

考試科目	經濟學	系所別	商學院共同科	考試時間	2月10日(四) 第二節
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I. Multiple Choice (1 point each)

Identify the letter of the choice that best completes the statement or answers the question.

- Suppose the demand function for a good is expressed as $Q = 200 - 4p$. If the good currently sells for \$30, then the price elasticity of demand equals
 - 1.
 - 1.5.
 - 4.
 - 6.67.
- If Andy likes broccoli (B) but hates cabbage (C), which of the following might best represent his utility function for broccoli and cabbage?
 - $U = B + C$
 - $U = \min\{B, C\}$
 - $U = U/C$
 - $U = B^{0.5}C^{0.5}$
- As the price of a Giffen good falls, the consumer will
 - purchase more units.
 - purchase fewer units.
 - not change the amount purchased.
 - There is not enough information to answer this question.
- What will happen to the equilibrium price of new textbooks if more students attend college, paper becomes more expensive, textbook authors accept lower royalties, and more used textbooks are sold?
 - Price will rise.
 - Price will fall.
 - Price will stay exactly the same.
 - The price change will be ambiguous.
- With capital on the vertical axis and labor on the horizontal axis, vertical isoquants imply that
 - capital and labor are perfect substitutes.
 - capital and labor must be used together in certain proportion.
 - capital is not productive.
 - labor is not productive.

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6. In a monopolistically competitive market, the entry of new firms will lead to the demand curve of an incumbent firm become
- A. steeper.
 - B. flatter.
 - C. remain the same.
 - D. none of the above.
7. Which of the following statement is wrong for an oligopolistic market?
- A. A firm in the market has a supply curve.
 - B. The market outcomes could be like a monopoly.
 - C. When the number of firms in the market getting large, this market will approach to a perfectly competitive market.
 - D. The owners of firm consider the output effect and the price effect when making production decisions.
8. Which of the following statement is wrong for a perfectly competitive market?
- A. Some firms might earn profit in the long run.
 - B. For a firm, average revenue equals marginal revenue.
 - C. When the fixed cost is zero, a firm will leave the market when it earns negative profit.
 - D. The market long-run supply curve is always horizontal at the price.
9. Which of the following statement is wrong?
- A. In a perfectly competitive market which all firms have the same cost structure, the firms will produce at the efficient scale in the long run.
 - B. Under the average cost pricing, a monopoly will not create deadweight losses.
 - C. A competitive market might not as efficient as a monopoly.
 - D. Price discrimination might create deadweight losses.
10. Consider the production possibilities frontier of two goods. Which of the following statement is wrong?
- A. A slope of the PPF measures the opportunity cost between the two goods that producers face.
 - B. The production point will not lie to the right of the PPF.
 - C. The consumption point will not lie to the right of the PPF.
 - D. The production point and the consumption point could be different points.

考試科目	經濟學	系所別	商學院共同科	考試時間	2月10日(四)第二節
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11. After a certain nation changed its policy from one that banned international trade in wheat to one that allowed international trade in wheat, the nation began importing wheat. As a result, total surplus in the wheat market increased by \$10 million. Which of the following changes could have occurred as well?

- A. The price of wheat in that nation increased with the adoption of the new policy.
- B. The domestic quantity of wheat supplied increased with the adoption of the new policy.
- C. Consumer surplus in the wheat market increased by \$7 million and producer surplus in the wheat market increased by \$3 million.
- D. Consumer surplus in the wheat market increased by \$15 million and producer surplus in the wheat market decreased by \$5 million.

12. Which of the following events would be consistent with purchasing-power parity?

- A. The price level in the United States rises more rapidly than that in Ireland and the real exchange rate defined as Irish goods per unit of U.S. goods stays the same.
- B. The money supply in the United States rises more rapidly than in Egypt and the nominal exchange rate defined as Egyptian pounds per dollar falls.
- C. Earl, a worldwide traveler, looks at exchange rates and worldwide breakfast prices one morning and finds that whatever country he decides to go to he can convert \$15 into enough local currency to buy the same breakfast.
- D. All of the above are correct.

