

國立中山大學 113 學年度 碩士班暨碩士在職專班招生考試試題

科目名稱：微積分【財管系碩士班甲組】

—作答注意事項—

考試時間：100 分鐘

- 考試開始鈴響前不得翻閱試題，並不得書寫、劃記、作答。請先檢查答案卷（卡）之應考證號碼、桌角號碼、應試科目是否正確，如有不同立即請監試人員處理。
- 答案卷限用藍、黑色筆(含鉛筆)書寫、繪圖或標示，可攜帶橡皮擦、無色透明無文字墊板、尺規、修正液（帶）、手錶(未附計算器者)。每人每節限使用一份答案卷，請衡酌作答。
- 答案卡請以 2B 鉛筆劃記，不可使用修正液（帶）塗改，未使用 2B 鉛筆、劃記太輕或污損致光學閱讀機無法辨識答案者，後果由考生自負。
- 答案卷（卡）應保持清潔完整，不得折疊、破壞或塗改應考證號碼及條碼，亦不得書寫考生姓名、應考證號碼或與答案無關之任何文字或符號。
- 可否使用計算機請依試題資訊內標註為準，如「可以」使用，廠牌、功能不拘，唯不得攜帶書籍、紙張（應考證不得做計算紙書寫）、具有通訊、記憶、傳輸或收發等功能之相關電子產品或其他有礙試場安寧、考試公平之各類器材入場。
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科目名稱：微積分【財管系碩士班甲組】

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※本科目依簡章規定「不可以」使用計算機(問答申論題)

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微積分試題共有 10 題，共計 100 分。請寫出計算過程，否則不予計分。

Q1: Please calculate the following limit: (10 points)

$$\lim_{x \rightarrow \infty} \frac{\sin x}{x}$$

Q2: Please calculate the following limit: (10 points)

$$\lim_{y \rightarrow \infty} (\sqrt{y^2 + y - 1} - \sqrt{y^2 - y})$$

Q3: Given that $A > B > 0$, please calculate the following limit: (10 points)

$$\lim_{n \rightarrow \infty} (A^n + B^n)^{\frac{1}{n}}$$

Q4: Please solve the following question: (10 points)

$$\int_0^1 \int_0^{\sqrt{1-x^2}} y \, dy \, dx$$

Q5: Please solve the following question: (10 points)

$$\int_0^1 \int_{\sqrt{x}}^1 e^{y^3} \, dy \, dx$$

Q6: Please solve the following question: (10 points)

$$\int_0^1 \int_y^1 y e^{-x^3} \, dx \, dy$$

Q7: Please solve the initial value question: (10 points)

$$\ddot{y} - \dot{y} - 2y = 0, \quad y(0) = 6, \quad \dot{y}(0) = 0$$

Q8: Please solve the initial value question: (10 points)

$$\ddot{y} - 4\dot{y} + 4y = 0, \quad y(0) = 0, \quad \dot{y}(0) = 10$$

Q9: Please find the variance for the following probability density function: (10 points)

$$f(x) = 2 - 2x, \quad 0 \leq x \leq 1$$

Q10: Please form the Lagrangian and solve the maximum values of a , b , and c based on the following objective function: $f(a, b, c) = bc + ac$, subject to: $b^2 + c^2 = 1$ and $ac = 3$. (10 points)

國立中山大學 113 學年度 碩士班暨碩士在職專班招生考試試題

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題號：443004

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壹、單選題，每題 2.5 分，總分 80 分

- 1) Suppose that salsa manufacturers sell 2 million bottles at \$3.50 in one year and 3 million bottles at \$3 in the next year. Based on this information, we can conclude that the
- A) law of supply has been violated. B) law of demand has been violated. C) demand for salsa has increased. D) supply of salsa has increased.
- 2) Market failures
- A) are only a concern when they result in prices that are too high. B) apply exclusively to situations where markets do not produce any of an economically desirable good. C) result in overproduction or underproduction of a good. D) result from government interference in markets.
- 3) Assume that there are four consumers A, B, C, and D, and the price that each is willing to pay for a glass of lemonade is, respectively, \$2.50, \$2.25, \$2.00, and \$1.75. If the actual price of lemonade is \$1.25 per glass, then consumer surplus in this market will be
- A) \$4.50. B) \$3.50. C) \$1.25. D) \$1.00.
- 4) Answer the question based on the following information for four state park programs of increasing scope. All figures are in millions of dollars.

Program	Total Cost	Total Benefit
A	\$ 2	\$ 5
B	4	8
C	7	13
D	11	16

The data indicate that

- A) program D should be undertaken because the marginal cost is less than the marginal benefit. B) the marginal cost and marginal benefit are \$3 and \$5 million, respectively, for program C. C) all the state park programs are economically justifiable based on cost-benefit analysis. D) none of the state park programs are economically justifiable based on cost-benefit analysis.
- 5) The relationship between prices of Good X and the quantity demanded of four products, A–D, is shown below.

Price of X	Quantity Demanded			
	Good A	Good B	Good C	Good D
\$ 20	24	30	42	120
\$ 24	22	35	42	126

Which of the following statements is true about the relationship between Good X and Goods A–D?

- A) A is complementary, B and D are substitutes, C is unrelated. B) A is a substitute, B and D are complementary, C is unrelated. C) A is an inferior good, B and D are normal goods, and C is unrelated. D) There is no relationship between Good X and any of the other goods.

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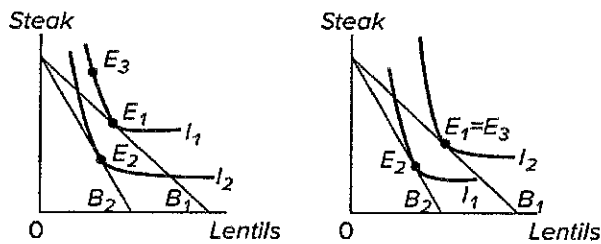
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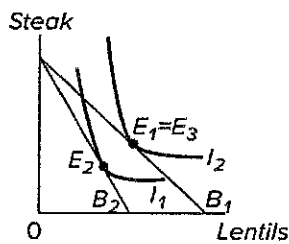
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共 9 頁第 2 頁

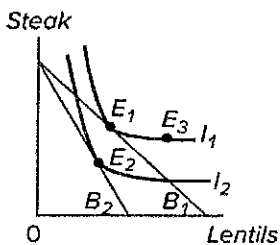
- 6) Recently, the price of lentils increased, impacting the residents of Lincoln. They observed their neighbor, Alex, reducing his consumption of both lentils and steak, leading to a decrease in his utility. In response, the community established the "Alex Aid Fund." Alex received a cash grant matching the amount he needed to restore his original utility level. With gratitude, he quickly went shopping, buying more steak and fewer lentils. The graphs depict two indifference curves for Alex, I_1 and I_2 , and the two budget constraints, B_1 and B_2 , that he faced. Let E_1 represent Alex's initial equilibrium, E_2 equal his equilibrium following the increase in the price of lentils, and E_3 his equilibrium after receiving the cash from the fund. Which graph aligns with Alex's experience as described?



