- 請問若資料為右偏分配，則眾數、平均數與中位數關係為何？(4 分)
- 請解釋抽樣誤差(Sampling error)與非抽樣誤差(Nonsampling error)? (4 分)
- A factory has been involved in statistical quality control for several years. As part of the production process, parts are randomly selected and tested. From the records of these tests, it has been established that a defective part occurs in a pattern that is Poisson distributed on the average of 1.26 defects every 40 minutes during production runs. Use this information to determine the probability that less than 15 minute will elapse between any two defects. (本題寫計算式即可, 4 分)
- What proportion of secretaries of the Taiwan largest 500 companies has a personal computer at his or her workstation? You want to answer this question by conducting a random survey. How large a sample should you take if you want to be 95% confident of the results and you want the width of the confidence interval to be no more than 0.10? Assume no one has any idea of what the proportion actually is. (4 分)
- An environmental protection association publishes figure on solid waste generation in Taiwan. One year, the average number of waste generated per person per day was 4.50 pounds. Suppose the daily amount of waste generated per person is normally distributed, with a standard deviation of 1.20 pounds. Of the daily amount of waste generated per person, 95% would be greater than what amount? (4 分)
- 假設某家銀行處理存款支票發生錯誤的機率為 0.0001，若有 20,000 張支票被該家銀行所處理，發生超過 5 次錯誤的機率為何？請問可以用什麼離散機率方法去計算，如何計算？(本題寫計算式即可, 8 分)
- According to the International Data Corporation, Acer Computers holds a 16% share of the personal computer market in the United States and a 12.7% share of the worldwide market. Suppose a market researcher believes that Acer holds a higher share of the market in the southwestern region of the United States. To verify this theory, he randomly selected 428 people who have purchased a personal computer in the last month in the southwestern region of the United States. Eighty-four of these purchases were Acer Computer. Using a 1% level of significance, test the markets researcher's theory. What is the probability of making a Type I error? If the market share is really 0.21 in the southwestern region of the United States, what is the probability of making a Type II error? (10 分)

國立中山大學 95 學年度碩士班招生考試試題

科目：統計學【財管系碩士班】

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Part II: 50%

Answer the following problems 1-7 concerning the relationship between money spent on research and development and profits.

Year t	Millions spent on Research And Development, X	Annual Profit (\$Million) Y
1990	\$ 5	\$31
1991	11	40
1992	4	30
1993	5	34
1994	3	25
1995	2	20

$$\sum X = 30 \quad \sum Y = 180 \quad \sum XY = 1,000$$

$$\sum X^2 = 200 \quad \sum Y^2 = 5,642$$

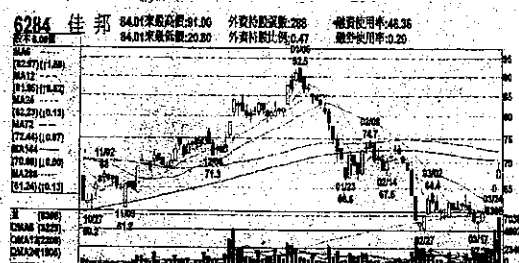
$$\bar{X} = 5 \quad \bar{Y} = 30$$

Assume: $Y_i = \alpha + \beta X_i + \varepsilon_i$

The standard error of the regression is 3.24.

The standard error of the regression coefficient is 0.46.

