| 考試科目 | 總體經濟學 | 所別 | 經濟系 262 | 考試時間 | 4月20日(上)午第二節 星期日 下 |
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**選擇題作答格式規定：**

**所有選擇題只需寫下答案即可，答案順序由上至下，由左至右，每列**

**每行均爲五個，如下表所示：**

| | | | | |
|---|---|---|---|---|
| 1. A | 6. A | 11. A | 16. A | 21. A |
| 2. B | 7. B | 12. B | 17. B | 22. B |
| 3. C | 8. C | 13. C | 18. C | 23. C |
| 4. D | 9. D | 14. D | 19. D | 24. D |
| 5. E | 10. E | 15. E | 20. E | 25. E |

國立政治大學圖書館

## 一、選擇題 (40%)

(1) Which one of the following statements regarding the U.S government's budget surpluses and deficits is correct?

A) If tax revenues exceed expenditures, the government has a budget deficit.

B) Since 1970, U.S. federal revenues have generally exceeded expenditures.

C) Budget deficits tend to increase during periods of recession.

D) During the 1980s large surplus arose from a combination of tax cuts and expenditure increases.

(2) Which multiplier is larger (in absolute value) for any given *MPC*?

A) lump-sum tax multiplier

B) transfer payments multiplier

C) government purchases multiplier

D) All the multipliers are the same size for any given *MPC*.

(3) Suppose prices are quoted in dollars and transactions are conducted in pesos. The dollar serves as a

A) medium of exchange.

B) store of value.

C) unit of account.

D) all of the above.

(4) The development of new financial products such as NOW accounts and variable rate mortgages has been spurred by all of the following EXCEPT

A) high inflation and high interest rates.

B) new technology in long-distance communication.

C) attempts to circumvent bank regulations such as Regulation Q.

D) decreasing competition from nonbank depository institutions.

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|---|---|

命題委員： -109- (簽章) 年 月 日

| 考試科目 | 總體經濟學 | 所別 | 經濟系 462 | 考試時間 | 4月20日 星期日 上午 下午 第二節 |
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(5) Consider an aggregate demand/aggregate supply framework with an upward-sloping short-run aggregate supply curve. Suppose that there is an increase in the quantity of money of 10 percent and in response the economy moves along the short-run aggregate supply curve. Then comparing the change in the money wage rate with the change in the price level in the short run, the money wage rate

A) increases more than the price level.
B) increases by less than the price level.
C) falls by more than the price level.
D) increases by the same amount as the price level.

(6) Because of a bank merger, Ms. Davis lost her position as Vice President and had to seek work with other banks. Ms. Davis has the skills necessary to find a new job, thus she is best considered as

A) frictionally unemployed.
B) cyclically unemployed.
C) structurally unemployed.
D) naturally unemployed.

(7) When a company pays an efficiency wage, it

A) decreases the amount of unemployment.
B) is maximizing its profits.
C) pays the lowest possible wage.
D) has no effect in an efficient labor market.

(8) According to Robert Solow's one-third rule, if both capital per hour of labor and real GDP per hour of labor grow by 3 percent a year, then we can conclude that

A) the one-third rule has been violated.
B) capital growth contributed one-third of one percent to GDP growth
C) technological change contributed 2 percent to growth in GDP per hour of labor.
D) most of the growth in GDP per hour of labor was due to growth in capital per hour of labor.

(9) Which of the following is consistent with classical growth theory?

A) Real GDP per person will increase because technological change induces investment.
B) Real GDP per person will never permanently increase.
C) Competition destroys innovation and decreases profit.
D) As real GDP increases, there will be a decrease in the rate of population growth

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(10) Which of the following pieces of evidence is most consistent with the real business cycle theory?

A) labor supply decisions do not seem to depend on real interest rates
B) real GDP and the quantity of money move closely together
C) money wage rates take some time to adjust to price changes
D) productivity and GDP move closely together

(11) Suppose the data show that an unanticipated change in tax rates caused a recent recession. These data support which model of the business cycle?

A) new classical.
B) new Keynesian.
C) real business cycle.
D) Both answers A and B are correct.

(12) Monetarists believe that activist policy might prove destabilizing because

A) the private economy is basically unstable so that anything the government does must be destabilizing.
B) the effects of monetary and fiscal policy are known with certainty.
C) fiscal and monetary policy have no effect on real GDP.
D) long lags characterize the effect of monetary policy on the economy.

(13) The Taylor Rule states that the

A) government should adopt strict fixed-rule macroeconomic policies.
B) use of feedback-rules, although costly, is economically efficient.
C) Fed should use a policy feedback rule that targets inflation and also is explicit about how the Fed will react to inflation and deviations of real GDP from potential GDP.
D) none of the above are correct.

(14) The demand for Dutch tulip bulbs by an American florist creates a

A) demand for the U.S. dollar.
B) demand for an interest rate differential.
C) supply of Dutch guilders.
D) supply of U.S. dollars.

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(15) According to purchasing power parity, the foreign exchange market will

A) undervalue the dollar if inflation in the United States is greater than it is elsewhere.

B) no longer demand dollars if the inflation rate in the United States exceeds that of other nations.

C) adjust the value of the exchange rate to reflect differing inflation rates between nations.

D) result in a flow of dollars out of the United States whenever its rate of inflation is below that of other nations.

(16) Which one of the following means that the CPI to overstate the inflation?

A) new goods bias

B) quality change bias

C) outlet substitution bias

D) All of the above cause the CPI to overstate inflation

(17) A change in the money wage rate shifts

A) both the *SAS* and *LAS* curves.

B) the *LAS* curve but not the *SAS* curve.

C) the *SAS* curve but not the *LAS* curve.

D) neither the *SAS* nor the *LAS* curve.

(18) Compared to the lags for monetary policy, the lags for fiscal policy are ____, which makes ____rules less likely to work well.

A) shorter; fixed

B) shorter; feedback

C) longer; fixed

D) longer; feedback

(19) Currently, the United States is a net ____ and a ____ nation.

A) borrower; creditor

B) lender; creditor

C) borrower; debtor

D) lender; debtor

| 備考 | 試題隨卷繳交 |
|---|---|

命題委員： -112- （簽章） 9 年 4 月 5 日

| 考試科目 | 總體經濟學 | 所別 | 經濟系 | 考試時間 | 4月20日 星期日 上午/下午 第二節 |
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(20) A speculative bubble is when a rapid price increase is

A) the result of a sudden change in market conditions.

B) followed by a gradual price decrease that pushes the stock price back to the long-term trend.

C) followed by a plunge in prices.

D) accompanied by a similar increase in the overall price level.

