NATIONAL UNIVERSITY OF SINGAPORE

EC3322 Industrial Organization I

Semester 1, 2011-2012

FINAL EXAMINATION

November 22, 2011

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 FOURTEEN (14) pages. Make sure you have all 14 pages before beginning.
4. This exam consists of SIX (6) questions. Answer ALL SIX 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 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.

Section I. No explanations are necessary in this section.

1. Which model, the Cournot or Bertrand model, do you think provides a better approximation of each of the following type of products/markets? Circle the correct answer. (5 points total)

a) DVDs:	Bertrand	Cournot
b) Music mp3s:	Bertrand	Cournot
c) Airlines:	Bertrand	Cournot

2. Rank the following market structures in decreasing order of consumer surplus: uniform price monopoly, first-degree price discriminating monopoly, perfect competition, Cournot oligopoly, and Bertrand duopoly. Assume that the product is homogeneous. (1 is for the market structure(s) with the most consumer surplus. Higher numbers indicate market structures with less consumer surplus. If two market structures have the same consumer surplus, then write them on the same line.) (5 points total)

Section II. Include your work for full marks.

3. The CEO of Staples claimed that prices would decrease if the FTC approved the merger of his company with Office Depot. Let the inverse demand function be given by $P(Q) = 6 - 4Q$. The pre-merger cost function is given by $C(Q) = 4Q$ and the post-merger cost function is given by $C(Q) = 4\theta Q$, where $\theta \leq 1$. Assume that the firms are Cournot competitors before the merger and act as a monopoly after the merger. Determine the value(s) of θ for the CEO's statement to be credible. (10 points total)

4. *Outel* is the sole producer of memory chips for supercomputers. Each chip costs $c = 30$ to produce. This monopoly can sell in two markets with the following inverse demand functions: (15 points total)

$$p_1 = 120 - q_1 \qquad \text{and} \qquad p_2 = 90 - \frac{q_2}{2}.$$

(a) Compute the monopoly's profit-maximizing prices in each market, p_1 and p_2, (5 points)

sales q_1 and q_2, and total profit assuming that *Outel* can price discriminate between the two markets.

(b) Due to a fire that nearly destroyed its factory, *Outel* cannot produce more than 30 units. In other words, assume that the production capacity of *Outel* is limited to no more than 30 chips. Compute the profit-maximizing prices in each market, p_1 and p_2, sales q_1 and q_2, and the monopoly's total profit. (10 points)

Section III. Include your work for full marks.

5. Consider a homogeneous good duopoly with linear demand $P(q) = 1 - q$, where q is the total industry output. Suppose that firms are quantity setters. Assume that marginal cost of each firm is initially zero. Firm 1 is already in the market. In stage 1, firm 1 can make an investment after which firm 2's marginal cost increases to $c_2 = 1/4$. Afterwards, firm 2 observes the investment decision of firm 1 and, in stage 2, decides whether to enter at a negligible entry cost $e > 0$ (i.e., e is very small). In stage 3, the active firms choose quantities. (30 points total)

   (a) Suppose initially that the investment costs, k, is zero. Determine the equilibrium outcome of the game. That is, does firm 1 invest? Does firm 2 enter? What are the quantities and profits of each firm and the price? (10 points)

   (b) How large does the cost of the investment, k, have to be for firm 1 *to not make the investment*? (20 points)

6. LC burgers is currently the sole fast-food chain in Linear City, a city that is one mile long and consists of one street, with ten thousand customers distributed uniformly along the street. The price for the BigLC, the only product sold by the LC Burger chain, is set nationally at \$4 so that the local Linear City manager's decision is limited to choosing the number and location of its stores. (35 points total)

   Each store costs \$6,000 to open, which is sunk. Each consumer buys one burger per week at the current price of \$4. However, no consumer will walk for more than a quarter of a mile to buy a burger. A burger costs \$1 to produce.

   (a) Suppose that LC Burgers face no competition and no threat of entry. How many stores should LC Burgers open, and at what locations? How much profit does it make? (10 points)

   CS Burgers is contemplating entering Linear City. CS Burgers' costs and price are the same as those of LC Burgers. Moreover, consumers regard the products of both chains as equally good, so if both brands are in town, each consumer buys from the closest store.

   (b) At what locations should CS Burgers open stores, given that LC Burgers has (10 points)

opened the locations found to be optimal in part (a). How much profit does each chain make?

(c) Recognizing the threat of entry by CS Burgers, at what locations should LC Burgers open stores? (The choice of locations is not unique. Provide one set of locations.) Does CS enter? How much profit does each firm make? (15 points)

- END OF PAPER -