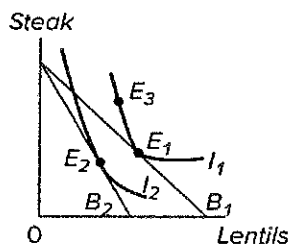
(A)



(B)



(C)



(D)

A) graph A

B) graph B

C) graph C

D) graph D

- 7) Answer the question on the basis of the following cost data.

Output	Total Cost
0	\$ 40
1	50
2	58
3	63
4	68
5	75
6	90
7	112

What is the average variable cost when the marginal cost curve intersects the average variable cost curve?

A) \$5

B) \$7

C) \$10

D) \$15

- 8) Suppose that at 500 units of output, marginal revenue is \$9, marginal cost is \$6, and average variable cost is \$7. On the basis of this information, we

A) cannot determine whether the firm should produce or shut down in the short run.

B) can say that the firm should continue to produce but reduce output in the short run.

C) can say that this firm is maximizing profits or minimizing losses in the short run.

D) can say that the firm should increase production in the short run.

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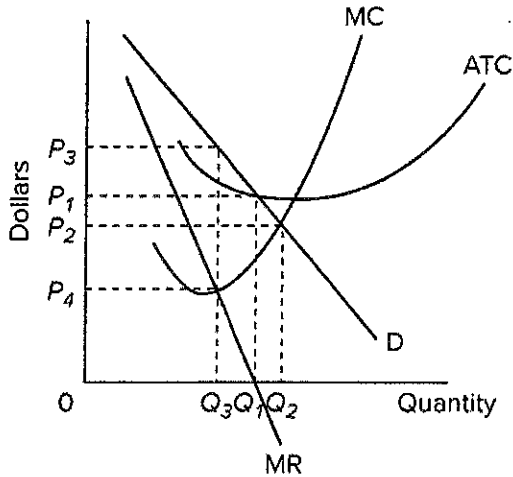
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9) Refer to the diagram for a pure monopolist. If a regulatory commission sets the price to be the socially optimal price for this market,



- A) resources will be overallocated to production of this good. B) the firm will also receive the fair-return price. C) it will encourage firm entry into the market. D) the firm will experience an economic loss unless the government provides a sufficient subsidy.

10) Suppose that a monopolistically competitive firm is currently selling 600 units of output at a price of \$140 per unit. At 600 units of output, the firm's marginal revenue is \$75, its marginal cost is \$90, its average total cost is \$150, and average variable cost is \$80. Based on this information,

- A) the monopolist is earning economic profits that could be increased by lowering price and increasing output. B) the monopolist is earning economic profits that could be increased by raising price and reducing output. C) the monopolist is incurring economic losses that could be reduced by lowering price and increasing output. D) the monopolist is incurring economic losses that could be reduced by raising price and reducing output.

11) Refer to the payoff matrix. Which cell represents the equilibrium outcome of this game?

		Beta's Price Policy	
		High	Low
Alpha's Price Policy	High	A \$30 / \$30	B \$40 / \$20
	Low	C \$20 / \$40	D \$25 / \$25

- A) A B) B C) C D) D

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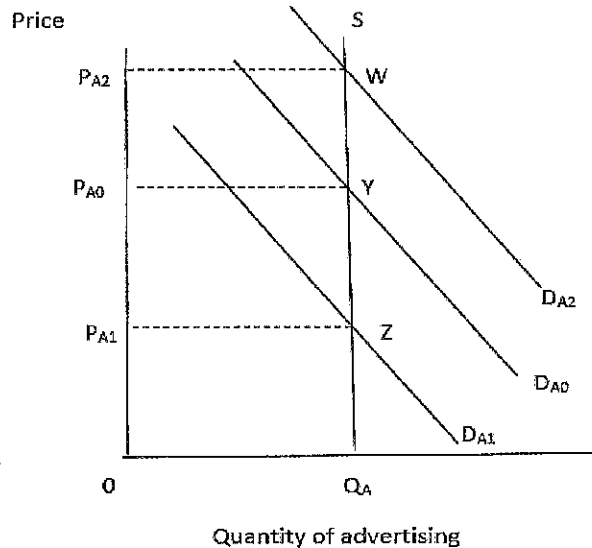
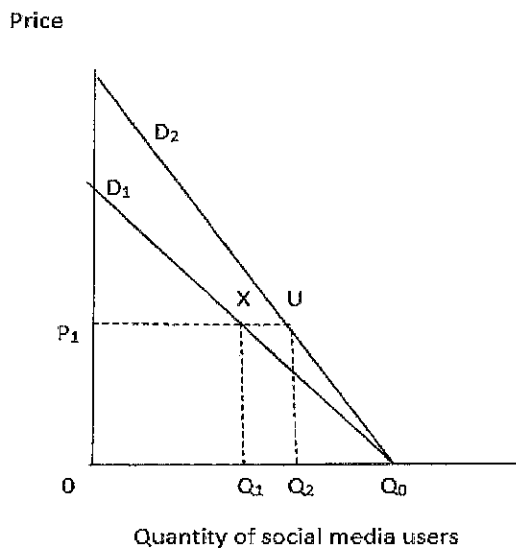
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12) Suppose the diagrams represent an Internet firm that offers social media services. The graph on the left represents the demand for users of the social networking; the graph on the right represents the demand for advertising space from would-be advertisers on the platform. Currently the platform does not charge for social media services ($P = 0$), and the demand for advertising space is shown by D_{A2} (equilibrium at point W). If the firm begins charging social media users P_1 , which of the following set of circumstances is the most favorable for this firm?



- A) The demand for social media network use is represented by D_2 , and the demand for advertising shifts to D_{A1} .
- B) The demand for social media network use is represented by D_1 , and the demand for advertising shifts to D_{A0} .
- C) The demand for social media network use is represented by D_1 , and the demand for advertising shifts to D_{A1} .
- D) The demand for social media network use is represented by D_2 , and the demand for advertising shifts to D_{A0} .

13)

Expected Rate of Return (%)	R&D (\$M)	Interest Rate Cost of Funds (%)
15	20	12
12	40	12
9	60	12
6	80	12
3	100	12

Refer to the data. If the interest rate cost of funds fell to 10 percent

- A) the firm would increase R&D spending by \$20 million.
- B) the firm would likely increase R&D spending, but by less than \$20 million.
- C) the firm would increase R&D spending by more than \$20 million.
- D) the firm would reduce R&D spending by \$20 million.

