問答題：（每題二十五分）

一、某甲以其價值 1000 萬之房屋向乙銀行貸款 600 萬元，並以該房屋為擔保，由銀行設定抵押。試問：
（1）若銀行就該房屋投保可以投保火災保險，應以何者為被保險人？
（2）若銀行就該房屋投保不能投保火災保險，銀行如何確保其房屋擔保之價值？

二、保證保險與保證有無不同？保證保險契約之當事人，除一方為保險人外，另一方為何人？其保險利益何在？試說明之。

三、電信業者於銷售手機時，招攬客戶付費參加「保固維修專案」並成為會員。若該手機因不慎掉落而毀損（如銀幕破裂），會員即可享受免費之維修服務。試問電信業者經營此類「保固維修專案」，是否構成經營保險業務？

四、人壽保險之被保險人死亡時，於下列不同情況下，其法律效果為何？試說明之：
（1）　要保人故意致被保險人於死
（2）　受益人故意致被保險人於死
（3）　被保險人自殺

| 備　註 | 一、作答於試題上者，不予計分。
二、試題請隨卷繳交。 |

考 試 科 目	民法（總則與債編總論）	系 所 別	風險管理與保險學系/法律組	考試時間	2 月 2 日（五）第三節

一、甲於民國 90 年 1 月間，以其配偶乙為被保險人，向 A 保險公司投保終身人壽保險契約，約定保險金額為 80 萬元。91 年 8 月 15 日，雖有颱風侵台，但乙仍冒險登山，從此失蹤，音訊全無。甲相信乙仍有存活返家的一天，所以仍持續繳交保險費。至 98 年 11 月，甲終於死心，向法院聲請對乙為死亡宣告獲准。甲取得死亡宣告裁定之後，向 A 公司請給付保險金 80 萬元，獲得全額給付後，用以出國旅遊療癒感情上的傷害，行遍歐美亞非各地，僅剩餘 5 萬元後返國。豈料甲返家時，發現乙在其出國期間安然返家，始知原來乙失蹤期間是與外遇對象共築愛巢隱居。請問：乙聲請法院撤銷死亡宣告獲准後，A 公司請求甲返還全部保險金，甲主張其僅須返還現存利益 5 萬元。雙方主張何者較有理由？（25 分）

二、甲為 A 保險經紀人公司所屬業務員，在銷售 B 保險公司之投資型保險商品時，在商品行銷 DM 記載「投資目標只追求正報酬」、「到期保本保息保證」、「到期保證年報酬率高於 2.5%」、「投資期間 100%參與投資獲利」等不符合投資型保險商品屬性的用語，誤導客戶。乙因誤信該商品保本保息且必有高於 2.5%的報酬率，遂經由甲與 A 保險經紀公司，於 95 年 6 月間與 B 保險公司訂立投資型保險契約，並繳付 60 萬元之單筆保險費。至 100 年 12 月時，乙查詢保單帳戶價值，發現僅有 35 萬元，不僅沒有預計的報酬率，還蒙受重大損失，便主張其係受詐欺而投保，向 B 保險公司發函撤銷其訂約之意思表示，請求返還保險費 60 萬元。B 保險公司抗辯：自己並無詐欺行為，亦不知甲有為詐欺行為，無須為保險經紀人的業務員行為而負責等，故乙之撤銷不合法，拒絕返還保險費。請詳細說明：何者之主張較有理由？（25 分）

三、甲於民國 101 年 1 月 15 日以自己為被保險人，向 A 保險公司投保人壽保險，約定保險金額 200 萬元，並指定配偶乙為受益人。惟其訂約時，故意隱匿自己曾罹患肝臟腫瘤的事實，未據實說明。103 年 2 月 1 日，甲因肝臟腫瘤復發去世，乙為其唯一之繼承人。請附詳細理由回答下列問題：

（1）乙請求給付保險金時，A 公司即查知甲故意隱匿病史投保情事，便主張係受詐欺而訂約，依民法第 198 條拒絕履行，有無理由？（25 分）

（2）A 公司於給付保險金之後，才知悉甲故意隱匿病史投保情事，進而主張其係受詐欺而訂約，依民法第 184 條向乙請求賠償其所給付之保險金，有無理由？（25 分）

備 註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考 試 科 目	經濟學	系 所 別	商學院共同科	考試時間	2月2日(五)第一節

一、Multiple Choice (1 point each)

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

1. Beef is a normal good. You observe that both the equilibrium price and quantity of beef have fallen over time. Which of the following explanations would be most consistent with this observation?

