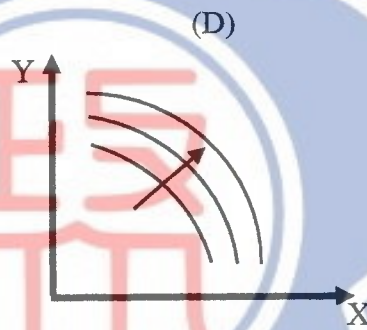
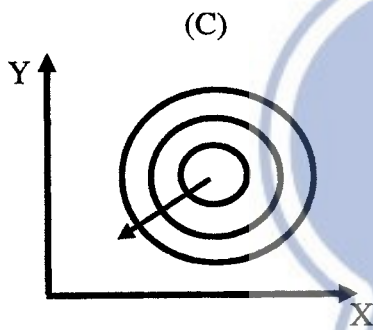
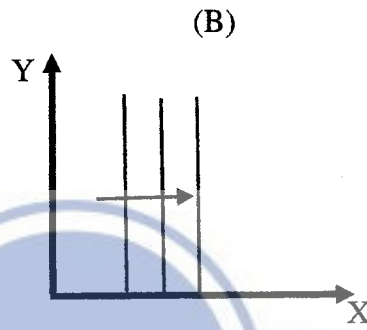
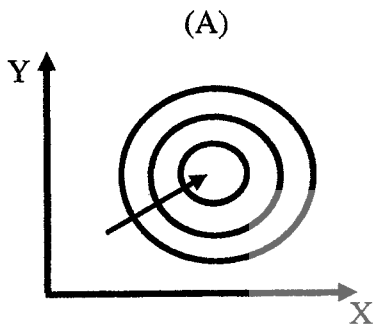
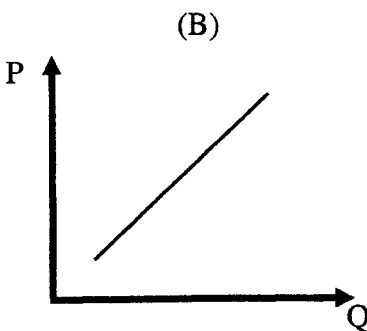
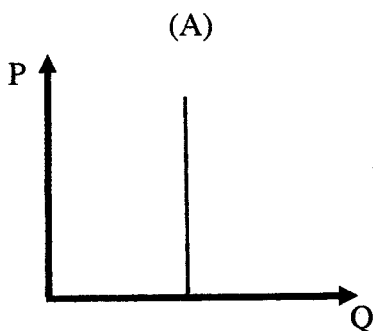


考試科目	個體經濟學	系所別	經濟學系	考試時間	2月5日(星期一) 第二節
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一、(20分，每小題各5分) 針對下列的無異曲線圖形，分別畫出其 Y 財貨的受補償需求曲線。效用往箭頭的方向遞增。



二、(10分，每小題各5分) 假設市場結構為完全競爭市場。某一廠商生產產品的總成本函數為 $TC = 100 + 0.8Q$ ，其中 Q 為產品產量。目前該產品的市場價格為 \$1，總廠商家數為 100 家。針對下列兩種市場需求曲線，分別畫出此一個別廠商所面對之產品需求曲線。



考 試 科 目	個體經濟學	系 所 別	經濟學系	考 試 時 間	2 月 5 日(星期一) 第二節
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三、(20 分，每小題各 10 分) 交換經濟體系內有三位消費者 A、B 和 C 以及三種財貨 X, Y 和 Z。三位消費者的效用函數分別為

$$U_A(X_A, Y_A, Z_A) = X_A + Y_A + Z_A,$$

$$U_B(X_B, Y_B, Z_B) = \min(X_B, Y_B, Z_B), \text{ 和}$$

$$U_C(X_C, Y_C, Z_C) = X_C Y_C Z_C.$$

三位消費者的初始資源稟賦為 A 有 1 單位的 X 財貨，B 有 1 單位的 Y 財貨，C 則有 1 單位的 Z 財貨。

- (A) 當財貨的市場價格為 $P_X = \$1$ ， $P_Y = \$2$ ， $P_Z = \$3$ 時，財貨 X 的市場是否存在超額需求？
 (B) 針對此交換經濟體系，請嘗試找出一組市場競爭均衡結果。

四、(10 分) Suppose that there are 100 people who have the same \$1 marginal benefit for a public good (X) regardless of the number of public good provided. If the total cost of providing the public good is given by $TC(X) = 100 + 2X$, what is the Pareto efficient number of the public good to provide?

五、(10 分) What are dominant strategy, dominated strategy and Nash equilibrium in game theory? Also, please explain the importance of these three concepts.

六、(30 分，每小題各 10 分) True/False/Uncertain. Please explain your answer in detail.

