

考試科目	經濟學	所別	商學院共同科	考試時間	2月26日(日) 第一節
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**Multiple Choice (1% each, 20% in total)**

- The market structure of an industry where firms have to invest a fixed cost before producing goods cannot be perfect competitive because
  - the average cost decreases as production level decreases.
  - the average cost is almost always higher than the marginal cost.
  - the goods each firm produced are not perfectly substitute.
  - firms always earn positive profit.
- Suppose in a country, there is one firm in an industry. Suppose also there is infinite number of firms producing the same good in the rest of world. What is the possible impact on welfare when the country opening up to trade
  - There will be no deadweight loss in the country.
  - The deadweight loss still exists but smaller under trade.
  - The deadweight loss is larger under trade.
  - The producer surplus is larger under trade.
- Suppose there are two countries. In the same industry, each country has only one producer. Producers produce the same good. Two producers have the same cost function and face the same demand function. Suppose there is international trade between two countries and producers choose output to maximize profit. There is also no collusion between firms.
  - Compared with the scenario when there is no trade, the price charged by a firm is lower.
  - Compared with the scenario when there is no trade, the production level of each firm is larger.
  - Compared with the scenario when there is no trade, the deadweight loss is larger.
  - Compared with the scenario when there is no trade, the profit of each firm increases.
- In the industry with monopolistic competition,
  - the price charged by a firm is larger than the average cost.
  - the price charged by a firm is lower than the average cost.
  - the number of producers increases as the aggregate demand increases.
  - the number of producers decreases as the aggregate demand increases.
- In the oligopoly economy with two identical producers producing the same product, when two producers collaborate to maximize aggregate profit
  - The aggregate production level is higher than that when there is only one producer.

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- (b) The aggregate production level is lower than that when there is only one producer.
- (c) The aggregate production level is the same as that when there is only one producer.
- (d) The price is lower than that when there is only one producer.
6. Ryan has an income of \$3,000. When the price of good A is \$50 and the price of good B is \$30, he consumes 30 units of good A and 50 units of good B. After the price of good B decreases to \$15, he consumes 30 units of good A and 100 units of good B. We can use the information provided to conclude that
- (a) good A is a normal good.
- (b) good A is a normal good, and good B is an inferior good.
- (c) good A is an inferior good, and good B is a normal good.
- (d) both goods A and B are normal goods.
7. Two drivers -Tom and Jerry- each drive up to a gas station. Before looking at the price, each places an order. Tom says, "I'd like 10 gallons of gas." Jerry says, "I'd like \$10 worth of gas." What is each driver's price elasticity of demand?
- (a) 0, 1.
- (b) 1, 0
- (c) 0, infinity.
- (d) 1, infinity.
8. Suppose buyers of computers and printers regard those two goods as complements. Then an increase in the price of computers will cause
- (a) a decrease in the supply of printers and a decrease in the quantity demanded of printers.
- (b) a decrease in the demand for printers and a decrease in the quantity supplied of printers.
- (c) a decrease in the equilibrium price of printers and an increase in the equilibrium quantity of printers.
- (d) an increase in the equilibrium price of printers and a decrease in the equilibrium quantity of printers.
9. In the market for widgets, the supply curve is the typical upward-sloping straight line, and the demand curve is the typical downward-sloping straight line. The equilibrium quantity in the market for widgets is 200 per month when there is no tax. Then a tax of \$5 per widget is imposed. As a result, the government is able to raise \$750 per month in tax revenue. We can conclude that the equilibrium quantity of widgets has fallen by
- (a) 25 per month.
- (b) 50 per month.
- (c) 75 per month.
- (d) 100 per month.

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10. The total cost to the firm of producing zero units of output is

- (a) zero in both the short run and the long run.
- (b) its fixed cost in both the short run and the long run.
- (c) its fixed cost in the short run and zero in the long run.
- (d) zero in the short run and its fixed cost in the long run.

11. As a result of an open market purchase, bank reserves

- (a) rise and interest rates fall.
- (b) and interest rates both fall.
- (c) and interest rates both rise.
- (d) fall and interest rates rise.

12. Theoretically, one can distinguish a demand-pull inflation from a cost-push inflation by comparing

- (a) how fast prices rise relative to wages.
- (b) when prices rise relative to wages.
- (c) the unemployment rate with its natural rate level.
- (d) government debt to real GDP.

