考 試 科 目 個體經濟學 2161 別 經濟所 考 試 時 間 3月17日 星期六 第 2 節

第一部分：一、單選題：（每題 2%，共 20%）

1. When labor is a variable factor and capital is a fixed factor, which of the following statements is true?

    (A) There are many different production functions in the short run, each corresponding to a different lever of labor.

    (B) There are many different production functions in the long run, each corresponding to a different technological process.

    (C) For a given level of capital, there is only one short-run production function available to the firm.

    (D) In the very long run there is no choice in the input mix which the firm has to produce a given level of output.

2. Which of the following is not usually a characteristic of a perfectly competitive industry?

    (A) No individual firm has any significant amount of market power.

    (B) The market demand curve for the industry is highly elastic.

    (C) Any individual firm can increase its production and sales without affecting the price of the good.

    (D) Existing firms cannot bar the entry of new firms.

3. Compared to the efficient competitive result, the monopolist will :

    (A) sell the same quantity but at a higher per-unit price

    (B) restrict quantity to raise the price per unit of output

    (C) increase total consumer surplus, even though consumers pay a higher price per unit of output

    (D) pay a higher price per unit of labor employed

4. Although a monopolistically competitive firm in long-run equilibrium is producing output at an average total cost higher than the minimum, economists are not greatly concerned about this inefficiency because:

    (A) additional firms may enter the industry

    (B) consumers gain satisfaction from having a wide variety of products available

    (C) consumes would unquestionably benefit from having fewer products produced more cheaply

    (D) advertising may allow a firm to expand output

5. The demand for labor is a derived demand because:

    (A) the demand for labor in a market is determined by the demand for the final product that the labor produces

    (B) the demand for labor is derived from the wage rate paid for labor's services

    (C) the demand for labor is derived from the producer's overall cost of production

    (D) the demand for labor is a function of the supply of labor's services

6. One of the major results of the specialization and division of labor is that :

(A) as labor becomes more specialized, the overall output of the economic system declines

(B) as labor becomes more specialized, there is a greater need for the economic system to expand trade

(C) as labor becomes more specialized, there is an increased need for government to intervene in the market place

(D) as labor becomes more specialized, the circular flow of income contracts

7. Demand is said to be inelastic when :

(A) the percentage change in quantity demanded is greater than the percentage change in price of a good

(B) the quantity demanded does not change when price changes

(C) a small price reduction raises the quantity demanded to infinity

8. When the consumer is in equilibrium with a certain consumption bundle of goods x and y (both normal goods), if the price of good y falls and the consumer's income and the price of good x remain unchanged, then we can assume that the consumer will:

(A) move along the original indifference curve purchasing less x and more y

(B) move to a higher indifference curve purchasing more x and an indeterminate amount of x

(C) move to a higher indifference curve purchasing more x and an indeterminate amount of y

(D) remain on the original budget line purchasing more x and less y

9. Which of the following is not true of price ceilings?

(A) The producer must charge the price established as the price ceiling.

(B) If the ceiling price is set above the equilibrium price, the intervention will have no effect whatsoever.

(C) If the ceiling price is set below the prevailing equilibrium price, then the price must be reduced.

(D) If the ceiling price is set below the equilibrium price, then an excess demand for the commodity will develop.

10. Consumer surplus is defined as the difference between:

(A) the marginal utility of a unit of a commodity and its price

(B) total utility and the marginal utility of the last unit consumed

(C) the total utility of all units and the price of the last unit

(D) the total value consumers place on all units consumed and the money payments they make to purchase those units

二、簡答題：(每題 10%，共 30%)

1．美國許多圖書公司在出版學術書籍時，經常會先出版訂價較高的精裝本，二年後再出版訂價較低的平裝本。請說明其理由何在?

2．幾年前政府推行「醫藥分業」制度，結果引起醫師公會與藥劑師公會之間的嚴重爭執。請問推行醫藥分業的經濟理由為何？又為什麼推行醫藥分業制度以後不久，現在我們在許多診所隔壁可以看到有「門前藥局」的出現？理由何在？

3．試以圖形証明:廠商長期成本必然會小於或等於短期成本。

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第二部分

一、單選題（24%，每題3%）

1. A rational firm will only seek to maximize total revenue if:
   A) it faces a totally inelastic demand curve.
   B) its marginal cost curve falls and then rises.
   C) its average costs are falling.
   D) it is a perfect monopoly.
   E) its variable costs are zero.

