Department of Agricultural & Applied Economics
Microeconomics Qualifying Exam

June 7, 2013
9:30 a.m. to 2:30 p.m.

Your **810 Code #** ____________________

Please provide complete answers to all questions. You have 5 hours to complete the exam; allocate your time accordingly. Number your responses to the questions clearly and write your answers legibly and orderly. Illegible writing may cause your answers to not be correctly credited. It is essential that you state all assumptions clearly and demonstrate your command of economic reasoning.

1. In agricultural markets, spatial monopsonies can arise. For example, farm production and procurement for processing of canning tomatoes might be characterized by monopsony market power. In answering the questions below consider the canning tomato industry when developing your answers. Production of canning tomatoes requires inputs of labor, land and machinery, and purchased materials. Production of processed canned tomatoes requires inputs of canning tomatoes, labor, capital, energy, and other purchased materials.

   a. Discuss factors that can lead to markets characterized by a small number of purchasers (processors like tomatoes canners) of an input within a regional market area.

   b. Suppose you are trying to determine the extent of a regional market for canning tomatoes. Develop two different tests to determine if transactions at three different locations are within the same market area. In answering this question be sure to define all terms and discuss data needs, estimation procedures, and how you would interpret the results.

   c. Often when researchers find evidence that prices in two different regions are cointegrated, they conclude that markets are competitive. Is this conclusion correct? Explain why or why not.

   d. Suppose you determine from (b) that transactions at different locations are in different market areas. Set up and discuss a specific test procedure to determine if tomato processors in a specific market are actually exerting monopsony market power in procuring canning tomatoes. In answering this question be sure to: 1) develop specific estimating equations including specific functional forms; 2) show how those equations incorporate or can be tested for standard conditions required for profit maximization; 3) define all terms and discuss; 4) discuss data needs and estimation procedures to obtain results; and 5) how you would interpret the results.

2. Consider an economy with two goods (a consumption commodity, x, and leisure, ℓ), two firms capable of producing the consumption commodity, and one consumer. Let the price of the consumption commodity, x, be denoted as , p, and the price of leisure be normalized to 1. Assume that the consumer has an initial endowment of 0 units of the consumption commodity and 1 unit time that may be allocated across labor and leisure activities. The agent's preferences can be represented as:

$$U(x, \ell) = \log(x) + \log(\ell)$$

Assuming that the consumer owns both firms, the production technologies can be represented as:

$$y_1 = (L_1)^{\frac{1}{2}}$$

$$y_2 = (2L_2)^{\frac{1}{2}}$$

where y_1 and y_2 denote the output from firm 1 and 2 respectively and L_1 and L_2 denote the (positive) labor input used for production at firm 1 and 2, respectively.

a. Define (but do not solve for) a competitive equilibrium for this economy

b. Solve for the competitive equilibrium for this economy.

c. State the First Fundamental Theorem of Welfare Economics. Briefly discuss whether it applies to the solution in part B.

d. Consider a pure exchange economy with 2 people (person A and person B) and 2 commodities denoted x_1 and x_2. Initial endowments for each individual are $e_1^A = e_1^B = e_2^A = e_2^B = 10$. Solve for the set of Pareto Efficient allocations if preferences are represented as:

$$U^A = (x_1^A) \quad + (x_2^A) \qquad\qquad U^B = \min\{x_1^B, x_2^B\}$$

3. Suppose that the inverse demand curve for paper is $p = 200 - Q$, the private marginal cost (unregulated competitive market supply) is $MC^P = 80 + Q$, and the marginal harm from gunk (a waste product) is $MC^G = Q$.

a. What is an externality? Describe an example of a negative externality and how it might be treated in government/third party regulatory policy or law. Describe an example of a positive externality and its value to a near producer or consumer.

b. What is the unregulated competitive equilibrium of the supply/demand situation described above?

c. What is the social optimum? What specific tax (per unit of output of gunk) results in the social optimum?

d. What is the unregulated monopoly equilibrium?

e. How would you optimally regulate the monopoly? What is the resulting equilibrium?

f. Let $H = G - G$ be the amount that gunk, G, is reduced from the competitive level, G. The benefit of reducing gunk is $B(H) - AH^{\alpha}$. The cost is $C(H) = H^{\beta}$. If the benefit is increasing but at a diminishing rate as H increases, and the cost is rising at an increasing rate, what are the possible ranges of values for A, α, and β?

4. Three consumers are to be asked to vote on whether to provide a pre-designed public good that costs \$99. If a majority votes in favor, the public good is provided and each pays \$33. True valuations of the good are $r_1 = 90$, $r_2 = 40$, and $r_3 = 30$, and each consumer knows the others' valuations.

a. Which outcome is Pareto optimal: provision or non-provision of the public good? Which outcome will be selected by majority vote?

b. Now suppose each consumer announces her willingness to pay, b_j (not necessarily equal to r_j), for the public good. If $\sum_j b_j \geq 99$ the good is provided and each consumer pays b_j. What is a Nash equilibrium of this game?

5. Consider a lawsuit involving a plaintiff (i.e., the person that files a lawsuit requesting compensation for damages) and a defendant (i.e., the person being sued who will have to compensate the plaintiff if he loses the trial). There is, determined by nature at the beginning of the lawsuit, a 1/3 probability that the plaintiff will be victorious in the trial and a 2/3 probability that the defendant will be victorious in the trial. The plaintiff observes whether he will be victorious, the defendant does not observe whether he will be victorious. If the plaintiff wins he receives a payoff of \$3 and the defendant has a payoff of \$-4. If the plaintiff loses he receives a payoff of \$-1 and the defendant has a payoff of \$0.

After nature reveals to the plaintiff who would win the trial, the plaintiff has the opportunity to propose a low or high settlement of either $m=\$1$ or $m=\$2$. If the defendant accepts the settlement offer, they do not go to trial and the plaintiff has a payoff of \$$m$ and the defendant has a payoff of \$-m. If the defendant rejects the settlement offer, they go to trial and receive the payoffs described above.

To summarize, the steps of the game are as follows. Nature decides who will win the lawsuit. The plaintiff observes who will win the lawsuit. The plaintiff decides whether to offer a low settlement or a high settlement. The defendant decides to accept or reject the settlement offer. If accepted, there is no trial. If rejected, they proceed with the trial.

a. Represent the game in extensive form. Label everything.
b. Solve for the equilibrium of this game (a weak perfect Bayesian equilibrium is preferred, but you may use any equilibrium concept that you prefer that is appropriate for this type of game).