考試科目	保險法	所別	風管系法律組	考試時間	2月23日(六)第1節

問答題：(每題二十五分)

一、張三為保險公司之財務長，負責該公司資金運用之所有事宜。該公司於投資有價證券時，其金額不慎超出保險法所規定之上限，後經主管機關於業務檢查時發現該項缺失。按保險法之規定，主管機關可採取何種行政處分？試說明之。

二、現行團體傷害保險單示範條款第二條規定如下列。其保險利益與適法性有無疑義？試分析之。

本契約所稱「要保人」是指要保單位。
本契約所稱「被保險人」是指本契約所附被保險人名冊內所載之人員。
本契約所稱「團體」是指具有五人以上且非以購買保險而組織之下列之一團體：
一、有一定雇主之員工團體。
二、依法成立之合作社、協會、職業工會、聯合團體、或聯盟所組成之團體。
三、債權、債務人團體。
四、依規定得參加公教人員保險、勞工保險、軍人保險、農民健康保險或依勞動基準法、勞工退休金條例規定參加退休金計畫之團體。
五、中央及地方民意代表所組成之團體。
六、凡非屬以上所列而具有法人資格之團體

三、按保險法之規定，保險業之營業範圍有何限制？保險代理人應否適用相同規範？試說明之。

四、現行保險法對於人壽保險契約之停效與復效有何規定？試說明之。

備註	試題隨卷繳交

國立政治大學 102 學年度碩士班招生考試試題

考試科目	民法	所別	風險管理與保險法律組	考試時間	2月23日(六)第3節

第一題：30%

債權人為多數時，如何行使債權？

債務人為多數時，如何履行債務？

第二題：30%

侵權行為如何以歸責事由（歸責原則）為標準，區分為「一般侵權行為」與「特殊侵權行為」？

第三題：40%

甲男出生於民國（以下同）80年3月8日，乙女生於82年3月8日，兩人已論及婚嫁。甲未經父母允許，於98年1月8日與丙訂立租賃契約，以每月3萬元租金承租三房兩廳公寓。乙於98年9月註冊時繳交保費，參加學生平安保險。99年1月8日，甲乙未經雙方父母之允許，即自行結婚，立下有丁及戊為證人之結婚證書，並辦妥結婚登記。99年3月8日甲向A汽車公司購買自用小客車一輛。嗣乙之父親訴請撤銷甲乙之婚姻，經法院於100年3月8日判決撤銷確定。101年3月8日甲基於與乙何庚調借現金二百萬元，已訂立借貸契約，但尚未點交現款。試說明上述各種法律行為之效力。

備註	試題隨卷繳交

考試科目	微積分	所別	風險管理與保險學系 精算科學組	考試時間	2月23日(六) 第 1 節

For $\alpha > 0$, the gamma function is defined as

$$\Gamma(\alpha) = \int_0^\infty u^{\alpha-1} e^{-u} du$$

1. (50%) Define the incomplete gamma function as

$$\Gamma(\alpha, t) = \frac{1}{\Gamma(\alpha)} \int_0^t u^{\alpha-1} e^{-u} du$$

Let $\theta > 0$ and $g(x) = x^{\alpha-1}\theta^{-\alpha}e^{-x/\theta}/\Gamma(\alpha)$.

(a) Show that $\Gamma(1) = 1$.

(b) Show that $\Gamma(\alpha + 1) = \alpha\Gamma(\alpha)$.

(c) Show that $\Gamma(\alpha) = (\alpha - 1)!$, when α is a positive integer.

(d) Show that $\int_0^t g(x)dx = \Gamma(\alpha, t)$.

(e) Let $\alpha = 2$ and $\theta = 2$, compute $\int_0^\infty x^3 g(x)dx$.

2. (20%) Compute

(a)

$$\lim_{\theta \to 0} \frac{\beta}{\theta} \left(A^{-\theta} - 1 \right),$$

where $\theta > 0$, $\beta > 0$ and $A > 1$.