## 二、請回答下列問題 (10%)

(1) 若一年期新台幣存款利率為 6.5%，一年期的美元存款利率為 5.3%，而即期美元匯率為新台幣 35 元。
若未拋補利率平價成立，請問市場預期一年後的美元匯率為多少？ (3%)

(2) 假定實質貨幣需求受所得及利率影響，且貨幣需求的所得彈性為 1.5，貨幣需求的利率彈性為 1.2。假定實質所得的成長趨勢為平均每年 8%，而利率沒有成長趨勢。若央行欲將每年的通貨膨脹率維持在 2%以內的水準，則名目貨幣供給年增加率必須控制在多少範圍內？ (3%)

(3) 有一個經濟社會的總生產函數為 $AK_t^{1/2}N_t^{1/2}$，其中 $A$ 為技術進步因子，$K$ 為資本投入量，$N$ 為勞動投入量。假設政府不課稅，也沒有公共支出；而產出增加率為 4%，資本及勞動增加率分別為 3%及 1%。請問此 4%的經濟成長貢獻中，有多少是來自技術進步的貢獻？ (4%)

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三、(50%, 2 points for each question) In the following, there are 25 multiple-choice questions. All you have to do is to choose the correct answer from several possible answers that are listed on the end of the question.

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(1) Inventories are included in the computation of gross domestic product as part of

A. nonresidential fixed investment.
B. residential fixed investment.
C. depreciation allowances.
D. the total capital stock.
E. none of the above.

(2) When real GDP growth exceeds nominal GDP growth,

A. inflation is increasing.
B. inflation is decreasing.
C. unemployment is decreasing.
D. the price level is decreasing.
E. none of the above.

(3) Empirical evidence seems to suggest that the wage elasticity of the supply of labor is small and positive. It must be true, therefore, that

A. the substitution effect of a change in the wage rate should be expected to exceed the associated income effect by a small amount.
B. the substitution effect of a change in the wage rate should be expected to fall short of the associated income effect by a small amount.
C. both the income and the substitution effects of a change in the wage rate should be expected to be small and of opposite signs.
D. both the income and substitution effects of a change in the wage rate should be expected to be of the same signs.
E. none of the above.

(4) Unemployment exceeds the natural rate of unemployment whenever

A. actual GDP is growing more slowly than potential GDP.
B. GDP is falling.
C. actual GDP exceeds potential GDP.
D. potential GDP exceeds actual GDP.
E. none of the above.

(5) An important conclusion from Solow's work on long run growth is that

A. in the steady state capital stock and output both grow at a slower rate than the labor force.
B. the economy's growth rate does not depend on the savings rate.
C. the economies which save more experience a higher growth rate.
D. in the steady state capital stock and output both grow at the same rate as the labor force.
E. b and d.

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(6) According to the Solow growth-accounting equation, a proportionate decline in population and labor force, all else equal, will cause

A. an increase in long-run per capita GDP.
B. a decrease in long-run per capita GDP.
C. an increase in long-run equilibrium GDP.
D. no significant impact on long-run equilibrium GDP.
E. none of the above.

(7) Suppose that the supply of money were fixed and GDP rose. To maintain the equality of supply and demand in the money market,

A. interest rates would have to fall if prices were to be held stable.
B. the price level would have to rise if interest rates were to be held constant.
C. interest rates would have to rise if prices were to be held stable.
D. nothing else would have to happen.
E. prices and interest rates would both have to fall.

(8) If an economy with a natural rate of unemployment of 6% were beset by a 7.33% unemployment rate and a potential GDP climbing at the rate of 3% per year, how fast would GDP have to grow over the course of the next year to achieve full employment at the natural rate in accordance with Okun's law?

A. 3% B. 4% C. 5% D. 6% E. 7%

(9) An executive who is laid off during a recession and must take a part-time job at a fast-food restaurant to feed his family is considered

A. unemployed in the official statistics.
B. employed in the official statistics.
C. a discouraged worker and thus not in the labor force by the official statistics.
D. underemployed and thus counted only fractionally in the official statistics.
E. none of the above.

(10) The simple, Keynesian consumption function is founded on the notion that total consumption expenditure should

A. increase with disposable income.
B. increase with wealth.
C. increase with expected disposable income.
D. increase with expected inflation.
E. all of the above.

(11) If the marginal propensity to consume were to increase with no change in the tax rate, then the consumption function drawn on a graph with disposable income on the horizontal axis would

A. rotate to a steeper line around the same intercept.
B. rotate to a steeper line and start at a higher intercept.
C. rotate to a steeper line but start from a lower intercept.
D. rotate to a flatter line around the same intercept.
E. shift to a parallel line starting from a higher intercept.

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命題委員： -115- （簽章） 92年4月4日

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(12) Let taxes be set equal to $T$, consumption be given by $C = a + b(Y - T)$, investment and government spending be exogenous, and net exports be characterized by $X = g - mY$. Suppose that $T$ and $G$ both increase by $10 billion. How much would equilibrium GDP increase?

A. It would increase by $10 billion.
B. It would increase by less than $10 billion.
C. It would increase by more than $10 billion.
D. It would be unaffected, since the federal deficit would be unchanged.
E. It would increase by more or less than $10 billion depending on the values assumed by $a$, $b$, $g$, and $m$.

(13) The slope of an LM curve

A. gets steeper the more responsive the demand for money is to changes in GDP.
B. gets flatter the more responsive the demand for money is to changes in the interest rate.
C. is invariant, in the simple case at least, to small changes in the price level.
D. is invariant to policy shifts in the supply of money, unless the sensitivity of the demand for money to changes in GDP and/or interest rates is affected.
E. all of the above.

(14) In the IS-LM model, changes in government purchases lead to larger changes in GDP if

A. the IS curve is flatter due to a larger value of the marginal propensity to consume.
B. money demand becomes less sensitive to the interest rate.
C. they are offset by increases in taxes.
D. the LM curve becomes steeper.
E. none of the above.

(15) Suppose that an economy's price adjustment were described by an expectations-augmented Phillips curve with expected inflation always set equal to last year's inflation. If a foreign oil shortage were to cause inflation to jump suddenly by 5%, then the rate of inflation

A. would climb by 5 points in one year, but fall back to the original level the next, even without recession, because the price shock was temporary.
B. would jump permanently by 5 points unless a recession or some other mechanism were arranged to lower expectations.
C. would begin an unavoidable period of price acceleration.
D. would fall only in response to some sort of energy rationing.
E. none of the above.

(16) In the short run, output is determined almost exclusively by

A. the level of the capital stock.
B. the level of current investment.
C. the level of government spending.
D. recent changes in technology.
E. the sum total of aggregate demand.

(17) Suppose that an economy were to suffer a doubling in the price that it pays for energy in 1998. Let the price shock be accommodated in 1998 and 1999. If the resulting inflation were met with tight

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monetary policy in 2000 and if the expectations-augmented price adjustment set expected inflation equal to last year's inflation, then you would expect 2000 to be a year of

A. inflation and unemployment higher than in 1998.
B. inflation and unemployment lower than in 1998.
C. inflation higher than it was in 1998, accompanied by lower unemployment.
D. inflation lower than it was in 1998, accompanied by higher unemployment.
E. unpredictable inflation and unemployment.