2. Which of the following economists argued that monopolies were economically beneficial?
   A) Adam Smith
   B) Milton Friedman
   C) Karl Marx
   D) Joseph Schumpeter
   E) None of the above

3. Bounded rationality means that:
   A) firms are profit maximizers.
   B) Not-for-profit firms cannot exist in a competitive economy.
   C) firms strive to make good decisions, but not always maximizing decisions.
   D) firms spend too much money trying to maximize profits.
   E) firms are really utility maximizers.

4. Which of the following best explains why collusive oligopolies are not stable?
   A) Companies are inherently hostile to each other.
   B) Companies feel they have a moral responsibility not to collude.
   C) Each company in the oligopoly can increase its profits by deviating from the agreed upon price and/or quantity.
   D) Oligopolies are not unstable; rather they are quite stable.
   E) None of the above.

5. Which of the following does not represent a barrier to entry into a market?
   A) Import quotas.
   B) Patent laws.
   C) Government franchises.
   D) Anti-trust legislation.
   E) All of the above are barriers.

6. All but one of the following are incompatible with the existence of perfect competition. That one is:
   A) prolonged decreasing costs.
   B) prolonged increasing returns to scale.
   C) a continually falling average fixed cost curve.
   D) a continually falling average total cost curve.
   E) product differentiation.

| 備 考 | 試 題 隨 卷 繳 交 |

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7. The problem leading to the development of the economics of information can be characterized as follows:
   A) Variable costs are high but fixed costs are low.
   B) Fixed costs equal zero.
   C) Marginal costs increase at an increasing rate.
   D) Production externatalities lead to lower demand.
   E) Fixed costs are high but marginal costs are low.

8. The long-run supply curve of an individual firm in perfect competition is the same thing as:
   A) the rising segment of its marginal cost curve, above average cost.
   B) the rising segment of its average cost curve.
   C) its entire average cost curve.
   D) that entire part of its total cost curve in which total cost rises or remains constant as output increases.
   E) none of the above.

二、（10%） 假設一產業包含二個競爭廠商，其總成本函數為

$$C_1 = \alpha q_1^2 + (\alpha+\beta)^2 q_1 + \beta q_1 q \qquad C_2 = \alpha q_2^2 + (\alpha+\beta)^2 q_2 + \beta q_2 q$$

其中 $q = q_1 + q_2$ ，$\alpha > 0$

(a) 若生產發生外部經濟，則產業供給曲線為何？與無外部性時之供給線有何差別？

(b) 若生產發生外部不經濟，則產業供給曲線之傾斜狀況又如何？

三、（10%） 假設有一競爭廠商座落在一偏遠鄉村，其獨買該村落之勞動 (x)。
此一獨買廠商之生產函數與勞動供給函數為

$$q = 15x^2 - 0.2x^3 \qquad w = 144 + 23.4x \qquad w\ 為工資率$$

假設完全競爭市場之產品價格為 3 元。試求此廠商利潤最大之勞動雇用量、工資率、邊際勞動成本、產量、與利潤。

四、（6%） 解釋下列專有名詞與概念
   (a) 囚犯的困境 (prisoner's dilemma)　(b) 交換經濟體系之核心（Core）

備　考　試　題　隨　卷　繳　交

命題委員：　　　094　　（簽章）96 年 3 月 4 日

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考 試 科 目	總體經濟學	所 別	經濟系	考 試 時 間	3 月 17 日 星期六 第 三 節

一、(30%) Please answer the following questions:

1. What is the Fisher effect? (3%)

2. During the Great Depression, the U.S. economy experienced many bank failures, to the point where people became unwilling to keep their money in banks, preferring to keep it in cash. How would you expect such a shift away from checkable deposits toward currency to affect the size of the money multiplier? Explain. (5%)

3. Explain the differences in the effects of expansionary monetary policies on the economy between the *classical* and *Keynesian* models. (10%)