(b)

$$\lim_{\alpha \to \infty} \frac{e^{-\alpha} \alpha^{\alpha - 0.5}}{\Gamma(\alpha)}$$

3. (20%)

(a) Compute

$$\int_0^1 \int_0^1 |x - y| dx dy$$

(b) Let

$$f(x) = \frac{\alpha \theta^\alpha}{(x + \theta)^{\alpha+1}}$$

For $-1 < k < \alpha$, compute $\int_0^\infty x^k f(x)dx$.

4. (10%) Let λ be a positive real number, compute

$$\sum_{k=1}^{\infty} \frac{e^{-\lambda} k^2 \lambda^k}{k!}$$

備註	試題隨卷繳交

考試科目	統計學	所別	風險管理與保險學系精算組	考試時間	2月23日(六) 第 3 節

5. (15%)

Let X have the pdf $f(x;\theta)=\theta^x(1-\theta)^{1-x}, x=0,1,$ zero elsewhere. We test $H_0:\theta=\frac{1}{2}$ against $H_1:\theta<\frac{1}{2}$ by taking a random sample $X_1,X_2,\dots,X_n$ of size $n=5$ and rejecting H_0 if Y is observed to be less than or equal to a constant c. (1) Find the uniformly most powerful test. (2) Find the significant level when c=1. (3) Find the significant level when c=0. (4) By using a randomized test, modify the tests given in (2) and (3) to find a test with significant level $\alpha=\frac{3}{32}$.

6. (15%)

Let $X_1,X_2,\dots,X_n$ denote a random sample from a distribution $N(\theta,\sigma^2),-\infty<\theta<\infty$, where σ^2 is a given positive number. Let $Y=\bar{X}$, the mean of the random sample. Take the loss function to be $L[\theta,w(y)]=|\theta-w(y)|$. (1) Define the Bayesian statistics and the Bayes' solution. (2) If θ is an observed value of the random variable Θ that is $N(\mu,\tau^2),\tau^2>0$ and μ are known numbers, find the Bayes' solution $w(y)$ for a point estimate of θ.

備註	試題隨卷繳交

考試科目	統計學	所別	[illegible]	考試時間	2 月 23 日(六) 第 3 節

1. Please explain the following items. (40%)

(a) Rao-Blackwell Theorem, Completeness and Uniqueness (10%)

(b) Moment-Generating Function, Chebyshev's Inequality and The Central Limit Theorem and. (10%)

(c) The Likelihood Ratio Tests and Chi-square Tests (10%)

(d) Rao-Cramer Inequality and Efficient Estimator (10%)

2. (10%)

Let $X_{(1)}, X_{(2)}, X_{(3)}$ be the order statistics of iid random variable's X_1, X_2, X_3 with common pdf

$$f(x) = \begin{cases} \beta e^{-x\beta}, x > 0, \beta > 0 \\ 0, otherwise, \end{cases}$$

Let $Y_1 = X_{(3)} - X_{(2)}$ and $Y_2 = X_{(2)}$. (1) Find the joint pdf of $X_{(2)}$ and $X_{(3)}$. (2) Are Y_1 and Y_2 independent? Details are required.

3. (10%)

Let X be an random variable with pdf

$$f(x) = \begin{cases} \frac{2x}{\pi^2}, 0 < x < \pi, \\ 0, otherwise, \end{cases}$$

Let $Y = \sin X$. Find the pdf of Y.

4. (10%)

Let $X_1, X_2, \ldots, X_n$ be iid $N(\mu, \sigma^2)$ random variables. Are $\bar{X} = \frac{\sum_{i=1}^{n} X_i}{n}$ and $(X_1 - \bar{X}, X_2 - \bar{X}, \cdots X_n - \bar{X})$ independent? You are required to show the details.

