
NATIONAL UNIVERSITY OF SINGAPORE

EC3322 Industrial Organization I

Semester 1, 2012-2013

FINAL EXAMINATION

November 27, 2012

Time Allowed: 2 hours

MATRICULATION/REGISTRATION NUMBER: _____

TUTORIAL GROUP: _____

Instructions

1. This is a CLOSED book examination.
2. Do NOT start reading the questions until you are told to do so.
3. There are a total of SIXTEEN (16) pages. Make sure you have all 16 pages before beginning.
4. This exam consists of FIVE (5) questions. Answer ALL FIVE questions. The exam totals 100 points.
5. Write your answers in the answer boxes provided for each question.
6. Include all work and derivations that you wish to be graded in the exam paper.
7. Write your matriculation number and your tutorial group number (or time and day) on the exam RIGHT NOW. Do not write your name on the exam. If you do not write your matriculation number and tutorial group number, you will be penalized 5 points.
8. You MAY NOT use calculators. If you have a calculator on your desk, you will receive a 10 point penalty.

Answer ALL questions. Include your work for full marks.

1. (10 points total) Suppose that two firms are engaged in Bertrand competition. There are 10,000 people in the market. If the price is \$10 or below, each person buys one unit. If the price is higher than \$10, no one buys the good. Currently both firms have a constant marginal cost of \$5 (and no fixed costs).
 - (a) (5 points) What price will each firm charge in equilibrium? What are each firm's profits?
 - (b) (5 points) Suppose firm 1 can adopt a new technology that lowers its marginal cost to \$3. What is the maximum amount that the firm would be willing to pay for this technology?
2. (15 points total) Consider a two-period Stackelberg model with three firms. Firm 1 chooses q_1 and firm 2 chooses q_2 simultaneously in period 1. Firm 3 chooses q_3 in period 2. The market inverse demand function is $p = 60 - 5Q$ and marginal cost and fixed cost are zero.
 - (a) (10 points) Find the equilibrium output level of each firm in the Stackelberg Subgame Perfect Nash Equilibrium.
 - (b) (5 points) What is the equilibrium price?
3. (25 points total) Suppose a linear market that is ten kilometers long has two suppliers. Firm A is located two kilometers from the left end of the market and firm B is located at the right end of the market. Transportation cost is 1 per kilometer. Marginal and average production cost is zero. The number of consumers in the market is normalized to 1.
 - (a) (5 points) Where is the location of the consumer indifferent between buying from firm A and firm B ?
 - (b) (10 points) Find the best response of each firm.
 - (c) (5 points) What are the equilibrium prices?
 - (d) (5 points) Draw a graph illustrating the equilibrium.
4. (25 points total) Consider an industry with three identical firms each selling a homogeneous good and producing at a marginal cost $1/2$. Market demand is given by $p = 1 - Q$. Competition is in quantities.
 - (a) (10 points) Find the equilibrium quantities, price, and profits.
 - (b) (5 points) Consider a merger of firm 1 and firm 2. We will refer to the new merged firm as firm 1. The merger gives rise to efficiency gains in the sense that firm 1 now produces at a cost of $\frac{1}{2}e$ where $0 < e < 1$. Firm 3 still has cost $1/2$. Find the post-merger equilibrium quantities, price, and profits.
 - (c) (5 points) Under what condition does the merger reduce price?
 - (d) (5 points) Under what condition is the merger beneficial to the merging firms?

5. (25 points total) Consider the simple two-period model of technology adoption that we discussed in lecture. The old technology is denoted **O** and the new technology **N**. There are only two adopters, both who currently use **O**. These adopters decide sequentially whether or not to switch to the new technology. An adopter may be an **O** type (prefers **O**), or an **N** type (prefers **N**). An adopter knows its own type but not the other adopter's type, but it is known that there is a 90% chance that any adopter is an **N** type. The first adopter does not know what the future adopter will do. The second adopter does observe the choice of the first adopter.

The payoffs to each type's choices is given below.

		Other agent's choice				Other agent's choice	
		O	N			O	N
N's choice	O	11	8	O's choice	O	25	3
	N	0	12		N	3	-5
<i>N type</i>				<i>O type</i>			

- (5 points) Let's first consider the second adopter. If the second adopter is an **O** type, what is his best strategy? What if he is an **N** type?
- (5 points) Now let's consider the first adopter. If the first adopter is an **O** type, what is his best strategy? What if he is **N** type?
- (5 points) Which technology is adopted?
- 10 points) Is this model an example of excess inertia or excess momentum? Provide one of the actual examples of this phenomenon that was given in lecture.

- END OF PAPER -