

NATIONAL UNIVERSITY OF SINGAPORE

EC3322 Industrial Organization I

Semester 2, 2010/2011

FINAL EXAMINATION

April 2011

Time Allowed: 2 hours

INSTRUCTIONS TO CANDIDATES

1. This examination paper comprises **FOUR (4)** printed pages, including this page.
2. This examination consists of **NINE (9)** questions. Answer **ALL** questions.
3. This is a **CLOSED** book examination. Calculators are **NOT** permitted.
4. The total points for this exam is **100**.
5. Write your answers **ONLY** in the answer books provided.
6. You are not allowed to take away this question booklet from the examination hall.

Section I.

For each question, clearly write the question number and your answer in the answer booklet. No explanation is necessary.

1. Which one of the following does not occur in perfect competition? (5 points total)
 - (a) No single firm can exert a significant influence on the market price of the good.
 - (b) There are many buyers.
 - (c) There are significant restrictions on entry into the industry.
 - (d) Firms and buyers are completely informed about the prices of the products of each firm in the industry.
2. In the dominant firm model, the smaller firms act like (5 points total)
 - (a) oligopolists.
 - (b) monopolists.
 - (c) monopolistic competitors.
 - (d) perfect competitors.
3. A monopolist faces a constant marginal cost of \$1 per unit. If at the price he is charging, the price elasticity of demand for the monopolist's output is $-\frac{1}{2}$, then (5 points total)
 - (a) the price he is charging must be \$2
 - (b) the price he is charging must exceed \$2
 - (c) the price he is charging must be less than \$2
 - (d) the monopolist cannot be maximizing output
4. Many video stores charge a lower rental rate for Wednesday nights compared to the weekend rate. This price discrimination is profitable only if the elasticity of demand for videos on Wednesdays is (5 points total)
 - (a) greater than the elasticity of demand for videos on weekends.
 - (b) less than the elasticity of demand for videos on weekends.
 - (c) negative and the elasticity of demand for videos on weekends is positive.
 - (d) positive and the elasticity of demand for videos on weekends is negative.

Section II.

Answer the following question.

5. The Competition Commission discussed several antitrust cases during their presentation. Choose one case and give a brief description of the case (3 sentences or less). (10 points total)

Section III.

Answer each of the following questions. Show your workings.

6. Suppose that market demand is given by $P = 260 - 2Q$. Two firms compete in prices. Their marginal cost is 20 and fixed costs are zero. What is the discount factor necessary to maintain a collusive agreement in an indefinitely repeated setting? Assume that the probability that the game continues is 1. Note the the formula for the threshold discount factor is: (15 points total)

$$\delta > \frac{\pi^D - \pi^M}{\pi^D - \pi^N},$$

where π^D is the deviation profit, π^M is the collusive profit, and π^N is the Nash equilibrium profit.

7. Consider a two-period Stackelberg model with three firms. Firm 1 chooses q_1 in period 1. Firm 2 chooses q_2 and firm 3 chooses q_3 simultaneously in period 2. The market inverse demand function is $p = 60 - 5Q$ and marginal cost and fixed cost is zero. Solve for the equilibrium output level of each firm and the market price in the Stackelberg SPNE. (15 points total)
8. Market demand is given by $p = 12 - Q$. There are two firms: the incumbent firm (I) and a potential entrant firm (E). The incumbent moves first by choosing quantity q_I . The entrant observes q_I and decides whether or not to enter and how much to produce if he enters (q_E). There is no fixed cost of entry. If the entrant decides to stay out, his profit is zero and the incumbent enjoys a monopoly position. Suppose that both incumbent and entrant have identical marginal costs equal to $c = 8$. (15 points total)
- (a) What are the subgame perfect Nash equilibrium quantities if the entrant enters the market? What are the profits? (5 points)

- (b) What is the minimum quantity that must be produced by the incumbent to deter entry? Will the incumbent try to deter entry? (5 points)

Now suppose that before production begins, the incumbent can purchase new equipment: he can either produce with the old equipment at marginal cost $c = 8$ or spend an additional amount $K = 5$ on new equipment which cuts his marginal cost to $c = 6$.

- (c) Will the incumbent choose to purchase the new equipment? Does the potential entrant enter? What are the profits? (5 points)
9. Consider the Hotelling line model of price competition on the interval $[0, 1]$. There are three firms with zero marginal cost. The firms are located at $x = 0$, $x = \frac{1}{2}$, and $x = 1$. A consumer located a distance d from a firm receives $V - p - td$ if she buys the product and zero otherwise. Assume $N = 1$. (25 points total)
- (a) Find the marginal consumers. There will be two since there are three firms. (10 points)
- (b) Find the best response function of each firm. (10 points)
- (c) Find the Nash equilibrium prices. (5 points)

— END OF PAPER —