２０１７年度

慶應義塾大学大学院入試問題

経済学研究科（修士課程）

２０１６年９月８日 実施

科目名	Economics (English)	受験番号		氏名	

注意事項（Please note:）

1. This set of problems contains 8 pages (including the cover page).

2. There are seven problems from which you should choose two to answer. Each problem should be answered on a separate answer sheet. Please write the number of the problem you are answering on each answer sheet.

3. If you answer two or more problems on one answer sheet, only the first answer will be treated as a valid answer. Everything after the first answer will not be marked.

4. Answer in English.

5. Although the problem sheets will not be collected after the examination, please write your name (氏名, shimei) and exam registration number (受験番号, jyuken-bango) on the cover page.

Problem 1. Answer the following questions.

1. Graphically explain the Slutsky decomposition. You can assume that there are only two types of goods.
2. Give an example of a preference that is locally non-satiated but not monotonic. You can assume that there are only two types of goods.
3. Define the core in a pure exchange economy when there are more than two individuals. You can assume that there are only two types of goods.
4. Give an example of a 2×2 game that has a pure strategy Nash equilibrium that is not a weakly dominant strategy equilibrium.
5. Consider a single-item auction. Discuss and compare the ascending auction and the second price auction.

Problem 2 There is a representative agent who lives for only one period with the following utility function:

$$U(C, L) = \sqrt{C} - \frac{1}{2}L,$$

where C is consumption, L is labor. The representative agent receives L units of consumer goods as the wage when he works for L hours. ($0 \leq C$, $0 \leq L$.) There is no other income. The government imposes the labor income tax at the rate τ on the representative agent, and throws the tax revenue into the ocean. Then, the budget constraint for the agent becomes

$$C \leq (1 - \tau)L.$$

(1) Solve the utility maximization problem for the representative agent and describe C and L as functions of only τ.

(2) Then, describe the tax revenue as a function of only τ.

(3) Discuss the determination of τ, when the government decides τ so as to make the tax revenue 0.09.

(4) Next, we assume that the government imposes consumption tax at the tax rate μ, instead of the labor income tax. The government throws the tax revenue into the ocean, again. Now the budget constraint for the agent becomes $(1 + \mu)C \leq L$. Solve the utility maximization problem and describe C and L as functions of only μ. Then, describe the tax revenue as a function of only μ.

(5) Derive the mathematical relationship between τ and μ, when the equilibrium allocation is the same for the economy with only the labor income tax and for the economy with only the consumption tax. Consider only the case where $0 < \mu < 1$.

Problem3.

Answer the following two questions on capitalism. Base your answer on the methodology of Marxian economics.

(1) Briefly explain the following concepts.
①Capital accumulation
②Organic composition of capital

(2)Discuss the relationships between the progress of capital accumulation and changes in the organic composition of capital.

Problem 4. Consider a regression

$Y_i = A + BX_i + e_i$

where Y_i is the log labor supply hours of worker i, X_i is the log wage rate, e_i is the error term, and log is the natural logarithm. Imagine that you have a data set for (Y_i, X_i) of 20 workers (i=1,2,..,20). Suppose that you have the following regression results in Table 1 by ordinary least squares (OLS), where OLS estimate of B is denoted by b, and its t-value is denoted by $t(b)$.

Table 1

b	$t(b)$
—0.03	0.01

Let $F_d(z)$ be the distribution function for the t-distribution with d degrees of freedom. Table 2 lists the values of z such that $F_d(z)$=0.95 and $F_d(z)$=0.975 for d=18,19, 20, 21, and 22.

Table 2

Degree of freedom	18	19	20	21	22
0.950	1.734	1.729	1.725	1.721	1.717
0.975	2.101	2.093	2.086	2.080	2.074

Answer the following questions, assuming that the standard assumptions for the classical linear regression model hold, including the assumption of the normally distributed error term.

(a) Let $\hat{b}$ denote the ordinary least square estimator for the coefficient B. Express $\hat{b}$ by a mathematical equation including (Y_i, X_i) (i=1,2,…,20).

(b) Prove that $\hat{b}$ is a linear unbiased estimator for B. Explain all of the standard assumptions of the classical linear regression model that are necessary.

(c) Express the variance of $\hat{b}$ by a mathematical expression including σ^2 and X_i (i=1,2,…,20).

(d) Interpret the estimated slope coefficient b in Table 1.

(e) Using a two-tailed t-test, answer whether or not you reject the null hypothesis B= 0 for the 5% significance level. State the critical value and explain your answer.

(f) Using a one-tailed t-test, answer whether or not you reject the null hypothesis B= 0 for the 5% significance level. State the critical value and the appropriate alternative hypothesis, and explain your answer. Also explain why your alternative hypothesis is appropriate.

Problem 5.

Answer one of the following questions.

A. Suppose that there are n competitive firms that produce an identical commodity. Let Y_i and $C_i(Y_i)$ represent the production of the commodity of the ith firm and its cost function, with $C_i'(Y_i) > 0, C_i''(Y_i) > 0$. The price of the commodity is expressed by p. Furthermore, assume that each firm emits pollutants into the air, proportional to the production of the firm. This relationship is expressed as $Z_i = a_i Y_i, (a_i > 0)$, where Z_i is the level of emission of the ith firm. Answer the following questions.

1. Suppose that the total amount of emission must be $\bar{Z}$ and that emission allowances $(\bar{Z}_1, \cdots, \bar{Z}_n)$ satisfying $\sum_{i=1}^{n} \bar{Z}_i = \bar{Z}$ are allocated to each firm. Then derive the condition that an emission allowances allocation is Pareto efficient.

2. Suppose that each firm can trade emission allowances. Let q and ΔZ_i stand for the price and the amount of the ith firm's trade in the emissions trading market, respectively. Then show the property of q that holds in the emissions trading market equilibrium, and discuss the role of the market.

B. Explain specifically what is meant by employment protection legislation. Also, use economic logic to explain the impact of stricter employment protection legislation on unemployment rates and the duration of unemployment.

Problem 6.

Choose any region or country and discuss the role of population in its economic development, using historical facts.

Problem 7.

Define a "scientific revolution" as a change in the mainstream scientific research programme. List four examples of such a scientific revolution in the history of economic thought. Choose any two of your four examples, and explain why you consider them to be scientific revolutions.