注意：考試開始鈴響前，不得翻閱試題，並不得書寫、畫記、作答。

一作答注意事項一

1. 請核對答案卷（卡）上之准考證號、科目名稱是否正確。

2. 作答中如有發現試題印刷不清，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。

請依題號作答

1. (30 points) George's preference for bubble tea (x) and pizzas (y) is given by the utility function:

$$U(x, y) = \sqrt{xy}$$

Suppose the price of bubble tea is initially $2 and the price of pizzas is $5. The consumer has a budget $200. (Note: $\sqrt{2} \approx 1.4$)

   a. (10 points) Derive George's compensated demand functions for bubble tea and pizza.

   b. (10 points) Suppose the price of bubble tea increases to $4, find the total effect (TE), the substitution effect (SE) and the income effect (IE) on the demand for bubble tea.

   c. (10 points) Calculate the compensating variation and the equivalent variation for the price change in bubble tea.

2. (20 points) Suppose that the demand curve for rice is $Q=500-5P$ and the supply curve is $Q=5P$, where Q is in million tons and P is in thousand dollars. The government imposes a price floor at $P=60$. Please evaluate the effects of the price floor using various methods.

   a. (10 points) If the government uses a deficiency payment program, what are the effects of the price floor on producer surplus and social welfare?

   b. (10 points) If the government buys all the excess supply at the price floor and dumps them, what are the effects of the price floor on consumer surplus and social welfare?

3. (30 points) In an isolated island city, there is only one movie theater. There is no internet nor TV broadcasting service here, so when people want to watch a movie, they just go to the theater. Assume that the market demand for movie tickets is given by $P=900-Q$, and the marginal cost to provide an additional movie ticket is given by $MC = \frac{1}{2}Q$.

   a. (10 points) For many years, the movie theater just charged one single price for all ticket purchases. Solve for the profit maximizing quantity and price of movie tickets for the theater and draw a graph to illustrate this decision. (*Your graph must contain the demand curve facing the movie theater, the*

請依題號作答

marginal revenue curve, the marginal cost curve, and the profit-maximizing price and quantity.).

b. (5 points) On your graph in part a, mark the consumer surplus, the producer surplus, and the deadweight loss, if any. Be sure to label each of them clearly. If any of the items does not exist, please also indicate it explicitly.

c. (10 points) One day, the theater owner suddenly realized that, he knew the city's residents so well that he knew exactly how much each person is willing to pay for each movie ticket. Consequently, he started practicing perfect price discrimination. Solve for the profit maximizing quantity of this perfectly-price-discriminating movie theater and draw another graph to illustrate this decision.

d. (5 points) On your graph in part c, mark the consumer surplus, the producer surplus, and the deadweight loss, if any. Be sure to label each of them clearly. If any of the items does not exist, please also indicate it explicitly.

4. (20 points) Dan has an initial wealth of $50,000 and he has two options: one is to keep the wealth as is, and the other is to use it towards the purchase of an antique race car which a neighbor of his is selling for exactly $50,000. This particular car is worth $90,000 on the market if it is a genuine original, but there is a 50 percent probability that the car is in fact a replica which is worth only $10,000. Suppose that Dan only cares about the car's monetary value, and his utility function is $U = \sqrt{W}$, where W represents his wealth in the given period.

a. (4 points) Is $50,000 an (actuarially) fair price for the antique race car?

b. (8 points) What is Dan's expected utility if he buys the car at the asking price of $50,000? What is the utility if he does not buy the car? Will Dan buy the car? Explain.

c. (8 points) Draw a graph of Dan's utility function and explicitly mark the (expected) utility levels of the two options (which you solved in part b) on the graph. Is Dan a risk-averse, risk-neutral, or risk-preferring individual?

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