(18) Let the expectations-augmented Phillips curve for an economy relate the difference between current and expected inflation (identically equal to last year's inflation) to 1/3 of the percentage difference between actual and potential GDP. Given a 10% inflation rate in 1995, 6% shortfalls of actual GDP from potential GDP in 1996, 1997, and 1998 could reduce inflation to 4% by 1998. Another set of shortfalls that could achieve the same 4% rate of inflation is

A. 3% shortfalls in 1996, 1997, 1998, 1999, and 2000.
B. 2% shortfalls in each year from 1996 through the year 2005.
C. 4% shortfalls for 1996, 1997, 1998, and 1999 followed by a 2% shortfall in 2000.
D. 1% shortfalls for the next 10 years.
E. none of the above.

(19) Suppose that an individual anticipated that the next calendar year's income would be $1000 higher than this year's. Facing a real interest rate of 0% and a 20-year planning horizon, you would expect her annual real consumption to

A. increase by $900 if the increase were permanent and $90 if it were a one-shot deal.
B. increase by $1000 if the increase were permanent and $100 if it were a one-shot deal.
C. increase by $950 if the increase were permanent and $50 if it were a one-shot deal.
D. remain the same for one year and then increase by $1000 if the increase were permanent and by $50 if it were temporary.
E. none of the above.

(20) Which of the following have been advanced to explain why estimates of the marginal propensity to consume out of temporary increments in income are too high relative to what the theory predicts?

A. People overspend temporary windfalls because they do not believe that they are temporary.
B. People contract their consumption too far because they are liquidity-constrained by their inability to borrow against their expected return to normal income levels.
C. People discount the future significantly when they make their intertemporal consumption decisions.
D. a and b only.
E. a, b, and c.

(21) Suppose that you observed that many firms were increasing their stocks of capital at a rate faster than you would have expected by simply looking at the correlation with the rate of growth of GDP. In such circumstances, you would expect to find that

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A. their Tobin q-values were greater than 1.
B. their market values exceeded the prices of their existing capital stocks.
C. the rental price of capital had fallen below the marginal revenue earned on new capital.
D. the firms adjusted toward their desired level of capital employment with a lag.
E. all of the above.

(22) Suppose that investment is independent of GDP. Which part below would then describe an IS-LM representation of a second economy in which investment is positively correlated with GDP?

A. no change in either the IS or the LM curves
B. a flatter IS curve and an unchanged LM curve
C. a steeper IS curve and an unchanged LM curve
D. a flatter LM curve and an unchanged IS curve
E. a steeper LM curve and an unchanged IS curve

(23) If you were told that the exchange rate had become more sensitive to changes in the interest rate, then you would conclude that

A. monetary policy had become less effective in stabilizing GDP in the short run.
B. monetary policy had become more effective in stabilizing GDP in the short run.
C. monetary policy had become less effective in stabilizing GDP in the long run.
D. monetary policy had become more effective in stabilizing GDP in the long run.
E. monetary policy had become less effective in stabilizing GDP not only at home, but also throughout the rest of the world.

(24) One variant of rational expectations theory that supports the long-run neutrality of fiscal policy asserts that

A. any tax reduction enacted now will ultimately be covered by a future tax increase because all federal borrowing must eventually be paid off.
B. any government spending financed by either higher taxes or increased borrowing must somehow be covered by taxpayers' liabilities.
C. people that anticipate future tax increases immediately begin to save to cover their future liability and thus reduce aggregate demand by an amount equal to the anticipated stimulus.
D. all of the above fit together to predict fiscal neutrality.
E. none of the above can be used to predict fiscal neutrality.

(25) The discount rate set by the Fed

A. is the rate of interest charged member banks when they borrow from the Fed to meet their reserve requirements.
B. is the difference between the rate of interest charged to the government for borrowing from the Fed and the rate of interest charged to commercial customers.
C. is the rate at which banks are required to borrow from each other to maintain their compliance with their reserve requirements.
D. is the rate at which the Fed discounts the future when it makes its policy decisions.
E. none of the above.

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國立政治大學圖書館

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一.(每小題五分)

1. The proportion of junior executives leaving large manufacturing companies within three years is to be estimated within 3 percent. The 0.95 degree of confidence is to be used. A study conducted several years ago revealed that the percent of junior executives leaving within three years was 21. To update this study, the files of how many junior executives should be studied?
   A) 594
   B) 612
   C) 709
   D) 897
   E) None of the above

2. From past records it is known that the average life of a battery used in a digital clock is 305 days. The battery life is normally distributed. The battery was recently modified to last longer. A sample of 20 of the modified batteries was tested. It was discovered that the mean life was 311 days and the sample standard deviation was 12 days. We want to test at the 0.05 level of significance whether the modification increases the life of the battery. What is our decision rule?
   A) Do not reject the null hypothesis if computed $t$ is 1.96 or greater
   B) Reject the null hypothesis if computed $t$ is less than 1.96
   C) Do not reject the null hypothesis if computed $t$ is 1.729 or greater
   D) Reject the null hypothesis if computed $t$ is 2.494 or greater
   E) None of the above

3. The net weights of a sample of bottles filled by a machine manufactured by Edne, and the net weights of a sample filled by a similar machine manufactured by Orno, Inc., are (in grams):

   Edne: 5, 8, 7, 6, 9 and 7
   Orno: 8, 10, 7, 11, 9, 12, 14 and 9

   Testing the claim at the 0.05 level the mean weight of the bottles filled by the Orno machine is greater than the mean weight of the bottles filled by the Edne machine, what is the critical value?
   A) –1.96
   B) –2.837
   C) –6.271
   D) +3.674
   E) None of the above

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Use the following to answer question 4:

The results of a mathematics placement exam at Mercy College for two campuses is as follows:

| Campus | Number | Mean | Std. Deviation |
|---|---|---|---|
| 1 | 330 | 33 | 8 |
| 2 | 310 | 31 | 7 |

4. What is the p-value if the computed test statistic is 4.1?
   A) 1.0
   B) 0.0
   C) 0.05
   D) 0.95
   E) None of the above

Use the following to answer question 5:

Accounting procedures allow a business to evaluate their inventory at LIFO (Last In First Out) or FIFO (First In First Out). A manufacturer evaluated its finished goods inventory (in $ thousands) for five products both ways. Based on the following results, is LIFO more effective in keeping the value of his inventory lower?

| Product | FIFO (F) | LIFO (L) |
|---|---|---|
| 1 | 225 | 221 |
| 2 | 119 | 100 |
| 3 | 100 | 113 |
| 4 | 212 | 200 |
| 5 | 248 | 245 |

5. What is the decision at the 5% level of significance?
   A) Fail to reject the null hypothesis and conclude LIFO is more effective.
   B) Reject the null hypothesis and conclude LIFO is more effective.
   C) Reject the alternate hypothesis and conclude LIFO is more effective.
   D) Fail to reject the null hypothesis and conclude LIFO is not more effective.
   E) None of the above.

