國立政治大學 102 學年度轉學生招生考試試題

考試科目	經濟學 A	系別	經濟學系 2161	考試時間	7月12日(星期五)第二節

一、解釋名詞（每小題5分，共計50分）

a. Coase theorem
b. Deadweight loss
c. Substitution effects
d. Production function
e. Behavior economics
f. Common knowledge
g. Convex preferences
h. Nash equilibrium
i. Public goods
j. General equilibrium

二、選擇題（每小題2分，共計20分）

1. This type of unemployment reflects the normal amount of unemployed workers who possess skills that will enable them to find another job.
a) cyclical unemployment
b) frictional unemployment
c) structural unemployment
d) None of the above answers is correct.

Component	Amount (billions of dollars)
Net taxes	1,635
Personal consumption expenditure	5,566
Depreciation	622
Government expenditure	1,784
Gross investment	1,234
Exports	957
Imports	1,138
Household saving	1,202

2. Using the data in the table above, what are the values of GDP and national saving, respectively?
a) $13,516 billion, $1,202 billion
b) $10,679 billion, $2,837 billion
c) $9,541 billion, -$85 billion
d) $8,403 billion, $1,053 billion

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3. When the Fed increases the quantity of assets it owns, it is said to be engaging in
   a) credit easing.
   b) forward guidance.
   c) quantitative easing.
   d) a maturity extension program.

4. In the Keynesian framework, as long as output is _____ the equilibrium level, unplanned inventory investment will remain negative and firms will continue to _____ production.
   a) below; lower
   b) above; lower
   c) below; raise
   d) above; raise

5. Classical economists think that the government _____ use fiscal policy to dampen the business cycle because prices and wages adjust _____.
   a) should not; rapidly
   b) should not; slowly
   c) should; slowly
   d) should; rapidly

6. Consider the market for dollars. The higher the exchange rate, the _____ is the expected profit from holding foreign currency and the greater is the _____.
   a) larger; quantity of dollars supplied
   b) larger; leftward shift in the demand curve for dollars
   c) smaller; quantity of dollars supplied
   d) smaller; leftward shift in the demand curve for dollars

7. According to aggregate demand and supply analysis, the negative supply shocks of 1973-1975 and 1978-1980 had the effect of
   a) increasing aggregate output, lowering unemployment, and raising the inflation.
   b) decreasing aggregate output, raising unemployment, and raising the inflation.
   c) increasing aggregate output, raising unemployment, and raising the inflation.
   d) decreasing aggregate output, raising unemployment, and lowering the inflation.

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8. To increase the pace of economic growth we must increase the growth rate of _____ or increase the growth rate of _____.
   a) capital per hour of labor; technological progress
   b) aggregate work hours; consumption
   c) aggregate supply; the price level
   d) aggregate demand; the real wage rate

9. Substitution effects help explain the slope of the aggregate demand curve. One substitution effect refers to the
   a) inverse relationship between the interest rate and the price level.
   b) direct relationship between the interest rate and the real value of wealth.
   c) effect on investment expenditures that result from a change in interest rates produced by a change in the price level.
   d) change in wealth that results from a change in the interest rate.

10. Based on the theory of the expectations-augmented Phillips curve, if the expected inflation rate is 2%, the short- run Phillips curve will
   a) have a kink at an inflation rate of 2%.
   b) be the same as the long-run Phillips curve.
   c) intersect the long-run Phillips curve at the natural unemployment rate, when the inflation rate is 2%.
   d) be horizontal at an expected inflation rate of 2%.

三、計算題與申論題（共計 30 分）

1. A Keynesian economy is described by the following equations.

$$C = 500 + 0.5(Y - T) - 100r,$$
$$I = 350 - 100r,$$
$$L = 0.5Y - 200i,$$
$$G = T = 200,$$
$$M = 3560,$$
$$\bar{Y} = 1850,$$

where *C* is the real consumption, *Y* is the real output, *T* is the real lump-sum tax, *I* is the real investment, and *L* is the real money demand. *i* and *r* are the nominal and real interest rate, respectively. *G* is the real government purchase. $\bar{Y}$ is the full-employment output. *M* is the nominal money balance. The expected inflation rate equals 0.05, that is $\pi^e = 0.05$.

Suppose government purchases decline to 175, with no change in taxes.

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(a) Calculate the values of the real interest rate, the price level, consumption, and investment for the economy in general equilibrium. (八分)

(b) What happens to the real interest rate, output, consumption, and investment in the short run (in which the price level is fixed)? (八分)

(c) What happens in the long run to consumption and the price level? (四分)

2. Describe the Taylor rule. (五分) If the Fed were following the rule, what would the nominal Fed funds rate be if inflation over the past year were 4% and output were 1% below its full-employment level? (五分)

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考試科目	微積分	系別	經濟學系/二年級 261	考試時間	7 月 12 日(五) 第四節

1. (20 pts) Solve the following two questions:

   A. Find "a" so that the curve $y = x^3 + 2x^2 + ax + 3$ has one horizontal tangent line only.

   B. Find the value of x where this tangent line occurs.

2. (10 pts) Find the value of k that would make the function continuous in each case.