13. If oil prices fall at the same time that the government increases its purchases, in the short run

- (a) aggregate output and the price level will both fall.
- (b) aggregate output will increase, but the price level may either increase or decrease.
- (c) aggregate output and the price level will both increase.
- (d) aggregate output will increase, but the price level will fall.

14. The less interest-sensitive is money demand, the \_\_\_\_\_.

- (a) flatter is the LM curve
- (b) more effective is monetary policy relative to fiscal policy
- (c) steeper is the IS curve
- (d) more effective is fiscal policy relative to monetary policy

15. If currency outstanding equals \$200 million, checkable deposits equal \$1 billion, reserves equal \$150 million, and the required reserve ratio is 0.10, the money multiplier equals

- (a) 3.14.
- (b) 3.43.
- (c) 0.86.

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- (d) 4.
16. The total sales of all firms in the economy for a year
- (a) equals GDP for the year.
  - (b) is larger than GDP for the year.
  - (c) is smaller than GDP for the year.
  - (d) Any of the above is possible.
17. The theory of purchasing-power parity implies that the demand curve for foreign-currency exchange is
- (a) downward sloping.
  - (b) upward sloping.
  - (c) horizontal.
  - (d) vertical.
18. When a country allows trade and becomes an exporter of a good, which of the following is not a consequence?
- (a) The price paid by domestic consumers of the good increases.
  - (b) The price received by domestic producers of the good increases.
  - (c) The losses of domestic consumers of the good exceed the gains of domestic producers of the good.
  - (d) The gains of domestic producers of the good exceed the losses of domestic consumers of the good.
19. Suppose that the adult population is 4 million, the number of unemployed is 0.25 million, and the labor-force participation rate is 75%. What is the unemployment rate?
- (a) 6.25%.
  - (b) 8.3%.
  - (c) 9.1%.
  - (d) 18.75%.
20. If a \$1,000 increase in income leads to a \$750 increase in consumption expenditures, then the marginal propensity to consume is
- (a) 0.75 and the multiplier is 1 1/3.
  - (b) 0.75 and the multiplier is 4.
  - (c) 0.25 and the multiplier is 1 1/3.
  - (d) 0.25 and the multiplier is 4.

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**Problem Solving (80%)**

1. In a monopolistic competitive economy, each producer faces the following demand function

$$Q = \frac{1}{n} - P,$$

where Q is the production level, n is the number of producer and P is the price charged by a firm. Suppose each producer has the following cost function

$$TC = 1 + Q,$$

where TC is the total cost. Solve the production level and price charged by a firm. Please also solve the number of producer at equilibrium (it need not to be an integer.) (20%)

2. There are four industrial firms in Happy Valley.

Firm	Initial Pollution Level	Cost of Reducing Pollution by 1 Unit
A	70 units	\$25
B	80 units	\$20
C	50 units	\$15
D	40 units	\$10

The government wants to reduce pollution to 160 units, so it gives each firm 40 tradable pollution permits.

- (a) Graph the demand and supply curves for tradable pollution permits. (4%)
- (b) Who sells permits and how many do they sell at market equilibrium? Who buys permits and how many do they buy? What is the total cost of pollution reduction in this situation? (11%)
- (c) How much higher would the costs of pollution reduction be if the permits could not be traded? (3%)
- (d) What size of a corrective tax would achieve the goal of reducing pollution to 160 units? (2%)

3. Economist Michael Woodford recently says: "If prices or wages are sticky, monetary policy affects real activity, and so the consequences of an increase in government purchases depend on the monetary policy response."

