國立雲林科技大學

101 學年度碩士班暨碩士在職專班招生考試試題

系所: 財金系

科目: 統計學(4)

1. (10 points) Records of a company show that 20% of the employees have only a high school diploma; 70% have bachelor degrees; and 10% have graduate degrees. Of those with only a high school diploma, 10% hold management positions; whereas, of those having bachelor degrees, 40% hold management positions. Finally, 80% of the employees who have graduate degrees hold management positions.

a. What percentage of employees holds management positions?
b. Given that a person holds a management position, what is the probability that she/he has a graduate degree?

2. (10 points) In a survey conducted by the Gallup Sports Organization, respondents were asked, "What is your favorite sport to watch?" Football and basketball ranked number one and two in terms of preference. Assume that in a group of 10 individuals, seven preferred football and three preferred basketball. A random sample of three of these individuals is selected.

a. What is the probability that exactly two preferred football?
b. What is the probability that the majority (either two or three) preferred football?

3. (10 points) Consider the following results for independent samples taken from two populations.

Sample 1	Sample 2
$n_1 = 400$	$n_2 = 300$
$\overline{p_1} = 0.48$	$\overline{p_2} = 0.36$

a. Develop a 95% confidence interval for the difference between the two population proportions.

4. (10 points) If the joint probability density of X and Y is given by

$$f(x,y) = f(x) = \begin{cases} \frac{1}{4}(2x+y), & \text{for } 0 < x < 1, 0 < y < 2 \\ 0, & \text{elsewhere} \end{cases}$$

find

a. the marginal density of Y;
b. the conditional density of X given Y=1.

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5. (10 points) If a random variable X has a uniform density with the parameters α and β, find its distribution function.

6. (25 points) In the simple regression Model, $Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$, i = 1,2,3, ... , n. X is control variable. We utility the method of least square to estimate β_0, β_1 with $E(\varepsilon_i) = 0$, $Var(\varepsilon_i) = \sigma^2$, and ε_i is uncorrelated

a. Please show that $\frac{\sum_{i=1}^{n} \hat{Y}_i}{n} = \bar{Y}$ (5 points)

b. Please show that $\sum_{i=1}^{n} e_i X_i = 0$ (5 points)

c. Please show that $E(MSE) = \sigma^2$, $MSE = \frac{SSE}{n-2}$ (5 points)

d. Please show that $Cov\left(\bar{Y}, \hat{\beta}_1\right) = 0$ (5 points)

e. Please show that $Cov\left(\hat{\beta}_0, \hat{\beta}_1\right) = \frac{-\bar{X}\sigma^2}{\sum_{i=1}^{n}(X_i - \bar{X})^2}$ (5 points)

7. (25 points) Suppose that the least square regression line $Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$ for these data. X is rate of market return (R_m) , Y is that the rate of stock return minus riskless rate ($R_i - R_f$) with $E(\varepsilon_i) = 0$, $Var(\varepsilon_i) = \sigma^2$. The coefficient of determination is 0.9025.

X	60	30	40	-30	20	-40	0	-10	-50	-20
Y	100	70	80	10	60	20	50	30	20	10

$\sum_{i=1}^{n} X_i = 0$, $\sum_{i=1}^{n} Y_i = 450$, $\sum_{i=1}^{n} X_i^2 = 12000$,

$\sum_{i=1}^{n} Y_i^2 = 29300$, $\sum_{i=1}^{n} X_i Y_i = 9900$

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Table1 Results of ANOVA

Sources	DF	SS (sum of square)	MS (mean of square)	F value	P value of F
regression	1	(A)	(C)	(E)	0.00003
error	8	(B)	(D)		
total	9	9050			

Table2 The Empirical Results of Regression Model

	Coefficient	S.E.	t value	p value of t
β_0	(F)	3.321333	(H)	0.00000
β_1	(G)	0.095879	(I)	0.03

a. Please fill out (A) to (E) of table 1 (10 points)
b. Please fill out (F) to (I) of table 2 (8 points)
c. Does the model satisfy goodness of fit at $\alpha = 0.01$ of significant level? Why?(2 points)
d. Compute 90% confidence limits for Y when X is equal to 50.(only show your equation) (3 points)
e. With regarding the empirical results of Table 2, is the capital asset pricing model supported ? Why? (2 points)