    A. Consumers have experienced an increase in income, and beef-production technology has improved.

    B. The price of chicken has risen, and the price of steak sauce has fallen.

    C. New medical evidence has been released that indicates a negative correlation between a person's beef consumption and life expectancy.

    D. Beef producers, concerned about the health of their customers, decided to produce relatively less beef.

2. Suppose a tax of $4 per unit is imposed on a good, and the tax causes the equilibrium quantity of the good to decrease from 2,000 units to 1,700 units. The tax decreases consumer surplus by $3,000 and decreases producer surplus by $4,400. The deadweight loss of the tax is

    A. $ 200.

    B. $ 400.

    C. $ 600.

    D. $ 1,200.

3. When a tax is levied on sellers of tea, buyers of a good bear the larger share of the tax burden when the

(i) supply is more elastic than the demand for the product.

(ii) demand in more elastic than the supply for the product.

(iii) tax is placed on the sellers of the product.

(iv) tax is placed on the buyers of the product.

    A. (i) only

    B. (ii) only

    C. (i) and (iii) only

    D. (i) and (iv) only

備 註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考 試 科 目	經濟學	系所別	商學院共同科	考試時間	2 月 2 日 (五) 第一節

4. The substitution effect of an increase in the interest rate will result in an increase in

    A. consumption when young and increase in savings when young.

    B. consumption when old and an increase in savings when young.

    C. consumption when young and an increase in savings when old.

    D. savings when old and an increase in consumption when old.

5. Assume that goods X and Y are not Giffen goods. If the price of good X falls, a consumer will definitely

    A. consume more of good X because her budget constraint has rotated outward.

    B. consume more of good X because her budget constraint has shifted outward.

    C. consume more of good Y because her budget constraint has rotated outward.

    D. consume more of good Y because her budget constraint has shifted outward.

6. Thirsty Thelma owns and operates a small lemonade stand. When Thelma is producing a small quantity of lemonade she has few workers and her equipment is not being fully utilized. Because she can easily put her idle resources to use,

    A. the marginal cost of an extra worker is large.

    B. the marginal product of an extra worker is small.

    C. The marginal cost of one more glass of lemonade is small.

    D. Her lemonade stand is likely to be crowded with workers.

7. When total revenue is less than total variable cost, a firm in a competitive market will

    A. shut down.

    B. continue to operate as long as average revenue exceeds marginal cost.

    C. continue to operate as long as average revenue exceeds average fixed costs.

    D. always exit the industry.

8. In a competitive market, a firm's supply curve dictates the amount it will supply. In a monopoly market

    A. the same is true.

    B. the decision about how much to supply is impossible to separate from the demand curve it faces.

備　　註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考 試 科 目	經濟學	系所別	商學院共同科	考試時間	2月2日(五) 第一節

C. the supply curve conceptually makes sense, but in practice is never used.

D. the supply curve will have limited predictive capacity.

9. Equilibrium quantity in markets characterized by oligopoly are

A. lower than in monopoly markets and higher than in perfectly competitive markets.

B. lower than in monopoly markets and lower than in perfectly competitive markets.

C. higher than in monopoly markets and higher than in perfectly competitive markets.

D. higher than in monopoly markets and lower than in perfectly competitive markets.

10. In the long run, a profit-maximizing firm in a monopolistically competitive market operates at

A. efficient scale.

B. the point where demand equals marginal cost.

C. the point where revenue is also maximized.

D. some point along the downward sloping portion of its average total cost curve.

11. Which of the following statements is correct if a country has adopted fixed exchange rate regime?

A. If the currency is overvalued with respect to the fixed parity, the central bank has to intervene e.g. by increasing the interest rate.

