NATIONAL UNIVERSITY OF SINGAPORE

EC3322 Industrial Organization I

Semester 1, AY 2013-2014

Name of examiner: Dr. Eric Fesselmeyer

Time Allowed: 2 hours

MATRICULATION/REGISTRATION NUMBER: _____

TUTORIAL GROUP OR DAY AND TIME: _____

<u>INSTRUCTIONS TO CANDIDATES</u>

1. Please write your matriculation/registration number only. **Do not write your name.**

2. This is a **CLOSED** book examination.

3. This assessment paper contains **SEVEN (7)** questions and comprises **SIXTEEN (16)** printed pages.

4. Write your answers in the answer boxes provided for each question.

5. Include all work and derivations that you wish to be graded in the exam paper.

6. You MAY NOT use calculators. If you have a calculator on your desk, you will receive a 10 point penalty.

7. The total mark for this paper is 100.

1. (5 points) In August 1999, Sony cut the price of its video game system from $129 to $99. One hour after Sony's price change was announced, Nintendo sent out a news release announcing its own price cut to match Sony's. Nintendo suffered severe shortages during the following 1999 holiday season. Based on these events, would the Cournot model or the Betrand model be a better approximation to the behavior of this industry? Explain.

2. (5 points) The following table contains the shares of firms in two industries, A and B, where, for example, s_1 denotes the market share of firm 1.

Market shares	s1	s2	s3	s4	s5
Industry A	60%	20%	10%	5%	5%
Industry B	30%	30%	30%	10%	–

Decide which of the four statements below is correct. Circle your answer in the answer box.

(a) The CR_3 is the same for both industries but the HHI is higher for industry A.

(b) The CR_3 is the same for both industries but the HHI is higher for industry B.

(c) Both the CR_3 and HHI are higher for industry A.

(d) The CR_3 is higher for industry A but the HHI is higher for industry B.

3. (5 points) Suppose a monopolist faces the demand function $P = 40 - 3q$. The cost function is $C(q) = q^2$. Compute the monopoly price, quantity, and Lerner index.

4. (10 points) Consider a Cournot model of competition with two firms and a linear demand curve. The firms have constant but different marginal costs. Which of the following statements are true? Circle your answers in the answer box.

(a) The equilibrium output of firm 1 is increasing in firm 1's marginal cost.

(b) The equilibrium output of firm 1 is decreasing in firm 1's marginal cost.

(c) The equilibrium output of firm 1 is increasing in firm 2's marginal cost.

(d) The equilibrium output of firm 1 is decreasing in firm 2's marginal cost.

(e) Total equilibrium output is increasing in firm 2's marginal cost.

(f) Total equilibrium output is decreasing in firm 2's marginal cost.

(g) Total equilibrium output is not affected by firm 2's marginal cost.

5. (20 points) The aggregate demand of an homogeneous good is $P = 64 - 2Q$. There are 2 firms in the market, both with constant marginal cost equal to 4.

   (a) (5 points) Compute the equilibrium price, quantity, and profit for each firm under Cournot competition.

   (b) (5 points) How much would firm 1 be willing to pay for firm 2?

   (c) (5 points) Consider another firm, firm 3, that is not in this market. How much would firm 3 pay for firm 2?

   (d) (5 points) If an auction was held for firm 2, which firm, firm 1 or firm 3, would buy firm 2? And for what price? Explain.

6. (25 points) Consider a model of vertical differentiation with two firms offering goods with different qualities. The quality of firm 1's good is $v_1 = 1$, and the quality of firm 2's good is $v_2 = 3$. Cost of production is zero. There is a continuum of N consumers. A good of quality v bought at price p yields utility $U = \theta v - p$, where θ, the marginal valuation of quality, is uniformly distributed on the interval $[1, 3]$.

   (a) (10 points) What are the equilibrium prices?

   (b) (15 points) Suppose firms choose their quality level simultaneously before price competition takes place. The possible qualities to choose from are 1 and 3. What is the Nash equilibrium (or equilibria)? Why?

7. (30 points) Consider the following payoff matrix:

Hank

		W	R
Bobby	W	1, 1	5, 0
	R	0, 5	3, 3

(a) (2 points) If the game is played once, what is the Nash equilibrium (or equilibria)?

(b) (3 points) If the players were able to write and enforce a collusive contract before playing the game, what strategies would they choose to maximize their joint payoffs?

(c) (5 points) Assume now that the game is repeated twice. Are there any strategies that would allow both players to reach the collusive outcome described in (b) as a sub-game perfect Nash equilibrium (SPNE)? Explain.

Assume now that the game is repeated infinitely many times and that both players discount future payoffs according to the discount factor $0 < \delta < 1$.

(d) (5 points) Describe the trigger strategy that leads to sustainable collusion when δ is large enough.

(e) (10 points) Show why the strategies in part (d) are a Subgame Perfect Nash Equilibrium (SPNE) when δ is large enough.

(f) (5 points) What is the smallest discount factor (δ) that sustains collusion?

- End of Paper -