- (A) A consumer only consumes two goods (X and Y). If the income of the consumer increases by 10%, the price of good X increases by 10% and the price of good Y decreases by 10% at the same time. The consumer necessarily be at least as well-off.
 (B) A firm's marginal cost cannot be negative.
 (C) An increase in the demand for a monopolist's product will always result in higher price and profit.

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	總體經濟學	系所別	經濟學系	考試時間	2月5日(一) 第三節
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1. [Multiple Choice] Choose the one alternative that best completes the statement or answers the question. (30%) [答題時，請於答案卷中清楚書寫題號及答案]
- (1) All others being equal, if some unemployed workers give up searching for jobs, then
- (A) the unemployment rate increases but the labor participation rate decreases.
 - (B) the unemployment rate decreases but the labor participation rate increases.
 - (C) both the unemployment rate and labor participation rate decrease.
 - (D) both the unemployment rate and labor participation rate increase.
- (2) According to the IS-LM model, if a country is under a liquidity trap, which of the following statements is WRONG?
- (A) Conventional monetary Policies have no effects.
 - (B) Government spending has no crowding out effect.
 - (C) Demand for money is perfectly interest elastic.
 - (D) The LM curve is a vertical line.
- (3) According to Keynes' liquidity preference theory of interest, if the quantity of money supplied is greater than the quantity of money demanded in a country, which of the following will occur?
- (A) Firms increase their investment.
 - (B) People increase their consumption.
 - (C) The government increases its spending.
 - (D) The price of bonds increases.
- (4) According to the IS-LM model (LM is positively sloped), if investment becomes more responsive to changes in the interest rate, which of the following is likely to occur?
- (A) Fiscal policy becomes more effective at changing output.
 - (B) Monetary policy becomes more effective at changing output.
 - (C) Fiscal policy becomes more effective at changing interest rates.
 - (D) Monetary policy becomes more effective at changing interest rates.
- (5) In an economy in which investment negatively depends on the interest rate only, an increase in lump-sum taxes will cause which of the following according to the IS-LM model (LM is positively sloped)?
- (A) A decrease in consumption and an increase in investment.
 - (B) An increase in consumption and a decrease in investment.
 - (C) An increase in both consumption and investment.
 - (D) A decrease in both consumption and investment.

(續下頁)

考試科目	總體經濟學	系所別	經濟學系	考試時間	2 月 5 日(一) 第三節
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- (6) Consider two countries: A and B. Both countries are identical except that Country A's saving rate is greater than Country B's. Moreover, there is no technological progress in both countries. According to the Solow growth model, which of the following statements is CORRECT in the long run?
- (A) The growth rate of total output is greater in Country A than in Country B.
 (B) The growth rate of per capita output in both countries are equal.
 (C) Investment per worker in both countries are equal.
 (D) Capital per worker in both countries are equal.
- (7) A country is under the steady state originally. If an earth quake occurs that destroys 50% of capital stock. Other things being equal, which of the following statements is correct according to the Solow growth model (without exogenously technological progress)? Compared with the original steady state,
- (A) the country's output per capita increases in the short run, but returns to the level in the original steady state in the long run.
 (B) the country's output per capita decreases in both the short run and the long run.
 (C) the country's growth rate of output per capita increases in the short run, but returns to the one in the original steady state in the long run.
 (D) the country's growth rate of output per capita decreases in both the short run and the long run.
- (8) Which of the following statements is correct?
- (A) A country's GDP cannot be greater than its GNI.
 (B) A country's exports cannot be greater than its GDP.
 (C) If the law of one price holds, the real exchange rate must be equal to 1.
 (D) None of the above is correct.
- (9) If a country has a current account surplus, then this country must be
- (A) running a balanced trade account.
 (B) lending to the rest of the world.
 (C) borrowing from the rest of the world.
 (D) suffering from negative investment income.
- (10) If the Marshall-Lerner condition does NOT hold, a depreciation in the real exchange rate will tend to cause which of the following to occur?
- (A) An increase in NX and an increase in Y.
 (B) An increase in NX and a reduction in Y.
 (C) A reduction in NX and an increase in Y.
 (D) A reduction in NX and a reduction in Y.

回答以下第 2、3、4 題，須提供完整答題過程。

(續下頁)

考試科目	總體經濟學	系所別	經濟學系	考試時間	2月5日(一) 第三節
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2. [The IS-LM model in a closed economy] Consider an economy with the following equation:

$$C = \alpha_0 + \alpha_1(Y - T), \alpha_0, \alpha_1 > 0,$$

where C , Y , and T are consumption, output, and Taxes. Moreover, the investment is given as

$$I = \beta_0 + \beta_1 Y - \beta_2 i, \beta_0, \beta_1, \beta_2 > 0$$

where C , Y , T , I , and i are consumption, output, taxes, investment, and the interest rate. The government spending is G .