1. What is the key assumption which allows one to estimate the regression coefficients? (5%)
2. Using the data above and the criterion of least squares, please and find the best-fitting line. (10%)
3. In evaluating the regression relationship, what should be tested at least? (5%)
4. What measure should be emphasized to understand the amount of the variation in Y that is explained by the regression line? (5%)
5. What is the meaning of the standard error of the regression economically and statistically? (5%)
6. What hypothesis can be assumed if there is no linear regression between money spent on research and development and profits? (5%)
7. Construct a 95% confidence interval for the estimated profit in 1992. (5%)
8. Based on the following graph, please provide two possible statistical models with justification. (Data source: 工商日報, 4/1/2006) (10%)



第一部份 (50 分)：此部分共 10 題，每題 5 分，其中 1~9 題為單選題，第 10 題為填充題

1. 請問 covered interest rate parity 係指哪一個公式？(1) $(1+i^*)/(1+i^{**}) = F_0/S_0$ (2) $(1+i^*)/(1+i^{**}) = S_0/F_0$ (3) $(1+i^*)/(1+i^{**}) = S_1/S_0$ (4) $(1+i^*)/(1+i^{**}) = S_0/S_1$ 。以上的 i^* = 本國利率， i^{**} = 外國利率， S_0 = 現在之外匯 spot rate (單位為本國貨幣：外國貨幣)， F_0 = 現在之遠期匯率報價， S_1 = 到期日之外匯 spot rate。
2. 兩個債信相同之公司債之 duration 和 yield 皆相同，但 convexity 不同，請問應選擇凸性大或凸性小之公司債？(1) 凸性大的 (2) 凸性小的 (3) 不一定
3. 甲公司打算借款 1 億元以在公開市場買回公司之股票，假設沒有資訊不對稱、沒有稅，請問上述計畫執行之前後，以下 5 個有幾個不變？EPS 期望值，EPS 變動之風險，stock's expected return, stock price, 資金成本(WACC)：(1) 1 個 (2) 2 個 (3) 3 個 (4) 4 個 (5) 5 個
4. 有人認為：『投資買權獲利潛力無窮 (如果標的物上漲，則買權價值跟著上漲)，但損失有限 (損失最多為權利金)』，根據上述論點，投資買權之風險比投資標的物股票之風險來得更低，對嗎？(1) 對 (2) 錯 (3) 不一定
5. 計算選擇權之價格時，我們可以採用『機率轉換法』(conversion of probability measures)，此一方法之第一步是將_____的未來 payoff 的真實機率轉換為一組『虛擬機率』：(1) 標的物 (2) 標的物加上公債所組成的一個複製投資組合(replication portfolio) (3) 公債 (4) 選擇權
6. 我們可以從分析師對一家公司未來 EPS 預估值來推估出該公司股票之預期報酬率，這一計算過程與以下哪一方法關係最密切？(1) CAPM (2) APT (3) Economic Value Added (4) $S = D_1/(1+r) + D_2/(1+r)^2 + D_3/(1+r)^3 + \dots$ where $D = \text{cash dividends}$
7. 根據歐美的文獻記載，大約有多少比率的企業合併收購最後是失敗的？(1) 約 10%~20% (2) 約 20%~40% (3) 約 40%~60% (4) 約 60%~80%。
8. 某一投資組合之報酬率與市場投資組合完全無關(相關係數為 0)，則該投資組合之預期報酬率 (1) 等於 0 (2) 等於市場投資組合之預期報酬率 (3) 等於 risk-free rate (4) 不一定
9. 某一投資組合之報酬率與市場投資組合完全無關(相關係數為 0)，則該投資組合之 beta (1) 等於 0 (2) 等於市場投資組合之 beta (3) 等於 1 (4) 不一定。
10. 某公司現金股利為每股 2 元，無風險報酬率為 8%，股票的預期報酬率為 15%，保留盈餘投資所獲得之 IRR 為 20%，負債／權益比率為 0.25，盈餘保留率為 60%，則股票公平市價等於_____元。(請算至小數點以下 2 位，四捨五入，此為填充題)

第一部份 (50 分)

八題單選題 40 分 + 一題問答題 10 分

I. 單選題

1. The three parts of the Du Pont identity can be generally described as:
 - I. operating efficiency, asset use efficiency and firm profitability.
 - II. financial leverage, operating efficiency and asset use efficiency.
 - III. the equity multiplier, the profit margin and the total asset turnover.
 - IV. the debt-equity ratio, the capital intensity ratio and the profit margin.
 - A. I and II only
 - B. II and III only
 - C. I and IV only
 - D. I and III only
 - E. III and IV only

2. At the optimal order quantity size, the:
 - A. total cost of holding inventory is fully offset by the restocking costs.
 - B. carrying costs are equal to zero.
 - C. restocking costs are equal to zero.
 - D. total costs equal the carrying costs.
 - E. carrying costs equal the restocking costs.