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Use the following to answer question 6:

A manufacturer of automobile transmissions uses three different processes. The management ordered a study of the production costs to see if there is a difference among the three processes. A summary of the findings is shown below.

| | Process 1 | Process 2 | Process 3 | Total |
|---|---|---|---|---|
| Process Totals ($ 100 ) | 137 | 108 | 107 | 352 |
| Sample Size | 10 | 10 | 10 | 30 |
| Sum of Squares | 1893 | 1188 | 1175 | 4256 |

6. What is the critical value of $F$ at the 5% level of significance?
   A) 19.45
   B) 3.00
   C) 3.35
   D) 3.39
   E) None of the above

Use the following to answer question 7:

Given the following Analysis of Variance table for three treatments each with six observations.

| Source | Sum of Squares | df | Mean Square |
|---|---|---|---|
| Treatments | 1116 | | |
| Error | 1068 | | |
| Total | 2184 | | |

7. What is the decision?
   A) Reject $H_0$ -- there is a difference in treatments
   B) Fail to reject $H_0$ -- there is a difference in treatments
   C) Reject $H_0$ -- there is a difference in errors
   D) Fail to reject $H_0$ -- there is a difference in errors
   E) None of the above

| 備考 | 試題隨卷繳交 |
|---|---|

命題委員： -121- （簽章） 92 年 3 月 25 日

| 考試科目 | 統計學 | 所別 | 經濟所 | 考試時間 | 4月20日 星期日 下午第一節 |
|---|---|---|---|---|---|

國立政治大學圖書館

Use the following to answer question 8:

A random sample of 30 executives from companies with assets over $1 million was selected and asked for their annual income and level of education. The ANOVA comparing the average income among three levels of education rejected the null hypothesis. The Mean Square Error (MSE) was 243.7. The following table summarized the results:

| | High School or Less | Undergraduate Degree | Master Degree or More |
|---|---|---|---|
| Number sampled | 7 | 11 | 12 |
| Mean salary (1,000 ) | 49 | 76.3 | 78.3 |

8. When comparing the mean annual incomes for executives with a High School education or less and Undergraduate Degree, the 95% confidence interval shows an interval of 11.7 to 42.7 for the difference. This result indicates that
   A) There is no significant difference between the two incomes.
   B) The interval contains a difference of zero.
   C) Executives with and Undergraduate Degree earn significantly more than executives with a High School education or less.
   D) Executives with and Undergraduate Degree earn significantly less than executives with a High School education or less.

| 備考 | 試題隨卷繳交 |
|---|---|

| 考試科目 | 統計學 | 所別 | 經濟所 | 考試時間 | 4月20日(星期日)下午第一節 |
|---|---|---|---|---|---|

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Use the following to answer question 9:

A survey of the opinions of property owners about a street widening project was taken to determine whether the resulting opinion was related to the distance of front footage. A randomly selected sample of 100 property owners was contacted and the results are shown below.

| | Opinion | | |
|---|---|---|---|
| Front-Footage | For | Undecided | Against |
| Under 45 feet | 12 | 4 | 4 |
| 45 – 120 feet | 35 | 5 | 30 |
| Over 120 feet | 3 | 2 | 5 |

9. What is the critical value at the 5% level of significance?
   A) 7.779
   B) 9.488
   C) 9.236
   D) 11.070
   E) None of the above

Use the following to answer question 10:

The following are the ratings (0 to 4) given by 12 individuals for two possible new flavors of soft drinks.

| Flavor | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 4 | 2 | 3½ | 1 | 0 | 3 | 2 | 4 | 2 | 0 | 3 | 2 |
| #2 | 3 | 3 | 3 | 2 | 1½ | 3½ | 4 | 3 | 2 | 1 | 2 | 2 |

Wilcoxon rank-sum is to be used. Assume that the is ranked first.

10. At the 0.05 level of significance, what is the decision?
   A) Fail to reject null hypothesis; critical value is ±1.65
   B) Fail to reject null hypothesis; critical value is ±1.96
   C) Reject null hypothesis; critical value is 0.1732
   D) Reject null hypothesis; critical value is 0.3464
   E) None of the above

| 備考 | 試題隨卷繳交 |
|---|---|

命題委員： -123- （簽章） 92年3月24日

| 考試科目 | 總計學 | 所別 | 經濟系(乙) | 考試時間 | 4月20日 星期日 上午(下)午第一節 |
|---|---|---|---|---|---|

國立政治大學圖書館

二.

1.(15%)一般而言，影響儲蓄($S$)的因素包括所得($Y$)與所得的變異數($\sigma$)。假設張教授在估計台灣的長期儲蓄函數時，只用了所得變數而忽略得所的變異數，請問他估計到的台灣的邊際儲蓄傾向會高估或低估？為什麼？

2.(15%)

(i)何謂異質變異(hetroscedasticity)？對 OLS 的估計結果有何影響？

(ii)如何測試異質變異是否存在？請舉出至少一種的檢定方式。

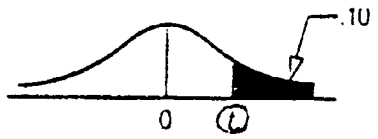
(iii)當有異質變異存在時，該如何解決？

3.(10%)陳教授想要用 1951 到 2000 年的季資料來估計台灣的貨幣需求函數時，他發現在 1951 到 1970 年台灣的貨幣數量只有年資料，1971 到 2000 年之間才有季資料，至於其他變數則在全部觀察期間都有季資料。陳教授不願意因此而放棄 1951 到 1970 年之間的資料，請問他該如何處理此一問題？

