注意：考試開始鈴響前，不得翻閱試題，
並不得書寫、畫記、作答。

國立清華大學 115 學年度碩士班考試入學試題

系所班組別：經濟學系

科 目 代 碼 ：4702

考 試 科 目 ：總體經濟學

—作答注意事項—

1. 請核對答案卷（卡）上之准考證號、科目名稱是否正確。
2. 考試開始後，請於作答前先翻閱整份試題，是否有污損或試題印刷不清，得舉手請監試人員處理，但不得要求解釋題意。
3. 考生限在答案卷上標記「由此開始作答」區內作答，且不可書寫姓名、准考證號或與作答無關之其他文字或符號。
4. 答案卷用盡不得要求加頁。
5. 答案卷可用任何書寫工具作答，惟為方便閱卷辨識，請儘量使用藍色或黑色書寫；答案卡限用 2B 鉛筆畫記；如畫記不清（含未依範例畫記）致光學閱讀機無法辨識答案者，其後果一律由考生自行負責。
6. 提早交卷者不可攜出試題，請將試題連同答案卷(卡)交予監考人員，攜出將以違規論處。當節考試結束後試題將置於講台，可自行取回，本試場不負保管責任。
7. 其他應考規則、違規處理及扣分方式，請自行詳閱准考證明上「**國立清華大學試場規則及違規處理辦法**」，無法因本試題封面作答注意事項中未列明而稱未知悉。

國立清華大學 115 學年度碩士班考試入學試題

系所班組別：經濟學系碩士班

考試科目（代碼）：總體經濟學(4702)

　　*請在【答案卷】作答

1. (20 points) Consider that the Republic of Letters is a closed economy, in which all workers are covered by labor contracts that specify employment conditions and the nominal wage for a period of three years. Employers unilaterally decide the amount of employment. The production function is

$$Y = A(10\sqrt{N})$$

where A is productivity, N is the total hours worked, and Y is the amount of output produced by all firms in the Republic of Letters. Suppose that the IS and LM curves of the economy can be described by the following equations:

IS curve: $Y = 120 - 160r$

LM curve: $M/P = 0.5Y - 80r$

where r is the real interest rate, M is the money supply, and P is the price level. Suppose that the nominal wage is W=5.

(1) (6 points) Assume that the level of technology A=1, and the money supply M=70. What is the relationship between the price level and the amount of output supplied by firms in the Republic of Letters? What is the equation of the aggregate demand curve (AD)? What are the equilibrium values of output, employment, and price level in the Republic of Letters?

(2) (8 points) A news article just reported that the consumer confidence slid 10 points this month to a reading of 91, reaching its lowest level in three years and extending a decline that began in last month. The recent declines highlight the growing pessimism among consumers in the Republic of Letters. If there could be a drop of consumer spending generated by weaken consumer confidence, what is likely to happen to employment, price level and output in the short run and in the long run? Using the Keynesian AD-AS framework, draw the SRAS curve, the AD curve, and the long-run aggregate supply (LRAS) curve in the same diagram to illustrate your answer.

(3) (6 points) What does the Keynesian model with labor contracts predict about monetary neutrality in the short run and in the long run? Compare the predictions about neutrality with those of the extended classical model with misperceptions.

2. (10 points) Consider an economy in the long-run equilibrium with an inflation rate (π) of 0.08 per year and a natural unemployment rate (u) of 0.05. Suppose Okun's law holds and a one percentage point increase in the unemployment rate reduces real output by 2% of full-employment output. The expectations-augmented Phillips curve is given by

$$\pi = \pi^e - 2.5(u - 0.05)$$

   (1) (6 points) Consider a disinflation policy of cold turkey. The inflation is reduced quickly in the first year so that $\pi = 0.04$, but the expected inflation does not adjust, that is $\pi^e = 0.08$, what is the sacrifice ratio for this cold turkey disinflation? If expected inflation declines to $\pi^e = 0.05$, how will the sacrifice ratio change?

   (2) (4 points) What is the most important factor determining how quickly expected inflation adjusts when the government attempts to reduce inflation? What kind of the disinflationary monetary policies would classical economists prefer?

3. (10 points) Suppose that both in country A and country B, the nominal GDP is \$100 million and the government has \$10 million of bonds outstanding. In country A, the bonds are one-year bonds that pay a 5% nominal interest rate per year and the annual growth rate of nominal GDP is 3%. While, in country B, the bonds are one-year bonds that pay a 5% nominal interest rate per year and the annual growth rate of nominal GDP is 7%. Starting now the government in each country runs a zero primary deficit forever and pays principal and interest on its existing debt by issuing new bonds.

   (1) (6 points) Whenever the debt-GDP ratio exceeds 5, the public in each country chooses not to buy additional government bonds. Will the government in country A or in country B someday have to run a primary surplus to repay its debts, or can it avoid repayment forever?

   Hint: Change in debt–GDP ratio = deficit/nominal GDP – [(total debt/nominal GDP) × growth rate of nominal GDP

   (2) (4 points) In country A or in country B, the government debt is more likely to be a potential burden on future generations? Why?