B. The central bank has to offset the effects of capital outflow on the exchange rate e.g. by buying domestic currency and paying with foreign reserves.

C. If, in order to reduce excess supply of the domestic currency, the central bank buys domestic currency at the target exchange rate, this will necessarily cause inflation in the home country.

D. Measures taken by the central bank to keep the exchange rate fixed will not affect the domestic interest rate.

12. Take a graph with the unemployment rate on the horizontal axis and the inflation rate on the vertical axis. Which of the following will shift the Phillips curve towards the northeast?

A. A positive aggregate demand shock

B. Contractionary monetary policy

C. A negative aggregate supply shock

D. A decrease in expected inflation

備　　　註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考 試 科 目	經濟學	系所別	商學院共同科	考試時間	2月2日(五)第一節

13. Which of the following statements is necessarily false:

   A. Monetary policy can be conducted through open market operations, setting the minimum reserve requirement and through changing the refinancing rate at which banks can borrow money from the central bank.

   B. In the short run, an increase in money supply causes a proportional increase in prices. Over time the latter decrease again.

   C. Unemployment benefits are automatic stabilizers.

   D. The positive effect of expansionary fiscal policy on production is reduced by crowding out.

14. According to the theory of sticky wages:

   A. prices adjust slowly to a decrease in nominal wages. Firms face lower wages and since prices stay high they increase the level of production and thus employment. This results in higher aggregate supply.

   B. wages adjust slowly to a decrease in prices. Firms face lower prices and since the costs of production stay high they have to decrease production and thus employment. This decreases aggregate supply.

   C. not all firms immediately adjust their prices in reaction to a decrease in the price level. These firms face higher prices and thus they increase production, which increases aggregate supply.

   D. prices react more than proportionally to increases in nominal wages. Producers face higher wages, but since prices increase more than wages they want to increase production. This results in higher aggregate supply.

15. According to the AS-AD model an increase of public investment

   A. might decrease GDP in the short run because of crowding out.

   B. decreases prices in the short run which stimulates an economic recovery.

   C. does not change long run aggregate supply.

   D. increases aggregate supply which is depicted as a shift of the AS curve to the right.

16. Which of the following is the most important variable for judging an economy's long-run performance?

   A. growth in nominal GDP

   B. growth in real GDP

備　　　　註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考 試 科 目	經濟學	系 所 別	商學院共同科	考試時間	2月2日(五)第一節

C. growth in real GDP per capita

D. growth in potential GDP

17. Assume that the currency-deposit ratio is 32%, the required reserve-deposit ratio is 7%, the excess reserve-deposit ratio is 1%, and total money supply is $1,320 billion. What is the amount of high-powered money?

    A. $132 billion

    B. $165 billion

    C. $330 billion

    D. $400 billion

18. When the central bank intervenes in the foreign exchange market by purchasing foreign currency, it also routinely engages in open market sales of government securities. Why?

    A. it has to sell securities to acquire the necessary funds

    B. to avoid a recession that may be caused by the reduction in money supply resulting from the purchase of foreign currency

    C. to prevent its intervention in the foreign exchange market from having a direct effect upon the domestic money supply

    D. it wants to isolate the domestic economy from foreign competition

19. According to the Baumol-Tobin transaction demand model, money demand for transactions

    A. depends only on the level of income

    B. depends only on the cost of illiquidity

    C. varies inversely with both the interest rate and the level of income

    D. increases as the interest rate decreases or income increases

20. Which are the three channels by which the Central Bank can reduce money supply?

    A. buy government securities, lower reserve requirements, and lower the discount rate

    B. buy government securities, raise reserve requirements, and raise the discount rate

    C. buy government securities, lower reserve requirements, and raise the discount rate

    D. sell government securities, raise reserve requirements, and raise the discount rate

備　　註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考 試 科 目	經濟學	系 所 別	商學院共同科	考 試 時 間	2月2日(五)第一節

二、Problems and Short-essay Questions

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

1. Suppose there is a railway that runs coal-burning steam locomotives through a farming area and caused fires in the crop fields at harvest time. The crop damage from each train run is $200. To run trains, the railway company incurs a private marginal cost of $100n, where n denotes the number of train runs. For simplicity, assume there are no fixed costs. The revenue from a train run is $400.