Answer the following questions: (25%)

(1) Specify and explain the condition under which the equilibrium of the goods market exists. Then, solve for equilibrium output under this condition. What is the value of the multiplier for the balanced government budget? Is it greater than or less than 1? Explain your result.

(2) Now, suppose that the equilibrium equation for the money market is

$$m_0 = \gamma_1 Y - \gamma_2 i.$$

where m_0 is the real money balance. Solve for equilibrium output in which both goods and money markets clear. What is the value of the multiplier for the balanced government budget? Explain the difference of your result with the one you find in (1).

3. [Expectation-augmented Phillips Curve] Consider an economy with the following Phillips curve:

$$\pi_t = \pi_t^e + 0.8(u_n - u_t),$$

where π_t is the actual inflation rate between period $t - 1$ and t and π_t^e is the expected inflation rate between period $t - 1$ and t that is formed at period $t - 1$; u_n is the natural rate of unemployment which is equal to 5% and u_t is the actual rate of unemployment at period t . Moreover, the economy has the following Okun's law:

$$\frac{Y_t - Y_n}{Y_n} = -(u_t - u_n),$$

where Y_t is the actual output at period t and Y_n is the natural output (or potential output).

Answer the following questions: (20%)

(1) Taking π_t^e as given, draw a diagram (in which the vertical axis is π_t and the horizontal axis is u_t) to show the Phillips curve. In particular, indicate the natural unemployment rate and the expected inflation rate in the diagram.

(2) Suppose that the economy's actual inflation rate is equal to 6%, much higher than the one announced by the central bank (=2%). Given this, people change their expectation of the inflation rate to be equal to $\pi_t^e = 6\%$. In this case, if the central bank of this economy wants to reduce the inflation rate from 6% to 2%, what will be the actual unemployment rate?

(3)[Continued from (2)] Calculate the sacrifice ratio.

(續下頁)

考試科目	總體經濟學	系所別	經濟學系	考試時間	2月5日(一) 第三節
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(4) [Lucas critique] Robert Lucas argued that the sacrifice ratio may be very small. Draw diagram to explain his argument using this economy.

4. [Solow growth model] Consider a closed economy with the following production function:

$$Y_t = K_t^\alpha (E_t L_t)^{1-\alpha}, \alpha \in (0, 1),$$

where Y_t , E_t , K_t , and L_t are, respectively, output, efficiency of labor, capital stock, and labor. $E_t L_t$ is defined as effective labor. The depreciation rate of capital is equal to δ and the net growth rate of labor is $n (> 0)$. The saving rate of the economy is constant over time and is denoted as s . Time is DISCRETE and capital stock evolves as

$$K_{t+1} = sY_t + (1 - \delta)K_t. \quad (A)$$

Assume that E_t grows at a net rate of $e (> 0)$. Answer the following questions: (25%)

- (1) Derive an equation showing the evolution of capital stock per effective labor step-by-step from equation (A) and obtain the steady state value of capital per effective labor for the economy. [Hint: both e and n are small so that $e \cdot n \approx 0$.]
- (2) Draw a diagram showing the evolution of capital per effective labor and its steady state.
- (3) Use the equation you derive in (1) to show the growth rates of output per labor and output per effective labor in the steady state.
- (4) What is the saving rate that can maximize consumption per effective labor in the steady state?

(The End)

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	經濟學系	考試時間	2月5日(一)第4節
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1. (40%) In the model $y_t = \alpha + \beta x_t + e_t$, with x_t non-stochastic. Assume that e_t is independent and identically distributed $N(0, \sigma_0^2)$. Giving the following sample moments:

$$\sum_{t=1}^{10} y_t = 16, \quad \sum_{t=1}^{10} x_t = 40, \quad \sum_{t=1}^{10} y_t^2 = 56, \quad \sum_{t=1}^{10} x_t^2 = 200, \quad \sum_{t=1}^{10} x_t y_t = 40.$$

Assume that this model holds for $x_{11} = -2$ and $x_{12} = 10$.

- Calculate the best linear unbiased predictor of y_{11} and y_{12} .
 - Estimate the standard error of your forecast in (a).
 - Construct 95% confidence intervals for y_{11} and y_{12} .
 - If the realized values for y_{11} and y_{12} are 1 and 2 respectively, test the null hypothesis that $H_0 : E(e_{11}) = 0$ and $H_0 : E(e_{12}) = 0$ at the 5% level.
2. (20%) Suppose that a random sample y_i is exponentially distributed, that is

$$f(y_i) = \frac{\exp(-y_i/\lambda)}{\lambda}.$$

We consider using maximum likelihood estimation to estimate the unknown parameter λ .