4. In Japan in the 1990s and the United States in the 1930s, interest rates reached very low levels. U.S. interest rates were well under 1 percent throughout the second half of the 1930s. The same was true in Japan during the second half of the 1990s. In 1999, Japanese short-term interest rates fell to about one-tenth of 1 percent. As a result, monetary policies may no longer be effective. Discuss the effects of *monetary* and *fiscal* policies in the circumstance with diagrams. (12%)

二、(20%) Please answer the following questions:

1. Perfect capital mobility in international financial markets implies that the uncovered interest parity condition should hold. Explain. (8%)

2. What are the differences between the effects of expansionary fiscal policies under fixed and floating exchange rates? Explain carefully. (12%)

三、為何政府的政策會產生時間不一致性(time inconsistency)現象？試舉例說明之。如果人們了解政策的時間不一致性並納入預期以為其行為決策，則會有何效果？又應如何解決政府政策的時間不一致問題？ (15%)

四、何謂雙重赤字(twin-deficit)？產生的原因為何？如何解決？試繪圖說明之。另舉現實一國為例說明其現況及產生原因，並試和理論相應証是否符合。(15%)

五、在成長理論中何謂絕對收斂(absolute convergence)？何謂條件收斂(conditional convergence)？Solow 成長模型可否解釋各國間為何有不同經濟成長率？若有，其造成的主要原因為何？若無，如何改善其理論模型才能更合理解釋？ (20%)

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一. (50分)

1 Estimating the slope (20)

Let y_t be generated by:

$$y_t = \alpha + \beta x_t + \epsilon_t, \ t = 1, \cdots, T \tag{1}$$

where ϵ_t is *iid* with mean 0 and variance σ^2, $\alpha = -1$, $\beta = 2$, and x_t is fixed regressor with values given in each case below.

- Case 1:
  $x_t = (-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5)'$, $\sigma^2 = 1$, $T = 11$

- Case 2:
  $x_t = (-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5)'$, $\sigma^2 = 2$, $T = 11$

- Case 3:
  $x_t = (-10, -8, -6, -4, -2, 0, 2, 4, 6, 8, 10)'$, $\sigma^2 = 1$, $T = 11$

- Case 4:
  $x_t = (-10, -8, -6, -4, -2, 0, 2, 4, 6, 8, 10)'$, $\sigma^2 = 2$, $T = 11$

- Case 5:
  $x_t = (-10, -9, -8, -7, -6, -5, -4, -3, -2, -1, 0)'$, $\sigma^2 = 1$, $T = 11$

- Case 6:
  $x_t = (-10, -9, -8, -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10)'$,
  $\sigma^2 = 1$, $T = 21$.

Let $\hat{\beta}^{(i)}, i = 1, \cdots, 6$ be the least square estimate of β for the i-th case. Answer the following questions.

1. Write down the general formula of $\hat{\beta}$ in term of x_t, y_t as in eq. (1). (2)

2. Rank the precision of $\hat{\beta}^{(i)}, i = 1, \cdots, 6$ in each case. Order from the most precise estimate to the least precise one. Explain your results. No partial credit is given to answer without explanation. (10)

3. Let $|x_t| \leq 10$, $t = 1, \cdots, 20$, and the values of x_t is under your control. What values of x_t you should give to maximize the precision of $\hat{\beta}$?. Explain your answer. Note that ϵ_t, $t = 1, \cdots, 20$ is drawn randomly from *iid* $N(0, 1)$. (4)

4. State the assumptions on x_t, ϵ_t as in eq. (1) for least square estimate of β to be the best linear unbiased estimates (BLUE). (4)

備　考	試 題 隨 卷 繳 交

命題委員：	096	（簽章）	年　月　日

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2　Simple but good enough (10)

Let the regression model be :

$$y_t = \beta_0 + \beta_1 x_{1t} + \beta_2 x_{2t} + \epsilon_t, \ t = 1, \cdots, T$$

where ϵ_t is white noise with mean 0 and variance σ^2. and is independent of x_{1t}, x_{2t}. Now you are given a simple calculator which can only compute single regressor case (with intercept). That is, it can only handle the regression with either x_{1t} or x_{2t} but not both simultaneously. Explain how to obtain the least square estimates of β_1, β_2 using this calculator. Justify or prove your answer. (10)

3　Is it worth it? (20)

To answer the question where it is worth studying for the master degree, you are given a dataset containing 1000 samples. For each sample, the variables included are education level (EDU: bachelor, master), monthly salary (INC: 0 ~ 1,000,000), gender (GEN: male, female), occupation (OCC: lawyer, teacher, physician, engineer, technician, business professional, others), working location (LOC: rural, urban), working experiences (WORK: years), religious belief (REL:none, Buddhist, Christian, others).