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本份試卷共有 50 題單選題，每題 2 分，請依題目順序將答案寫在答案卷上

1. Suppose there are two goods, X and Y, with X measured on the horizontal axis and Y measured on the vertical axis. Which of the following statements about a budget line relating the two goods is incorrect?
   (a) The budget line shows all the possible combinations of X and Y a consumer can buy, given the income and prices assumed and zero savings.
   (b) The slope of the budget line is minus P_Y/P_X.
   (c) The slope of the budget line reflects the trade-off of one good for another.
   (d) Drawing the budget line as a smooth line reflects the assumption of continuous divisibility.
2. Perfect complements are associated with
   (a) U-shaped indifference curves.
   (b) straight-line indifference curves.
   (c) V-shaped indifference curves.
   (d) L-shaped indifference curves.
3. If the prices of two goods, X and Y, increase by 50 percent, and the consumer's income rises by 100 percent,
   (a) the slope of the consumer's budget line will change, becoming flatter to indicate that X and Y are now relatively less expensive.
   (b) the consumer's budget line will shift out from the origin, with its slope unchanged.
   (c) the consumer's budget line will shift out from the origin and its slope will also change, reflecting the lower prices for X and Y.
   (d) the consumer's budget line will remain unchanged.
4. For the same fall in price, the increase in consumer surplus is _____ if the good is normal than if it is inferior.
   A) less
   B) greater
   C) the same
   D) need more information
5. The demand function for C derived from a Cobb-Douglas utility function, $U = CM^{-1}$ depends upon
   A) income and the prices of C and M.
   B) income and the price of C.
   C) income and the price of M.
   D) the prices of both C and M, but not income.
6. If the price-consumption curve is horizontal, then demand elasticity
   A) may be between 0 and 0.5.
   B) must be between 0 and 0.5.

C) is greater than 1.

D) equals 1.

7. If the price of X increases and the demand for Y decreases, then

A) X and Y are complements.

B) X and Y are substitutes.

C) X is a normal good and Y is a Giffen good.

D) X is a normal good and Y is an inferior good.

8. The indifference curve approach to measuring consumer surplus will yield the same answer as the approach using areas under the demand curve if

A) the substitution effect of a price change is zero.

B) the substitution effect of a price change is larger than the income effect.

C) the income effect of a price change is larger than the income effect.

D) the income effect of a price change is zero.

9. A subsidy can actually cause the consumption of subsidized goods to fall if

A) the consumer has concave indifference curves.

B) the government prohibits resale of the good.

C) it is very difficult for the consumer to buy more of the subsidized good.

D) none of the above.

10. Two goods are allocated efficiently between consumers when

A) all items owned by someone.

B) there are no trades that will make anyone strictly worse off.

C) one party is as well off as possible, given the welfare of the other party.

D) both parties are maximizing utility.

11. Assume that Jeff and Jane both consume only two goods: burgers and soft drinks. Suppose that Jeff would be willing to trade three soft drinks for one more burger, while Jane is willing to trade only two soft drinks for one more burger. Under these conditions, if Jeff and Jane are going to trade then

A) Jeff should trade soft drinks for burgers.

B) Jeff should trade burgers for soft drinks.

C) Jeff should be willing to trade, but Jane should not.

D) Jane should be willing to trade, but Jeff should not.

12. The slope of the total product curve measures

A) the marginal rate of technical substitution.

B) marginal product.

C) average product.

D) the maximum output.