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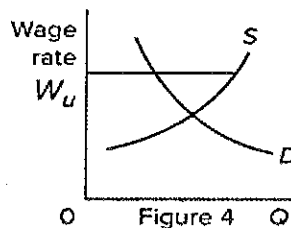
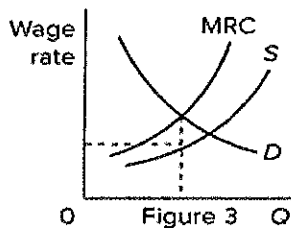
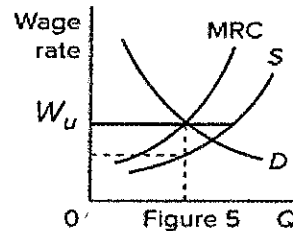
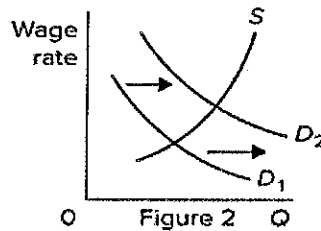
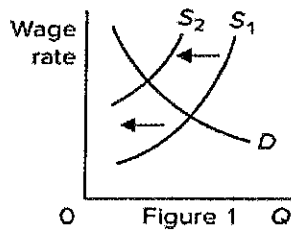
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14) Refer to the labor market diagrams. The case of bilateral monopoly is represented by Figure



A) 5.

B) 4.

C) 2.

D) 1.

15)

Energy Source	Maximum Capacity (per plant)	Cost of Building Power Plant (in millions)	Operating Cost at One-Half Capacity (per kwh)	Operating Cost at Full Capacity (per kwh)
Coal	30 Megawatts	\$ 50	\$ 0.20	\$ 0.05
Natural Gas	20 Megawatts	\$ 30	\$ 0.30	\$ 0.15
Hydroelectric	10 Megawatts	\$ 15	\$ 0.50	\$ 0.20

Consider a city requiring 30 megawatts of energy off-peak and 40 megawatts at peak times. The city, previously buying electricity externally, plans to construct its own power plants. Options include coal, natural gas, and hydroelectric plants, each with different costs. The goal is to minimize power generation costs, assuming stable future energy demands. To this end, the city should build

A) two coal-fired plants.

B) two natural gas plants.

C) one coal-fired and one hydroelectric plant.

D) four hydroelectric plants.

16)

Quantity Supplied	Price	Quantity Demanded
12,000	\$ 5,000	500
10,000	4,000	1,500
7,000	3,000	2,800
4,000	2,000	4,000
1,000	1,000	7,000

The table gives supply and demand data for a certain elective surgical procedure. If suppliers provide the quantity of health care demanded and insurance pays one-half of the equilibrium price, there would be a resulting allocative

A) efficiency because, at 7,000 units, the marginal cost to society is \$3,000 and the marginal benefit is \$2,000.

B) efficiency because, at 4,000 units, the marginal cost to society of \$2,000 equals the marginal benefit of \$2,000.

C) inefficiency because, at 7,000 units, the marginal cost to society is \$1,000 and the marginal benefit is \$3,000.

D) inefficiency because, at 7,000 units, the marginal cost to society is \$3,000 and the marginal benefit is \$1,000.

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17) Which of the following statements is correct?

- | | | | |
|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| A) For a given real interest rate, the nominal interest must decrease if expected inflation increases. | B) For a given nominal interest rate, the real interest will decrease if inflation decreases. | C) For a given expected inflation rate, the nominal interest must increase if real interest decreases. | D) For a given real interest rate, the nominal interest must increase if expected inflation increases. |
|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|

18) What are the primary effects of cost-push inflation?

- | | | | |
|---------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| A) It raises real output, increases employment, and redistributes income. | B) It reduces real output, reduces employment, and redistributes income. | C) It raises real output but redistributes a decreased level of real income. | D) It reduces real output but redistributes an increased level of real income. |
|---------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------|

19)

(1)		(2)		(3)	
DI	C	DI	C	DI	C
\$ 0	\$ 4	\$ 0	\$ 65	\$ 0	\$ 2
10	11	80	125	20	20
20	18	160	185	40	38
30	25	240	245	60	56
40	32	320	305	80	74
50	39	400	365	100	92

Refer to the given consumption schedules. DI signifies disposable income and C represents consumption expenditures. All figures are in billions of dollars. The marginal propensity to consume

- | | | | |
|-------------------------------|-------------------------------|-------------------------------|----------------------------------------------|
| A) is highest in economy (1). | B) is highest in economy (2). | C) is highest in economy (3). | D) cannot be calculated from the data given. |
|-------------------------------|-------------------------------|-------------------------------|----------------------------------------------|

20) Which statement about the multiplier is correct?

- | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A) If a \$20 billion increase in spending creates \$20 billion of new income in the first round of the multiplier process and \$15 billion in the second round, the multiplier in the economy is 5. | B) If a \$40 billion increase in spending creates \$40 billion of new income in the first round of the multiplier process and \$20 billion in the second round, the multiplier in the economy is 4. | C) If a \$60 billion increase in spending creates \$60 billion of new income in the first round of the multiplier process and \$50 billion in the second round, the multiplier in the economy is 5. | D) If an \$80 billion increase in spending creates \$80 billion of new income in the first round of the multiplier process and \$60 billion in the second round, the multiplier in the economy is 4. |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

21) In a private closed economy,

1. the marginal propensity to save is 0.25,
2. consumption equals income at \$120 billion,
3. the level of investment is \$40 billion.

What is the equilibrium level of income?

- | | | | |
|------------------|------------------|------------------|------------------|
| A) \$280 billion | B) \$320 billion | C) \$262 billion | D) \$198 billion |
|------------------|------------------|------------------|------------------|

22) Refer to the accompanying information for a closed economy. If government spends \$80 billion at each level of GDP, and imposes a lump-sum tax of \$100,

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GDP	C	S	I_g
\$ 118	\$ 118	\$ 0	\$ 80
218	178	40	80
318	238	80	80
418	298	120	80
518	358	160	80
618	418	200	80
718	478	240	80

- A) equilibrium GDP will now be \$400. B) equilibrium GDP will now be \$368. C) equilibrium GDP will now be \$300. D) the equilibrium GDP cannot be determined.

23) An economy is employing 3 units of capital, 6 units of raw materials, and 9 units of labor to produce its total output of 650 units. Each unit of capital costs \$11; each unit of raw materials, \$5; and each unit of labor, \$2. If the per-unit price of raw materials rises from \$5 to \$9 and all else remains constant, the per-unit cost of production will rise by about

- A) 41 percent. B) 100.05 percent. C) 60 percent. D) 51 percent.