13. According to classical macroeconomic theory, in the long run

- A. monetary growth affects both real and nominal variables.
- B. the only real variable affected by monetary growth is the unemployment rate.
- C. a number of factors that affect unemployment are influenced by monetary growth.
- D. monetary growth affects nominal but not real variables.

14. Jennifer took out a fixed-interest-rate loan when the CPI was 100. She expected the CPI to increase to 103 but it actually increased to 105. The real interest rate she paid is

- A. higher than she had expected, and the real value of the loan is higher than she had expected.
- B. higher than she had expected, and the real value of the loan is lower than she had expected.
- C. lower than she had expected, and the real value of the loan is higher than she had expected.
- D. lower than she had expected, and the real value of the loan is lower than she had expected.

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15. There is a temporary adverse supply shock. Given the effects of this shock, if the central bank chooses to return unemployment closer to its previous rate it would

A. raise the rate at which it increases the money supply. In the long run this will shift the short-run Phillips curve right.

B. raise the rate at which it increases the money supply. In the long run this will shift the short-run Phillips curve left.

C. reduce the rate at which it increases the money supply. In the long run this will shift the short-run Phillips curve right.

D. reduce the rate at which it increases the money supply. In the long run this will shift the short-run Phillips curve left.

16. Which one of the following will increase the supply of money in the economy, everything else held constant?

A. If the general public in the economy decides to hold more currency in the pockets.

B. If the banking system decides to reduce the holding of excess reserves.

C. The central bank sells bonds to the general public.

D. The central bank sells its foreign currency reserves.

17. Which one of the following is not considered to be “conventional monetary policy tool”?

A. Open market operation.

B. Reserve requirement ratio.

C. Discount rate and lending.

D. Large scale asset purchases.

18. In the December 2021 statement, the FOMC “decided to keep the target range for the federal funds rate at 0 to 1/4 percent.” What is the federal funds rate?

A. The interest rate anyone needs to pay to borrow money from the government.

B. The interest rate banks receive by depositing money with the central bank.

C. The interest rate banks pay to borrow money from the central bank.

D. The interest rate banks pay to borrow money from other banks.

19. Since 2014, the ECB has adopted a negative interest rate policy. What is the rate that is negative?

A. The interest rate the ECB pays to banks for depositing money with the ECB.

B. The interest rate that the ECB lends to banks.

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- C. The interest rate that the banks lend and borrow from other banks.
D. The rate of Eurodollar.

20. Everything else held constant, which of the following does not cause aggregate demand to increase?

- A. An increase in consumer spending.
B. An increase in investment spending.
C. An increase in taxes.
D. An increase in exports.

II. Problems and Short-essay Questions

Please answer the following questions IN SEQUENCE. All questions may be answered in either Chinese or English.

1. Suppose that the inverse demand curve for paper is $p = 150 - Q$. Paper is produced with a constant marginal cost of 10. For simplicity, assume that there are no fixed costs. Producing paper creates pollution. Each unit of production generates an external cost of 80 to the residents who live near the paper mill(s).

A. (7 points) What are the equilibrium price, quantity and the associated deadweight loss if paper is produced by perfectly competitive firms?

B. (7 points) What are the equilibrium price, quantity and the associated deadweight loss if paper is produced by a monopoly?

C. (6 points) Suppose the residents can costlessly negotiate with the monopoly. What is the equilibrium quantity of paper produced? What is the minimum monetary transfer from the residents to the monopoly that can achieve the social optimum?

2. Assume Taiwan is a small country and imports pork under free trade. The demand and supply are all linear. The consumers of Taiwan consume 1 million kilograms of pork per year. 400,000 of those are produced domestically and 600,000 are imported.