13. If isoquants are drawn as right angles, it implies
    A) that the two inputs are perfect substitutes for each other.
    B) that the MRTS is constant.
    C) that the inputs must be used in fixed proportions.
    D) none of the above.
14. Which of the following statements about marginal cost is incorrect?
    A) A U-shaped marginal cost curve implies the existence of diminishing returns over all ranges of output.
    B) When marginal cost equals average cost, average cost is at its minimum.
    C) In the short-run, the marginal cost curve is parallel to the average fixed cost curve.
    D) When marginal cost is falling, total cost is rising at a decreasing rate.
15. If there are no fixed costs and variable costs are constant at $1.00 per unit over the relevant range of output, what will the average total cost be after 1 unit is produced?
    A) $0
    B) $1
    C) $1.50
    D) $2
16. The law of diminishing marginal returns
    A) is relevant in both the short and long-run.
    B) says that increasing fixed inputs eventually results in smaller and smaller increases in total output.
    C) says that increasing variable inputs eventually results in smaller and smaller increases in total output.
    D) says that increasing variable inputs eventually results in smaller and smaller increases in total cost.
17. The demand curve of a perfectly competitive firm is determined by
    A) the level of the quality of the good the firm produces.
    B) the intersection of the market demand and supply curves.
    C) the reputation of the firm.
    D) the price the firm chooses to charge.
18. In the short-run, if a competitive firm finds itself operating at a loss, it will
    A) shut down.
    B) continue to operate as long as price is greater than average variable cost.
    C) raise the price of its product.
    D) reduce the size of its plant to lower fixed costs.
19. After a significant decrease in the price of a variable input, at the initial output level
    A) marginal revenue is higher than at the final output level.
    B) marginal cost is higher than marginal revenue.
    C) marginal cost is lower than average revenue.
    D) marginal cost is still equal to marginal revenue.
20. When a price ceiling is imposed on a competitive market at a level below the equilibrium price
    A) the gain to producers outweighs the loss to consumers.

B) market efficiency is reduced.

C) market efficiency is not altered.

D) producer surplus is increased.

21. The monopolist's demand curve slopes downward because

A) the monopolist faces the market demand curve which is the horizontal summation of all individual consumer demands.

B) the monopolist is a large firm and can force people to buy their product at whatever price they desire.

C) all firms face downward-sloping demand curves.

D) the marginal product of labor is diminishing.

22. A monopoly will never operate in the inelastic segment of its demand curve because

A) average revenues are negative.

B) it would imply a marginal cost greater than marginal revenue.

C) total revenue is still rising.

D) none of the above.

23. A perfectly price-discriminating monopolist

A) restricts output more than an ordinary monopolist does.

B) sell the last unit of output where price equals marginal cost.

C) charges all consumers the same price but sells each different quantities.

D) has less producer surplus than does an ordinary monopolist.

24. The monopolistically competitive firm is in many ways like the competitive firm. However, it is unlike the competitive firm in that:

A) it might make a profit in the short-run, but not in the long-run.

B) it might make a profit in the long-run and the short-run.

C) entry into the industry is not unrestricted.

D) it sells a differentiated product, whereas the competitive firm does not.

25. Most economists would not advocate government intervention in monopolistically competitive industries because

A) monopolistically competitive industries are efficient.

B) firms earn zero profits in the long run just as perfectly competitive firms do.

C) the product variety produced by monopolistic competition is a benefit that helps offset its relatively small welfare costs.

D) these firms tend to be important exporters.

26. 請問台灣在 2011 年的國內生產毛額(GDP)大概是

(A) 14 兆新台幣 (B) 14 億美金 (C) 14 兆美金 (D) 1.4 兆新台幣

27. 請問下列關於 2008-2011 年台灣的名目 GDP 成長率的敘述合者正確?

(A) 每年皆爲正成長

(B) 除了 2008 年出現衰退以外，每年皆爲正成長
(C) 除了 2009 年出現衰退以外，每年皆爲正成長
(D) 每年的成長率都在 10%以下

28. 請問下列哪個國家或地區在 2011 年時出現名目 GDP 衰退的現象?
(A) 台灣
(B) 中國大陸
(C) 美國
(D) 希臘

29. 小可從韓國進口 200 件成衣回台網拍，每件成本爲 500 元。一開始售價爲 1,000, 但銷路不好只賣出 50 件，開學後小花急需現金繳學費, 無奈之下只好以 300 的價格將其餘 150 件賠本賣出。假設小花會誠實的申報所得，請問小可的網拍活動對於台灣的 GDP 的貢獻爲和?
(A) 95,000 元 (B) 5,000 元 (C) -5,000 元 (D) 沒有任何貢獻

30. 根據行政院主計處「家庭收支調查」，2011 年台灣的貧富差距爲 6.19 倍，請問此貧富差距是如何計算出來的?
(A) 最有錢 10%的家庭的可支配所的平均，除以最貧窮的 10%家庭平均可支配所得的平均。
(B) 最有錢 20%的家庭的可支配所的平均，除以最貧窮的 20%家庭平均可支配所得的平均。
(C) 最有錢 20%的家庭**每人**可支配所得的平均，得除以最貧窮的 20%家庭**每人**可支配所得的平均。
(D) 最有錢 10%的家庭**每人**可支配所得的平均，得除以最貧窮的 10%家庭**每人**可支配所得的平均。

