ECO 2145 – MICROECONOMIC THEORY II

FINAL EXAMINATION

DECEMBER 18, 2009

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NOTE: You have the right to use a calculator. No reference to textbooks or other reference materials is permitted.

TRUE/FALSE (30 points). Indicate whether the statement is true, false or uncertain, and provide a one (or two) sentence explanation. Your grade is based on the quality of your explanation.

1. Monopolies exist because of government regulations.
2. Monopolists should be prohibited from practising price discrimination.
3. The model of monopolistic competition is appropriate for industries with differentiated products.
4. A game which has an equilibrium in dominant strategies can have more than one Nash equilibrium.
5. You have a choice between two automobile insurance plans. The first plan, which has a $200 deductible, will cost you $800 annually in premiums. The second plan, which has a $1600 deductible, will cost you only $400 annually in premiums. You are a careful driver, so you should choose the second plan.
6. Sellers of antique furniture will maximize the price they obtain if they use an English auction to sell their goods.
7. If two individuals have the same endowments, and the same preferences, the general equilibrium of the economy is the endowment point.
8. Consider an economy with production. At an efficient allocation of resources in the economy, total output is maximized.
9. The best way to curb greenhouse gas emissions by cars is to tax the ownership of cars.
10. Public goods should be provided by the government.

PROBLEMS (70 points). Please solve the following problems. Show all of your work.

11. Suppose that a monopolist faces a market demand curve $Q = 50 - 0.5P$. Assume that the monopolist's total cost function is $C(Q) = 0.25Q^2 + 100$.
    a. Calculate the profit-maximizing monopoly price and quantity.
    b. Calculate the competitive equilibrium price and quantity if the aggregate supply curve is $P = Q/2$.
    c. Calculate the deadweight loss of monopoly.

12. Consider a market with 1000 identical individuals *each* with the demand schedule for natural gas Q = 200 – P. They are served by an gas utility with a total cost function C(Q) = 10Q. Design a two-part tariff (access fee + per unit usage fee) that maximizes the sum of consumer and producer surplus but ensures that the firm earns zero economic profit.

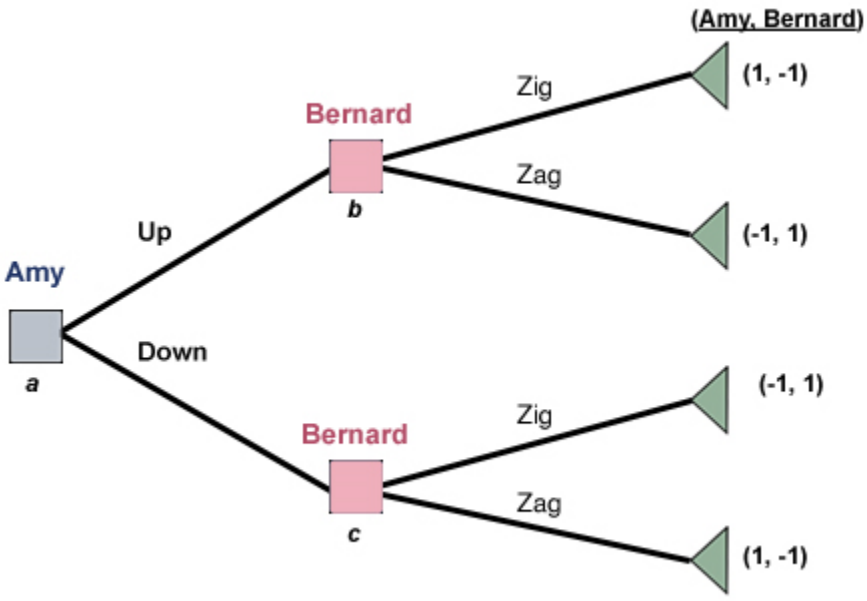
13. Consider the following two person game in normal form. In each cell in the payoff matrix, Andrea's payoff is listed first, and Eric's second.

Eric

Andrea	A	B	C	D
a	0,3	1,0	3,0	2,2
b	1,1	3,2	3,0	3,0
c	0,2	1,0	2,3	4,0
d	1,2	2,3	4,1	2,1

a. Solve this game using iterated elimination of dominated strategies.
b. What are the Nash equilibria of this game? Comment on the relationship between the solution to (a) and the set of Nash equilibria.

14. Consider the following sequential game in extensive form:



a. Solve this game using backwards induction. Find the subgame perfect Nash equilibria.
b. Rewrite the game in normal form. Are there any Nash equilibria in pure strategies? In mixed strategies?
c. Explain the difference between equilibria found in (a) and (b).

15. An Australian homeowner has decided to sell her house by auction. There are three individuals interested in buying the home. Bidder A values the home at $350,000; bidder B values the

home at $300,000 and bidder C values the home at 420,000. Each bidder believes that the distribution of valuations follows the uniform distribution between $280,000 and $500,000, i.e., any private valuation between $280,000 and $500,000 is equally likely.

a. Suppose that the seller chooses to use a first-price sealed bid auction. Determine the optimal bids for each potential buyer and show that these bids consititute a Nash equilibrium.
b. What would be the selling price if the seller were to use a second-price sealed bid auction?

16. Consider a Robinson Crusoe economy in which Robinson has one unit of labour (L) which can be used to produce coconuts according to the production function $C = 200L^{0.5}$ or may be consumed as leisure (1-L). Robinson's utility function is $U(C, 1-L) = 0.01C + (1-L)$. Let coconuts be the numéraire good.

    The coconut producing firm acts like a perfectly competitive firm: it takes the price of coconuts and the price of labour (w) as given, and then chooses a production plan to maximize profits. Any profits earned are paid to Robinson as a dividend, D.

    Calculate the general equilibrium of this economy.

17. Suppose that there are two coal-fired electrical power generating stations which produce electrical energy for Ontario households. Station A has the cost function $TC(Q_A) = 0.5Q_A^2$. Station B has the cost function $TC(Q_B) = 2Q_B^2$. The inverse demand for electricity of Ontario households is $P = 10000 – Q = 10000 - Q_A - Q_B$. Unfortunately, the production of electricity by these power generating stations leads to the emission of greenhouse gases: $E_i = Q_i$. There is a constant marginal external cost of $5 per unit of emissions produced.
    a. Assuming that each firm acts like a profit-maximizer, find the competitive equilibrium outcome.
    b. Can you determine what the socially optimal level of production would be?
    c. How can the socially-optimal level of production be achieved?
    d. Suppose that overall production of electricity were capped at the socially optimal level, and that each of the two firms were given the right to produce half of the total output. Would this be efficient? What do you think might happen?