24) A given reduction in government spending will dampen demand-pull inflation by a greater amount when the

- A) economy's MPS is large. B) economy's aggregate supply curve is flat. C) economy's aggregate supply curve is steep. D) unemployment rate is high.

25) Refer to the table, in which investment is in billions. Which of the following scenarios would be consistent with expansionary monetary policy?

Interest Rate (1)	Investment (2)	Investment(3)
4%	\$ 100	\$ 80
5	90	70
6	80	60
7	70	50
8	60	40

- A) the Fed raises the interest rate from 5 to 6 percent, then investment spending changes from \$90 to \$80 billion B) the Fed lowers the interest rate from 8 to 7 percent, then investment spending increases from \$60 to \$70 billion C) the Fed lowers the interest rate from 8 to 7 percent, then investment spending decreases from \$60 to \$50 billion D) the Fed raises the interest rate from 6 to 7 percent, then investment spending changes from \$80 to \$50 billion.

26) Even though the Federal Reserve lowered the risk-free interest rate, the stock market crashed during the first month of the 2020 pandemic. Why?

- A) Investor's appetite for risk did not change but they did avoid arbitrage that month. B) Investor's desire for risk decreased and they sold off their stock without regard to stock prices. C) After two weeks of deliberate study, experts' advice to investors was to sell stocks and buy real estate. D) People were so busy coping with COVID that they did not have time to manage their stock portfolios and just cashed out.

27) If government uses its stabilization policies to maintain full employment under conditions of cost-push inflation,

國立中山大學 113 學年度碩士班暨碩士在職專班招生考試試題

科目名稱：經濟學【財管系碩士班乙組】

題號：443004

※本科目依簡章規定「不可以」使用計算機(混合題)

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- A) a deflationary spiral is likely to occur. B) even higher inflation is likely to occur. C) stagflation is likely to occur. D) the Phillips Curve is likely to shift inward.

28) Rational expectations theory explains the temporary change in output that is caused by a price-level surprise occurs whenever firms

- A) think that the higher prices in the economy will cause them to lose money so they decrease output. B) confuse a general increase in the price level as a rising price for just their own product. C) increase their output and begin charging a much higher price to their surprised customers. D) decrease their output and charge a higher price because they think other firms will be doing the same thing.

29) The accompanying table gives domestic supply and demand schedules for a product. Suppose that the world price of the product is \$1.

Quantity Supplied (Domestic)	Price	Quantity Demanded (Domestic)
12	\$ 5	2
10	4	4
7	3	7
4	2	11
1	1	16

With a \$1-per-unit tariff, price and total quantity sold will be

- A) \$3 and 7 units. B) \$5 and 2 units. C) \$1 and 16 units. D) \$2 and 11 units.

30) Which of the following combinations is plausible, as it relates to a nation's balance of payments?

- A) Current account = +\$60 billion; capital account = -\$10 billion; financial account = -\$70 billion. B) Current account = +\$15 billion; capital account = -\$20 billion; financial account = +\$30 billion. C) Current account = -\$30 billion; capital account = +\$40 billion; financial account = +\$5 billion. D) Current account = +\$8 billion; capital account = -\$20 billion; financial account = +12 billion.

31) One problem associated with implementing trade controls like tariffs and quotas in order to defend the nation's fixed exchange rate is that

- A) the rationing of scarce foreign exchange might lead some governments to individually select importers based on favoritism. B) the nation loses some of the economic benefits of a free flow of world trade. C) the nation will experience a big decline in services exports albeit there will be a small increase in goods exports. D) the government might then need to raise taxes.

32) Which of the following statements is correct?

- A) Saving is high in less-developed nations because the opportunities for consumption are limited. B) For developing nations, the annual rate of population increase is about 5 percent. C) Most of the labor forces of developing nations are engaged in light industrial production. D) Investment is low in developing nations, making it difficult to increase productivity and incomes.

貳、填充題，總分20分（中英文回答皆可）

1) [4%] Determine the each item or service listed below as either a Public Good, Collective Good, Common Good, or Private Good. (2%@each)

1. A toll road without any tolls from 01:00 AM to 05:00 AM when there is very little traffic: _____.
2. Netflix: _____.

國立中山大學 113 學年度碩士班暨碩士在職專班招生考試試題

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2) [2%] The phenomenon in which insurance is purchased more frequently by those who are the most costly for companies to insure is referred to as _____.

3) [2%] What specific theory helps to explain many consumer behaviors including how people cope with negative possibilities. Framing, anchoring, the endowment effect, mental accounting, and the status quo bias? _____.

4) [2%] According to behavioral economics, temptation to make harmful decisions can be overcome by presenting decision makers with better information and more options. _____ (True/False)

5) [4%] Using the following national income accounting data: NDP is _____; NI is _____. (2%@each)

Category	Billions
Compensation of employees	\$ 194.2
Exports of goods and services	17.8
Consumption of fixed capital	11.8
Government purchases	59.4
Taxes on production and imports	14.4
Net private domestic investment	52.1
Transfer payments	13.9
Imports of goods and services	16.5
Personal taxes	40.5
Net foreign factor income	2.2
Personal consumption expenditures	219.1
Statistical discrepancy	0.0

6) [2%] A nation's real GDP was \$250 billion in Year 1 and \$260 billion in Year 2. Its population was 120 million in Year 1 and 125 million in Year 2. Its real GDP growth rate in Year 2 is _____.

7) [2%] _____ law states that in the short run, an increase in money supply leads to a decrease in the real interest rate, which stimulates investment and, consequently, aggregate demand and output.

8) [2%] _____ is a phenomenon where a country's currency value appreciates due to high interest rates, attracting short-term capital inflows but potentially leading to economic instability or a currency crisis.