A. (10 points) Assume due to some reasons, the international price of pork falls by 100 dollars per kilogram. The consumers now consume 1.2 million kilograms of pork per year. 1 million of them are imported. Please calculate the welfare gain and the change of the producer surplus of the economy of Taiwan.

B. (10 points) If the government sets up a quota that only allows 400,000 kilograms of pork to be imported. After this policy, the price of pork in Taiwan rises by 150 dollars. Please calculate the deadweight loss for this policy.

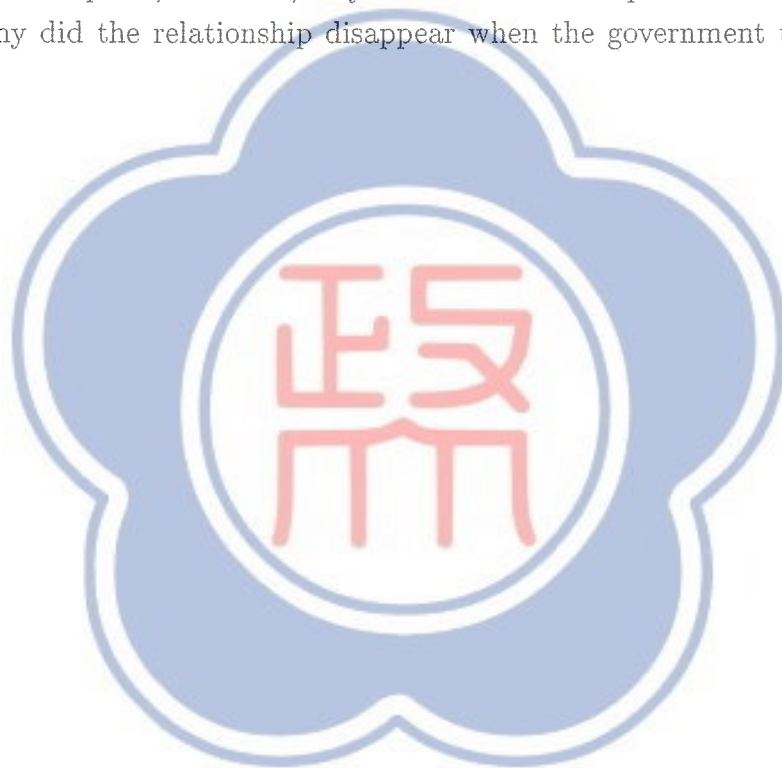
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3. Suppose Taiwan makes a decision to tax the import of agricultural products from abroad, but it does not decrease taxes or increase any other government spending to offset this tax revenues.

Using diagrams and words, show and explain what happens to

- A. (12 points) national saving, domestic investment, net capital outflow and the interest rate;
- B. (4 points) the exchange rate; and
- C. (4 points) the amount of exports, imports and trade balance.

4. (20 points) Please explain, in words, why did the relationship of the Phillips curve exist in the past, and then why did the relationship disappear when the government tried to use it to boost the economy?



