# 國立中山大學113學年度
# 碩士班暨碩士在職專班招生考試試題

**科目名稱：個體經濟學【經濟所碩士班】**

－作答注意事項－

考試時間：100分鐘

- **考試開始鈴響前不得翻閱試題，並不得書寫、劃記、作答。**請先檢查答案卷（卡）之應考證號碼、桌角號碼、應試科目是否正確，如有不同立即請監試人員處理。
- **答案卷限用藍、黑色筆(含鉛筆)書寫、繪圖或標示**，可攜帶橡皮擦、無色透明無文字墊板、尺規、修正液（帶）、手錶(未附計算器者)。每人每節限使用一份答案卷，請衡酌作答。
- 答案卡請以2B鉛筆劃記，不可使用修正液（帶）塗改，未使用2B鉛筆、劃記太輕或污損致光學閱讀機無法辨識答案者，後果由考生自負。
- 答案卷（卡）應保持清潔完整，不得折疊、破壞或塗改應考證號碼及條碼，亦不得書寫考生姓名、應考證號碼或與答案無關之任何文字或符號。
- 可否使用計算機請依試題資訊內標註為準，如「可以」使用，廠牌、功能不拘，唯不得攜帶書籍、紙張（應考證不得做計算紙書寫）、具有通訊、記憶、傳輸或收發等功能之相關電子產品或其他有礙試場安寧、考試公平之各類器材入場。
- **試題及答案卷（卡）請務必繳回，未繳回者該科成績以零分計算。**
- **試題採雙面列印，考生應注意試題頁數確實作答。**
- **違規者依本校招生考試試場規則及違規處理辦法處理。**

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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)　　

Question 1: Consider a consumer with a utility function $u(x_1, x_2) = 2\sqrt{x_1} + x_2$, where $x_1$ represents the consumption of good 1, and $x_2$ represents the consumption of good 2. Suppose the price of good 1 is $p_1$, and the price of good 2 is $p_2$. In addition, the income for the consumer is m. Suppose this consumer chooses his/her consumptions of good 1 and good 2 such that his/her utility is maximized.

(a) Suppose $p_1 = 2$. $p_2 = 1$, and $m \geq \frac{1}{2}$. What is the demand for good 1 (as a function of m)? (4 points) What is the demand for good 2 (as a function of m)? (4 points)

(b) Suppose $p_1 = 2$. $p_2 = 1$, and $0 \leq m < \frac{1}{2}$. What is the demand for good 1 (as a function of m)? (4 points) What is the demand for good 2 (as a function of m)? (4 points)

(c) Suppose $p_1 = 2$ and $p_2 = 1$. Draw the Engel curve for good 1. (3 points) Draw the Engel curve for good 2. (3 points)

(d) Suppose the income is $m = 10$. In addition, suppose initially $p_1 = 2$ and $p_2 = 1$. Now, the price of good 1 becomes $p_1' = 1$, and the price of good 2 is still $p_2 = 1$. What is the change of demand for good 1? (1 point) What is the (Slutsky) substitution effect? (3 points) What is the income effect? (3 points)

Question 2: Two players A and B are playing a game. Player A has the strategies T and D, and player B has the strategies L, M, and R. The payoff matrix is in Figure 1.

| | L | M | R |
|---|---|---|---|
| T | 5, 5 | 3, 2 | 0, 1 |
| D | 2, 3 | 6, 6 | 0, 0 |

Figure 1: The Payoff Matrix of the Game

(a) Suppose player B chooses strategy R. What is the best response for player A? (3 points)

(b) What are the pure-strategy Nash equilibria in this game? (10 points)

(c) What is the mixed-strategy Nash equilibrium in this game? (10 points)

Question 3: Consider a market where there are two firms selling identical goods. Firm 1 is the leader firm, and the firm 2 is the follower firm. Firm 1 sets the price p, and both firms sell the goods at the same price. Suppose Firm 1 produces $q_1$ and the cost is $2q_1$, and Firm 2 produces $q_2$, and the cost is $\frac{1}{2}q_2^2$.In addition, the demand for the goods produced by these two firms is $D(p) = 10 - p$.

(a) Given p, what is the output $q_2^*$ that maximizes the profit of Firm 2 (as a function of p)? (8 points)

(b) Given $q_2^*$, what is the demand for Firm 1 (as a function of p)? (8 points)

(c) Write down the profit for Firm 1 (as a function of p). (4 points)

(d) What is the price p that maximizes the profit of Firm 1? (4 points)

Question 4: Consider a linear city that is represented by a line. The line has the length of 1. Consumers are located on the line uniformly, and the density of the population at each point on the line is 1. We can use x with $0 \leq x \leq 1$ to represent a location on the line.

There are two firms that produce identical goods. Firm 1 is located at $x = 0$, and Firm 2 is located at $x = 1$. The cost to produce one unit of the good is 2. This production cost is the same for both firms. Firm 1 sells the products at price $p_1$, and Firm 2 sells the products at the price $p_2$.

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A consumer need to visit one of the firms before he/she can purchase the good. Each consumer wants to purchase at most one unit of the goods. For a consumer who is located at x, he/she has a traveling cost $x^2$ to visit Firm 1 and a traveling cost $(1-x)^2$ to visit Firm 2. His/her utility from purchasing a good from Firm 1 is $v - x^2 - p_1$, and his/her utility from purchasing a good from Firm 2 is $v - (1-x)^2 - p_2$. Suppose $p_1$ and $p_2$ are such that every consumer would purchase one unit of the goods from one of the firms.

(a) What is the location of the consumer who is indifferent between purchasing the good from Firm 1 and purchasing the good form Firm 2? (6 points)

(b) Write down the demand for Firm 1 (as a function of $p_1$ and $p_2$). (4 points) Write down the demand for Firm 2 (as a function of $p_1$ and $p_2$). (4 points)

(c) Write down the profit for Firm 1 (as a function of $p_1$ and $p_2$). (2 points) Write down the profit for Firm 2 (as a function of $p_1$ and $p_2$). (2 points)

(d) Given $p_2$, what is the profit-maximizing price $p_1^*$ for Firm 1 (as a function of $p_2$)? (2 points) Given $p_1$, what is the profit-maximizing price $p_2^*$ for Firm 2 (as a function of $p_1$)? (2 points)

(e) Suppose $p_1^* = p_2^*$. What are $p_1^*$ and $p_2^*$? (2 points)