

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 112 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：4701

考試科目：個體經濟學

—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. 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。

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共 2 頁, 第 1 頁, *請在 [答案卷、卡] 作答

[Please show your work in details.]

1. Amy's utility from food (x) and clothing (y) is given by the function $u(x, y) = x^2y$, and she has an income of m . Consider price vectors of the form $p = (p_x, p_y)$ where p_x is the price of good x and p_y is the price of good y . Suppose $p_x = 200$. [16 points]

a. Write down Amy's Marshallian demand function for each of the two goods. [8 points]

b. Suppose that $m = 300$, p_y increases from 1 to 8. Calculate the compensating variation of a change in the price vector from $(200, 1)$ to $(200, 8)$. [4 points]

c. Suppose that $m = 300$, p_y increases from 1 to 8. Calculate the equivalent variation of a change in the price vector from $(200, 1)$ to $(200, 8)$. [4 points]

2. John loves soft drinks. He views sprite and coke as perfect substitutes. Initially a bottle of sprite is cheaper. However, a price increase makes a bottle of sprite more expensive than a bottle of coke. Please draw the indifference curves and budget lines of John with the bottle of sprite on the horizontal axis and the bottle of coke on the vertical axis, and show the substitution, income, and total effect of this price change in a diagram. [10 points]

3. Short questions (Please show all calculations and details of each step in process) [24 points, 8 points each]

a. Kathy purchases a firm that produces heaters by employing machines and workers. Each machine requires exactly two workers to operate. Without two workers, the machine will not work, and any additional worker above two will just stand there doing nothing. When operated this way, the machine produces 20 heaters per hour. Determine this firm's production function.

b. Determine the output expansion path (equation) for a Cobb-Douglas production function $f(L, K) = 5L^\gamma K^{1-\gamma}$. How does the shape of the output expansion path change as " γ " increases?

c. For what values of α and β will the production function $q = (L^\alpha + K^\alpha)^{1/\beta}$ exhibit increasing, decreasing or constant returns to scale?

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共 2 頁, 第 2 頁, *請在 [答案卷、卡] 作答

[Please show your work in details.]

4. There are two traders, Joe and Kamala, in a pure exchange economy with two goods, G and H. Suppose that Joe's utility function is $U_J = G_J^2 H_J^2$, and Kamala's utility function is $U_K = G_K(H_K)^2$. They own a total of 100 units of G and a total of 100 units of H. Solve for the contract curve [10 points]. Utilize the contract curve to briefly explain the first theorem of welfare economics.[5 points]
5. There are only three firms producing identical products with a market demand of $P = 100 - 2Q$, where Q is the sum of three firms' outputs. Suppose Firm 1's output and marginal cost of production are q_1 and \$16; Firm 2's output and marginal cost are q_2 and \$20; and Firm 3's output and marginal cost are q_3 and \$24.
- Solve the Nash-Cournot equilibrium outputs and prices for each of the three firms. [10 points]
 - If Firm 3 is a foreign company and the government decides to impose a unit tax of \$24 on its outputs, find the Nash-Cournot equilibrium outputs and prices for each of the three firms. [10 points]
6. An employer is willing to pay high-ability workers up to a total of \$100,000 while to pay low-ability workers up to a total of \$60,000 over a lifetime. A college degree can qualify the workers as high-ability ones but will cost \$30,000 for high-ability workers and \$50,000 for low-ability workers.
- What's the smallest share of high-ability workers to get a pooling equilibrium if the employer pays all workers the average wage when she is not able to tell high-ability workers from low-ability workers? [10 points]
 - Will there be a separating equilibrium if the employer pays all workers the low-ability wage when she is not able to tell high-ability workers from low-ability workers? Why or why not? [5 points]