- (a) Please explain the first part of the above quote, why is that if prices or wages are sticky, monetary policy affects real activity? (10%)
- (b) Please explain the second part of the above quote, what does it mean by "the consequences of an increase in government purchase depend on the monetary policy response"? (10%)

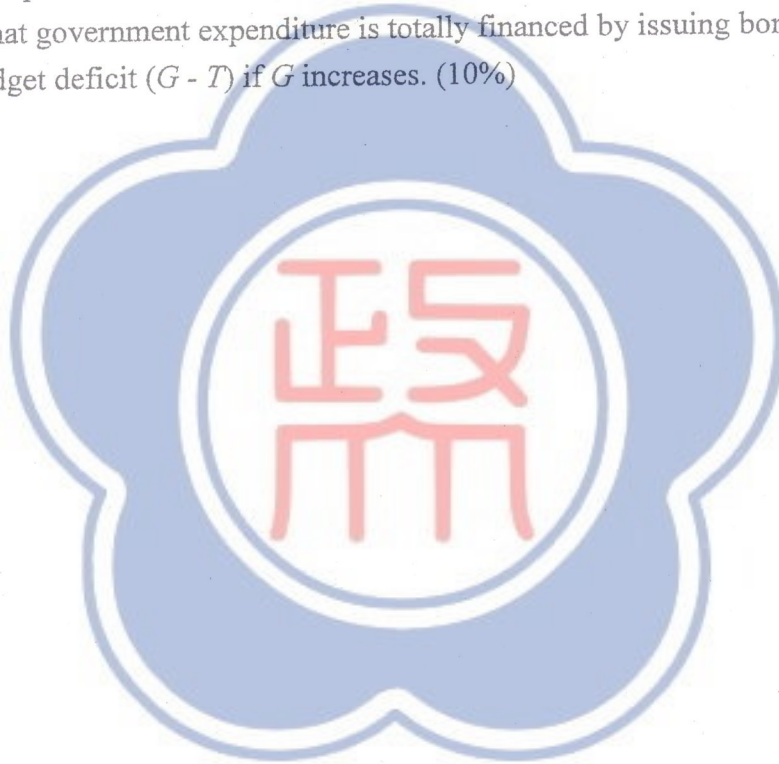
考試科目	經濟學	所別	商學院共同科	考試時間	7月26日(日) 第一節
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4. Consider a close economy described by:

$$Y = C + I + G$$

$$C = a + b(Y - T), 0 < b < 1, I = \bar{I}$$

- (a) Compute the output multiplier with respect to government consumption ( $dY/dG$ ), under the assumption that  $G$  is totally financed by raising new lump-sum tax. (10%)
- (b) Now, assume a proportional taxation system, i.e.  $T = t \cdot Y$ , where  $t$  is the average income tax rate. Under the assumption that government expenditure is totally financed by issuing bonds, show what would happen to the budget deficit ( $G - T$ ) if  $G$  increases. (10%)



考試科目	保險法	所別	風管所法律組 4181	考試時間	2月26日(日) 第一節
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問答題：(每題二十五分)

一、甲乙為夫婦，育有獨子丙。乙婦另有老父丁，便無其他親屬。甲經乙之書面同意，採取「以甲為要保人、乙為被保險人、甲與丙同為受益人」之方式，向 A 保險公司投保終身壽險，保險金額為 2000 萬元。假設丙因終日沈迷於賭博，積欠地下錢莊款項達 1000 萬元。丙因不堪黑道之暴力討債，遂與其勾結，趁甲乙赴海外旅遊時，設計謀害甲乙二人致死。其所生之法律效果為何？試分析之。

二、於銀行實務上，針對以信用卡支付旅遊團費或機票費用之持卡人或其子女配偶，發卡銀行常有提供所謂之「飛航平安保險」。此時之保險利益為何？保險契約之當事人為何人？試分析之。

三、保險業於進行資金運用時，必須遵守保險法之相關規範。其立法理由為何？試論述之。

四、何謂「保險標的」？於責任保險之場合，其保險標的為何？試論述之。

4181

考試科目	民法(總則與 債編總論)	所別	風險管理與保險 學系(法律組)	考試時間	二月六日(日)第三節
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第一題：(25%)

何謂「法律事實」？法律事實中之「法律行為」、「準法律行為」與「事實行為」，其行為之法律效力如何決定？

第二題：(25%)

完全行為能力人、限制行為能力人及無行為能力人如何判定？限制行為能力人以自己之名義所為之法律行為，其效力為何？

第三題：(25%)

「消滅時效」與「除斥期間」，如採用雙重期間之規定時，其時效之完成或期間之經過如何認定，舉例說明之。

第四題：(25%)

舉例說明民事法上違法行為之類型，並舉例說明民事法上違法行為之歸責事由（或歸責原則）。

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註 試題隨卷繳交

考試科目	統計學	所別	風管所管理組 4182	考試時間	2 月 26 日 (日) 第三節
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(24%) 1. Suppose that  $X_1$  and  $X_2$  are independent, exponential random variables with parameters  $\lambda_1$  and  $\lambda_2$  respectively. Please show that

(6%) (1)  $X_3 = \min(X_1, X_2)$  is independent of the event  $\{X_1 < X_2\}$ , and

(6%) (2)  $P(X_3 = X_1) = P(X_1 < X_2)$ .