31. 以下哪一種政府政策最不可能減少貧富差距?
(A) 全民健保
(B) 國民年金
(C) 特種貨物及勞務稅 (奢侈稅)
(D) 低收入戶教育補助

32. 2012 年時台灣老農津貼發放的額度爲每月 7000 元，未來每 4 年將依消費者物價指數成長率調整發放金額。2012 年年初的消費者物價指數爲 108, 假設到了 2016 年物價指數上升爲 117, 請問屆時老農津貼每月將增加爲多少錢?
(A) 6,353 元 (B) 6,461 元 (C)7,583 元 (D) 7,560 元

33. 在 2012 年初美國「富比世雜誌」(Forbes) 公布的全球最富有國家與地區的排名中，台灣的人均國民所得高達 35,604 美元，世界排名第 21，不只超越排名 25 的日本和 27 的南韓，甚至也超過歐洲的英國、法國、西班牙、義大利等國。依照主計處的資料 2011 年台灣的人均所得約在 20,000 美元左右。請問以下何種因素最有可能解釋富比世與主計處資料的差距?
(A) 主計處的資料未考慮地下經濟活動

(B) 主計處的資料未考慮家庭勞務的價值
(C) 富比世的資料考慮了各國的環境品質及休閒的價值
(D) 富比世的資料考慮的各國的物價與實質購買力

題組: 請根據以下某開放經濟國家的資料計算 8-11 題的總體經濟變數:

GDP =9,
政府稅收 (Tax)=1.5,
私人儲蓄 (Private Saving)=0.5,
政府儲蓄 (Public Saving) = -0.2
民間投資 =2

34. 民間消費支出 = (A) 7.5 (B) 7 (C) 7.2 (D) 6.8
35. 政府支出 = (A) 1.7 (B) 1.3 (C) 1.5 (D) 3.5
36. 國家總儲蓄 = (A) 2 (B) 1.2 (C) -1.2 (D) 0.3
37. 淨資本流出 = (A) 1.7 (B) 1.2 (C) -1.2 (D) -1.7

38. 請問台灣 2011 年的失業率及勞動參與率大約爲
(A) 失業率在 5%左右，勞動參與率在 60%左右
(B) 失業率在 3%左右，勞動參與率在 70%左右
(C) 失業率在 8%左右，勞動參與率在 50%左右
(D) 失業率在 6%左右，勞動參與率在 80%左右

39. 台灣 2011 年時 20-24 歲年齡層的失業率高達 12.7， 遠高於 24 歲以上的人口。請問以下何種因素較可能解釋此現象?
(A) 台灣大學生延畢或畢業後繼續升學的比例提高
(B) 台灣的男性服兵役的期間不斷縮短
(C) 台灣的年輕人越來越不喜歡工作
(D) 台灣的年輕人越來越找不到自己喜歡的工作

40. 根據台灣主計總處 2011 年的調查，台灣女性平均每月薪資只有男性的 79.9%。因此，勞委會在婦女節前夕，公布 3 月 5 日爲台灣今年的同酬日，希望喚起兩性同酬意識，期許爲縮小兩性薪資差距努力。但勞委會提供的資料也顯示大學畢業的女性起薪爲男性的 97.2%，差距較小。請問以下何種原因較不能解釋上述兩性的薪資差距的現象?
(A) 女性的工時較短，也較少加班
(B) 雇主刻意歧視非大學畢業的女性
(C) 女性從事的較多是薪資水準較低 (如風險較低) 的職業
(D) 女性因生育或家庭因素年資較低

41. 以下何者與 2011 年諾貝爾經濟學獎得主 T. Sargent 的研究方法及研究成果較不相關:

(A) 以理性預期的概念來推導總體經濟模型
(B) 使用向量自我迴歸(vector auto-regression)來估計總體經濟模型中的參數
(C) 被預期到的政府政策是無效的
(D) 菲利浦曲線是一條垂直線