1. A raw estimate of the value of the master degree is the difference between the average salary for those who have bachelor degree and those who have master degree. How good is this raw estimate? Explain. (4)

2. Write down the regression model for the raw estimate above. (Hint: let EDU=0 for bachelor and 1 for master.) (4)

3. Write down the complete regression model including all regressors listed above. How do you test if your model is an appropriate one? Be specific about the null hypothesis, the test statistics and its distribution. (4)

4. How do you test if the master degree significantly increases the monthly salary? Be specific about the null hypothesis, the test statistics and its distribution. (4)

5. Some people argue that the value of master degree differs among different occupations. How do you test for this argument? Be specific about the null hypothesis, model specification, test statistics and its distribution. (4)

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二、(50分)

1.

    a. **(5 points)** A significance test is performed and the p-value = 0.20. Why can't we claim that the probability that the null hypothesis is true is 0.20?

    b. **(5 points)** What is a standard error and why is it important?

    c. **(5 points)** Is it possible for a statistic to be unbiased yet be very inefficient? How about being very efficient but biased?

    d. **(5 points)** What is the most difficult step in estimating power?

2. **(10 points)** Assume four normally distributed populations with means of 10, 11, 12, and 13 all with the same standard deviation of 2. Four subjects are sampled from each population and the mean of each sample computed. What is the probability that average of the means of the samples from Populations 1 and 3 will be greater than the average of the means of the samples from Populations 2 and 4?

3. **(10 points)** A person claims to be able to throw a die and make a 1 come up more often than chance (1/6). The die is thrown 100 times and a one comes up 18 times. Do you agree with the person's statement?

4. **(10 points)** What are sufficient statistics? Let $X_1, X_2, ..., X_n$ be a random sample from the normal distribution $N(0, \theta)$, $0 < \theta < \infty$. Is $X_1^2 + X_2^2 + ... + X_n^2$ a sufficient statistic for θ.

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國立政治大學圖書館

STATISTICAL TABLES

TABLE G.1 Cumulative Normal Distribution. Table Entry Is Φ(z) = Prob[Z ≤ z]

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998

| 備考 | 試題隨卷繳交 |

命題委員：　　　　　099　　（簽章）96 年 2 月 14 日

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TABLE G.2　Percentiles of the Student's *t* Distribution. Table Entry Is *x* Such that $\text{Prob}[t_n \leq x] = P$

n	.750	.900	.950	.975	.990	.995
1	1.000	3.078	6.314	12.706	31.821	63.657
2	.816	1.886	2.920	4.303	6.965	9.925
3	.765	1.638	2.353	3.182	4.541	5.841
4	.741	1.533	2.132	2.776	3.747	4.604
5	.727	1.476	2.015	2.571	3.365	4.032
6	.718	1.440	1.943	2.447	3.143	3.707
7	.711	1.415	1.895	2.365	2.998	3.499
8	.706	1.397	1.860	2.306	2.896	3.355
9	.703	1.383	1.833	2.262	2.821	3.250
10	.700	1.372	1.812	2.228	2.764	3.169
11	.697	1.363	1.796	2.201	2.718	3.106
12	.695	1.356	1.782	2.179	2.681	3.055
13	.694	1.350	1.771	2.160	2.650	3.012
14	.692	1.345	1.761	2.145	2.624	2.977
15	.691	1.341	1.753	2.131	2.602	2.947
16	.690	1.337	1.746	2.120	2.583	2.921
17	.689	1.333	1.740	2.110	2.567	2.898
18	.688	1.330	1.734	2.101	2.552	2.878
19	.688	1.328	1.729	2.093	2.539	2.861
20	.687	1.325	1.725	2.086	2.528	2.845
21	.686	1.323	1.721	2.080	2.518	2.831
22	.686	1.321	1.717	2.074	2.508	2.819
23	.685	1.319	1.714	2.069	2.500	2.807
24	.685	1.318	1.711	2.064	2.492	2.797
25	.684	1.316	1.708	2.060	2.485	2.787
26	.684	1.315	1.706	2.056	2.479	2.779
27	.684	1.314	1.703	2.052	2.473	2.771
28	.683	1.313	1.701	2.048	2.467	2.763
29	.683	1.311	1.699	2.045	2.462	2.756
30	.683	1.310	1.697	2.042	2.457	2.750
35	.682	1.306	1.690	2.030	2.438	2.724
40	.681	1.303	1.684	2.021	2.423	2.704
45	.680	1.301	1.679	2.014	2.412	2.690
50	.679	1.299	1.676	2.009	2.403	2.678
60	.679	1.296	1.671	2.000	2.390	2.660
70	.678	1.294	1.667	1.994	2.381	2.648
80	.678	1.292	1.664	1.990	2.374	2.639
90	.677	1.291	1.662	1.987	2.368	2.632
100	.677	1.290	1.660	1.984	2.364	2.626
∞	.674	1.282	1.645	1.960	2.326	2.576