備註	試題隨卷繳交

考試科目	統計學	系別	風險管理與保險學系/管理組	考試時間	2 月 23 日(六) 第三節

6. Suppose random variable X follows a continuous uniform distribution on the interval $0< x < 12$. Random variable Y has a conditional distribution, given X= x, that is uniform on the interval $0< y < x$. Please find the unconditional variance of Y. (10%)

7. Suppose you want to estimate a regression of x on y. $\sum x_i = 1{,}137$, $\sum y_i = 6.05$, $\sum x_i^2 = 54{,}749$, $\sum y_i^2 = 1.522$, $\sum x_i y_i = 262.96$. i ranges from 1 to 27, i.e., the number of sample size is 27.
   (1) Fit the regression line. (10%)
   (2) Test for the significance of the regression slope at the 5% level (10%)
   ($t_{25, 0.95} = 1.708$; $t_{27, 0.95} = 1.703$; $t_{25, 0.975} = 2.060$; $t_{27, 0.975} = 2.052$)

8. You are formulating two hypotheses- a null and an alternative hypothesis. Suppose the null mean is 175, the alternative mean is 190, and the standard deviation is 50. You are considering carrying out a one-sided test at a significance level of 5% with a power of 90%. What is the required sample size? (10%) ($z_{0.90} = 1.28$; $z_{0.95} = 1.645$; $z_{0.975} = 1.96$; $z_{0.9901} = 2.33$)

備註	試題隨卷繳交

國立政治大學 102 學年度碩士班招生考試試題

考試科目	統計學	系別	風險管理與保險學系/管理組	考試時間	2 月 23 日(六) 第三節

1. Define the following terms:
   (1) p-value (5%)
   (2) significance level of a test (5%)
   (3) skewness (5%)
   (4) power of a test (5%)

2. Suppose a patient has Symptoms A and B. The physician therefore orders the patient admitted to the hospital for a physical examination. Assume that the results of the examination are consistent with either Disease C or Disease D. The probabilities of having Symptoms A and B given no disease, Disease C, and Disease D are 0.001, 0.9, 0.9 respectively. Also assume that the probabilities of having no disease, Disease C, and Disease D are 0.99, 0.001, 0.009 respectively. As a statistician, you are requested to help this physician to determine whether the patient has no disease, Disease C, or Disease D. What professional opinion would you offer? (10%)

3. Use a normal distribution to approximate the upper 2.5th percentile for a Chi-square distribution with a degree of freedom of 5,000? (10%) ($z_{0.95}$= 1.645; $z_{0.975}$= 1.96; $z_{0.9901}$= 2.33)

4. A statistician would like to compare how long it takes users of Drugs A and B, respectively to become ill after stopping taking these drugs. A study of group of 20 Drug A users is formed. The statistician also finds Drug B users who match each Drug A user. The mean difference (Drugs A minus B) in time to illness is four months with a standard deviation of eight months. What can you conclude from these data? (10%)
   ($t_{19, 0.975}$= 2.093; $t_{19, 0.99}$= 2.539; $t_{20, 0.975}$= 2.086; $t_{19, 0.99}$= 2.528)

5. A researcher is examining the effect of Drug A on Disease B. It is found that among 5,000 Drug A users, 13 people develop Disease B, while among 10,000 non-Drug A users, seven develop Disease B. Assess the data for statistical significance. (10%) ($\chi^2_{(0.99,1)}$= 6.63; $\chi^2_{(0.995,1)}$= 7.78; $\chi^2_{(0.99,4)}$= 13.28; $\chi^2_{(0.995,4)}$= 14.86)

備註	試題隨卷繳交

考試科目	經濟學	所別	商學院各系所（科管與智財所科技管理組學士後甲一般生除外）	考試時間	2月23日(六)第一節

Multiple Choice (1 point each)

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

1. When marginal cost is rising, average variable cost
   A. must be rising.
   B. must be falling.
   C. must be constant.
   D. could be rising or falling.

2. When goods are not excludable
   A. the good will be produced as a private good but not as a public good.
   B. the good will not be produced since no one values it.
   C. the free-rider problem prevents the private market from supplying them.
   D. everyone can have all they want and the good will have a zero price.

3. The Coase theorem suggests that private markets may not be able to solve the problem of externalities
   A. if the government does not become involved in the process.
   B. when the number of interested parties is large and bargaining costs are high.
   C. if the firm in the market is a monopoly.
   D. if some people benefit from the externality.