　　A. (4 points) What is the socially optimal number of train runs?

　　B. (4 points) How many trains would the railway company run if no compensation is required for crop damage and the transaction cost is high enough to prevent the parties from bargaining? How much profit does the company make?

　　C. (6 points) How many trains would the railway company run if no compensation is required for crop damage but the negotiations between the company and the farmers are free of any transaction costs? How much profit does the company make?

　　D. (6 points) Now assume the railway company is legally liable for the damage caused. That is, it is required to pay the farmer $200 for each train run. How many trains would the company run? How much profit does it make?

2. There are two large countries H and F. Each country can choose its trade policy between free trade and protection. If both countries choose free trade, the welfare is (welfare of H, welfare of F)=$(20, 20)$. If H chooses free trade but F chooses protection, according to the optimal tariff theory, F can obtain more gains from trade at the expense of H, so that (welfare of H, welfare of F)=$(-20, 30)$. On the contrary if H chooses protection while F chooses free trade, the welfare is (welfare of H, welfare of F)=$(30, -20)$. However, if both countries choose protection, the welfare level moves down toward that near autarky. Therefore, (welfare of H, welfare of F)=$(-10, -10)$. Answer the following questions.

　　A. (10 points) If two countries choose trade policy simultaneously, what is the possible policy combination they will choose?

　　B. (10 points) What is the value of a bilateral trade agreement?

備　　　註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考 試 科 目	經濟學	系所別	商學院共同科	考試時間	2月2日(五)第一節

3. Consider an economy with the following aggregate demand and aggregate supply functions:

$$\begin{cases} \text{Aggregate Demand function:} & Y = 100 + 0.5 \times \frac{M}{P}, \\ \text{Aggregate Supply function:} & Y = \bar{Y} + 25 \times (P - P^e), \end{cases}$$

where Y represents the output, $\bar{Y}$ is the potential output, P is the price level, P^e is the expected price level, M is the nominal money supply. Furthermore, assume that $M = 400$ and $\bar{Y} = 200$.

　　A. (6 points) Compute the equilibrium price and the equilibrium output, given that the expected price level is exactly equal to the actual price level.

　　B. (7 points) Suppose that the central bank dramatically increases the nominal money supply to 750 while the general public maintains exactly the same expected price level, what would be the new equilibrium price and the new equilibrium output?

　　C. (7 points) Compute the equilibrium price and the equilibrium output if the aforementioned expansionary monetary policy of the central bank is fully anticipated by the public.

4. Consider the following structural macroeconomic model:

- Production function: $Y = F(N, K)$; $F_N > 0, F_K > 0$.

- Labor demand: $\frac{W}{P} = F_N(N, K)$; $F_{NN} < 0, F_{KK} < 0$.

- Consumption: $C = C(Y - T, r)$; $1 > C_y > 0, C_r < 0$.

- Investment: $I = I(r, y)$; $I_y > 0, I_r < 0$.

- Goods market equilibrium: $Y = C + I + G$.

- Money market equilibrium: $\frac{M}{P} = m(r, y)$; $m_r < 0, m_y > 0$.

The terms Y(nominal GDP), y(real GDP), N(employment level), P(price level), C(consumption), r(interest rate), I(investment) are endogenous variables while K(capital stock), W(nominal wage), T(tax), G(government purchase), M(money supply) are exogenous variables.