Furthermore, please find:

(6%) (3) The distribution functions of  $U = \max(X_1 - X_2, 0)$  and

$V = \max(X_1, X_2) - \min(X_1, X_2)$ , and

(6%) (4)  $P(X_1 \leq s < X_1 + X_2)$  where  $s > 0$ .

(16%) 2. Please show that  $P(\bigcap_{i=1}^m A_i) \geq 1 - \sum_{i=1}^m P(A_i^c)$  for any events  $A_1, A_2, \dots, A_m$ .

(20%) 3. Please show that  $\text{Var}(Y) = E(\text{Var}(Y|X)) + \text{Var}(E(Y|X))$ .

(16%) 4. Suppose that you face a rabbit race bet. There are  $n$  rabbits in total and the dealer offered odds  $f(k)$  for the  $k$ -th rabbit where  $\sum_{k=1}^n (f(k) + 1)^{-1} < 1$ . Please specify a sure-win strategy in this bet.

(24%) 5. Let  $Z_1, \dots, Z_n$  be i. i. d. random samples from  $f(z|\theta) = \theta z^{\theta-1}$ ,  $0 \leq z \leq 1$ ,  $0 < \theta < \infty$ .

(8%) (1) Please find the MLE of  $\theta$ .

(8%) (2) Is the MLE a consistent estimator?

(8%) (3) Please find of MM estimator of  $\theta$ .

考試科目	微積分	所別	4183 風險管理學系 (精算組)	考試時間	2月6日(日)第一節
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1. (20 分) Suppose  $f$  and  $g$  are two functions with derivatives.  
Prove that

$$\frac{d}{dt}(f(t)g(t)) = \frac{d}{dt}f(t) \cdot g(t) + f(t) \cdot \frac{d}{dt}g(t)$$

2. (30 分)

- (a) Let  $n$  be a positive integer, compute

$$\lim_{\theta \rightarrow 0} \frac{1 - \cos(n\theta)}{\theta^2}$$

- (b) Let  $x > 1/3$  be a constant and  $\log(\cdot)$  denote the natural logarithm, compute

$$\lim_{\theta \rightarrow 0} \frac{\log(3x + 5\theta) - \log(3x)}{\theta}$$

- (c) Compute

$$\lim_{\theta \rightarrow 0^+} \theta^{3\theta}$$

3. (20 分) Compute

- (a)

$$\int_0^1 \frac{1}{\sqrt{x}} dx$$

- (b)

$$\int_0^1 \frac{1}{x\sqrt{x}} dx$$

4. (30 分) Let  $f(t) = \exp(-t^2/2)$  and  $\theta$  is a real number. Compute

- (a)

$$A = \int_0^{\infty} f(t) dt$$

- (b)

$$g(\theta) = \int_{-\infty}^{\infty} \exp(\theta t) f(t) dt$$

- (c)