4.(10%)何謂 Almon lag？何謂 Koyck lag？請詳細比較兩者的優缺點。

| 備考 | 試題隨卷繳交 |
|---|---|

命題委員： -124- (簽章) 92 年 4 月 1 日

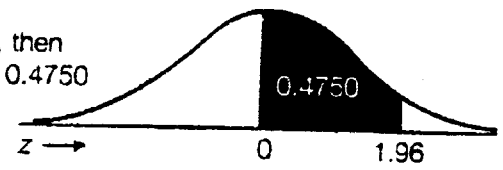



| df | Level of Significance for One-Tailed Test | | | | | |
|---|---|---|---|---|---|---|
| | 0.100 | 0.050 | 0.025 | 0.010 | 0.005 | 0.0005 |
| | Level of Significance for Two-Tailed Test | | | | | |
| | 0.20 | 0.10 | 0.05 | 0.02 | 0.01 | 0.001 |
| 1 | 3.078 | 6.314 | 12.706 | 31.821 | 63.657 | 636.619 |
| 2 | 1.886 | 2.920 | 4.303 | 6.965 | 9.925 | 31.599 |
| 3 | 1.638 | 2.353 | 3.182 | 4.541 | 5.841 | 12.924 |
| 4 | 1.533 | 2.132 | 2.776 | 3.747 | 4.604 | 8.610 |
| 5 | 1.476 | 2.015 | 2.571 | 3.365 | 4.032 | 6.869 |
| 6 | 1.440 | 1.943 | 2.447 | 3.143 | 3.707 | 5.959 |
| 7 | 1.415 | 1.895 | 2.365 | 2.998 | 3.499 | 5.408 |
| 8 | 1.397 | 1.860 | 2.306 | 2.896 | 3.355 | 5.041 |
| 9 | 1.383 | 1.833 | 2.262 | 2.821 | 3.250 | 4.781 |
| 10 | 1.372 | 1.812 | 2.228 | 2.764 | 3.169 | 4.587 |
| 11 | 1.363 | 1.796 | 2.201 | 2.718 | 3.106 | 4.437 |
| 12 | 1.356 | 1.782 | 2.179 | 2.681 | 3.055 | 4.318 |
| 13 | 1.350 | 1.771 | 2.160 | 2.650 | 3.012 | 4.221 |
| 14 | 1.345 | 1.761 | 2.145 | 2.624 | 2.977 | 4.140 |
| 15 | 1.341 | 1.753 | 2.131 | 2.602 | 2.947 | 4.073 |
| 16 | 1.337 | 1.746 | 2.120 | 2.583 | 2.921 | 4.015 |
| 17 | 1.333 | 1.740 | 2.110 | 2.567 | 2.898 | 3.965 |
| 18 | 1.330 | 1.734 | 2.101 | 2.552 | 2.878 | 3.922 |
| 19 | 1.328 | 1.729 | 2.093 | 2.539 | 2.861 | 3.883 |
| 20 | 1.325 | 1.725 | 2.086 | 2.528 | 2.845 | 3.850 |
| 21 | 1.323 | 1.721 | 2.080 | 2.518 | 2.831 | 3.819 |
| 22 | 1.321 | 1.717 | 2.074 | 2.508 | 2.819 | 3.792 |
| 23 | 1.319 | 1.714 | 2.069 | 2.500 | 2.807 | 3.768 |
| 24 | 1.318 | 1.711 | 2.064 | 2.492 | 2.797 | 3.745 |
| 25 | 1.316 | 1.708 | 2.060 | 2.485 | 2.787 | 3.725 |
| 26 | 1.315 | 1.706 | 2.056 | 2.479 | 2.779 | 3.707 |
| 27 | 1.314 | 1.703 | 2.052 | 2.473 | 2.771 | 3.690 |
| 28 | 1.313 | 1.701 | 2.048 | 2.467 | 2.763 | 3.674 |
| 29 | 1.311 | 1.699 | 2.045 | 2.462 | 2.756 | 3.659 |
| 30 | 1.310 | 1.697 | 2.042 | 2.457 | 2.750 | 3.646 |
| 40 | 1.303 | 1.684 | 2.021 | 2.423 | 2.704 | 3.551 |
| 60 | 1.296 | 1.671 | 2.000 | 2.390 | 2.660 | 3.460 |
| 120 | 1.289 | 1.658 | 1.980 | 2.358 | 2.617 | 3.373 |
| ∞ | 1.282 | 1.645 | 1.960 | 2.326 | 2.576 | 3.291 |

# APPENDIX D

## *Areas under the Normal Curve*

Example:
If $z = 1.96$, then
$P(0 \text{ to } z) = 0.4750$




| z | 0.00 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0000 | 0.0040 | 0.0080 | 0.0120 | 0.0160 | 0.0199 | 0.0239 | 0.0279 | 0.0319 | 0.0359 |
| 0.1 | 0.0398 | 0.0438 | 0.0478 | 0.0517 | 0.0557 | 0.0596 | 0.0636 | 0.0675 | 0.0714 | 0.0753 |
| 0.2 | 0.0793 | 0.0832 | 0.0871 | 0.0910 | 0.0948 | 0.0987 | 0.1026 | 0.1064 | 0.1103 | 0.1141 |
| 0.3 | 0.1179 | 0.1217 | 0.1255 | 0.1293 | 0.1331 | 0.1368 | 0.1406 | 0.1443 | 0.1480 | 0.1517 |
| 0.4 | 0.1554 | 0.1591 | 0.1628 | 0.1664 | 0.1700 | 0.1736 | 0.1772 | 0.1808 | 0.1844 | 0.1879 |
| 0.5 | 0.1915 | 0.1950 | 0.1985 | 0.2019 | 0.2054 | 0.2088 | 0.2123 | 0.2157 | 0.2190 | 0.2224 |
| 0.6 | 0.2257 | 0.2291 | 0.2324 | 0.2357 | 0.2389 | 0.2422 | 0.2454 | 0.2486 | 0.2517 | 0.2549 |
| 0.7 | 0.2580 | 0.2611 | 0.2642 | 0.2673 | 0.2704 | 0.2734 | 0.2764 | 0.2794 | 0.2823 | 0.2852 |
| 0.8 | 0.2881 | 0.2910 | 0.2939 | 0.2967 | 0.2995 | 0.3023 | 0.3051 | 0.3078 | 0.3106 | 0.3133 |
| 0.9 | 0.3159 | 0.3186 | 0.3212 | 0.3238 | 0.3264 | 0.3289 | 0.3315 | 0.3340 | 0.3365 | 0.3389 |
| 1.0 | 0.3413 | 0.3438 | 0.3461 | 0.3485 | 0.3508 | 0.3531 | 0.3554 | 0.3577 | 0.3599 | 0.3621 |
| 1.1 | 0.3643 | 0.3665 | 0.3686 | 0.3708 | 0.3729 | 0.3749 | 0.3770 | 0.3790 | 0.3810 | 0.3830 |
| 1.2 | 0.3849 | 0.3869 | 0.3888 | 0.3907 | 0.3925 | 0.3944 | 0.3962 | 0.3980 | 0.3997 | 0.4015 |
| 1.3 | 0.4032 | 0.4049 | 0.4066 | 0.4082 | 0.4099 | 0.4115 | 0.4131 | 0.4147 | 0.4162 | 0.4177 |
| 1.4 | 0.4192 | 0.4207 | 0.4222 | 0.4236 | 0.4251 | 0.4265 | 0.4279 | 0.4292 | 0.4306 | 0.4319 |
| 1.5 | 0.4332 | 0.4345 | 0.4357 | 0.4370 | 0.4382 | 0.4394 | 0.4406 | 0.4418 | 0.4429 | 0.4441 |
| 1.6 | 0.4452 | 0.4463 | 0.4474 | 0.4484 | 0.4495 | 0.4505 | 0.4515 | 0.4525 | 0.4535 | 0.4545 |
| 1.7 | 0.4554 | 0.4564 | 0.4573 | 0.4582 | 0.4591 | 0.4599 | 0.4608 | 0.4616 | 0.4625 | 0.4633 |
| 1.8 | 0.4641 | 0.4649 | 0.4656 | 0.4664 | 0.4671 | 0.4678 | 0.4686 | 0.4693 | 0.4699 | 0.4706 |
| 1.9 | 0.4713 | 0.4719 | 0.4726 | 0.4732 | 0.4738 | 0.4744 | 0.4750 | 0.4756 | 0.4761 | 0.4767 |
| 2.0 | 0.4772 | 0.4778 | 0.4783 | 0.4788 | 0.4793 | 0.4798 | 0.4803 | 0.4808 | 0.4812 | 0.4817 |
| 2.1 | 0.4821 | 0.4826 | 0.4830 | 0.4834 | 0.4838 | 0.4842 | 0.4846 | 0.4850 | 0.4854 | 0.4857 |
| 2.2 | 0.4861 | 0.4864 | 0.4868 | 0.4871 | 0.4875 | 0.4878 | 0.4881 | 0.4884 | 0.4887 | 0.4890 |
| 2.3 | 0.4893 | 0.4896 | 0.4898 | 0.4901 | 0.4904 | 0.4906 | 0.4909 | 0.4911 | 0.4913 | 0.4916 |
| 2.4 | 0.4918 | 0.4920 | 0.4922 | 0.4925 | 0.4927 | 0.4929 | 0.4931 | 0.4932 | 0.4934 | 0.4936 |
| 2.5 | 0.4938 | 0.4940 | 0.4941 | 0.4943 | 0.4945 | 0.4946 | 0.4948 | 0.4949 | 0.4951 | 0.4952 |
| 2.6 | 0.4953 | 0.4955 | 0.4956 | 0.4957 | 0.4959 | 0.4960 | 0.4961 | 0.4962 | 0.4963 | 0.4964 |
| 2.7 | 0.4965 | 0.4966 | 0.4967 | 0.4968 | 0.4969 | 0.4970 | 0.4971 | 0.4972 | 0.4973 | 0.4974 |
| 2.8 | 0.4974 | 0.4975 | 0.4976 | 0.4977 | 0.4977 | 0.4978 | 0.4979 | 0.4979 | 0.4980 | 0.4981 |
| 2.9 | 0.4981 | 0.4982 | 0.4982 | 0.4983 | 0.4984 | 0.4984 | 0.4985 | 0.4985 | 0.4986 | 0.4986 |
| 3.0 | 0.4987 | 0.4987 | 0.4987 | 0.4988 | 0.4988 | 0.4989 | 0.4989 | 0.4989 | 0.4990 | 0.4990 |

