考 試 科 目	經濟學	系 所 別	財政學系	考 試 時 間	2 月 7 日(五) 第 二 節

本試卷共四大題。答案請化簡，並寫出計算過程。可以中文或英文作答。

第一題: 40 分

假設在疊代模型中，一個人只活兩期。第 t 期年輕時工作，所得工資為 w_t，儲蓄為 s_t，第 $t+1$ 期年老即退休，靠儲蓄所得 $(1+r_{t+1})s_t$ 支應消費，其中 r_{t+1} 為市場利率。N_t 為第 t 期人口總數，為年輕人 $N_{1,t}$ 與老年人 $N_{2,t}$ 的加總。因本期老年人口數即為前期年輕人口數，故 $N_{2,t} = N_{1,t-1}$。另外，假設每期人口成長率為一固定常數 n，第 t 期年輕人口可表示成 $N_{1,t} = (1+n)N_{1,t-1}$。

(1) (5 分)請導出 $N_t = \left(\frac{2+n}{1+n}\right)N_{1,t}$。

(2) (5 分)令 $c_{1,t}$ 為代表性年輕人在第 t 期的消費量，請寫出年輕人在第 t 期的預算限制式。

(3) (5 分)令 $c_{2,t+1}$ 為代表性老年人在第 $t+1$ 期的消費量。請寫出老年人在第 $t+1$ 期的預算限制式。

(4) (5 分)請導出模型中代表性經濟個體的跨期預算限制式。

(5) (15 分)假設代表性經濟個體的效用函數為 $U = \ln c_{1t} + \beta \ln c_{2t+1}$，其中 $\beta = \frac{1}{1+\theta}$ 為貼現因子，θ 為經濟個體的時間偏好率(貼現率)。配合第(4)題的跨期預算限制式，請求出極大化效用下的 $c_{1,t}$，$c_{2,t+1}$ 與 s_t。

(6) (5 分)試說明當 $r_{t+1} > \theta$，其他條件不變下，會如何影響 $c_{1,t}$ 與 $c_{2,t+1}$？

第二題: 25 分

Suppose a utility function is defined as $U(l, C) = 2l + 4C$ and the consumer's budget constraint is $C = w(1-l) + \pi - T$. C is consumption, l is leisure time, w is hourly real wage, π is dividend income, and T is the lump-sum tax. The total hours are normalized to 1. Assume $\pi > T$.

(1) (5 分) What is the marginal rate of substitution between l and C? (Let l be on the x-axis)

(2) (10 分) If w equals 1 unit of consumption goods, what will be the optimal C and l?

Now suppose the government considers imposing a proportional tax t on wage income that will yield the same revenue as the lump-sum tax scheme.

(3) (5 分) Write down the consumer's budget constraint under a proportional tax scheme.

(4) (5 分) Explain why a competitive equilibrium is not Pareto optimal under a proportional tax scheme.

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第三題: 15 分

A tea shop is in a monopolistically competitive market. The market demand facing the tea shop is given by $Q = 200 - 2p$, where p is the price per cup of tea. Suppose the tea shop's total fixed cost is $2,000 a day. The tea shop's average variable cost and marginal cost are a constant $30 per cup.

(1) (5 分) What is the tea shop's profit-maximizing price?

(2) (5 分) What is the tea shop's price markup?

(3) (5 分) What is the tea shop's maximum economic profit?

第四題: 20 分

Suppose the market demand for T-shirts in country A is defined as $Q = 90 - 10p$, where p is the price per T-shirt. T-shirts are supplied by firms in country A and firms in country B. Assume that in each country there are 10 firms in the T-shirt industry that behave competitively and have an identical cost function given by $c(q) = q^2/2$, where q represents the T-shirts produced by each firm.

(1) (5 分) What are the equilibrium price and quantity of T-shirts sold?

(2) (5 分) Now suppose country A imposes a $3 tariff on T-shirts imported from country B. What is the new price of a T-shirt paid by the consumers in country A? What is the new quantity of T-shirts sold?

(3) (5 分) How many T-shirts are imported from country B after the $3 tariff is imposed?

(4) (5 分) How many T-shirts are supplied by the firms in country A after the $3 tariff is imposed?

備 註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。