4. The substitution effect of a wage decrease in the work-leisure model results in the worker choosing to
   A. work less than before.
   B. work more than before.
   C. possibly work more or less than before.
   D. work more with a higher level of consumption.

5. Suppose a tax of $1 per unit is imposed on a good. The more elastic the supply of the good, other things equal, the
   A. smaller is the response of quantity supplied to the tax.
   B. larger is the tax burden on sellers relative to the tax burden on buyers.
   C. larger is the deadweight loss of the tax.
   D. All of the above are correct.

備註	試題隨卷繳交

考試科目	經濟學	所別	商學院各系所（科智與智財所科技管理組學士班甲一般生除外）	考試時間	2月23日(六)第一節

6. If a monopolist faces a downward sloping market demand curve, its
   A. average revenue is always less than marginal revenue.
   B. marginal revenue is greater than the price of the units it sells.
   C. average revenue is less than the price of its product.
   D. marginal revenue is always less than the price of the units it sells.

7. Comparing marginal revenue to marginal cost
(i) reveals the contribution of the last unit of production to total profit.
(ii) is helpful in making profit maximizing production decisions.
(iii) always reveals whether a firm is making an economic profit.
(iv) tells a firm whether its fixed costs are too high.
   A. (i) and (ii) only
   B. (iii) only
   C. (ii) and (iii) only
   D. All of the above are correct.

8. In a world with only two countries, the noncooperative outcome to an "arm race" game clearly
   A. could not be considered a waste of economic resources.
   B. is bad for society.
   C. is the best possible outcome for society.
   D. is optimal for one player at the expense of the other.

9. When a profit-maximizing firm in a monopolistically competitive market is producing the long-run equilibrium quantity,
   A. it will be earning economic profit.
   B. its demand curve will be tangent to its average total cost curve.
   C. its average revenue will equal marginal cost.
   D. its marginal revenue will exceed marginal cost.

10. Workers displaced by trade will eventually find jobs in
   A. another country.
   B. the government sector.
   C. the industries in which the country has a comparative advantage.
   D. a different company in the same industry.

備註	試題隨卷繳交

考試科目	經濟學	所別	商學院各系所（科管與智財所科技管理組學士後甲一般生除外）	考試時間	2月23日(六)第一節

11. A citizen of Japan uses previously obtained U.S. dollars to purchase the Kindle e-book readers from the United States. This transaction
   A. increases Japan net capital outflow, and increases U.S. net exports.
   B. increases Japan net capital outflow, and decreases U.S. net exports.
   C. decreases Japan net capital outflow, and increases U.S. net exports.
   D. decreases Japan net capital outflow, and decreases U.S. net exports.

12. Which of the following shifts aggregate demand to the left?
   A. an increase in the price level
   B. a decrease in the money supply
   C. an increase in net exports
   D. Congress passes a new investment tax credit

13. Policymakers who control monetary and fiscal policy and want to offset the effects on output of an economic contraction caused by a shift in aggregate supply could use policy to shift
   A. aggregate supply to the right.
   B. aggregate supply to the left.
   C. aggregate demand to the right.
   D. aggregate demand to the left.

14. Judith sells cars. In 2012 she added $500,000 to her inventory. $200,000 of this addition was from used cars she purchased, while the remaining $300,000 was from her purchases of newly manufactured cars. How much of Judith's inventory is included in 2012's GDP?
   A. $0
   B. $200,000
   C. $300,000
   D. $500,000

15. The Consumer Price Index measures the level of prices in a given year relative to some base year and is calculated using a weighted average of prices for a typical bundle of goods. The weights are
   A. the same for each good.
   B. equal to the share of income spent on each good in the base year.
   C. equal to the share of income spent on each good in the current year.
   D. different across goods but assigned randomly.