3. Which of the following statements are correct concerning diversifiable risks?
 - I. Diversifiable risks can be essentially eliminated by investing in several unrelated securities.
 - II. The market rewards investors for diversifiable risk by paying a risk premium.
 - III. Diversifiable risks are generally associated with an individual firm or industry.
 - IV. Beta measures diversifiable risk.
 - A. I and III only
 - B. II and IV only
 - C. I and IV only
 - D. II and III only
 - E. I, II, and III only

4. Which of the following account changes occur as a result of a large stock dividend?
 - I. common stock increases
 - II. cash decreases
 - III. capital in excess of par increases
 - IV. retained earnings decreases
 - A. I and III only
 - B. II and IV only
 - C. I and IV only
 - D. II and III only
 - E. I, III, and IV only

5. The primary purpose of a protective put is to:
- A. increase the maximum potential return on a stock.
 - B. offset an equivalent call option.
 - C. limit the downside risk of stock ownership.
 - D. lock in a risk-free rate of return on an individual stock.
 - E. increase the upside potential return on a stock.
6. Which one of the following statements is correct concerning interest rate risk as it relates to bonds, all else equal?
- A. The shorter the time to maturity, the greater the interest rate risk.
 - B. The higher the coupon rate, the greater the interest rate risk.
 - C. For a bond selling at par value, there is no interest rate risk.
 - D. The greater the number of semiannual interest payments, the greater the interest rate risk.
 - E. The lower the amount of each interest payment, the lower the interest rate risk.
7. The static theory of capital structure:
- A. assumes that the firm's operations and assets are fixed.
 - B. assumes that the firm's operations are fixed but that its assets are increasing.
 - C. supports increasing the leverage employed by a firm when the probability of financial distress becomes significant.
 - D. equates the benefits of equity financing to the costs associated with the probability of financial distress.
 - E. states that a firm should operate at the point where the cost of capital is maximized.
8. Which one of the following statements is correct?
- A. Acquiring firms tend to avoid firms with large net operating losses when they are seeking a target firm to acquire.
 - B. If an acquisition increases the debt level of a firm the tax liability of the firm tends to increase as a result.
 - C. If either an increase or a decrease in the level of production causes the average cost per unit to increase the firm is currently operating at its optimal size.
 - D. Firms can always benefit from economies of scale if they increase the size of their firm through acquisitions.
 - E. If a firm uses its surplus cash to acquire another firm the shareholders of the acquiring firm immediately incur a tax liability related to the transaction.