備考	試題隨卷繳交

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考試科目	統計學	所別	經濟	考試時間	3月17日 星期六 第4節

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TABLE G.3 Percentiles of the Chi-Squared Distribution. Table Entry is c such that $\text{Prob}[\chi^2_n \leq c] = P$

n	.005	.010	.025	.050	.100	.250	.500	.750	.900	.950	.975	.990	.995
1	.00004	.0002	.001	.004	.02	.10	.45	1.32	2.71	3.84	5.02	6.63	7.88
2	.01	.02	.05	.10	.21	.58	1.39	2.77	4.61	5.99	7.38	9.21	10.60
3	.07	.11	.22	.35	.58	1.21	2.37	4.11	6.25	7.81	9.35	11.34	12.84
4	.21	.30	.48	.71	1.06	1.92	3.36	5.39	7.78	9.49	11.14	13.28	14.86
5	.41	.55	.83	1.15	1.61	2.67	4.35	6.63	9.24	11.07	12.83	15.09	16.75
6	.68	.87	1.24	1.64	2.20	3.45	5.35	7.84	10.64	12.59	14.45	16.81	18.55
7	.99	1.24	1.69	2.17	2.83	4.25	6.35	9.04	12.02	14.07	16.01	18.48	20.28
8	1.34	1.65	2.18	2.73	3.49	5.07	7.34	10.22	13.36	15.51	17.53	20.09	21.95
9	1.73	2.09	2.70	3.33	4.17	5.90	8.34	11.39	14.68	16.92	19.02	21.67	23.59
10	2.16	2.56	3.25	3.94	4.87	6.74	9.34	12.55	15.99	18.31	20.48	23.21	25.19
11	2.60	3.05	3.82	4.57	5.58	7.58	10.34	13.70	17.28	19.68	21.92	24.72	26.76
12	3.07	3.57	4.40	5.23	6.30	8.44	11.34	14.85	18.55	21.03	23.34	26.22	28.30
13	3.57	4.11	5.01	5.89	7.04	9.30	12.34	15.98	19.81	22.36	24.74	27.69	29.82
14	4.07	4.66	5.63	6.57	7.79	10.17	13.34	17.12	21.06	23.68	26.12	29.14	31.32
15	4.60	5.23	6.26	7.26	8.55	11.04	14.34	18.25	22.31	25.00	27.49	30.58	32.80
16	5.14	5.81	6.91	7.96	9.31	11.91	15.34	19.37	23.54	26.30	28.85	32.00	34.27
17	5.70	6.41	7.56	8.67	10.09	12.79	16.34	20.49	24.77	27.59	30.19	33.41	35.72
18	6.26	7.01	8.23	9.39	10.86	13.68	17.34	21.60	25.99	28.87	31.53	34.81	37.16
19	6.84	7.63	8.91	10.12	11.65	14.56	18.34	22.72	27.20	30.14	32.85	36.19	38.58
20	7.43	8.26	9.59	10.85	12.44	15.45	19.34	23.83	28.41	31.41	34.17	37.57	40.00
21	8.03	8.90	10.28	11.59	13.24	16.34	20.34	24.93	29.62	32.67	35.48	38.93	41.40
22	8.64	9.54	10.98	12.34	14.04	17.24	21.34	26.04	30.81	33.92	36.78	40.29	42.80
23	9.26	10.20	11.69	13.09	14.85	18.14	22.34	27.14	32.01	35.17	38.08	41.64	44.18
24	9.89	10.86	12.40	13.85	15.66	19.04	23.34	28.24	33.20	36.42	39.36	42.98	45.56
25	10.52	11.52	13.12	14.61	16.47	19.94	24.34	29.34	34.38	37.65	40.65	44.31	46.93
30	13.79	14.95	16.79	18.49	20.60	24.48	29.34	34.80	40.26	43.77	46.98	50.89	53.67
35	17.19	18.51	20.57	22.47	24.80	29.05	34.34	40.22	46.06	49.80	53.20	57.34	60.27
40	20.71	22.16	24.43	26.51	29.05	33.66	39.34	45.62	51.81	55.76	59.34	63.69	66.77
45	24.31	25.90	28.37	30.61	33.35	38.29	44.34	50.98	57.51	61.66	65.41	69.96	73.17
50	27.99	29.71	32.36	34.76	37.69	42.94	49.33	56.33	63.17	67.50	71.42	76.15	79.49