$$\frac{d^2}{d\theta^2} g(\theta) |_{\theta=0}$$

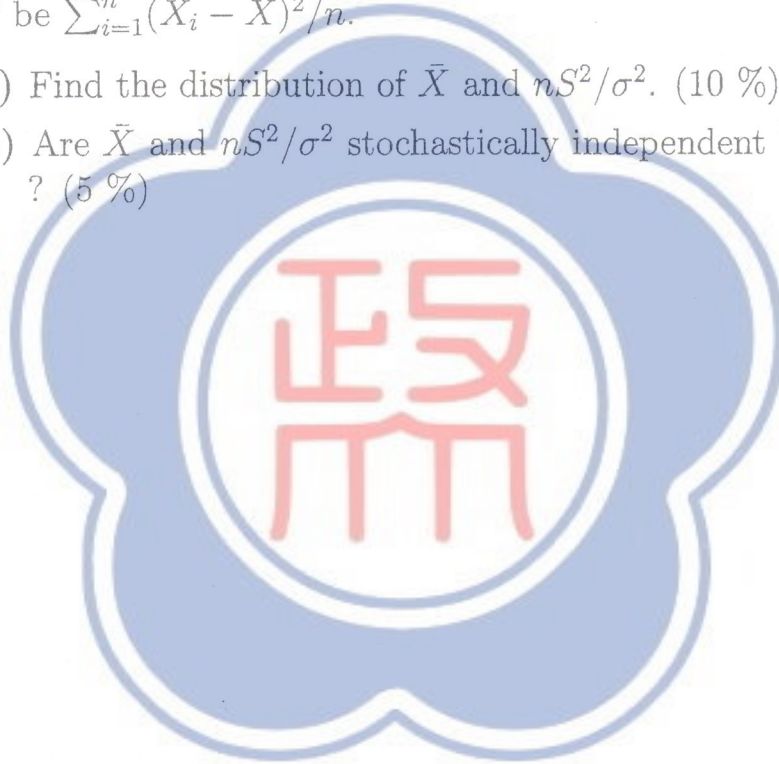
考試科目	統計學	所別	(國政管理學院) 統計學系 精進科學組 4183	考試時間	2 月 26 日(日) 第 3 節
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1. Please explain the following items. (40%)
  - (a) Stochastic Independence, Correlation Coefficient and their Relationship. (10 %)
  - (b) Stochastic Convergence, Moment-Generation function, the Central Limit Theorem. (10%)
  - (c) Unbiased Minimum Variance Estimator and Bayesian Estimators. (10 %)
  - (d) Sufficient Statistics and the *Factorization Theorem* of Neyman. (10 %)
  
2. (15 %) Let the random variable variables  $X$  and  $Y$  have the joint p.d.f.  $f(x, y) = \frac{2}{\theta^2} e^{-\frac{(x+y)}{\theta}}$ ,  $0 < x < y < \infty$ , zero elsewhere.
  - (a) Show the mean and variance of  $Y$ . (5 %)
  - (b) Show  $E(Y | x)$  and the variance of  $X + \theta$  is less than of  $Y$ . (5 %)
  - (c) The connection with the Rao-Blackwell theorem. (5%)
  
3. (10 %) Let  $Y_n$  denote the  $n$ -th order statistic of a random sample of size  $n$  from a uniform distribution on the interval  $(0, \theta)$ . Find the limiting distribution of  $Z_n = \sqrt{Y_n}$ .
  
4. (10 %) Let  $n$  independent trials of an experiment be such that  $x_1, x_2, x_3, x_4$  are the respectively numbers of times that the experiment ends in the mutually exclusive and exhaustive event  $A_1, A_2, A_3, A_4$ . If  $p_i = P(A_i)$  is constant throughout the  $n$  trials, then the probability of that particular sequence of trials is  $L = p_1^{x_1} p_2^{x_2} p_3^{x_3} p_4^{x_4}$ . Find the likelihood ratio for testing  $H_0 : p_i = p_{i0} > 0, i = 1, 2, 3, 4$ , against all alternatives.

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考試科目	統計學	所別	(刑) 法律學系 法律學系(組418)	考試時間	2月26日(日) 第 3 節
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5. (10 %) If  $X_1, X_2$  is a random sample from a distribution that is  $n(0, 1)$ , find the joint p.d.f. of  $Y_1 = X_1^2 + X_2^2$  and  $Y_2 = X_2$  and the marginal p.d.f of  $Y_1$ .
6. (15 %) Let  $X_1, X_2, \dots, X_n$  denote a sample of size  $n \geq 2$  from distribution that is  $n(\mu, \sigma^2)$ . Let  $\bar{X}$  be  $\sum_{i=1}^n X_i/n$  and  $S^2$  be  $\sum_{i=1}^n (X_i - \bar{X})^2/n$ .
- (a) Find the distribution of  $\bar{X}$  and  $nS^2/\sigma^2$ . (10 %)
- (b) Are  $\bar{X}$  and  $nS^2/\sigma^2$  stochastically independent? Why? (5 %)



備註	試題隨卷繳交
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