Queen Mary
University of London

Main Examination Period 2024

ECN 211 Microeconomics 2 Duration: 2 hours

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Answer ALL Questions. **Please explain all answers and where appropriate show your calculations.**

Non programmable calculators are permitted in this examination. Please state on your answer book the name and type of machine used.

Complete all rough workings in the answer book and cross through any work that is not to be assessed.

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Examiner: Nick Vriend

Question 1 - 28 marks

Consider an economy with one consumer, one firm, and two goods: Coconuts (C) and Time (T).
The consumer owns the entire endowment of the economy, which is 0 units of good C and 48 units of good T. She can use her Time either for labour or for leisure. She is also the sole shareholder of the firm, receiving all profits π in the form of dividends. Her utility function is

$$u(x_C, x_T) = x_C \cdot x_T,$$

where x_C, x_T denote the consumed amounts of good C and T, respectively.
The firm can transform y_T units of good T into y_C units of good C using the following technology:

$$y_C = \sqrt{y_T}.$$

We assume that any time that is *not* used for labour remains available to consume as leisure time: $x_T = 48 - y_T$.

a) Setting the price of Time as numéraire, i.e. $p_T = 1$, and denoting the price of Coconuts as p, i.e. $p_C = p$, find x_C and x_T, i.e. the utility-maximising consumer demand for goods C and T, given some price p, and a dividend π that she receives from the firm as a lump-sum transfer.

[7 marks]

b) Given price p, what is y_T, i.e. the firm's profit-maximising demand for good T (labour)? What is the profit maximising y_C, i.e. the firm's supply of good C?

[7 marks]

c) Find the market-clearing price p. (Hint: don't forget to take into account the profits)

[7 marks]

d) Putting leisure time x_T on the horizontal axis, and coconuts x_C on the vertical axis, sketch the firm's Production Possibility Frontier and the most relevant indifference curve(s) for the consumer.

[7 marks]

Question 2 - 37 marks

a) Explain the concept of a public good and its defining characteristics. Give two examples of goods that are typically seen as public goods, and discuss how well they fit the defining characteristics.

[7 marks]

b) Compare and contrast public goods with common resources, highlighting their key difference and the main challenge each presents for efficient allocation.

[6 marks]

c) Local authorities are considering a project that has the characteristics of a public good. Before they decide to go ahead with the project, they want to make sure providing the public good will be Pareto efficient. What is the main condition they must check, and why may checking this be difficult?

[6 marks]

d) Sketch the Vickrey-Clarke-Groves (VCG) mechanism to decide on the provision of public goods.

[6 marks]

e) What is the main problem the VCG mechanism solves? What are the two key ingredients of the mechanism to achieve this?

[6 marks]

f) Compare the relevant aspect of the VCG mechanism with that of a Pigouvian tax to deal with externalities, highlighting in your comparison both the externality and the tax aspect.

[6 marks]

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Question 3 - 35 marks

Consider a second-hand car market with two kinds of cars: type H cars and type L cars.
Type H cars are valued 720 by their current owners and 900 by potential buyers.
Type L cars are valued 400 by their current owners and 500 by potential buyers.

Each seller knows the type of their own car, but this information is not available to the buyers.
The buyers only know that 50% of the cars are type H and 50% are type L.
Assume that both buyers and owners are risk neutral.
There are many car owners, and even more buyers.
For any transaction assume that the sellers get all the surplus.

a) Given the situation described above, when a buyer (any buyer) faces a potential purchase, what is the expected value of that car to him, and how much would he be prepared to pay for it?

[7 marks]

b) When facing a potential buyer, what is the value of the car to its current owner?

[7 marks]

c) Which type(s) of car(s) would be traded and at what price(s)?

[7 marks]

d) Is the market outcome efficient?

[7 marks]

e) Suppose any seller can offer a warranty, which is a contract that promises to pay the buyer R (with $R > 0$) if the car turns out to be of type L. No payment is made if the car is type H. For which values of R will there be a separating equilibrium, in which only sellers of type H offer a warranty?

[7 marks]

End of Paper

End of Examination/ Nick Vriend