備 考	試題隨卷繳交

命題委員： 101 （簽章） 96 年 2 月 14 日

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考試科目 統計學 2161 所別 經濟 考試時間 2月17日 星期六 第 4 節

TABLE G.4 95th Percentiles of the F Distribution. Table Entry is f such that $Prob[F_{n_1,n_2} \leq f] = .95$

$n_1 = Degrees\ of\ Freedom\ for\ the\ Numerator$

n_2	1	2	3	4	5	6	7	8	9
1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12
50	4.03	3.18	2.79	2.56	2.40	2.29	2.20	2.13	2.07
70	3.98	3.13	2.74	2.50	2.35	2.23	2.14	2.07	2.02
100	3.94	3.09	2.70	2.46	2.31	2.19	2.10	2.03	1.97
∞	3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88

n_2	10	12	15	20	30	40	50	60	∞
1	241.88	243.91	245.95	248.01	250.10	251.14	252.20	252.20	254.19
2	19.40	19.41	19.43	19.45	19.46	19.47	19.48	19.48	19.49
3	8.79	8.74	8.70	8.66	8.62	8.59	8.57	8.57	8.53
4	5.96	5.91	5.86	5.80	5.75	5.72	5.69	5.69	5.63
5	4.74	4.68	4.62	4.56	4.50	4.46	4.43	4.43	4.37
6	4.06	4.00	3.94	3.87	3.81	3.77	3.74	3.74	3.67
7	3.64	3.57	3.51	3.44	3.38	3.34	3.30	3.30	3.23
8	3.35	3.28	3.22	3.15	3.08	3.04	3.01	3.01	2.93
9	3.14	3.07	3.01	2.94	2.86	2.83	2.79	2.79	2.71
10	2.98	2.91	2.85	2.77	2.70	2.66	2.62	2.62	2.54
15	2.54	2.48	2.40	2.33	2.25	2.20	2.16	2.16	2.07
20	2.35	2.28	2.20	2.12	2.04	1.99	1.95	1.95	1.85
25	2.24	2.16	2.09	2.01	1.92	1.87	1.82	1.82	1.72
30	2.16	2.09	2.01	1.93	1.84	1.79	1.74	1.74	1.63
40	2.08	2.00	1.92	1.84	1.74	1.69	1.64	1.64	1.52
50	2.03	1.95	1.87	1.78	1.69	1.63	1.58	1.58	1.45
70	1.97	1.89	1.81	1.72	1.62	1.57	1.50	1.50	1.36
100	1.93	1.85	1.77	1.68	1.57	1.52	1.45	1.45	1.30
∞	1.83	1.75	1.67	1.57	1.46	1.39	1.34	1.31	1.30

備 考 試 題 隨 卷 繳 交

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