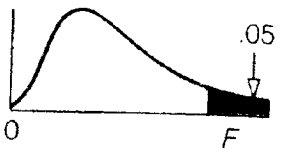
考試科目
考試時間
4月20日上午第一節
星期日 ⑧ ⑦
科別
座位號碼
政治大學
學號
姓名

| 考試科目 | 統計學 | 所別 | 經濟學 | 考試時間 | 4月20日上午第一節 星期日(下) |
|---|---|---|---|---|---|

國立政治大學圖書館

# APPENDIX G

*Critical Values of the F Distribution at a 5 Percent Level of Significance*




| Degrees of Freedom for the Denominator | Degrees of Freedom for the Numerator: 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 15 | 20 | 24 | 30 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 161 | 200 | 216 | 225 | 230 | 234 | 237 | 239 | 241 | 242 | 244 | 246 | 248 | 249 | 250 | 251 |
| 2 | 18.5 | 19.0 | 19.2 | 19.2 | 19.3 | 19.3 | 19.4 | 19.4 | 19.4 | 19.4 | 19.4 | 19.4 | 19.4 | 19.5 | 19.5 | 19.5 |
| 3 | 10.1 | 9.55 | 9.28 | 9.12 | 9.01 | 8.94 | 8.89 | 8.85 | 8.81 | 8.79 | 8.74 | 8.70 | 8.66 | 8.64 | 8.62 | 8.59 |
| 4 | 7.71 | 6.94 | 6.59 | 6.39 | 6.26 | 6.16 | 6.09 | 6.04 | 6.00 | 5.96 | 5.91 | 5.86 | 5.80 | 5.77 | 5.75 | 5.72 |
| 5 | 6.61 | 5.79 | 5.41 | 5.19 | 5.05 | 4.95 | 4.88 | 4.82 | 4.77 | 4.74 | 4.68 | 4.62 | 4.56 | 4.53 | 4.50 | 4.46 |
| 6 | 5.99 | 5.14 | 4.76 | 4.53 | 4.39 | 4.28 | 4.21 | 4.15 | 4.10 | 4.06 | 4.00 | 3.94 | 3.87 | 3.84 | 3.81 | 3.77 |
| 7 | 5.59 | 4.74 | 4.35 | 4.12 | 3.97 | 3.87 | 3.79 | 3.73 | 3.68 | 3.64 | 3.57 | 3.51 | 3.44 | 3.41 | 3.38 | 3.34 |
| 8 | 5.32 | 4.46 | 4.07 | 3.84 | 3.69 | 3.58 | 3.50 | 3.44 | 3.39 | 3.35 | 3.28 | 3.22 | 3.15 | 3.12 | 3.08 | 3.04 |
| 9 | 5.12 | 4.26 | 3.86 | 3.63 | 3.48 | 3.37 | 3.29 | 3.23 | 3.18 | 3.14 | 3.07 | 3.01 | 2.94 | 2.90 | 2.86 | 2.83 |
| 10 | 4.96 | 4.10 | 3.71 | 3.48 | 3.33 | 3.22 | 3.14 | 3.07 | 3.02 | 2.98 | 2.91 | 2.85 | 2.77 | 2.74 | 2.70 | 2.66 |
| 11 | 4.84 | 3.98 | 3.59 | 3.36 | 3.20 | 3.09 | 3.01 | 2.95 | 2.90 | 2.85 | 2.79 | 2.72 | 2.65 | 2.61 | 2.57 | 2.53 |
| 12 | 4.75 | 3.89 | 3.49 | 3.26 | 3.11 | 3.00 | 2.91 | 2.85 | 2.80 | 2.75 | 2.69 | 2.62 | 2.54 | 2.51 | 2.47 | 2.43 |
| 13 | 4.67 | 3.81 | 3.41 | 3.18 | 3.03 | 2.92 | 2.83 | 2.77 | 2.71 | 2.67 | 2.60 | 2.53 | 2.46 | 2.42 | 2.38 | 2.34 |
| 14 | 4.60 | 3.74 | 3.34 | 3.11 | 2.96 | 2.85 | 2.76 | 2.70 | 2.65 | 2.60 | 2.53 | 2.46 | 2.39 | 2.35 | 2.31 | 2.27 |
| 15 | 4.54 | 3.68 | 3.29 | 3.06 | 2.90 | 2.79 | 2.71 | 2.64 | 2.59 | 2.54 | 2.48 | 2.40 | 2.33 | 2.29 | 2.25 | 2.20 |
| 16 | 4.49 | 3.63 | 3.24 | 3.01 | 2.85 | 2.74 | 2.66 | 2.59 | 2.54 | 2.49 | 2.42 | 2.35 | 2.28 | 2.24 | 2.19 | 2.15 |
| 17 | 4.45 | 3.59 | 3.20 | 2.96 | 2.81 | 2.70 | 2.61 | 2.55 | 2.49 | 2.45 | 2.38 | 2.31 | 2.23 | 2.19 | 2.15 | 2.10 |
| 18 | 4.41 | 3.55 | 3.16 | 2.93 | 2.77 | 2.66 | 2.58 | 2.51 | 2.46 | 2.41 | 2.34 | 2.27 | 2.19 | 2.15 | 2.11 | 2.06 |
| 19 | 4.38 | 3.52 | 3.13 | 2.90 | 2.74 | 2.63 | 2.54 | 2.48 | 2.42 | 2.38 | 2.31 | 2.23 | 2.16 | 2.11 | 2.07 | 2.03 |
| 20 | 4.35 | 3.49 | 3.10 | 2.87 | 2.71 | 2.60 | 2.51 | 2.45 | 2.39 | 2.35 | 2.28 | 2.20 | 2.12 | 2.08 | 2.04 | 1.99 |
| 21 | 4.32 | 3.47 | 3.07 | 2.84 | 2.68 | 2.57 | 2.49 | 2.42 | 2.37 | 2.32 | 2.25 | 2.18 | 2.10 | 2.05 | 2.01 | 1.96 |
| 22 | 4.30 | 3.44 | 3.05 | 2.82 | 2.66 | 2.55 | 2.46 | 2.40 | 2.34 | 2.30 | 2.23 | 2.15 | 2.07 | 2.03 | 1.98 | 1.94 |
| 23 | 4.28 | 3.42 | 3.03 | 2.80 | 2.64 | 2.53 | 2.44 | 2.37 | 2.32 | 2.27 | 2.20 | 2.13 | 2.05 | 2.01 | 1.96 | 1.91 |
| 24 | 4.26 | 3.40 | 3.01 | 2.78 | 2.62 | 2.51 | 2.42 | 2.36 | 2.30 | 2.25 | 2.18 | 2.11 | 2.03 | 1.98 | 1.94 | 1.89 |
| 25 | 4.24 | 3.39 | 2.99 | 2.76 | 2.60 | 2.49 | 2.40 | 2.34 | 2.28 | 2.24 | 2.16 | 2.09 | 2.01 | 1.96 | 1.92 | 1.87 |
| 30 | 4.17 | 3.32 | 2.92 | 2.69 | 2.53 | 2.42 | 2.33 | 2.27 | 2.21 | 2.16 | 2.09 | 2.01 | 1.93 | 1.89 | 1.84 | 1.79 |
| 40 | 4.08 | 3.23 | 2.84 | 2.61 | 2.45 | 2.34 | 2.25 | 2.18 | 2.12 | 2.08 | 2.00 | 1.92 | 1.84 | 1.79 | 1.74 | 1.69 |
| 60 | 4.00 | 3.15 | 2.76 | 2.53 | 2.37 | 2.25 | 2.17 | 2.10 | 2.04 | 1.99 | 1.92 | 1.84 | 1.75 | 1.70 | 1.65 | 1.59 |
| 120 | 3.92 | 3.07 | 2.68 | 2.45 | 2.29 | 2.18 | 2.09 | 2.02 | 1.96 | 1.91 | 1.83 | 1.75 | 1.66 | 1.61 | 1.55 | 1.50 |
| ∞ | 3.84 | 3.00 | 2.60 | 2.37 | 2.21 | 2.10 | 2.01 | 1.94 | 1.88 | 1.83 | 1.75 | 1.67 | 1.57 | 1.52 | 1.46 | 1.39 |