II. 問答題

- (1)、請定義何謂“獨立董事”與“公司治理”。
- (2)、舉一實例說明臺灣現況有那些公司治理的問題？你覺得解決之道為何？

財管所經濟學

一、總體經濟部份，選擇題，單選，共十題，每題五分

- 設有典型 IS-LM-BP 模型，若資本移動自由，在浮動匯率之下，若政府支出增加，則下列何者不正確？A)實質產出增加 B)實質消費增加 C)實質投資減少 D)實質貿易餘額提高
- 若典型 IS-LM-BP 共同構成總需求，設有正斜率的總供給線，則當相同幅度的政府支出增加在此 AS-AD 模型所導致之調整與 IS-LM-BP 模型相較 A)實質產出增加較多 B)實質消費增加較多 C)實質投資減少較多 D)實質貿易餘額提高較多
- 下列何者錯誤？A)持有現金的名目報酬為零 B)持有現金的預期實質報酬為預期物價上漲率 C)持有債券的預期名目報酬為其殖利率 D)持有債券的預期實質報酬為其實質殖利率
- 在其他情況不變之下，下列何者錯誤？A)影響實質消費的是名目利率 B)影響實質投資的是實質利率 C)影響實質貨幣需求的是名目利率 D)若一國實質利率相對外國上升則該國貨幣會升值
- 過去幾年間，世界原物料價格大幅上揚，一般認為主要由於 A)中國與印度的需求增加 B)先進國家的需求拉動 C)各國生產力成長緩慢 D)各國強勢工會導致工資上漲太快 E)石油國家輸出組織共同拉抬油價
- 政府發放災難救濟金，A)在國民所得帳中視為政府消費 B)當災民用之於消費後在國民所得帳中視為民間消費 C)不列入個人所得 personal income D)不會增加可支配所得
- 在香港，韓國，新加坡，馬來西亞四國中，去年以美元計算的平均每人國民所得何國最低？A)香港 B)新加坡 C)馬來西亞 D)韓國
- 設有下列 IS-LM 模型： $Y=C+I+G$, $C=140+0.8Y_d$, $T=200$, $I=200-500r$, $G=120$, $M/P=100$, $L=50+0.3Y-500r$ ，設政府支出增加 30，請計算政府支出的排擠效果對均衡所得的影響幅度 x 。A) $x \leq 65$ B) $65 < x \leq 75$ C) $75 < x \leq 85$ D) $85 < x \leq 95$ E) $x > 95$
- 一般而言，貨幣市場透過利率變動可以使市場迅速清結(clear)，而貨物市場則調整緩慢。若有如第 8 題中之 IS-LM 模型，若實質貨幣供給增加 50，在貨物市場未及調整之前，則利率 x 會調整至何水準？A) $x \leq 0.24$ B) $0.24 < x \leq 0.26$ C) $0.26 < x \leq 0.28$ D) $0.28 < x \leq 0.3$ E) $x > 0.3$
- IS-LM 模型構成總需求線，第 8 題 IS-LM 模型中，設原來 $P=1$ ，設物價下降為 $P=0.5$ ，則總支出 x 成爲 A) $x \leq 750$ B) $750 < x \leq 800$ C) $800 < x \leq 850$ D) $850 < x \leq 900$ E) $x > 900$

二、個體經濟部分 (50 points)

A. Multiple Choice (2pts each, total 36 points, 單選)

1. Modern microeconomic theory generally regards utility as
 - a. cardinal
 - b. ordinal
 - c. independent
 - d. classical
 - e. neoclassical

2. The theory of revealed preference is
 - a. a practical technique to measure indifference curves
 - b. a discredited version of utility theory
 - c. a means of demonstrating how indifference curve can be, in principle, determined
 - d. none of the above
 - e. all of the above

3. The Paasche index
 - a. measures the change in the cost of market basket purchased in the original year
 - b. measures the change in the cost of market basket purchased in the later year
 - c. always exceeds 1
 - d. always is less than 1
 - e. none of the above

4. The relationship between marginal revenue and the price elasticity of demand is
 - a. $MR = P(1 - \frac{1}{n})$
 - b. $P = MR(1 - \frac{1}{n})$
 - c. $P = MR(1 + n)$
 - d. $MR = P(1 + n)$
 - e. none of the above

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5. The marginal product equals the average product when the latter is
 - a. 0.5 of its maximum value
 - b. 0.33 of its maximum value
 - c. equal to its maximum value
 - d. 0.67 of its maximum value
 - e. none of the above

6. Firm X's average total cost per month equals $\$5 \times Q$, where Q is the number of units of output produced per month. The marginal cost of the third unit produced per month is
 - a. \$15
 - b. \$20
 - c. \$25
 - d. \$30
 - e. none of the above

7. The firm's cost functions are determined by
 - a. the price of its product
 - b. its assets
 - c. its production function
 - d. the magnitude of the firm
 - e. all of the above