國立中山大學 113 學年度 碩士班暨碩士在職專班招生考試試題

科目名稱：財務管理【財管系碩士班丙組】

— 作答注意事項 —

考試時間：100 分鐘

- 考試開始鈴響前不得翻閱試題，並不得書寫、劃記、作答。請先檢查答案卷（卡）之應考證號碼、桌角號碼、應試科目是否正確，如有不同立即請監試人員處理。
- 答案卷限用藍、黑色筆(含鉛筆)書寫、繪圖或標示，可攜帶橡皮擦、無色透明無文字墊板、尺規、修正液（帶）、手錶(未附計算器者)。每人每節限使用一份答案卷，請衡酌作答。
- 答案卡請以 2B 鉛筆劃記，不可使用修正液（帶）塗改，未使用 2B 鉛筆、劃記太輕或污損致光學閱讀機無法辨識答案者，後果由考生自負。
- 答案卷（卡）應保持清潔完整，不得折疊、破壞或塗改應考證號碼及條碼，亦不得書寫考生姓名、應考證號碼或與答案無關之任何文字或符號。
- 可否使用計算機請依試題資訊內標註為準，如「可以」使用，廠牌、功能不拘，唯不得攜帶書籍、紙張（應考證不得做計算紙書寫）、具有通訊、記憶、傳輸或收發等功能之相關電子產品或其他有礙試場安寧、考試公平之各類器材入場。
- 試題及答案卷（卡）請務必繳回，未繳回者該科成績以零分計算。
- 試題採雙面列印，考生應注意試題頁數確實作答。
- 違規者依本校招生考試試場規則及違規處理辦法處理。

國立中山大學 113 學年度碩士班暨碩士在職專班招生考試試題

科目名稱：財務管理【財管系碩士班丙組】

題號：443002

※本科目依簡章規定「不可以」使用計算機(混合題)

共 5 頁 第 1 頁

一、單選題(共五十分；第 1 題至第 10 題，每題 2 分，第 11 題至第 20 題每題 3 分)

1.(2 points)

Dividends paid reduce the net income that is reported on a company's income statement.

(A) True.

(B) False.

2. (2 points)

Additional funds needed (AFN) are typically raised using a combination of notes payable, long-term debt, and common stock. Such funds are non-spontaneous in the sense that they require explicit financing decisions to obtain them.

(A) True.

(B) False.

3. (2 points)

Since the ROA measures the firm's effective utilization of assets without considering how these assets are financed, two firms with the same EBIT must have the same ROA.

(A) True.

(B) False.

4. (2 points)

In general, if investors regard a company as being relatively risky and/or having relatively poor growth prospects, then it will have relatively high P/E and M/B ratios.

(A) True.

(B) False.

5. (2 points)

If you were restricted to investing in publicly traded common stocks, yet you wanted to minimize the riskiness of your portfolio as measured by its beta, then according to the CAPM theory you should invest an equal amount of money in each stock in the market. That is, if there were 10,000 traded stocks in the world, the least risky possible portfolio would include some shares of each one.

(A) True.

(B) False.

6. (2 points)

The beta coefficient of a stock is normally found by regressing past returns on a stock against past market returns. One could also construct a scatter diagram of returns on the stock versus those on the market, estimate the slope of the line of best fit, and use it as beta. However, this historical beta may differ from the beta that exists in the future.

(A) True.

(B) False.

7. (2 points)

Forward contracts are generally standardized instruments, whereas futures contracts are generally tailor-made for the 2 parties of the contract.

(A) True.

(B) False.

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共 5 頁第 2 頁

8. (2 points)

The price of a call option increases as the risk-free rate increases.

- (A) True.
- (B) False.

9. (2 points)

A riskless hedge can best be defined as a hedge in which an investor buys a stock and simultaneously sells a call option on that stock and ends up with a riskless position.

- (A) True.
- (B) False.

10. (2 points)

Foreign bonds are bonds sold by a foreign borrower but denominated in the currency of the country in which the issue is sold.

- (A) True.
- (B) False.

11. (3 points)

Assume that OpenSU Equipment commenced operations on January 1, 2020, and it was granted permission to use the same depreciation calculations for shareholder reporting and income tax purposes. The company planned to depreciate its fixed assets over 15 years, but in December 2020 management realized that the assets would last for only 10 years. The firm's accountants plan to report the 2020 financial statements based on this new information. How would the new depreciation assumption affect the company's financial statements?

- (A) The firm's cash position in 2020 and 2021 would increase.
- (B) The firm's operating income (EBIT) would increase.
- (C) The firm's reported 2020 earnings per share would increase.
- (D) The firm's reported net fixed assets would increase.
- (E) The provision will increase the company's tax payments.

12. (3 points)

Which of the following factors would be most likely to lead to an increase in nominal interest rates?

- (A) The Federal Reserve decides to try to stimulate the economy.
- (B) Households reduce their consumption and increase their savings.
- (C) A new technology like the AI has just been introduced, and it increases investment opportunities.
- (D) There is a decrease in expected inflation.
- (E) The economy falls into a recession.

13. (3 points)

Assume the following: The real risk-free rate is expected to remain constant. Inflation is expected to be 2% next year and then to be constant at 1.5% a year thereafter. The maturity risk premium is zero. Given this information, which of the following statements is CORRECT?

- (A) The yield curve for U.S. Treasury securities will be upward sloping.
- (B) If the expectations theory holds, the Treasury bond yield curve will never be downward sloping.
- (C) A 5-year corporate bond must have a lower yield than a 7-year Treasury security.
- (D) The real risk-free rate cannot be constant if inflation is not expected to remain constant.
- (E) This problem assumed a zero maturity risk premium, but that is probably not valid in the real world.

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14. (3 points)

A highly risk-averse investor is considering adding one additional stock to a 4-stock portfolio, to form a 5-stock portfolio. The four stocks currently held all have $\beta = 1.0$, and they are perfectly positively correlated with the market. Potential new Stocks A and B both have expected returns of 9%, are in equilibrium, and are equally correlated with the market, with $r = 0.65$. However, Stock A's standard deviation of returns is 5% versus 7% for Stock B. Which stock should this investor add to his or her portfolio, or does the choice not matter?

- (A) Either A or B, i.e., the investor should be indifferent between the two.
- (B) Stock A.
- (C) Stock B.
- (D) Neither A nor B, as neither has a return sufficient to compensate for risk.
- (E) Add A, since its beta must be lower.

15. (3 points)

Which of the following statements is CORRECT?

- (A) For a project with normal cash flows, any change in the WACC will change both the NPV and the IRR.
- (B) To find the MIRR, we first compound cash flows at the regular IRR to find the TV, and then we discount the TV at the WACC to find the PV.
- (C) The NPV and IRR methods both assume that cash flows can be reinvested at the WACC. However, the MIRR method assumes reinvestment at the MIRR itself.
- (D) One advantage of the NPV over the IRR is that NPV assumes that cash flows will be reinvested at the WACC, whereas IRR assumes that cash flows are reinvested at the IRR. The NPV assumption is generally more appropriate.
- (E) If two projects have the same cost, and if their NPV profiles cross in the upper right quadrant, then the project with the higher IRR probably has more of its cash flows coming in the later years.

16. (3 points)

Which one of the following statements is most CORRECT?

