Economics 11 Caltech Spring 2010

Mid term

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Following the Honor code, you should find 90 minutes and to do this test, by yourself and without using any notes. Paper and pen should be all you need. Turn it in Class Tuesday May 3. Each quiz is worth 52pts (out of 200 possible pts)

EXAMS IN PENCIL WILL NOT BE REGRADED.
I Definitions (use words not equations)

1. Definitions

1.A. 2pt Please define: Pareto equilibrium

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1.B. 2pt Please define: the indifference set of a consumer

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1.C. 2pt Please explain: What is an inferior good?

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1.D. 2pt Please explain: Why are firms under perfect competition the most efficient?

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**Word/Graph problems**

2.a. 4pts: Please explain each question in a few sentences.

A firm is in a competitive market. The CEO adopts a new technology that doubles the speeds of all the machines in the plant? What does that do in terms of output? Why? Is it likely to hire more workers? Why?________________________________________________________________________________
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2.b. 4pts True or False: Please explain each question in a few sentences.

How does a profit-maximizing firm decide how much to produce if it takes all prices as given? Why does the same firm shut down if the price falls below the minimum average variable cost of production?_____________________________________________________________________________________
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2.c. 4pts Please explain each question in a few sentences.

Tom drops by. He has just been to the market and bought 2 boxes of pears and 1 box of bananas. The cost of pears is $3 a box and that of bananas is $1 a box. What must be true for him to have made the ‘right’ choice from the economist’s perspective? What is Tom likely to do if the price of bananas increases to $2? You may want to draw a graph to illustrate your point.

2.d. 4pts Please explain each question in a few sentences.

What should happen to the demand for beef when consumers become more worried about mad cow disease? In the short run will the price of beef go up or down? What are the consequences for the amount of cattle-hides brought on the market? Does the price of hides go up or down? Why?
Technical problem

3. Edgeworth box 14 pts
Assume that Ms Crusoe and Mr Friday are in two person, two good, exchange economy. Ms. Crusoe’s utility function over rice and shrimp is given by \( U_c (R, S)=R^{0.6}S^{0.4} \). Mr Friday has a utility that is \( U_f (R,S)=R^{0.5}S^{0.5} \).
Denote the price of rice as \( p_R \), the price of shrimp as \( p_s \), the income of Ms Crusoe as \( I_c \) and that of Mr Friday \( I_F \).
4.a 4pt Use the Lagrange method to derive Ms Crusoe’s demand for Rice and Shrimp as a function of prices and income. What is Mr Friday’s demand for Rice and Shrimp as a function of prices and income?
4.b 2pt Ms Crusoe nets a100 ounces of shrimp a day. Mr Friday harvests 70 ounces of rice a day. If the price of rice is 1, what is the income of Ms Crusoe and Mr Friday?
4.c 4 pts if they can trade at a market price as price-takers with \( p_{R}-1 \). Using the information above determine the equilibrium price of shrimp. What is the final allocation of Rice and Shrimp?
4.d 4pt If the price of rice becomes 2 what happens to the price of shrimp and the final allocation?
4. **Competition 14 pts**

Consider a market where \( D(p) = A - 2p \). Assume that each firm in this market has a cost function given by \( 100 + q^2/4 \).

5.a **2 pt** define a competitive equilibrium for this market (with one firm)

5.b **4 pt** If the firm is a price taker, what is the competitive equilibrium?

5.c **4 pt** What happens to equilibrium quantity and prices when there are 2 firms that both take prices as given.

5.d **4 pt** Give a formula for the supply curve if all firms have the same cost function and the equilibrium is perfect competition. Be sure to define what conditions are required for perfect competition to hold.