42. 在2011年歐債危機時美國聯準會推出了第二波量化寬鬆政策 (QE2), 請問聯準會實際上如何執行 QE2?
(A) 公開市場操作 (在市場上買入債券)
(B) 調低重貼現率
(C) 調低銀行的存款準備率
(D) 以上皆是

43. 承上題，以下何者較可能是量化寬鬆政策無法奏效的原因?
(A) 美國公債信用評等降低
(B) 通膨陷阱
(C) 流動性陷阱
(D) 美國政府預算赤字逐年增加

44. 由於受到歐債危機的影響，2011年底義大利的舉債成本飆上1997年來的新高，5年期公債殖利率達到6.47%。請問以下哪一個公債殖利率的定義最爲精確?
(A) 投資人投資公債一年後賣出可以得到的報酬率
(B) 投資公債每年可以得到的利息除以購買時的投資金額
(C) 投資公債並持有到期的預期報酬率
(D) 投資公債的報酬率與無風險利率的利差

45. 2011年年底時義大利的公債殖利率比德國的要高4.62%，請問此利差大部分反應了何種風險?
(A) 利率風險
(B) 流動性風險
(C) 信用風險
(D) 匯率風險

46. 台灣可口可樂一罐25元，美國可口可樂一罐0.8美元。目前新台幣兌美元的匯率約爲30。請問根據購買力平價假說(Purchasing Power Parity)，用可樂的價格所計算出的合理新台幣兌美元匯率應是多少?
(A) 37.5 (B)32 (C)24 (D)31.25

47. 已下何者不屬於我國經建會所編製的景氣指標中的「領先指標」:
(A) 外銷訂單指數
(B) 股價指數

(C) 核發建照面積
(D) 工業生產指數

48. 下列哪一種產業較不可能是因政府與中國大陸簽訂「兩岸經濟合作架構協議 (ECFA)」而受惠或受害的產業
(A) 個人電腦零組件
(B) 紡織業
(C) 塑化業
(D) 汽車零組件

49. 請問根據財政部所公布的國債鐘，2012 年初國人平均每人負擔政府債務 (政府一年以上未償債務餘額及短期債務餘額，不計入隱藏債務)大概是多少?
(A) 2 千元左右
(B) 2 萬元左右
(C) 20 萬元左右
(D) 200 萬元左右

50. 請問以下何者較不可能是台灣過去經濟成長的動力
(A) 勞動人口及勞動參與率的增加
(B) 開放外資投資本土企業
(C) 良好的司法制度及官僚體制
(D) 技術創新

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系所：財金系

科目：微積分(3)

1. Determine the value of x in the domain of definition makes the following function continuous. $f(x)=x\csc x, f(0)=1.$ (5 分)

2. Write the first four terms of the following sequence. $\left\{\frac{(-1)^n x^{2n-1}}{1.3.5.,,,.(2n-1)}\right\}$ (5 分)

3. Find a possible nth term for the sequence whose first 5 terms are indicated as follows. $\frac{-1}{5},\frac{3}{8},\frac{-5}{11},\frac{7}{14},\frac{-9}{17},....$ (5 分)

4. If $xy-\ln y=1$, calculate (a) $\frac{dy}{dx}$, (b) $\frac{d^2y}{dx^2}$. (10 分)

5. Evaluate $\int_0^\infty \frac{dx}{1+x^2}$. (5 分)

6. Evaluate $\lim_{M\to\infty}\int_0^M \frac{dx}{x^4+4}$. (10 分)

7. Let $f(x)=\sum_1^\infty \frac{\sin nx}{n^3}$, evaluate $\int_0^\pi f(x)dx$. (10 分)

8. Find the second derivative of the function $f(x)=x\ln x+2x^2$ at $x=1$. (10 分)

9. Evaluate $\int_0^2 \frac{x^2-1}{\sqrt{x^3-3x+4}}dx$. (10 分)

10. Let α be the positive root of the equation $x^2+x-1=0$. What is the value of the series $\sum_{n=0}^\infty \alpha^n$? (10 分)

11. Evaluate $\int_0^{\ln 2} x e^x dx$. (10 分)

12. A company sells one product whose demand functions is given by $q=100e^{-0.05p}$ where q represents the units of the product and p is the price of a product. Suppose that the revenue $R=pq$. Find the price of the product as the company has the maximal revenue. (10 分)