- Write down the likelihood function.
 - Derive the first order conditions and the maximum likelihood estimator for λ .
 - Five observations are 1, 1.5, 0.7, 0.8 and 3. Find the maximum likelihood estimate for λ .
3. (15%) Given the following distribution function,

$$F_X(a) = \frac{a^2}{36}.$$

Please find the density function and compute the mean and variance.

備註

- 作答於試題上者, 不予計分。
- 試題請隨卷繳交。

考試科目	統計學	系所別	經濟學系	考試時間	2月5日(一)第4節
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4. (25%) Consider the following model

$$y_t = c_0 + y_{t-1} + e_t,$$

with e_t independent and identically distributed $N(0,1)$, and $c_0 = 1, y_0 = 0$.

Please find

- (a) the distribution of y_t ,
- (b) the autocovariance and autocorrelation of y_t .



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	經濟學系	考試時間	2月5日(一)第4節
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Table Cumulative normal distribution

$$\Phi(x) = \int_{-\infty}^x \frac{1}{\sqrt{2\pi}} e^{-t^2/2} dt$$

x	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998

x	1.282	1.645	1.960	2.326	2.576	3.090	3.291	3.891	4.417
$\Phi(x)$	0.90	0.95	0.975	0.99	0.995	0.999	0.9995	0.99995	0.999995
$2[1 - \Phi(x)]$	0.20	0.10	0.05	0.02	0.01	0.002	0.001	0.0001	0.00001

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	經濟學系	考試時間	2月5日(一)第4節
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Table Cumulative student's *t*-distribution

$$F(t) = \int_{-\infty}^t \frac{\Gamma\left(\frac{n+1}{2}\right)}{\Gamma(n/2)\sqrt{\pi n} \left(1 + \frac{x^2}{n}\right)^{(n+1)/2}} dx$$

<i>n</i> \ <i>F</i>	0.75	0.90	0.95	0.975	0.99	0.995	0.9995
1	1.000	3.078	6.314	12.706	31.821	63.657	636.619
2	0.816	1.886	2.920	4.303	6.965	9.925	31.598
3	0.765	1.638	2.353	3.182	4.541	5.841	12.941
4	0.741	1.533	2.132	2.776	3.747	4.604	8.610
5	0.727	1.476	2.015	2.571	3.365	4.032	6.859
6	0.718	1.440	1.943	2.447	3.143	3.707	5.959
7	0.711	1.415	1.895	2.365	2.998	3.499	5.405
8	0.706	1.397	1.860	2.306	2.896	3.355	5.041
9	0.703	1.383	1.833	2.262	2.821	3.250	4.781
10	0.700	1.372	1.812	2.228	2.764	3.169	4.587
11	0.697	1.363	1.796	2.201	2.718	3.106	4.437
12	0.695	1.356	1.782	2.179	2.681	3.055	4.318
13	0.694	1.350	1.771	2.160	2.650	3.012	4.221
14	0.692	1.345	1.761	2.145	2.624	2.977	4.140
15	0.691	1.341	1.753	2.131	2.602	2.947	4.073
16	0.690	1.337	1.746	2.120	2.583	2.921	4.015
17	0.689	1.333	1.740	2.110	2.567	2.898	3.965
18	0.688	1.330	1.734	2.101	2.552	2.878	3.922
19	0.688	1.328	1.729	2.093	2.539	2.861	3.883
20	0.687	1.325	1.725	2.086	2.528	2.845	3.850
21	0.686	1.323	1.721	2.080	2.518	2.831	3.819
22	0.686	1.321	1.717	2.074	2.508	2.819	3.792
23	0.685	1.319	1.714	2.069	2.500	2.807	3.767
24	0.685	1.318	1.711	2.064	2.492	2.797	3.745
25	0.684	1.316	1.708	2.060	2.485	2.787	3.725
26	0.684	1.315	1.706	2.056	2.479	2.779	3.707
27	0.684	1.314	1.703	2.052	2.473	2.771	3.690
28	0.683	1.313	1.701	2.048	2.467	2.763	3.674
29	0.683	1.311	1.699	2.045	2.462	2.756	3.659
30	0.683	1.310	1.697	2.042	2.457	2.750	3.646
40	0.681	1.303	1.684	2.021	2.423	2.704	3.551
60	0.679	1.296	1.671	2.000	2.390	2.660	3.460
120	0.677	1.289	1.658	1.980	2.358	2.617	3.373
∞	0.674	1.282	1.645	1.960	2.326	2.576	3.291

備註

- 一、作答於試題上者，不予計分。
- 二、試題請隨卷繳交。