- (A) Real options can reduce the cost of capital that should be used to discount a project's expected cash flows.
- (B) The option to switch the type of fuel used in an industrial furnace to lower the cost of production is not a real option.
- (C) An increase in the cost of obtaining the real option increase the value of a real option.
- (D) Real options are more valuable when there is very little uncertainty about the true values of future sales and costs.
- (E) Real options change the size, but not the risk, of projects' expected NPVs.

17. (3 points)

Which of the following statements is NOT CORRECT?

- (A) After a 3-for-1 stock split, a company's price per share should fall, but the number of shares outstanding will rise.
- (B) If a firm repurchases some of its stock in the open market, then shareholders who sell their stock for more than they paid for it will be subject to capital gains taxes.
- (C) If a company has an established clientele of investors who prefer a high dividend payout, and if management wants to keep stockholders happy, it should not follow the strict residual dividend policy.
- (D) If a firm follows a strict residual dividend policy, then, holding all else constant, its dividend payout ratio will tend to rise whenever its investment opportunities improve.
- (E) Investors may interpret a stock repurchase program as a signal that the firm's managers believe the stock is undervalued, or, alternatively, as a signal that the firm does not have many good investment opportunities.

國立中山大學 113 學年度碩士班暨碩士在職專班招生考試試題

科目名稱：財務管理【財管系碩士班丙組】

題號：443002

※本科目依簡章規定「不可以」使用計算機(混合題)

共 5 頁第 4 頁

18. (3 points)

Which of the following statements is most CORRECT?

- (A) Not all target firms are acquired by publicly traded corporations. In recent years, an increasing number of firms have been acquired by private equity firms. Private equity firms raise capital from wealthy individuals and look for opportunities to make profitable investments.
- (B) Leveraged buyouts (LBOs) occur when a firm issues equity and uses the proceeds to take a firm public.
- (C) Acquiring firms send a signal that their stock is undervalued if they choose to use stock to pay for the acquisition.
- (D) In a liquidation, the firm's existing stockholders are given new stock representing separate ownership rights in the division that was divested. The division establishes its own board of directors and officers, and it becomes a separate company.
- (E) The smaller the synergistic benefits of a particular merger, the greater the scope for striking a bargain in negotiations, and the higher the probability that the merger will be completed.

19. (3 points)

OpenSU recently completed a 4-for-1 stock split. Prior to the split, its stock sold for \$200 per share. If the firm's total market value increased by 2% as a result of increased liquidity and favorable signaling effects, what was the stock price following the split?

- (A) \$38.22
- (B) \$49.02
- (C) \$51.00
- (D) \$51.05
- (E) \$55.00

20. (3 points)

A 6-month put option on OpenSU Corp.'s stock has a strike price of \$50.5 and sells in the market for \$11.2. Smith's current stock price is \$45. What is the option premium?

- (A) \$5.5
- (B) \$5.6
- (C) \$5.7
- (D) \$6.0
- (E) \$6.2

二、問答及計算題(共五十分)

1. (10 points)

Managerial compensation can be used to encourage managers to act in the best interest of stockholders. One commonly cited tool is stock options. The idea is that if management has an ownership interest in the firm, they will be more likely to try to maximize owner wealth. A study performed at Harvard Business School indicates that the total return to shareholders is closely related to the nature of CEO compensation; specifically, higher returns were achieved by CEOs whose pay packages included more options and stock components. However, this may not be the best way to encourage managers to act in the stockholders' best interest. Why? Please state clearly at least two possible explanations.

2. (10 points)

(a) (5 points)

What is quantitative investing? The efficient-market hypothesis (EMH) is divided into three categories: weak, semi-strong, and strong, depending on the level of information that is already reflected in the prices of assets. What level of market efficiency is best for quantitative investment strategies?

(b) (5 points)

Please define what Active ETF and Passive ETF are, respectively.

國立中山大學 113 學年度碩士班暨碩士在職專班招生考試試題

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共 5 頁 第 5 頁

3. (10 points)

OpenSU company is considering a new project for \$10,000 million at $t=0$. Because this is a green project, OpenSU is applying for the government tax reduction program. The after-tax cash flows generated will depend on whether the application is approved and there is a 50-50 chance the application will pass. If it passes, after-tax cash flow will be \$3,500 million per year for the next 5 years. If it doesn't pass, the after-tax cash flows will be \$1,800 million per year for the next 5 years. The project's WACC is 10%. If the tax is not passed, the firm has the option to abandon the project 1 year from now, in which case the property could be sold to net \$6,600 million after tax at $t=1$. What is the value of the abandonment option?

(Note:

***PVIF(r, n) is defined as the present value of \$1 to be received after t periods; PVIFA(r, n) is defined as the present value of an annuity of \$1 per period for t periods; PVIF(0.1, 1)=0.91; PVIF(0.1, 2)=0.83; PVIF(0.1, 3)=0.75; PVIF(0.1, 4)=0.68; PVIF(0.1, 5)=0.62; PVIFA(0.1, 5)=3.79

***請詳列計算過程，清楚表達如何計算)

4. (10 points)

The new CFO of OpenSU wants to evaluate whether to increase the debt ratio. The financial information of OpenSU is described as follows:

Sales: \$80,000

Operation costs: \$45,000

Year-end assets: \$50,000

Debt ratio: 20%

Interest rate on the debt: 6%

Tax rate: 30%

The new CFO wants to use a 40% debt ratio. Assuming that sales, operation costs, and total assets would not be affected, the firm's interest rate will increase to 7%, and the tax rate will decrease to 28%, respectively. Please help the new CFO calculate how much the ROE would change in response to the change in the capital structure. (Note: ***請詳列計算過程，清楚表達如何計算)

5. (10 points)

(a) (5 points)

OpenSU has a beta of 1.4 when the market is in equilibrium, and the required return on the stock is 12%. Meanwhile, the required return on an average stock is 10%. Now, the required return on an average stock increases to 15%. Neither betas nor the risk-free rate change. What would OpenSU's new required return be? (Note: ***請詳列計算過程，清楚表達如何計算)

(b) (5 points)

The main products of OpenSU are exported to the European Union. The CFO found that OpenSU's carbon emissions were too high and did not comply with government and international regulations.

Please define what carbon tax is and what impact carbon tax has on company operations. Besides reducing carbon emissions by optimizing manufacturing processes, what else can you do to help your company reduce carbon border tax if you are a CFO?