　　A. (6 points) Is there an equilibrium in this model? If so, is it unique?

　　B. (7 points) Is there a stable equilibrium? If instability is possible, what is the sufficient condition for instability? (7%)

　　C. (7 points) What are the effects of an increase in government spending on y, r and P? What are the effects of an increase in money supply on y, r and P? (7%)
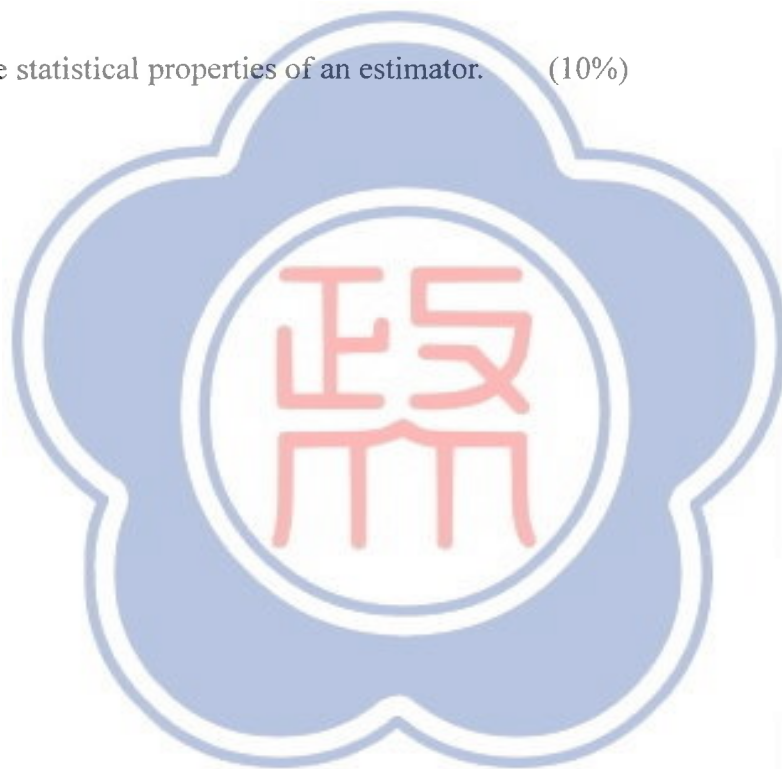
備　　　註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

| 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 2 日（五）第 3 節 |

1. A student casts two fair and six-faced dices simultaneously and repeatedly. What is the probability that the student obtains a sum of 4 before she obtains a sum of 7?　　(10%)

2. Suppose the time (in hours) that students spend on preparing for a particular exam follows the following distribution: less than 10 hours, probability= 0.0004; 10-20 hours, probability= 0.0059; 21-30 hours, probability= 0.0855; more than 30 hours, probability= 0.9082. We further assume that the probability of the exam being flunk given that the preparation time is: less than 10 hours is 0.540; the probability of the exam being flunk given that the preparation time is 10-20 hours is 0.813; the probability of the exam being flunk given that the preparation time is 21-30 hours is 0.379; the probability of the exam being flunk given that the preparation time is more than 30 hours is 0.035. What is the probability of the exam being flunk? (10%)

3. Use the information given in Question 2. Show that the event of spending less than 20 hours in preparation for the exam and the event of the exam being flunk are not independent.　　(10%)

4. A candidate believes that he can win a county election if he can earn at least 55% of the votes in his precinct. The latest opinion poll shows that half of the county's voters favor him. If 100 voters appear to vote at his precinct, what is the probability that he will receive at least 55% of the votes? Use a normal approximation to the binomial distribution. ($z_{0.1587}= 1$; $z_{0.05}= 1.645$; $z_{0.025}= 1.96$; $z_{0.0228}= 2$)　　(10%)

5. Assume that the t value is -2.42 based on a sample size of 8. Evaluate the p-value. ($t_{7, 0.025}= 2.365$; $t_{7, 0.010}= 2.998$; $t_{8, 0.025}= 2.306$; $t_{8, 0.010}= 2.896$)　　(10%)

