

# 國立中山大學 109 學年度 碩士暨碩士專班招生考試試題

科目名稱：總體經濟學【經濟所碩士班】

## — 作答注意事項 —

考試時間：100 分鐘

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**I. Multiple Choice Questions (50%, 5 points each, 單選題)**

1. A lagging variable can be recognized by the fact that
  - (A) its persistence is smaller than that of GDP.
  - (B) its turning points happen before the turning points of GDP.
  - (C) the turning points of GDP happen before its turning points.
  - (D) its persistence is larger than that of GDP.
  
2. A temporary increase in government spending that leads to only a small decline in lifetime wealth likely shifts the output demand curve to the
  - (A) right by more than the rightward shift in output supply.
  - (B) right by less than the rightward shift in output supply.
  - (C) left by more than the leftward shift in output supply.
  - (D) left by less than the leftward shift in output supply.
  
3. The desire to smooth consumption is reflected in
  - (A) the consumer's budget constraint.
  - (B) the curvature in a consumer's indifference curves.
  - (C) choice between present and future.
  - (D) the production possibilities frontier.
  
4. Which of the following, if implemented in the Solow growth model, would not lead to a steady state?
  - (A) A higher population growth rate.
  - (B) Decreasing returns to scale in production.
  - (C) A savings rate that decreases as income increases.
  - (D) A constant marginal product of capital.
  
5. Any increase in the present value of taxes for the consumer implies
  - (A) an increase in lifetime wealth and an increase in current labor supply.
  - (B) an increase in lifetime wealth and a decrease in current labor supply.
  - (C) a decrease in lifetime wealth and an increase in current labor supply.
  - (D) a decrease in lifetime wealth and a decrease in current labor supply.
  
6. At the competitive equilibrium with a positive proportional labor income tax
  - (A) the real wage after tax exceeds the marginal product of labor.
  - (B) the real wage after tax equals the marginal product of labor.
  - (C) the real wage equals the marginal product of labor.
  - (D) We cannot say.
  
7. When a macroeconomic aggregate is procyclical
  - (A) it grows faster than GDP.
  - (B) its deviations from trend generally change before the deviations from trend in GDP do.
  - (C) its deviations from trend generally change more than the deviations from trend in GDP.
  - (D) its deviations from trend are more often of the same sign as the deviations from trend in GDP.
  
8. In the model with asymmetric information in the credit market, a decrease in the fraction of bad borrowers in the population
  - (A) reduces the interest rate spread.
  - (B) increases the default premium.
  - (C) hurts good borrowers.
  - (D) causes banks to earn negative profits.

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科目名稱：總體經濟學【經濟所碩士班】

題號：403001

※本科目依簡章規定「不可以」使用計算機(混合題)

共 2 頁第 2 頁

9. An increase in the real interest rate

- (A) increases savings for both borrowers and lenders.
- (B) increases savings for borrowers, but has an uncertain effect on the savings of lenders.
- (C) increases savings for lenders, but has an uncertain effect on the savings of borrowers.
- (D) has an uncertain effect on the savings of both borrowers and lenders.

10. In the Solow growth model, if all countries had the same technology, population growth, savings behavior, and depreciation rates, then

- (A) rich countries remain rich, poor countries remain poor.
- (B) in the long run, all countries will have the same standard of living.
- (C) consumption will fall in rich countries in the long run.
- (D) technology will be transferred from rich countries to poor ones.

## II. Problems and Calculations (50%) Explain all your answers in detail.

1. A consumer's income in the current period is  $y = 100$ , and income in the future period is  $y' = 120$ . He or she pays lump-sum taxes  $t = 20$  in the current period and  $t' = 10$  in the future period. The real interest rate is 0.1 (i.e., 10%) in each period. Suppose that current and future consumptions are perfect complements for the consumer and that he or she always wants to have equal consumption in the current and future periods. [20 points]
  - (a) Determine what the consumer's optimal current-period and future-period consumptions are, and what optimal saving is, and show this in a diagram with the consumer's budget constraint and indifference curves. Is the consumer a lender or a borrower? [8 points]
  - (b) Now suppose that instead of  $y = 100$ , the consumer has  $y = 140$ . Again, determine optimal consumption in the current and future periods and optimal saving, and show this in a diagram. Is the consumer a lender or a borrower? [8 points]
  - (c) Explain the differences in your results between parts (a) and (b). [4 points]
2. Consider a numerical example using the Solow growth model. Suppose that production is  $Y = F(K, N) = K^{0.5}N^{0.5}$ , where  $K$  is capital and  $N$  is labor. The capital depreciation rate  $d = 0.02$ , saving rate  $s = 0.1$ , and population growth rate  $n = 0.01$ . [20 points]
  - (a) Determine capital per worker, income per capita, and consumption per capita in the steady state. [6 points]
  - (b) Find the golden rule quantity of capital per worker and the golden rule savings rate. [6 points]
  - (c) Suppose that the economy is initially in the steady state that you calculated in (a). Then, saving rate  $s$  increases to 0.2 thereafter. Calculate the capital per worker in the next period. [8 points]
3. Consider a two-period endowment economy. Explain why Ricardian equivalence theorem does not hold when borrowers face a higher interest rate. Use a diagram to explain clearly how a tax cut in current period affects the lifetime income for a borrower given that government's spending is unchanged. [10 points]