備

註

- 一、作答於試題上者，不予計分。
- 二、試題請隨卷繳交。

國立政治大學 111 學年度 碩士暨碩士在職專班 招生考試試題

第 1 頁，共 1 頁

考試科目	保險法	系所別	風險管理與保險學系 法律組	考試時間	2 月 10 日(四) 第 2 節
<p>1. 試依學理與我國法，論述以下問題：(1) 何謂保險利益、保險標的、保險標的物？(2) 人身保險有無保險利益之適用？(3) 如欠缺保險利益時，法律效果為何？(20%)</p> <p>2. 金管會 108 年 8 月 8 日金管保壽字第 1080494305 號函：「每一被保險人投保實支實付型醫療保險（含日額或實支實付給付擇一之商品）之張數上限 3 張，上開上限於醫療保險及傷害醫療保險採分別計算。另保戶原已投保 1 張實支實付型醫療（傷害醫療）商品，另行向同一保險公司投保 1 張銜接原給付限額之具自負額商品者，該張自負額商品可不列入張數計算，又整體保險業可不計入上開張數計算之自負額商品於醫療保險及傷害醫療保險分別以 1 張為限。」請依據學理與我國實務見解，評論上述內容之妥適性。(20%)</p> <p>3. A 女與 B 女為親密好友。後 A 與 B 集資合夥共同經營日式酒店，並經書面同意，均允許對方為要保人與受益人、以自己為被保險人，投保人壽保險（B 為 A 投保為保單 1，A 為 B 投保為保單 2）。B 並有為全體員工投保團體意外險（保單 3）。A 曾與 D 男交往，分手後 D 轉與 B 交往。A 知悉上情後大怒，口頭表示欲撤回 B 為自己投保之同意。A 更以欲使 B 死亡之故意，以煙灰缸砸向 B 使其頭部遭受輕傷。但因 B 年幼時曾被施暴導致特殊疾病，合併此次外傷數天內狀況急轉直下，終至死亡。試問保單 1、保單 2 與保單 3 之保險人，是否或應如何負責？(20%)</p> <p>4. 一般民事契約與保險契約之解釋原則有何相同與不同？並申論何謂「合理期待原則」？(20%)</p> <p>5. 何謂「80% 共保附加條款」？試說明之。(20%)</p>					
備註	<p>一、作答於試題上者，不予計分。 二、試題請隨卷繳交。</p>				

考試科目	微積分	系所別	政治學系與國際 事務精進學系組	考試時間	2月10日(四)第二節
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Problem 1 (10 points)

Evaluate the integral

$$\int_0^1 \frac{(2+x)^2}{1+x^2} dx.$$

Problem 2 (15 points) (5 % each)

- (a) Write down the general terms the MacLaurin series of $\sin x$ and $\sin^{-1}x$.
 (b) Find their radii of convergence.
 (c) Find

$$\lim_{x \rightarrow 0} \frac{\sin x \cdot \sin^{-1}x - x^2}{x^6}.$$

Problem 3 (15 points)Find the critical points of $f(x, y) = x^3 + y^2 - 2xy + 7x - 8y + 2$. Which of them give rise to maximum values? Minimum values? Saddle points?**Problem 4** (10 points)

Determine the convergence of the following series. (5 % each)

(a)

$$\sum_{n=0}^{\infty} \frac{\sqrt{n+1} - \sqrt{n}}{\sqrt{n+1} + \sqrt{n}}.$$

(b)

$$\sum_{n=1}^{\infty} \sqrt{\sin \frac{1}{n^3}}.$$

考試科目	微積分	系所別	政大商學院(學院) 統計學系	考試時間	2 月 10 日 (四) 第二節
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Problem 5 (10 points)

Evaluate the integral

$$\int \frac{(e^{3x} + 1)}{(e^{2x} + 1)^2} dx.$$

Problem 6 (10 points)

Compute

$$\int \frac{1}{e^{2x} + e^x + 1} dx.$$

Problem 7 (10 points)

A plane curve is defined by $(x^2 + y^2)^2 = 2xy$. (5 % each)

- (a) Find its polar coordinate equation, and draw the graph.
 (b) Find the area of the plane region bounded by the curve.

Problem 8 (20 points)

Evaluate the limits. (10 % each)

(a)

$$\lim_{x \rightarrow \infty} (2^x + 3^x + 5^x)^{\frac{1}{x}}.$$

(b)

$$\lim_{x \rightarrow \infty} \frac{\sin\left(\frac{1}{\sqrt{x^2+1}}\right)}{\sqrt{x^2+2} - \sqrt{x^2-1}}.$$

