

**FINAL EXAMINATION**  
**INDUSTRIAL ORGANIZATION AND PUBLIC POLICY**  
**(Econ 640)**

Spring 2011

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**Instructions:** There are two parts to this examination, weighted 40 points and 60 points, respectively. Write legibly and think carefully about your answers. You may find that graphical and/or mathematical analysis will assist you in answering some of these questions.

**Part I. (40 Points) Short Answer and Analysis.** Answer 4 (and only 4) of the following 6 questions.

1. The inverse market demand function is given by  $P = 16 - 2Q$ . There are 5 identical firms in the market and each firm has cost function of the form  $C(q_i) = 4q_i$ , for  $i = 1, 2, 3, 4, 5$ . What is the price that prevails in equilibrium in this market?
2. A monopolist serves a market with an aggregate demand function given by  $Q = 38 - 3P$ . This market can be partitioned into submarkets 1 and 2 with submarket demand functions given by  $Q_1 = 24 - 2P_1$  and  $Q_2 = 14 - P_2$ . The monopolist's cost function is given by  $C(Q) = 2Q$ . What prices will the monopolist set if she decides to practice third-degree price discrimination? Does price discrimination lead to higher economic welfare under these conditions?
3. Suppose that a profit-maximizing firm is a member of a cartel. The firm must decide whether to adhere to the cartel agreement or cheat by expanding output beyond its assigned quota. Once cheating is detected, the cartel breaks down and the competitive outcome prevails thereafter. Assume that the game lasts forever (i.e., an infinite number of periods). The firm's discount rate is  $r = 0.2$ . Suppose that the firm will adhere to the cartel agreement if cheating is detected at the end of the first period, but will cheat if such cheating is not detected until the end of the second period. The firm's profits are \$100 per period if it adheres to the cartel agreement. What can you infer about the per period profits the firm realizes when it cheats on the cartel agreement prior to the cheating being detected?
4. Two firms compete in a Bertrand setting for homogenous products. The market demand function is given by  $Q = 20 - P$ , where  $Q$  is quantity and  $P$  is price. The cost function for firm 1 is given by  $C(Q) = 2Q$  and the cost function for firm 2 is given by  $C(Q) = xQ$ , where  $x > 0$ . At the Nash equilibrium in this market, firm 1 earns profits of 56. Determine the value(s) of  $x$ ?
5. Rank the following market structures in decreasing order of consumers' surplus: Uniform Price Monopolist, First-Degree Price Discrimination Monopolist, Perfect

Competition, Cournot Oligopoly, Bertrand Duopoly (homogenous products)? [You should assume that costs are independent of market structure.]

6. The N-members of a successful cartel desire to merge to a monopoly. Should the government oppose this merger? Provide an economic rationale for your conclusion.

**Part II. (60 Points). Problems and Essay.** Answer 2 (and only 2) of the following 3 questions.

1. [Cournot Oligopoly] Let inverse market demand be given by  $P = 36 - Q$ , where  $P$  is price and  $Q = q_1 + q_2$ . The cost function for firm 1 is given by  $C(q_1) = 12q_1$  and the cost function for firm 2 is given by  $C(q_2) = 12q_2$ .
  - a) Compute the reaction functions for firm 1 and firm 2.
  - b) Determine the equilibrium level of output, price and consumers' surplus.
  - c) Suppose that these two firms wish to merge. The Department of Justice will allow them to merge only if it believes that price will be no higher, post-merger. The post-merger cost function is of the form  $C(Q) = xQ$ . Determine the value(s) of  $x$  for which the Justice Department will deny this merger.
2. [Price Discrimination] A monopolist serves a market with an aggregate demand function given by  $Q = 36 - 3P$ . The monopolist's cost function is given by  $C(Q) = 2Q$ .
  - a) How much profit can the monopolist generate with first-degree price discrimination if resale can be prevented? What is the associated deadweight loss relative to the competitive level of output?
  - b) Suppose that the monopolist can partition its market into two separate submarkets. The demand function for submarket 1 is given by  $Q_1 = 20 - 2P_1$  and the demand function for submarket 2 is given by  $Q_2 = 16 - P_2$ . What prices would this monopolist set if she practices third degree price discrimination? What is the level of profits that would be realized if resale can be prevented? What level of profits would the monopolist realize if resale cannot be prevented? Does price discrimination in this case lead to higher economic welfare? Provide the economic basis for your claim.
  - c) Suppose that this monopolist must incur up-front entry costs of  $\$S$  before it enters this market. What inference can you draw about the value of  $S$  if the monopolist enters the market if allowed to practice third-degree price discrimination but does not enter the market if constrained to uniform monopoly pricing? [Assume that first degree price discrimination is not an option here.]

3. In class discussions throughout the term, we have discussed consolidation trends (i.e., mergers) in airlines, telecommunications, automobiles and other industries. In the course of these discussions, we have frequently noted the difficulties the government, particularly the Justice Department, encounters in determining whether the underlying motive for the proposed merger is to realize efficiency gains and hence reduce costs, consolidate market power and raise prices, or some combination of these motives. Evaluate the following proposed merger policy in terms of its effectiveness in enabling the government to discern the true motive for the merger, and the likelihood that any industry consolidation that does occur is welfare-enhancing. [Note: You should anticipate that grading for this question will be demanding yet fair. It may prove helpful to begin by constructing an outline for your answer.]

The merger policy of the U.S. Department of Justice shall be the following. Any two or more firms are free to merge provided that the average price for the product/service sold by the consolidated firm post-merger not exceed the average price for the product/service that prevailed in the market for a two-year period prior to the merger. This particular policy is known as a *price-cap* merger policy because the price for the product/service is capped at the average market price that prevailed pre-merger. [Assume that there are no supply constraints. In other words, assume that supply accommodates demand at the prevailing price.]