| 備考 | 試題隨卷繳交 |
|---|---|



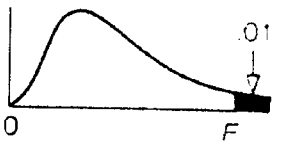
命題委員： （簽章） 年 月 日

| 考試科目 | 總計學 | 所別 | 經濟系 | 考試時間 | 十月20日上午第一節 星期日 (下) |
|---|---|---|---|---|---|

國立政治大學圖書館

# APPENDIX G

*Critical Values of the F Distribution at a 1 Percent Level of Significance*




| Degrees of Freedom for the Denominator | Degrees of Freedom for the Numerator: 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 15 | 20 | 24 | 30 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4052 | 5000 | 5403 | 5625 | 5764 | 5859 | 5928 | 5981 | 6022 | 6056 | 6106 | 6157 | 6209 | 6235 | 6261 | 6287 |
| 2 | 98.5 | 99.0 | 99.2 | 99.2 | 99.3 | 99.3 | 99.4 | 99.4 | 99.4 | 99.4 | 99.4 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 |
| 3 | 34.1 | 30.8 | 29.5 | 28.7 | 28.2 | 27.9 | 27.7 | 27.5 | 27.3 | 27.2 | 27.1 | 26.9 | 26.7 | 26.6 | 26.5 | 26.4 |
| 4 | 21.2 | 18.0 | 16.7 | 16.0 | 15.5 | 15.2 | 15.0 | 14.8 | 14.7 | 14.5 | 14.4 | 14.2 | 14.0 | 13.9 | 13.8 | 13.7 |
| 5 | 16.3 | 13.3 | 12.1 | 11.4 | 11.0 | 10.7 | 10.5 | 10.3 | 10.2 | 10.1 | 9.89 | 9.72 | 9.55 | 9.47 | 9.38 | 9.29 |
| 6 | 13.7 | 10.9 | 9.78 | 9.15 | 8.75 | 8.47 | 8.26 | 8.10 | 7.98 | 7.87 | 7.72 | 7.56 | 7.40 | 7.31 | 7.23 | 7.14 |
| 7 | 12.2 | 9.55 | 8.45 | 7.85 | 7.46 | 7.19 | 6.99 | 6.84 | 6.72 | 6.62 | 6.47 | 6.31 | 6.16 | 6.07 | 5.99 | 5.91 |
| 8 | 11.3 | 8.65 | 7.59 | 7.01 | 6.63 | 6.37 | 6.18 | 6.03 | 5.91 | 5.81 | 5.67 | 5.52 | 5.36 | 5.28 | 5.20 | 5.12 |
| 9 | 10.6 | 8.02 | 6.99 | 6.42 | 6.06 | 5.80 | 5.61 | 5.47 | 5.35 | 5.26 | 5.11 | 4.96 | 4.81 | 4.73 | 4.65 | 4.57 |
| 10 | 10.0 | 7.56 | 6.55 | 5.99 | 5.64 | 5.39 | 5.20 | 5.06 | 4.94 | 4.85 | 4.71 | 4.56 | 4.41 | 4.33 | 4.25 | 4.17 |
| 11 | 9.65 | 7.21 | 6.22 | 5.67 | 5.32 | 5.07 | 4.89 | 4.74 | 4.63 | 4.54 | 4.40 | 4.25 | 4.10 | 4.02 | 3.94 | 3.86 |
| 12 | 9.33 | 6.93 | 5.95 | 5.41 | 5.06 | 4.82 | 4.64 | 4.50 | 4.39 | 4.30 | 4.16 | 4.01 | 3.86 | 3.78 | 3.70 | 3.62 |
| 13 | 9.07 | 6.70 | 5.74 | 5.21 | 4.86 | 4.62 | 4.44 | 4.30 | 4.19 | 4.10 | 3.96 | 3.82 | 3.66 | 3.59 | 3.51 | 3.43 |
| 14 | 8.86 | 6.51 | 5.56 | 5.04 | 4.69 | 4.46 | 4.28 | 4.14 | 4.03 | 3.94 | 3.80 | 3.66 | 3.51 | 3.43 | 3.35 | 3.27 |
| 15 | 8.68 | 6.36 | 5.42 | 4.89 | 4.56 | 4.32 | 4.14 | 4.00 | 3.89 | 3.80 | 3.67 | 3.52 | 3.37 | 3.29 | 3.21 | 3.13 |
| 16 | 8.53 | 6.23 | 5.29 | 4.77 | 4.44 | 4.20 | 4.03 | 3.89 | 3.78 | 3.69 | 3.55 | 3.41 | 3.26 | 3.18 | 3.10 | 3.02 |
| 17 | 8.40 | 6.11 | 5.18 | 4.67 | 4.34 | 4.10 | 3.93 | 3.79 | 3.68 | 3.59 | 3.46 | 3.31 | 3.16 | 3.08 | 3.00 | 2.92 |
| 18 | 8.29 | 6.01 | 5.09 | 4.58 | 4.25 | 4.01 | 3.84 | 3.71 | 3.60 | 3.51 | 3.37 | 3.23 | 3.08 | 3.00 | 2.92 | 2.84 |
| 19 | 8.18 | 5.93 | 5.01 | 4.50 | 4.17 | 3.94 | 3.77 | 3.63 | 3.52 | 3.43 | 3.30 | 3.15 | 3.00 | 2.92 | 2.84 | 2.76 |
| 20 | 8.10 | 5.85 | 4.94 | 4.43 | 4.10 | 3.87 | 3.70 | 3.56 | 3.46 | 3.37 | 3.23 | 3.09 | 2.94 | 2.86 | 2.78 | 2.69 |
| 21 | 8.02 | 5.78 | 4.87 | 4.37 | 4.04 | 3.81 | 3.64 | 3.51 | 3.40 | 3.31 | 3.17 | 3.03 | 2.88 | 2.80 | 2.72 | 2.64 |