備註	試題隨卷繳交

考試科目	經濟學	所別	商學院各系所（科管與智財所科技管理組學士班甲一般生陞升）	考試時間	2月23日(六) 第一節

16. Assume that autonomous consumption equals $400 and disposable income equals $2000. If total consumption equals $1600, then the marginal propensity to consumption is

A. 0.2
B. 0.6
C. 0.8
D. 1.0

17. Suppose that from a new checkable deposit, Bank A holds four million dollars in vault cash, sixteen million dollars on deposit with the central bank, and two million dollars in required reserves. Given this information, we can say Bank A faces a required reserve ratio of

A. 5%
B. 10%
C. 15%
D. 20%

18. Everything else held constant, in the market for reserves, when the federal funds rate is 3%, raising the discount rate from 4% to 5%

A. has an indeterminate effect on the federal funds rate.
B. raises the federal funds rate.
C. lowers the federal funds rate.
D. has no effect on the federal funds rate.

19. The quantity theory of inflation indicates that if the aggregate output is growing at 6% per year and the growth rate of money is 10%, then inflation is

A. 4%
B. -4%
C. 1.6%
D. 0.6%

20. If the required reserve ratio is 10%, currency in circulation is $200 billion, checkable deposits are $400 billion, and excess reserves are $0.4 billion, then the M1 money multiplier is about

A. 0.60
B. 3.50
C. 1.50
D. 2.50

備註	試題隨卷繳交

考試科目	經濟學	所別	商學院各系所（科管與智財所科技管理組學士班甲一般生除外）	考試時間	2月23日(六)第一節

Problems and Short-essay Questions

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

1. Consider a competitive market whose demand is given by $Q(P) = 500 - 50P$. There are 200 identical firms in the market, each producing with a technology characterized by the total cost function, $TC(q) = 4 + 0.02nq + q^2$, where n and q denote the number of firms and quantity produced by each firm, respectively. Apparently, each firm's marginal cost is increasing in the number of firms coexisting in the market.

a. (5 points) How much profit does each firm make in the short-run equilibrium?

b. (15 points) In the long run, firms can freely enter or exit the market. How many firms are there in the market when it reaches the long-run equilibrium? How many units of output does each firm produce in the long-run equilibrium? What is the corresponding marginal cost?

2. Suppose, for a specific good, the excess demand function of the home country is $P = 2 - Q$ and the excess supply function of the foreign country is $P = 1 + Q$. Answer the following questions.

a. (10 points) What are the equilibrium price and the home country's quantity of import under free trade?

b. (10 points) Suppose the home country imposes an ad valorem tariff. Calculate the optimal tariff the government should levy if it wants to maximize the welfare of its citizen.

3. a. (6 points) Give two major reasons that support a downward-sloping aggregate demand (AD) curve?

b. (7 popints) Explain in detail how the several rounds of quantitative easing (QE) implemented by the Federal Reserve system could possibly affect the AD curve in the U.S.?

c. (7points) Given that the current interest rate is already very low (the real interest rate is reportedly negative), how could another round of QE (say QE4) boost up the U.S. economy?

4. (20 points) This is a question about the expectations theory of the term structure of interest rates. Consider 1-year zero-coupon bond and 2-year zero-coupon bond. Both bonds have the same face value of \$1. Today's 1-year interest rate on the 1-year bond is 10%. Investors are risk-neutral.

a. Suppose that investors expect that the 1-year interest rate on the 1-year bond next year will be 10%. There is no uncertainty, meaning that investors assume that the 1-year interest rate next year will be exactly 10%. Given these information, according to the expectations theory of term structure, what would be today's 2-year interest rate on the 2-year bond?

備註	試題隨卷繳交

考試科目	經濟學	所別	商學院各系所（科管與智財所科技管理組學士班甲一般生除外）	考試時間	2月23日(六)第一節

b. Now the expected rate is still 10%, but suppose there is uncertainty: with probability 1/2 the 1-year interest rate on the 1-year bond next year will be 12%, and with probability 1/2 the 1-year interest rate on the 1-year bond next year will be 8%. What would be today's 2-year interest rate on the 2-year bond in this case?

c. Continue from (b) above, but now suppose the investors are risk-averse. In this case, today's 2-year interest rate will be higher or lower than your answer in (b)? Why?

備註	試題隨卷繳交