國立中山大學 113 學年度 碩士班暨碩士在職專班招生考試試題

科目名稱：統計學【財管系碩士班甲組、乙組、丙組】

— 作答注意事項 —

考試時間：100 分鐘

- 考試開始鈴響前不得翻閱試題，並不得書寫、劃記、作答。請先檢查答案卷（卡）之應考證號碼、桌角號碼、應試科目是否正確，如有不同立即請監試人員處理。
- 答案卷限用藍、黑色筆(含鉛筆)書寫、繪圖或標示，可攜帶橡皮擦、無色透明無文字墊板、尺規、修正液（帶）、手錶(未附計算器者)。每人每節限使用一份答案卷，請衡酌作答。
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- 違規者依本校招生考試試場規則及違規處理辦法處理。

國立中山大學 113 學年度碩士班暨碩士在職專班招生考試試題

科目名稱：統計學【財管系碩士班甲組、乙組、丙組】

題號：443001

※本科目依簡章規定「不可以」使用計算機(選擇題)

共 6 頁第 1 頁

注意事項：各題的計分方式與配分不完全相同，請參考各部份開頭說明。

第一部份：**複選題**（第 1-5 題，總共 70 分，每題 14 分且各有 5 個選項，每錯一選項扣 3.6 分，得分低於零分或所有選項均未作答者，該題以零分計。）

提醒：表格出現(??)或空白是指表格原本有這些文字或符號或數據，作答時若有用到需自行判斷或計算。關於假說檢定的題目，皆設定顯著水準為 5%。

【題組，包括第 1-4 題（不包括第 5 題）】

某金融機構想了解客戶對於金融知識的了解程度，於 75 家分行請客戶填寫問卷並且予以評分，分數範圍介於 0 到 100 之間，分數愈高表示金融知識了解程度愈高。此金融機構的目標在於了解不同區域之間客戶金融知識了解程度的差異，將有效問卷資料進行以下處理。令 $Score_i$ 為第 i 個分行受測者金融知識了解程度的平均分數， $i = 1, 2, 3, \dots, 75$ 。依地理位置將這 75 家分行劃分為三區：K 區、L 區、N 區，同時考慮 x_{iK} 、 x_{iL} 、 x_{iN} ，若第 i 個分行位於 K 區，則 $x_{iK} = 1$ ，反之 $x_{iK} = 0$ ；若第 i 個分行位於 L 區，則 $x_{iL} = 1$ ，反之 $x_{iL} = 0$ ；若第 i 個分行位於 N 區，則 $x_{iN} = 1$ ，反之 $x_{iN} = 0$ 。藉由此處理，可得到 75 組資料，每一組皆有完整的 $Score_i$ 、 x_{iK} 、 x_{iL} 、 x_{iN} 數據。研究者使用 R 語言進行統計分析，首先使用 summary 指令得到 $Score$ 、 x_K 、 x_L 、 x_N 的敘述統計結果，得到表一。

Score	xK	xL	xN
Min. :39.0	Min. :0.00	Min. :0.0	Min. :0.00
1st Qu. :48.0	1st Qu. :0.00	1st Qu. :0.0	1st Qu. :0.00
Median :54.0	Median :0.00	Median :1.0	Median :0.00
Mean :56.0	Mean :0.16	Mean :0.6	Mean :0.24
3rd Qu. :62.5	3rd Qu. :0.00	3rd Qu. :1.0	3rd Qu. :0.00
Max. :82.0	Max. :1.00	Max. :1.0	Max. :1.00

1. 除了表一之外，研究者另外使用 t.test 指令對所有的 $Score$ 數據資料進行分析，得到表二。以下敘述哪些或哪一項正確？

- (A) 依據現有資訊，無法推斷 $Score$ 資料是否存在離群值。
- (B) 依據現有資訊，可以推算在 75 家分行中，位於 K 區的分行家數。
- (C) 表二(甲)為 74。
- (D) 表二(乙)為 53.98。
- (E) 由表二可知，研究者目前執行的假說檢定是左尾檢定。

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表二

```
One Sample t-test
data: Score
t = -3.3013, df = (甲), p-value = 0.0007417
alternative hypothesis: true mean is less than 60
95 percent confidence interval:
(乙) 58.02
sample estimates:
mean of x
(??)
```

2. 研究者接著使用 K 區與 L 區的 Score 樣本資料進行分析，SK 存放 K 區的 Score 數據、SL 存放 L 區的 Score 數據，使用指令 `var.test(SK,SL,alternative="two.sided",conf.level=0.95)` 得到表三，並且使用 `t.test` 指令分別得到表四與表五，其中表四對應的指令是 `t.test(SK,SL,alternative="two.sided",mu=0,paired=F,var.equal=T)`，表五對應的指令是 `t.test(SK,SL,alternative="two.sided",mu=0,paired=F,var.equal=F)`。以下敘述哪些或哪一項正確？
- (A) 如果 `var.test` 指令中信心水準設定為 0.9，得到的信賴區間上限小於 2.208。
 - (B) 表三(丙)這格數字大於 1。
 - (C) 綜合考慮本題組與表一到表五提供的資訊，無法推算得到表四(丁)這格數字。
 - (D) 表四(戊)為 52。
 - (E) 表五(己)這格數字的絕對值大於 5.560。

表三

```
F test to compare two variances
data: SK and SL
F = 0.72511, num df = (??), denom df = (??), p-value = 0.5829
alternative hypothesis: true ratio of variances is not equal to 1
95 percent confidence interval:
(丙) 2.208
sample estimates:
ratio of variances
0.72511
```

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表四

Two Sample t-test
data: SK and SL
 $t = -0.41595$, $df = (\text{丁})$, $p\text{-value} = (??)$
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
-5.560 3.648
sample estimates:
mean of x mean of y
(戌) 52.956

表五

Welch Two Sample t-test
data: SK and SL
 $t = -0.45696$, $df = (??)$, $p\text{-value} = (??)$
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
(己) 3.408
sample estimates:
mean of x mean of y
(??) 52.956

3. 研究者接著建立迴歸模型如下： $Y_i = \beta_0 + \beta_1 x_{iK} + \beta_2 x_{iL} + \varepsilon_i$ ，其中 ε_i 為誤差項 (error term)。使用 R 語言與 75 組資料進行迴歸分析 (但不考慮 x_{iN})，使用 `lm` 與 `summary` 指令，部份報表如表六所示。以下敘述哪些或哪一項正確？
- (A) 表六(庚)為 66.278。
 - (B) 表六(辛)約為 2.9 (四捨五入至小數點後第一位)。
 - (C) 表六(壬)小於 0.3081。
 - (D) 從表六的「 $p\text{-value}: 1.743e-06$ 」可推論得到「 β_1, β_2 皆顯著異於 0」。
 - (E) 如果研究者考慮自變數 x_{iN} ，另建立新迴歸模型 $Y_i = \beta_0 + \beta_1 x_{iK} + \beta_2 x_{iL} + \beta_3 x_{iN} + \varepsilon_i$ ，這個新迴歸模型有線性重合的問題。