6. Suppose X is a random variable which follows a normal distribution. The probability that X is less than 70 is 10.03%; the probability that X is greater than 80 is 5%. Find the standard deviation for the normal distribution. ($z_{0.3085}= 0.5$; $z_{0.1587}= 1$; $z_{0.1003}= 1.28$; $z_{0.05}= 1.645$; $z_{0.025}= 1.96$; $z_{0.0228}= 2$)　　(10%)

7. Suppose birds' arrivals at a lamppost follow a Poisson distribution. We further assume that one bird arrives at a lamppost during a given 30-minute period. Find the probability that the bird arrives during the last 10 minutes of the 30-minute period.　　(10%)

8. Suppose $f(x) = \frac{x+2}{5}$, $0 < x < 2$. Find $E[(x + 2)^2]$　　(10%)

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 2 日（五）第 3 節

9. A researcher uses a matched-pair design to compare two different medical treatments, i.e., Treatments A and B, for a particular disease. Patients are matched in terms of their age and gender. One patient of the matched pair is assigned Treatment A, while the other Treatment B. It is expected that patients in a matched pair will respond similarly to the treatments in 70% of matched pairs. For those pairs where there is a difference in response, it is expected that in 2/3 of the pairs the Treatment-A patient will respond, while the Treatment-B patient will not; in 1/3 of the pairs the Treatment-B patient will respond, while the Treatment-A patient will not. How many matched pairs are required to be enrolled in this study to have a 90% chance of finding a significant difference using a two-sided test with a statistical significant level of 0.05? ($z_{0.1}$= 1.28; $z_{0.05}$= 1.645; $z_{0.025}$= 1.96; $z_{0.0228}$= 2)　　　(10%)

10. Describe the desirable statistical properties of an estimator.　　　(10%)

備　　　註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考　試　科　目	微積分	系 所 別	風險管理與保險學系/精算科學組	考 試 時 間	2 月 2 日（五）第 1 節

1. Find $\lim_{t \to 0} \frac{sin(\cos t)}{\sec t}$　　(10%)

2. Find the volume of the solid obtained by rotating the region bounded by the following curves about the x-axis:　　(10%)

$$y = |x + 2|, y = 0, x = -3, x = 0$$

3. Evaluate $\int_1^4 ln\sqrt{x}\,dx$　　(10%)

4. Determine whether the following series is convergent. If it is, find its sum. (10%)

$$\sum_{t=1}^{\infty} 2\left(\frac{3}{4}\right)^{t-1}$$

5. Find the area under $y = x^2 + 1, \quad 0 < x < 3$　　(10%)

6. Find the point on the plane $x + 2y + 3z = 4$ that is closest to the origin.　(10%)

7. Find the area of the region inside the circle $r = 3\cos\theta$ and outside the cardioid $r = 1 + \cos\theta$ (10%)

8. Solve the following differential equation:　　(10%)
$$y' - 2xy = 2xe^{x^2}, y(0) = 3$$

9. Find $\lim_{t \to -\infty} \sqrt[3]{t}$　　(10%)

10. Find $\int_1^2 \int_1^2 x^2 y \, dy\, dx$　　(10%)

備　　　　　註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

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 *2* 日（五）第三節

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question (5 points each question). 選擇題請在答案卡上作答，否則不予計分。

1) A certain HMO is attempting to show the benefits of managed care to an insurance company. The HMO believes that certain types of doctors are more cost-effective than others. One theory is that certification level is an important factor in measuring the cost-effectiveness of physicians. To investigate this, the HMO obtained independent random samples of 26 physicians from each of the three certification levels—Board certified (C); Uncertified, board eligible (E); and Uncertified, board ineligible (I)—and recorded the total per-member, per-month charges for each (a total of 26 physicians). In order to compare the mean charges for the three groups, the data will be subjected to an analysis of variance. Write the null hypothesis tested by the ANOVA.