| 22 | 7.95 | 5.72 | 4.82 | 4.31 | 3.99 | 3.76 | 3.59 | 3.45 | 3.35 | 3.26 | 3.12 | 2.98 | 2.83 | 2.75 | 2.67 | 2.58 |
| 23 | 7.88 | 5.66 | 4.76 | 4.26 | 3.94 | 3.71 | 3.54 | 3.41 | 3.30 | 3.21 | 3.07 | 2.93 | 2.78 | 2.70 | 2.62 | 2.54 |
| 24 | 7.82 | 5.61 | 4.72 | 4.22 | 3.90 | 3.67 | 3.50 | 3.36 | 3.26 | 3.17 | 3.03 | 2.89 | 2.74 | 2.66 | 2.58 | 2.49 |
| 25 | 7.77 | 5.57 | 4.68 | 4.18 | 3.85 | 3.63 | 3.46 | 3.32 | 3.22 | 3.13 | 2.99 | 2.85 | 2.70 | 2.62 | 2.54 | 2.45 |
| 30 | 7.56 | 5.39 | 4.51 | 4.02 | 3.70 | 3.47 | 3.30 | 3.17 | 3.07 | 2.98 | 2.84 | 2.70 | 2.55 | 2.47 | 2.39 | 2.30 |
| 40 | 7.31 | 5.18 | 4.31 | 3.83 | 3.51 | 3.29 | 3.12 | 2.99 | 2.89 | 2.80 | 2.66 | 2.52 | 2.37 | 2.29 | 2.20 | 2.11 |
| 60 | 7.08 | 4.98 | 4.13 | 3.65 | 3.34 | 3.12 | 2.95 | 2.82 | 2.72 | 2.63 | 2.50 | 2.35 | 2.20 | 2.12 | 2.03 | 1.94 |
| 120 | 6.85 | 4.79 | 3.95 | 3.48 | 3.17 | 2.96 | 2.79 | 2.66 | 2.56 | 2.47 | 2.34 | 2.19 | 2.03 | 1.95 | 1.86 | 1.76 |
| ∞ | 6.63 | 4.61 | 3.78 | 3.32 | 3.02 | 2.80 | 2.64 | 2.51 | 2.41 | 2.32 | 2.18 | 2.04 | 1.88 | 1.79 | 1.70 | 1.59 |

| 備考 | 試題隨卷繳交 |
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命題委員：



（簽章） 年 月 日

| 考試科目 | 統計學 | 所別 | 經濟系 | 考試時間 | 4月20日上午第一節 星期日 (下) |
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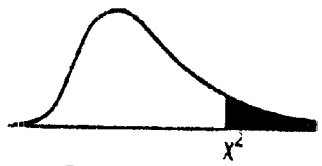
# APPENDIX I

## *Critical Values of Chi-Square*

This table contains the values of $\chi^2$ that correspond to a specific right-tail area and specific number of degrees of freedom.




Possible values of $\chi^2$

| Degrees of Freedom, *df* | Right-Tail Area | | | |
|---|---|---|---|---|
| | 0.10 | 0.05 | 0.02 | 0.01 |
| 1 | 2.706 | 3.841 | 5.412 | 6.635 |
| 2 | 4.605 | 5.991 | 7.824 | 9.210 |
| 3 | 6.251 | 7.815 | 9.837 | 11.345 |
| 4 | 7.779 | 9.488 | 11.668 | 13.277 |
| 5 | 9.236 | 11.070 | 13.388 | 15.086 |
| 6 | 10.645 | 12.592 | 15.033 | 16.812 |
| 7 | 12.017 | 14.067 | 16.622 | 18.475 |
| 8 | 13.362 | 15.507 | 18.168 | 20.090 |
| 9 | 14.684 | 16.919 | 19.679 | 21.666 |
| 10 | 15.987 | 18.307 | 21.161 | 23.209 |
| 11 | 17.275 | 19.675 | 22.618 | 24.725 |
| 12 | 18.549 | 21.026 | 24.054 | 26.217 |
| 13 | 19.812 | 22.362 | 25.472 | 27.688 |
| 14 | 21.064 | 23.685 | 26.873 | 29.141 |
| 15 | 22.307 | 24.996 | 28.259 | 30.578 |
| 16 | 23.542 | 26.296 | 29.633 | 32.000 |
| 17 | 24.769 | 27.587 | 30.995 | 33.409 |
| 18 | 25.989 | 28.869 | 32.346 | 34.805 |
| 19 | 27.204 | 30.144 | 33.687 | 36.191 |
| 20 | 28.412 | 31.410 | 35.020 | 37.566 |
| 21 | 29.615 | 32.671 | 36.343 | 38.932 |
| 22 | 30.813 | 33.924 | 37.659 | 40.289 |
| 23 | 32.007 | 35.172 | 38.968 | 41.638 |
| 24 | 33.196 | 36.415 | 40.270 | 42.980 |
| 25 | 34.382 | 37.652 | 41.566 | 44.314 |
| 26 | 35.563 | 38.885 | 42.856 | 45.642 |
| 27 | 36.741 | 40.113 | 44.140 | 46.963 |
| 28 | 37.916 | 41.337 | 45.419 | 48.278 |
| 29 | 39.087 | 42.557 | 46.693 | 49.588 |
| 30 | 40.256 | 43.773 | 47.962 | 50.892 |

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