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表六

Coefficients:				
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	(庚)	2.086	(??)	< 2e-16 ***
xK	(??)	(辛)	-4.330	4.75e-05 ***
xL	-13.322	2.468	(??)	8.22e-07 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				
Residual standard error: 8.849 on (??) degrees of freedom				
Multiple R-squared: 0.3081, Adjusted R-squared: (壬)				
F-statistic: 16.03 on 2 and (??) DF, p-value: 1.743e-06				

4. 另一位研究者主張：在進行推論前，最好先確認誤差項是否滿足某些性質。延續使用迴歸模型 $Y_i = \beta_0 + \beta_1 x_{iK} + \beta_2 x_{iL} + \varepsilon_i$ (不考慮 x_{iN})，就殘差 (residual) 進行分析，使用 R 語言的幾個指令 (shapiro.test、jarque.bera.test、durbinWatsonTest、ncvTest) 分別得到報表，整理為表七至表十。以下敘述哪些或哪一項正確？

- (A) 無證據支持「誤差項服從常態分配」的說法。
- (B) 可推論得到「誤差項相互獨立」。
- (C) 可推論得到「誤差項變異數為同質」。
- (D) 表八(癸)為 2。
- (E) 表八使用的檢定統計量服從之分配具有無記憶性質。

表七	表八
Shapiro-Wilk normality test W = 0.97383, p-value = 0.1223	Jarque Bera Test X-squared = 2.8262, df = (癸), p-value = 0.2434
表九	表十
lag Autocorrelation D-W Statistic p-value 1 0.2010495 1.57683 0.032 Alternative hypothesis: rho != 0	Non-constant Variance Score Test Variance formula: ~ fitted.values Chisquare = 15.40203, Df = (??), p = 8.6895e-05

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5. (本題與第 1-4 題無關) 某研究機構針對某議題請 400 位受訪者表達意見，意見可分為贊成、不贊成、沒意見。表十一呈現對應的符號與數據，舉例來說，贊成者佔社會大眾的母體比例為 p_1 ，400 位受訪者中有 216 位贊成。

意見	贊成	不贊成	沒意見
母體比例	p_1	p_2	$1 - p_1 - p_2$
表達該意見的受訪者人數	216	160	24

以下敘述哪些或哪一項正確？

- (A) 在 95% 信心水準下， p_1 的雙尾信賴區間下限為 $0.54 - 1.96 \times \sqrt{\frac{0.54 \times (1-0.54)}{400}}$ 。
- (B) 令 $LowerLimit = 0.54 - 1.96 \times \sqrt{\frac{0.54 \times (1-0.54)}{400}}$ ， p_1 小於 $LowerLimit$ 的機率為 0.025。
- (C) 研究者可以考慮下列假說檢定： $H_0: p_1 \leq 0.5$ ， $H_1: p_1 > 0.5$ ，經計算後得到「無法拒絕虛無假說」的推論。
- (D) 在 95% 信心水準下， $p_1 - p_2$ 的雙尾信賴區間下限為 $0.14 - 1.96 \times \sqrt{\frac{0.54 \times (1-0.54)}{400} + \frac{0.4 \times (1-0.4)}{400}}$ 。
- (E) 研究者可以考慮下列假說檢定： $H_0: p_1 = p_2$ ， $H_1: p_1 \neq p_2$ ，檢定統計量的值為 $\frac{0.54 - 0.4}{\sqrt{0.94 \times (1-0.94) \times (\frac{1}{400} + \frac{1}{400})}}$ 。

第二部份：單選題 (第 6-11 題，總共 30 分，每題 5 分，答錯倒扣 1.3 分，至多扣至本部份總分為 0 分；未作答者，該題以零分計。)

【題組，包括第 6-7 題】 X_1 、 X_2 、 X_3 為三個獨立同態的隨機變數，皆服從常態分配，期望值

皆為 0，變異數皆為 σ^2 。令 $\bar{X} = \frac{X_1 + X_2 + X_3}{3}$ ， $S = \sqrt{\frac{\sum_{i=1}^3 (X_i - \bar{X})^2}{2}}$ ， $T = \frac{2S^2}{\sigma^2}$ 。

6. 計算 \sqrt{T} 的期望值，答案是以下何者？

- (A) $\sqrt{\pi}$ (B) $\frac{\sqrt{2\pi}}{2}$ (C) $\frac{\sqrt{\pi}}{2}$ (D) $\frac{\sqrt{2\pi}}{4}$ (E) 以上皆非

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7. 計算 S 的期望值，答案是以下何者？

- (A) $\frac{\sqrt{\pi}}{4}\sigma$ (B) $\frac{\sqrt{2\pi}}{2}\sigma$ (C) $\frac{\sqrt{\pi}}{2}\sigma$ (D) $\frac{\sqrt{2\pi}}{4}\sigma$ (E) 以上皆非

【題組，包括第 8-9 題】連續型二元隨機變數 (X, Y) 之聯合機率密度函數如下：

$$f(x, y) = \begin{cases} 24x^3y & \text{if } 0 < x < y < 1 \\ 0 & \text{o.w.} \end{cases}$$

8. 計算條件機率 $P\left(\frac{1}{4} < X < \frac{3}{4} \mid Y = \frac{1}{2}\right)$ ，答案是以下何者？

- (A) $\frac{1}{8}$ (B) $\frac{35}{64}$ (C) $\frac{1}{2}$ (D) $\frac{15}{16}$ (E) 以上皆非

9. 計算條件機率 $P\left(\frac{1}{4} < X < \frac{3}{4} \mid Y < \frac{1}{2}\right)$ ，答案是以下何者？

- (A) $\frac{1}{32}$ (B) $\frac{27}{32}$ (C) $\frac{147}{256}$ (D) $\frac{51}{64}$ (E) 以上皆非

【題組，包括第 10-11 題】 W_1, W_2, W_3, W_4 為一組來自均勻分配 $U(0, \theta)$ 母體之隨機樣本，此分配之機率密度函數如下：

$$f(w) = \begin{cases} \frac{1}{\theta} & \text{if } 0 < w < \theta \\ 0 & \text{o.w.} \end{cases}$$

10. 令 $Y_1 = \text{Min}(W_1, W_2, W_3, W_4)$ ，當 c 是以下何者時可使得 cY_1 為 θ 的不偏估計元？

- (A) 5 (B) 4 (C) 3 (D) 2 (E) 以上皆非

11. 令 $Y_4 = \text{Max}(W_1, W_2, W_3, W_4)$ ，當 d 是以下何者時可使得 dY_4 為 θ 的不偏估計元？

- (A) $\frac{4}{3}$ (B) $\frac{3}{2}$ (C) $\frac{5}{4}$ (D) $\frac{6}{5}$ (E) 以上皆非

【試題至此全部結束，以下無其他試題】