A) $H_0: \mu_C = \mu_E = \mu_I = 0$ 　B) $H_0: \mu_C = \mu_E = \mu_I$

C) $H_0: \beta_1 = \beta_2 = \beta_3 = 0$ 　D) $H_0: p_1 = p_2 = p_3$

2) Suppose a Poisson probability distribution with $\lambda = 7.6$ provides a good approximation of the distribution of a rndom variable x. Find σ for x.

A) 57.76　B) 3.8　C) 7.6　D) $\sqrt{7.6}$

3) A teacher finds that final grades in the statistics department are distributed as: A, 25%; B, 25%; C, 40%; D, 5%; F, 5%. At the end of a randomly selected semester, the following grades were recorded. Calculate the chi-square test statistic x^2 used to determine if the grade distribution for the department is different than expected. Use $\alpha = 0.01$.

Grade	A	B	C	D	F
Number	42	36	60	8	14

A) 4.82　B) 6.87　C) 3.41　D) 5.25

4) The dean of the Business School at a small Florida college wishes to determine whether the grade-point average (GPA) of a graduating student can be used to predict the graduate's starting salary. More specifically, the dean wants to know whether higher GPAs lead to higher starting salaries. Records for 23 of last year's Business School graduates are selected at random, and data on GPA (x) and starting salary (y, in $thousands) for each graduate were used to fit the model

$$E(y) = \beta_0 + \beta_1 x$$

The results of the simple linear regression are provided below.

$$\hat{y} = 4.25 + 2.75x, \qquad SS_{xy} = 5.15, \ SS_{xx} = 1.87, \quad SS_{yy} = 15.17, \ SSE = 1.0075$$

Calculate the value of r^2, the coefficient of determination.

A) 0.339　B) 0.661　C) 0.934　D) 0.872

5) A random sample of 160 car accidents are selected and categorized by the age of the driver determined to be at fault. The results are listed below. The age distribution of drivers for the given categories is 18% for the under 26 group, 39% for the

26–45 group, 31% for the 45–65 group, and 12% for the group over 65. Calculate the chi-square test statistic x^2 used to test the claim that all ages have crash rates proportional to their driving rates.

Age	Under 26	26 – 45	46 – 65	Over 65
Drivers	66	39	25	30

A) 75.101　B) 85.123　C) 95.431　D) 101.324

6) Independent random samples were selected from each of two normally distributed populations, $n_1 = 7$ from population 1 and $n_2 = 9$ from population 2. The data are shown below.

Population 1:　2.5　3.1　2.3　1.8　4.2　3.5　3.9

Population 2:　2.9　1.7　4.6　3.5　3.7　2.8　4.6　3.4　1.9

Find the test statistic for the test of $H_0: \sigma_1^2 = \sigma_2^2$ against $H_a: \sigma_1^2 \neq \sigma_2^2$

A) 1.17　　　B) .735　　C) 1.36　　D) .857

7) A consumer protection agency is comparing the work of two electrical contractors. The agency plans to inspect residences in which each of these contractors has done the wiring in order to estimate the difference in the proportions of residences that are electrically deficient. Suppose the proportions of residences with deficient work are expected to be about .2 for both contractors. How many homes should be sampled in order to estimate the difference in proportions using a 90% confidence interval of width .5?

A) $n_1 = n_2 = 18$　B) $n_1 = n_2 = 14$　C) $n_1 = n_2 = 28$　D) $n_1 = n_2 = 7$

8) The FDA is comparing the mean caffeine contents of two brands of cola. Independent random samples of 6-oz. cans of each brand were selected and the caffeine content of each can determined. The study provided the following summary information.

	Brand A	Brand B
Sample size	15	10
Mean	18	20
Variance	1.2	1.5

How many cans of each soda would need to be sampled in order to estimate the difference in the mean caffeine content to within .10 with 90% reliability?

A) $n_1 = n_2 = 731$　B) $n_1 = n_2 = 104$　C) $n_1 = n_2 = 74$　D) $n_1 = n_2 = 1038$

9) Suppose an experiment utilizing a random block design has 3 treatments and 8 blocks for a total of 24 observations. Assume that the total Sum of Squares for the response is SS(Total) = 400. If the Sum of Squares for Treatments (SST) is 10% of SS(Total), and the Sum of Squares for Blocks (SSB) is 20% of SS (Total), find the F values for this experiment.