備註

- 一、作答於試題上者，不予計分。
 二、試題請隨卷繳交。

國立政治大學 111 學年度 碩士暨碩士在職專班 招生考試試題

第 1 頁，共 1 頁

考試科目	公司法	系所別	風險管理與保險學系 法律組	考試時間	2 月 10 日(四) 第 4 節
<p>1. 監察人之職權為何？其行使方式與董事會有何差異？公司法第 220 條規定：「監察人除董事會不為召集或不能召集股東會外，得為公司利益，於必要時，召集股東會。」其中「必要時」應如何界定？如監察人非於必要時即召集股東會，則該股東會之效力與監察人之責任為何？（25%）</p> <p>2. 股東權在學理上有何種分類？試申論之。保險法第 146-9 條：「保險業因持有有價證券行使股東權利時，不得與被投資公司或第三人以信託、委任或其他契約約定或以協議、授權或其他方法進行股權交換或利益輸送，並不得損及要保人、被保險人或受益人之利益。保險業於出席被投資公司股東會前，應將行使表決權之評估分析作業作成說明，並應於各該次股東會後，將行使表決權之書面紀錄，提報董事會。保險業及其從屬公司，不得擔任被投資公司之委託書徵求人或委託他人擔任委託書徵求人。」試由公司法與股東權之角度評論之。（25%）</p> <p>3. 非公開發行公司甲公司，有董事 A、B、C、D、E 五人，並以 A 為董事長，但未設置監察人。在董事會中，B 董事以公司未妥善因應海運價格高漲為理由，提出臨時動議以解任 A 董事長職位。並經過半數之出席與過半數之同意通過以下議案：改選 C 為董事長、選任副董事長 D、E 二名、以及發行新股。C 隨即召集股東會，並以臨時動議提出解任 A 董事、以及保留發行新股總數百分之五之股份由公司員工承購並經通過。請依公司法理分析上述事實。（25%）</p> <p>4. 非公開發行之甲公司之大股東 A，與股東 C 達成書面協議，以 A 給付現金一百萬為代價，C 必須永久支持 A 所推出之董事人選。A 並與股東 B 達成口頭協議，彼此相互支持在本年度之股東會提案，違反者應給付五十萬賠償。試依公司法理分析上述事實。（25%）</p>					
備註	<p>一、作答於試題上者，不予計分。 二、試題請隨卷繳交。</p>				

考試科目	保險學	系所別	風險管理與保險學 / 法律組	考試時間	2 月 10 日 (四) 第四節
<p>一、請問再保險主要有哪些種類?它們各有什麼特色?再保險的主要功能為何?25%</p> <p>二、請問何謂小額終老保險?有何特色?15%</p> <p>三、何謂逆選擇?何謂自負額?請問保險公司的保單，如何透過自負額的設計降低逆選擇的風險?20%</p> <p>四、何謂純網路保險公司?這種保險公司有何特色?15%</p> <p>五、以下為小明與小王的對話:</p> <p>小明:是不是未來一定會發生的事故是不能買保險的啊?。小王:是啊!怎麼了嗎? 小明:但是我發現人是一定會死的，為何可以買終身壽險? 小王:對啊!我怎麼沒想到。小明:還有保險法不是規定要保人跟被保險人間一定要有保險利益才行，否則契約是無效的。小王:對啊!有問題嗎? 小明:那為什麼先生以自己為要保人，並以自己太太為被保險人買一張壽險，但夫妻後來離婚了，他們離婚前買的人壽保險為何還可以繼續有效? 小王:對啊!好奇怪喔!。小明:你好像很搞不清楚狀況啊!。小王:那我問你，保險不是都要符合損害填補原則嗎? 小明:對啊! 小王:那為何一個人可以同時買好幾張日額型的醫療保險，明明實際醫療費用只有幾千塊，但是卻可以獲得理賠一兩萬元? 小明:對喔!我也不知道為何如此! 小王:我看你跟我都是半斤八兩。</p> <p>請根據上面這段對話，評論小明與小王的觀點。25%</p>					
備註	<p>一、作答於試題上者，不予計分。</p> <p>二、試題請隨卷繳交。</p>				