8. A monopoly's total cost equals $100 + 3Q$, where Q is the number of output per month. Its demand curve is $P = 200 - Q$, where P is the price of the product. The marginal revenue from the twentieth unit of output per month equals
 - a. \$3,600
 - b. \$3,439
 - c. \$180
 - d. \$140
 - e. none of the above

9. A monopolist will never produce at a point where
 - a. demand is price inelastic
 - b. demand is price elastic
 - c. marginal cost is positive
 - d. marginal cost is increasing
 - e. none of the above

10. A dominant strategy is a strategy where
 - a. the player always loses
 - b. a second best approach is used
 - c. pure strategies are mixed with impure strategies
 - d. all of the above
 - e. none of the above

11. the marginal expenditure for an input will always be
 - a. higher than the input's price
 - b. higher than the input's price if its supply curve is upward sloping
 - c. higher than the input's price if its supply curve is horizontal
 - d. all of the above
 - e. none of the above

12. Under imperfect competition in the product market, the equilibrium price of an input is given by
 - a. the intersection of the product demand and supply curves
 - b. the intersection of the input demand and supply curves
 - c. the intersection of the product demand and input supply curves
 - d. all of the above
 - e. none of the above

13. If there is only one variable input, the firm's demand curve for an input is obtained by multiplying
 - a. marginal cost and marginal revenue curves
 - b. marginal product and marginal revenue curves
 - c. average cost and marginal revenue curves
 - d. average cost and average revenue curves
 - e. none of the above

14. Marginal cost pricing is automatically the rule under
 - a. monopoly
 - b. oligopoly
 - c. monopolistic competition
 - d. perfect competition
 - e. none of the above

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15. If a once perfectly competitive industry is then monopolized, the result is that
- the marginal conditions for optimal resource allocation are no longer fulfilled
 - the marginal conditions for optimal resource allocation are still fulfilled
 - more of the marginal conditions for optimal resource allocation are fulfilled than was formally the case.
 - the marginal conditions for optimal resource allocation are no longer applicable.
 - None of the above
16. The rate of growth output per hour of labor is
- an adequate measure of the rate of technological change
 - influenced by the rate of technological change
 - independent of the rate of technological change
 - constant in the rate of technological change
 - none of the above
17. Sean's Neumann-Morgenstern utility function is $U=10+3M$, where U is utility and M is monetary gain (in dollars). Sean will prefer the certainty of a gain of \$20 over a gamble where there is 30% probability of a \$9 gain and 70% probability of
- a \$31 gain
 - a \$29 gain
 - a \$27 gain
 - a \$25 gain
 - none of the above
18. In the previous question (No. 17), if Sean has a 40% probability of receiving \$100 and 60% probability of losing \$200, the expected utility of the gamble is
- 70
 - 80
 - 230
 - 250
 - none of the above

B. 計算題(單一題，共 14 分)

某一消費者的購買行為可以用下列 Program 代表之

$$\text{Max: } U(X_1, X_2) = a \ln X_1 + b \ln X_2$$

$$\text{s.t. } P_1 X_1 + P_2 X_2 = M$$

- (a) 請問在上述 Program 中，何者是外生變數 (exogenous variables)？何者為內生變數 (endogenous variables)？(3 分)
- (b) 在上述 Program 中，消費者最適之選擇 (X_1^*, X_2^*) 為何？(4 分)
- (c) Given X_1^* 及 X_2^* ，若 P_1 有些許變化的趨勢，會對 X_1^* 及 X_2^* 產生何種影響？

$$\left(\frac{\partial X_1^*}{\partial P_1} = ? \quad \frac{\partial X_2^*}{\partial P_1} = ? \right) \text{ (3 分)}$$

- (d) 若我們將 X_1^* 及 X_2^* 代入 $U(X_1, X_2)$ 中，其代表的意義為何？我們稱 $U(X_1^*, X_2^*)$ 為什麼函數？(4 分)