   A. $g(x) = \begin{cases} \dfrac{e^x - 1}{x} & x \neq 0 \\ k & x = 0 \end{cases}$

   B. $h(x) = \begin{cases} \dfrac{\sin(5\pi x) - 1}{2x - 1} & x \neq \dfrac{1}{2} \\ k & x = \dfrac{1}{2} \end{cases}$

3. (10 pts) Compute the following:

   A. $\lim_{y \to \infty} \dfrac{\sqrt{y^2 + 2}}{5y - 6} =$

   B. $\lim_{t \to 1^+} \dfrac{|1 - t|}{1 - t} =$

4. (10 pts) Estimate the area of the region bounded by $f(x) = e^{-x^2}$, the x-axis, $x = 0$, and $x = 0.5$. Estimate the average value of $f(x)$ over the interval [0, 0.5]. Include an illustration of these two quantities.

5. (30 pts) If $\int_3^6 f(z)dz = 4$, evaluate the following integrals exactly by using appropriate substitution and limits.

   A. $\int_1^2 f(3z)dz$

   B. $\int_{0.5}^2 f(7 - 2z)dz$

   C. $\int_4^7 (f(z - 1) + 5)dz$

6. (20 pts) Use Newton's Method to find approximations to the roots of the following equations, correct to two decimal places. In each case, make a reasonable plot of the function in order to obtain an initial "guess", x_1.

   A. $x^3 - x^2 + x - 22 = 0$

   B. $x \ln x = 6$

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考試科目	經濟學 B	系別	經濟學系 166	考試時間	7 月 12 日(星期五)第二節

一、（二十分）許多的大學在分配學生宿舍的床位時，會將學生家裡與學校間距離的遠近，當作一個主要的考慮因素。

A1: 請嘗試從『效率』的觀點，來為學校行政單位合理化此規定的正當性。

A2: 除了透過考量學生家裡與學校間距離的遠近之外，還有哪些方式也可以達到你在 A1 的答案中所定義的『效率』目標。

B1: 請嘗試從『公平』的觀點，來為學校行政單位合理化此規定的正當性。

B2: 除了透過考量學生家裡與學校間距離的遠近之外，還有哪些方式也可以達到你在 B1 的答案中所定義的『公平』目標。

二、（十分）為何許多財貨的短期價格供給彈性小於長期價格供給彈性？

三、（十分）國民年金的財源若透過提高個人綜合所得稅率來籌措，將降低每個人的工作誘因，妳（你）同意嗎？

四、（十分）請評論『只要人們面對風險，他們一定會設法去買保險』。

五、選擇題（二十分、每題兩分）

1. Neoclassical growth theory predicts that
   a) advances in technology increase the productivity of capital, which leads to an increase in investment and rising per capita GDP.
   b) advances in technology are a result of discoveries motivated by the pursuit of profits.
   c) growth in real GDP can increase without any increase in investment demand.
   d) growth in real GDP can continue indefinitely.

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2. The uses-of-saving identity says that an economy's private saving is used for
   a) investment, interest expenses, and the government budget deficit.
   b) investment, the government budget deficit, and the current account.
   c) investment, interest expenses, the government budget deficit, and the current account.
   d) investment, interest expenses, the government budget deficit, transfer payments, and the current account.

3. The new classical cycle theory predicts that an unexpected increase in aggregate demand _____ create a business cycle and an expected increase in aggregate demand _____ create a business cycle.
   a) will; will
   b) will; will not
   c) will not; will
   d) will not; will not

4. Suppose that the Federal Reserve enacts expansionary policy. Everything else held constant, this will cause the demand for U.S. assets to _____ and the U.S. dollar to _____.
   a) increase; appreciate
   b) decrease; appreciate
   c) increase; depreciate
   d) decrease; depreciate

5. The reason that economists are so interested in the stability of velocity is because if the demand for money is not stable, then steady growth of the money supply
   a) is going to promote price stability at the expense of low unemployment.
   b) is going to promote low unemployment at the expense of price stability.
   c) is an ineffective way to conduct monetary policy.
   d) can still be used to conduct monetary policy if the goal is price stability.

6. The current deficit is
   a) the deficit minus government investment.
   b) the deficit plus net interest payments.
   c) the deficit minus current expenditures.
   d) the deficit minus depreciation.

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7. Valuing the quantities of goods produced in consecutive years using prices in both years and then averaging the percentage changes in the value of output is part of the _____ method of calculating real GDP.
   a) base- year
   b) moving- base- year
   c) chain- weighted output index
   d) fixed quantities/variable prices

8. A decrease in the expected inflation rate shifts the short-run Phillips curve
   a) downward and shifts the long-run Phillips curve leftward.
   b) upward and shifts long-run Phillips curve rightward.
   c) downward and creates a movement downward along the long-run Phillips curve.
   d) upward and creates a movement upward along the long-run Phillips curve.