4. (10 points) Since the beginning of his second term on January 20, 2025, President Donald J. Trump has increased tariffs on U.S. imports from all global partners. Under the tariffs currently imposed and scheduled, the weighted average applied tariff is projected to increase from 1.5 percent in 2022 to 15.8 percent in 2025 according to the Tax Foundation. Suppose that the ensuing trade disputes and resulting tariffs cause the United States to produce many goods at higher costs, primarily by forcing production toward domestic sources that lack a comparative advantage. The result is very likely to be a direct effect on the production function, which may cause the full employment (FE) line to shift left. Assume that the IS curve does not shift. In a classical model with no effect on labor supply, in general equilibrium, what is the outcome of the level of output, the real interest rate and the price level? Will the US dollars appreciate or depreciate in the short run? Explain your answer without showing any diagram.

Macroeconomics, Part II

Part A: Multiple choices (20 points)
Consider the island of Motunui. This island produces coconuts, breadfruits, and eggs. Everyone owns chickens that produce enough eggs for their own use. No eggs are traded on this island. The Tui Company produces coconuts, breadfruit, and coconut cookies, and hires workers to do all the planting, harvesting, and baking. The households consume all the products produced on this island. There are no imports and exports.

1. The table below shows the total production and value produced on Motunui in 2023 and 2024.

	2023		2024	
	price	Quantity	price	Quantity
Coconuts	$4	1000	$6	1000
Breadfruits	$6	500	$9	500
Coconut cookies	$10	100	$15	100
Eggs	$1	1000	$1	2000

What is the real GDP growth rate for the island of Motunui from 2023 to 2024?

(A) The real GDP growth rate equals 0%
(B) The real GDP growth rate equals 7.7%
(C) The real GDP growth rate equals 11.1%
(D) The real GDP growth rate equals 38.5%
(E) The information is not enough to determine the answer.

2. In the year 2025, the Tui company decided to shut down the bakery business (i.e., produce no more coconut cookies) and Sina decided to open her own bakery—Sina Bakery. This year, Tui Company produces $3000 worth of coconuts and $4000 worth of breadfruits and sells them to Sina Bakery and households. Sina Bakery produced $5,000 worth of coconut cookies, using $1,000 worth of coconuts and $1,000 worth of breadfruits bought from the Tui company. The households buy all the cookies produced.

On the other hand, households on this island are the workers, and they received \$1,800 from Sina Bakery and \$2,000 from Tui Company. They also own the company and the bakery and received \$1,200 in interest from Sina Bakery and \$2,000 from Tui Company. Please compute the GDP of this economy in 2025.

(A) Based on the product approach, the GDP equals \$12000.

(B) Based on the expenditure approach, the GDP equals \$10000.

(C) Based on the income approach, the GDP equals \$7000.

(D) More than one of the above answers is correct.

(E) None of the above.

3. Due to the ecological issue, the island of Motunui faces failing crops today, but they are confident that the princess, Moana, will solve the problem by tomorrow. Thus, we treat this ecological issue as a temporary adverse supply shock. Please identify the correct statements below:

(i) The goods market equilibrium results in less quantity saved and invested, but the interest rate can be either lower or higher.

(ii) The goods market equilibrium results in less quantity saved and invested, and a lower interest rate.

(iii) The labor market equilibrium results in either higher or lower full employment, but lower market-clearing wages.

(iv) The labor market equilibrium results in lower full employment and lower market-clearing wages.

(A) i, iii

(B) i, iv

(C) ii, iii

(D) ii, iv

(E) None of the above.

4. Let us assume that the Solow model can fully describe the island's economy. If the production technology used on this island can be characterized by the Cobb-Douglas production as follows:

$$Y_t = AK_t^{0.3}L_t^{0.7}.$$

Y_t is output produced in year t, A is the production efficiency, K_t is capital stock in year t, and L_t is the workers available in year t. Moreover, the households all save 40% of their income.

Please discuss how, if the households coordinate their behaviors, changes in the saving rate can improve the welfare of the island?

(A) Increase the saving rate by 30%.

(B) Increase the saving rate by 75%.

(C) Decrease the saving rate by 10%.

(D) Decrease the saving rate by 25%.

(E) None of the above.

Part B: Short Answer Questions

If you find any part of the question unclear, you need to make proper assumptions and answer the question based on all possible assumptions. If the question provides enough information, but you ignore this fact and make assumptions, no point will be granted.

Question 1: Solow model (15 points)

Assume that an economy can be characterized by the Solow model based on the following equations:

$$Y_t = AK_t^{0.4}((1+g)^t L_t)^{0.6}$$

$$C_t = 0.5 \cdot Y_t$$

$$K_{t+1} = (1-\delta)K_t + I_t$$

$$Y_t = C_t + I_t$$

Y_t is output produced in year t, A is the production efficiency, K_t is capital stock in year t, g is the rate of labor-augmenting technological progress, L_t is the workers available in year t, C_t is consumption in year t, δ is depreciation rate, and I_t is investment in year t.

2.1. (5 points) Please explain why the Solow model is not an endogenous growth model.

2.2. (5 points) Please discuss why, even though the output per effective worker is lower when the technological growth rate increases, high technological growth is preferred in the long run.

2.3. (5 points) Let us assume the economy has been at the steady state. Please discuss, when the saving rate decreased by 20%, what happens to the consumption per capita in the long run (compared to the original steady state), and explain your answers.

Question 3: Tax and saving (15 points)

Due to the tariff shock caused by the Trump administration, a nation in Asia decided to exercise a lump-sum tax cut without changing any government spending. The government financed the budget deficit by issuing bonds. All the household income is either consumed or saved. Please discuss what happens to private consumption, private saving, and the desired national saving. Then, use a saving-investment diagram to illustrate how to determine the equilibrium real interest rate before and after the tax cut.