考 試 科 目	統計學	系 所 別	風險管理與保險學系管理組	考 試 時 間	2 月 10 日(四) 第 4 節
<p>1. Suppose that the probability of having an earthquake tomorrow only depends on whether or not an earthquake occurs today. Assume that if an earthquake occurs today then there will be an earthquake tomorrow with a probability of 0.8; if there is no earthquake today, then there is an earthquake tomorrow with a probability of 0.5. What is the limiting probability of having an earthquake? (15%)</p> <p>2. Suppose independent trials are conducted consecutively. Each and every one of them leads to a success with a probability of t. Find $E(N^2)$, if N represents the trial number of the first success. (15%)</p> <p>3. (a) Please describe the Law of Large Number and how it can be applied in insurance operations. (10%) (b) Please describe the Central Limit Theorem and how it can be applied in insurance operations. (10%)</p> <p>4. Suppose the average English marks in the whole population of college students is 175. Assume that the mean English marks of 10 students is 200 and the standard deviation is 50. ($z_{0.05} = 1.645$; $z_{0.025} = 1.96$; $z_{0.0099} = 2.33$; $\Phi(1.50) = 0.9332$, $\Phi(1.58) = 0.9429$, $\Phi(1.64) = 0.9495$, where $\Phi(x) = Pr(X \leq x)$) (a) Test the hypothesis under the significance level of 0.05 that the mean mark is higher in this group than in the population. (10%) (b) Calculate the exact p-value. (15%)</p> <p>5. Suppose that T_1 and T_2 are random variables and have the joint density function given by</p> $f(t_1, t_2) = 3t_1, \quad 0 \leq t_2 \leq t_1 \leq 1,$ $f(t_1, t_2) = 0, \quad \text{otherwise}$ <p>(1) Find $P(T_1 \leq 3/4, \text{ given } T_2 \leq 1/2)$. (10%) (2) Find $P(T_1 \leq 3/4, \text{ given } T_2 = 1/2)$. (15%)</p>					
備 註	<p>一、作答於試題上者，不予計分。 二、試題請隨卷繳交。</p>				

考試科目	統計學	系所別	風險管理與保險學系 精算科學組	考試時間	2 月 10 日 (四) 第四節
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- (30 pts) Please explain the following items.
 - (10 pts) The Rao-Cramer Inequality
 - (10 pts) The Rao-Blackwell Theorem
 - (10 pts) Chebyshev's Inequality and its proof
- (15 pts) Let X_1, X_2, X_3, X_4 be mutually stochastically independent random variables, each with p.d.f.

$$f(x) = \begin{cases} e^{-x}, & 0 < x < \infty \\ 0, & \text{elsewhere} \end{cases}$$

Find the distribution of $Y = \min\{X_1, X_2, X_3, X_4\}$.

- (15 pts) Let X be a random variable following $N(\mu, \sigma^2)$ and consider a transform $Y = e^X$.
 - (9 pts) Find the p.d.f. of Y .
 - (6 pts) Find the mean and the variance of Y .
- (20 pts) Let X_1, X_2, \dots, X_n be a random sample from a distribution with one of two pdfs.

$$f(x; \theta) = \begin{cases} \frac{1}{\sqrt{2\pi}} e^{-x^2/2}, & -\infty < x < \infty, \quad \theta = 1; \\ \frac{1}{\pi(1+x^2)}, & -\infty < x < \infty, \quad \theta = 2. \end{cases}$$

Find the maximum likelihood estimation (MLE) of θ .

- (20 pts) Let X_1 and X_2 be the two independent exponential random variables with population means α_1 and α_2 , respectively. Please show that the probability density function of the difference of two exponentials $Y = X_1 - X_2$, $f_Y(y)$, has a Laplace distribution with parameters α_1 and α_2 .

$$f_Y(y) = \begin{cases} \frac{e^{-\frac{y}{\alpha_2}}}{\alpha_1 + \alpha_2}, & y \leq 0 \\ \frac{e^{-\frac{y}{\alpha_1}}}{\alpha_1 + \alpha_2}, & y > 0 \end{cases}$$

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。
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