

**Economics 335: Final Exam  
Spring 2003**

Name: \_\_\_\_\_

**Answer all questions. If you get stuck with the math, explain in words what you are trying to do and why.**

1. (2 points) Using the concept of returns to scale, carefully explain how the merger of two agribusiness firms could benefit society.

2. (3 points) Consider a firm that operates in a perfectly competitive market with the following cost function:  $C(q) = 2q + 0.5q^2$ , where  $q$  is output quantity. What output should the firm bring to the market to maximize its profits when the price in the market takes the following values:  $p = \$4, \$7, \$10, \$11, \$19, \$28, \$60, \text{ and } \$90$ .

3. (4 points) Suppose that there are two firms competing in a market with no further threat of entry. The firms sell a homogenous good. Demand for the good is given by  $Q^D = 2000 - 1000P$ , where  $Q^D$  is the market quantity and  $P$  is the price. Firm 1 has a cost function  $C(q_1) = .2q_1$ . Firm 2 has cost function  $C(q_2) = .4q_2$ . Firm 1 has a first-mover advantage. Using the Stackelberg duopoly model, calculate the Nash equilibrium output quantities for the firms. Then calculate the price in the market, and the profits of each firm.

4. (3 points) The limit pricing model suggests that a monopolist can maintain its monopoly position by threatening to lower price to the point where a new firm that enters their market will lose money. Do you think that this model is sensible? Carefully explain your answer.

5. (2 points) Consider the following game which is known as the Battle of the Sexes. A married couple wants to go on a date on Friday night. They decide on Thursday that they will attend either a hockey game or an art opening but cannot choose between the two events. Above all, they want to be together. The woman would prefer the art opening and the man would prefer the hockey game. It is now Friday and each must decide which event to attend. The problem is that the phone lines are down (use your imagination) and the couple is unable to communicate in order to finalize their plans. The following matrix shows the payoffs for the man and woman.

		Woman	
		Hockey Game	Art Opening
Man	Hockey Game	3,2	1,0
	Art Opening	0,1	2,3

Do the players of this game have a dominant strategy? \_\_\_\_\_ If so what is it? \_\_\_\_\_.

Does this game have a Nash equilibrium? \_\_\_\_\_ If so, what is it (or what are they)?

6. (2 points) Suppose there are three firms operating in a market with no further threat of entry. Explain why (i) these firms have an incentive to collude, and (ii) why collusive agreements are unstable.

7. (2 points) In the Choices article titled *Animal Waste Policy: Reforms to Improve Environmental Quality*, the authors consider different approaches to regulate or control the pollution that is caused by animal waste. Explain why society might be better off under an animal waste regulatory policy.

8. (5 points) The company you own has developed a new genetically modified corn seed that produces significantly higher yields than other varieties. One drawback is that the crop does not do as well in fields with poor drainage. A marketing agency has divided the population of Iowa farmers into those with wet fields and those with dry fields, and has provided the following estimates of seed demand:

$$Q_D = 7 - \frac{1}{2}p$$

$$Q_W = 5 - \frac{1}{2}p,$$

where  $Q_D$  is quantity (in pounds) demanded by farmers with dry fields and  $Q_W$  is quantity demanded by farmers with wet fields. The cost of producing the seed is  $C(Q) = 2Q$ . You plan to sell the seed in small and large bags. You must decide how many pounds of seed will go into small and large bags, and a price to charge for each bag. One problem you face is that it is impossible to know whether a particular farmer has a dry or a wet field.

Determine how many pounds of seed to put in the small and large bags, and what price to charge. Assume there are an equal number of farmers with dry and wet fields and that farmers cannot trade seed among themselves.

9. (2 points) Why do you think the people of the United States are willing to spend billions of dollars per year in support of farm incomes?