9. Cyclical unemployment is caused by
   a) people entering the labor force to search for jobs.
   b) technological progress, which causes some industries to expand employment and others to reduce employment.
   c) reducing international trade barriers, which causes some industries to expand employment and others to reduce employment.
   d) business cycle fluctuations.

10. A small open economy has a current account balance of zero. A rise in its investment demand causes
   a) a current account surplus.
   b) a capital and financial account deficit.
   c) income to exceed absorption.
   d) net borrowing from abroad.

六、計算題與申論題（三十分）

1. Use a saving-investment diagram to explain what happens to saving, investment, and the real interest rate in the following scenarios in a closed economy: the government increases lump-sum taxes on citizens. (十分)

2. 假設一經濟體的總體經濟模型如下：

   商品市場均衡條件：$Y_t = Y_F - \alpha(r_t - r_n) + \lambda v_t$,

   貨幣政策曲線：$r_t = r_n + \beta_\pi(\pi_t - \pi^T)$,

   總和供給：$\pi_t = \pi^e + \gamma(Y_t - Y_F) + \rho_t$,

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其中，Y_t和Y_F分別為第 t 期實質產出和充分就業產出水準；r_t和r_n分別為第 t 期實質利率和充分就業下的實質利率；π_t、π^e和π^T分別為第 t 期通貨膨脹、預期通貨膨脹和中央銀行的通貨膨脹目標；結構參數$\alpha, \gamma, \lambda, \beta_\pi$皆為正數；$v_t$和$\rho_t$分別為需求面和供給面的外生干擾。請據此以總和供給-總和需求圖形分析，2007-2009 年全球金融危機對中國大陸短期產出和通貨膨脹的影響，以及中國大陸在此期間之振興經濟政策對其短期產出和通貨膨脹的效果。(二十分)

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1. (30%) 令 A 和 B 爲同一出象空間 (outcome space) 中的兩個事件 (events), 且 $\mathbb{P}(A) = 0.3$, $\mathbb{P}(B) = 0.5$。請依下各種狀況計算 $\mathbb{P}(A \cup B)$。

   (1) $\mathbb{P}(A \cap B) = 0.2$;

   (2) A 和 B 爲互斥事件 (mutually exclusive events);

   (3) $A \subseteq B$;

   (4) $A \subseteq B^c$, 其中 B^c 爲 B 事件的補集 (complement);

   (5) $\mathbb{P}(B|A) = 1$;

   (6) $\mathbb{P}(A|B) = 0.2$.

2. (10%) 請分別說明以下兩個函數是否可爲機率密度函數 (probability density function)。

   (1) $f_1(x) = \begin{cases} (x+1)/2, & 0 \le x < 1, \\ 0, & x \text{ 爲其他值。} \end{cases}$

   (2) $f_1(x) = \begin{cases} 2 - 4x, & 0 \le x < 1/2, \\ 4x - 2, & 1/2 \le x \le 1, \\ 0, & x \text{ 爲其他值。} \end{cases}$

3. (15%) 假設等待 236 公車的時間爲從 0 分鐘到 15 分鐘的均等分配 (uniform distribution)。

   (1) 請問等該路公車超過 10 分鐘的機率爲何?

   (2) 請問等該路公車的時間介於 5 分鐘與 10 分鐘的機率爲何?

   (3) 請問等該路公車的均數 μ 與標準差 σ 爲何?

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4. (10%) 請根據以下的累積分配函數 (cumulative distribution function) 求出 $\mathbb{E}[X]$ 與 $\text{var}(X)$。

$$F_X(x) = \begin{cases} 0, & x < 12, \\ 0.25, & 12 \le x < 16, \\ 0.5, & 16 \le x < 22, \\ 0.75, & 22 \le x < 30, \\ 1, & 30 \le x. \end{cases}$$

5. (15%) 若隨機變數 X 和 Y 之聯合機率函數 (joint probability function) 爲 $f_{X,Y}(x, y) = c(x + y)$, 其中, $x = 0, 1, 2$, $y = 1, 2, 3$, 而 c 爲未知的實數。

   (1) 請計算 X 和 Y 各自的邊際機率 (marginal probability) 以及其均數 (mean)。

   (2) 請計算 $\text{cov}(X, Y)$。

   (3) 請計算 $\mathbb{E}[X|Y = 2]$ 以及 $\mathbb{E}[3 + 0.2Y|X = 2]$。

6. (20%) 假設甲乙兩班的學生的身高皆呈現常態分配, 其變異數皆爲 256。甲班的人數爲 20 人, 測得其身高之平均數爲 165 公分; 乙班的人數爲 25 人, 測得其身高的平均數爲 155 公分。試求:

   (1) 在 95% 的信賴係數下, 計算各班學生平均身高的信賴區間。

   (2) 在 95% 的信賴係數下, 計算兩班學生平均身高之差的信賴區間。

備註	試題隨卷繳交