NATIONAL UNIVERSITY OF SINGAPORE

EC3322: Industrial Organization I

Semester 2, AY2014/15

Time allowed: 2 hours

MATRICULATION/REGISTRATION NUMBER: _____

INSTRUCTIONS TO STUDENTS

1. Write your matriculation number in the space provided above RIGHT NOW. Do not write your name on the exam.
2. This assessment paper contains **SEVEN (7)** questions and comprises **SIXTEEN (16)** printed pages.
3. Answer all questions.
4. This is a **CLOSED** book assessment.
5. The total mark for this paper is **100**.
6. You MAY NOT use calculators. If you have a calculator on your desk, please remove it.

Questions 1 is multiple choice. Write your answer in the answer box provided.

1. (5 marks) Which of the following is an example of a prisoner's dilemma?

   (a) Hiring attorneys in labor disputes

   (b) Intel making two versions of their 486 microchip

   (c) An airline manufacturer building larger than usual small jets, a niche ingored by other companies

   (d) DuPoint expanding capacity to deter entry

   (e) None of the above

For questions 2 and 3, write your *brief* and *concise* answer in the answer boxes provided.

2. (15 marks) Is it possible for an incumbent firm (a firm already in the market) to use advertising in a strategic manner to deter entry? Be specific in your answer, and include any relevant examples to support your argument.

3. (15 marks) The Competition Commission of Singapore plans to challenge a merger of two firms in a homogeneous product market. They have hired you to run a merger simulation. Describe the purpose of a merger simulation, how it is done, and what data is necessary. Be precise in your explanations.

Questions 4 to 7 are analytical questions. Write your answers in the answer boxes provided.

4. (10 marks) A profit-maximizing firm is a member of a cartel, earning 100 in profit per period. The firm must decide whether to stick to the cartel agreement or deviate. If the firm cheats, the cartel breaks down when the cheating is detected and the competitive outcome prevails forever, which results in zero profit per period. The firm's discount factor is 0.5.

   There are two different scenarios regarding the detection of cheating behavior. In the first scenario, cheating is detected at the end of the first period of cheating. In the second scenario, cheating is not detected until the end of the second period of cheating.

   What can you say about the per period deviation profit if the firm would not want to cheat under scenario 1 but would want to cheat under scenario 2?

5. (15 marks total) There are two markets for a product sold by a monopolist. The inverse demand curve of market 1 is

$$p_1 = 200 - q_1,$$

   and the inverse demand curve of market 2 is

$$p_2 = 300 - q_2.$$

   The firm's cost function is:

$$C(Q) = Q^2,$$

   where $Q = q_1 + q_2$.

   (a) (7 marks) Suppose that the firm is not able to price discriminate. What price does it set and how much does it sell in each market?

   (b) (8 marks) Suppose now that the firm can price discriminate. How much will the firm sell in each market and at what price?

6. (15 marks total) Suppose that two firms in a homogeneous-product market compete in prices. Demand is given by

$$Q = 9 - p.$$

The capacity of each firm is 3, and the firms have zero costs.

(a) (5 marks) What is the equilibrium price?

(b) (5 marks) Argue/show that neither firm would want to deviate from the equilibrium price found in (a).

(c) (5 marks) Now suppose that firm 1's capacity is 5 and firm 2's capacity is 3. Is $p = 1$ the equilibrium price? Why or why not?

7. (25 marks total) Consider two Bertrand competitors who sell differentiated products with demand given by:

$$q_1 = 4 - p_1 + 2p_2 \quad \text{and} \quad q_2 = 4 - 2p_2 + p_1$$

Assume that costs are zero.

(a) (5 marks) Suppose that prices are chosen simultaneously. What are the equilibrium prices?

(b) (5 marks) Suppose now that prices are chosen sequentially with firm 1 choosing first, and firm 2 choosing second. What are the equilibrium prices?

(c) (5 marks) Continue to assume that the two firms choose price sequentially, but now assume that firm 2 has entry costs of $F = 8$ (assume that firm 1 has no fixed costs). What is the limit price of firm 1?

(d) (10 marks) Based on your answer in part (c), would firm 1 want to deter entry? Why or why not?