A) treatments: $F = 1.64$; blocks: $F = 0.94$　B) treatments: $F = 0.67$; blocks: $F = 0.50$

C) treatments: $F = 1.00$; blocks: $F = 0.57$　D) treatments: $F = 8.57$; blocks: $F = 2.45$

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 2 日(五) 第三節

10). Event *A* occurs with probability 0.3.   If event *A* and *B* are disjoint then

A) $P(B) \leq 0.3$.

B) $P(B) \geq 0.3$.

C) $P(B) \leq 0.7$.

D) $P(B) \geq 0.7$.

11).   A manufacturer receives parts from two suppliers.   An SRS of 400 parts from supplier 1 finds 20 defective.   An SRS of 100 parts from supplier 2 finds 10 defective.   Let p_1 and p_2 be the proportion of all parts from suppliers 1 and 2, respectively, that are defective.   A 95% confidence interval for $p_1 - p_2$ is

A) $-.056 \pm 0.068$.

B) $-.056 \pm 0.054$.

C) $-.056 \pm 0.033$.

D) $.056 \pm 0.033$.

12).   In a particular game, a fair die is tossed.   If the number of spots showing is either 4 or 5 you win $1; if the number of spots showing is 6 you win $4; and if the number of spots showing is 1, 2, or 3, you win nothing.   Let X be the amount that you win.   The expected value of *X* is

A) $0.00.

B) $1.00.

C) $2.50.

D) $4.00.

13)   The scores of individual students on the American College Testing (ACT) Program composite college entrance examination have a normal distribution with mean 18.6 and standard deviation 6.0.   At Northside High, 36 seniors take the test.   If the scores at this school have the same distribution as national scores, what is the standard deviation of the sampling distribution of the average (sample mean) score for the 36 students?

A)   1.0

B)   3.1

C)   6.0

D)   18.6

Use the following to answer questions 14-17:

A particular electronic component is produced at two plants for an electronics manufacturer.   Plant A produces 60% of the

components used and the remainder are produced by plant B.　The proportion of defective components produced at plant A is 1% and the proportion of defective components produced at plant B is 2%.

14). The proportion of defective components that the electronics manufacturer receives from these two plants is

A) 0.014.

B) 0.015.

C) 0.016.

D) 0.018.

15). The proportion of nondefective components that the electronics manufacturer receives from these two plants is

A) 0.982.

B) 0.984.

C) 0.985.

D) 0.986.

16). If a component received by the manufacturer is defective, the probability that it was produced at plant A is

A) 1/7.

B) 2/7.

C) 3/7.

D) 4/7.

17). If a component received by the manufacturer is not defective, the probability that it was produced at plant A is

A) 0.602.

B) 0.622.

C) 0.684.

D) 0.713.

18). To assess the accuracy of a laboratory scale, a standard weight that is known to weigh 1 gram is repeatedly weighed a total of n times and the mean $\bar{x}$ of the weighings is computed. Suppose the scale readings are normally distributed with unknown mean　and standard deviation　$= 0.01$ g.　How large should n be so that a 95% confidence interval for　has a margin of error of ± 0.0001?

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2日(五)第三節

A)　100
B)　196
C)　10000
D)　38416

Use the following to answer questions 19-20:

A researcher plans to conduct a test of hypotheses at the 1% significance level.　She designs her study to have a power of 0.90 at a particular alternative value of the parameter of interest.

19).　The probability that the researcher will commit a type I error is

A)　0.01.

B)　0.10.

C)　0.90.

D)　equal to the P-value and cannot be determined until the data have been collected.

20.　The probability that the researcher will commit a type II error for the particular alternative value of the parameter at which she computed the power is

A)　0.01.

B)　0.10.

C)　0.90.

D)　equal to 1 – (P-value) and cannot be determined until the data have been collected.

備　　　　註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。