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科目名稱：個體經濟學【經濟所碩士班】

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# 國立中山大學 109 學年度碩士暨碩士專班招生考試試題

科目名稱：個體經濟學【經濟所碩士班】

題號：403002

※本科目依簡章規定「不可以」使用計算機(問答申論題)

共 1 頁 第 1 頁

1. (10pts) When the Kaohsiung symphony orchestra faced a growing deficit, it cut its ticket prices by 20%, hoping to attract more customers. At the same time, the Kaohsiung metro raised subway fares to reduce its growing deficit. Was one of these two opposite approaches to reducing a deficit necessarily wrong?
2. (10pts) The foreign demand for our exports  $E$  depends on the foreign income  $Y_f$  and our price level  $P$ :  $E = Y_f^{1/2} + P^{-2}$ . Find the partial elasticity of foreign demand for our exports with respect to our price level.
3. (10pts) If a government wants to support the price of peanuts above the equilibrium price, can you provide two possible methods to achieve it? What is the difference between the two methods that you propose?
4. (20pt) Given a utility function for two goods,  $x$  and  $y$ :  $U = (x + 2)(y + 1)$ . The price of  $x$  is 4 and the price of  $y$  is 6. If the total budget is 130, please answer the following question:
  - (1) (10pts) Find the optimal levels of  $x$  and  $y$ .
  - (2) (10pts) Is the second-order sufficient condition for maximum satisfied?
5. (10pts) Please use the same graph to show the respective equilibrium outputs and prices of a competitive market and a market of monopolistic competition. Is there any difference?
6. (10pts) A firm's revenue function is  $R(Q) = 1200Q - 2Q^2$ ; its cost function is  $C(Q) = Q^3 - 61.25Q^2 + 1528Q + 2000$ . Please find the profit-maximizing output for the firm.
7. (10pts) In a two-commodity economy, consider the following preference: If a consumer thinks a commodity bundle  $x = (x_1, x_2)$  is at least as good as a commodity bundle  $y = (y_1, y_2)$ , then  $x_1 + x_2 > y_1 + y_2$ , or both  $x_1 + x_2 = y_1 + y_2$  and  $x_1 \geq y_1$ , where  $x_i$  is the quantities of commodity  $i$  in bundle  $x$ , and  $y_i$  is the quantities of commodity  $i$  in bundle  $y$ ,  $i = \{1, 2\}$ . Please write down the demand function of such a preference. (Use  $P_1, P_2$  and  $w$  as the prices for commodities 1, 2 and the wealth, respectively.)
8. (10pts) Consider a duopoly with a quantity competition. Firms 1 and 2 have the same cost function,  $cq_i$ , where  $i = \{1, 2\}$ . The inverse demand function is  $P(Q) = a - Q$ , where  $a > Q$  and  $Q = q_1 + q_2$ . If firm 1's objective is to maximize its market share and firm 2's objective is to maximize its profit, please calculate their respective output level.
9. (10pts) Please use a graph to show the deadweight loss of the social welfare if the market has a monopsony.

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科目名稱：統計學【經濟所碩士班】

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科目名稱：統計學【經濟所碩士班】

題號：403003

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共 1 頁第 1 頁

Answer the following five questions, equally weighted

請務必依題序在答案卷上作答 (5 大題, 共 100 分)

1. (20%) Suppose that  $f(x) = 3x^2$  for  $0 < x < 1$  and  $f(y|x) = 2y/x^2$  for  $0 < y < x$ . Find  $f(x|y)$ . ■

2. (20%) Let  $Y$  be uniformly distributed on the interval  $(0, 1)$ . Conditional on  $Y = y$ , let  $X$  be uniformly distributed on the interval  $(0, y)$ . Find  $E(X)$  and  $Var(X)$ . ■

3. (20%) Let  $X_1, \dots, X_n$  be a random sample from

$$f(x; \theta) = (\theta + 1)x^\theta, \quad 0 < x < 1.$$

Find the method of moments estimator for  $\theta$ . ■

4. (20%) A random sample of size  $n = 1$  is drawn from a uniform pdf density over the interval  $[0, \theta]$ . We decide to test

$$H_0 : \theta = 2,$$

versus

$$H_1 : \theta \neq 2$$

by rejecting  $H_0$  if either  $x \leq 0.1$  or  $x \geq 1.9$ , where  $x$  is the value drawn. Find  $\alpha$ . Also, find  $\beta$  if the true value of  $\theta$  is 2.5. ■

5. (20%) Let

$$\begin{pmatrix} X_1 \\ X_2 \\ X_3 \end{pmatrix} \sim N \left( \begin{bmatrix} 170 \\ 68 \\ 40 \end{bmatrix}, \begin{bmatrix} 400 & 64 & 128 \\ 64 & 16 & 0 \\ 128 & 0 & 256 \end{bmatrix} \right).$$

Find  $f(X_1|X_2 = 75, X_3 = 36)$ . ■