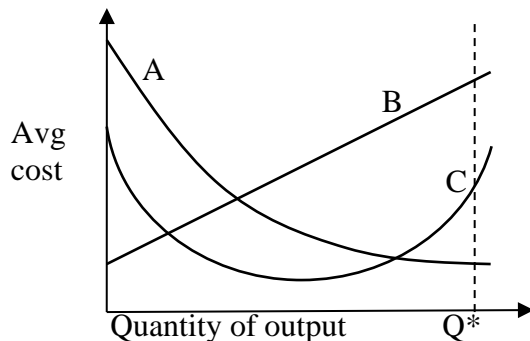


**EXAMINATION 2 VERSION A**  
**“Antitrust Theory”**  
**March 14, 2019**

**INSTRUCTIONS:** This exam is closed-book, closed-notes. Simple calculators are permitted, but graphing calculators or calculators with alphabetical keyboards are NOT permitted. Mobile phones or other wireless devices are NOT permitted. Fractional answers are acceptable. Decimal answers, if rounded, must be correct to at least three significant digits. Points will be subtracted for illegible writing or incorrect rounding. Point values for each question are noted in brackets.

**I. Multiple choice:** Please circle the one best answer to each question. [1 pt each, 15 pts total]

- (1) Which average cost curve below is typical of a firm that enjoys a natural monopoly? Assume that industry output is at least  $Q^*$
- a. Average cost curve A.
  - b. Average cost curve B.
  - c. Average cost curve C.
  - d. None of the above.
  - e. Cannot be determined from information given.



- (2) If marginal cost is greater than marginal revenue at the current level of output, the firm can increase its profit by
- a. increasing output.
  - b. decreasing output.
  - c. either increasing or decreasing output.
  - d. none of the above.
  - e. Cannot be determined from information given.

- (3) Monopoly causes economic inefficiency because
- a. monopolists are usually wealthier than their customers.
  - b. some consumers, willing to pay the marginal cost of the product, are not served.
  - c. monopolists enjoy profits, called monopoly rents, even in the long run.
  - d. monopoly prices are unfair.
  - e. it is unfair for one firm to control the market.

- (4) The "Structure-Conduct-Performance" paradigm is simplistic because it assumes that
- a. performance does not depend on structure.
  - b. performance does not depend on conduct.
  - c. structure does not depend on conduct.
  - d. conduct does not depend on structure.

- (5) In a Nash equilibrium, each firm chooses a strategy that maximizes
- a. the firm's profit, given the rival firm's chosen strategy.
  - b. the firm's profit, regardless of the strategy the rival firm might choose.
  - c. the combined profit of the firms.
  - d. social welfare.

- (6) One implication of the Cournot model of oligopoly is that the equilibrium price is lower
- a. the more firms are in the industry.
  - b. the more elastic is market demand.
  - c. both of the above.
  - d. none of the above.

(7) Which market model predicts the largest quantity of total output?

- a. Price competition.
- b. Collusion to maximize joint profits.
- c. Cournot oligopoly.
- d. All models predict the same quantity of output, if all use the same assumptions about market demand and marginal cost.

(8) A cartel member's "trigger strategy" discourages other cartel members from cheating by threatening to

- a. raise members' costs.
- b. raise the market price.
- c. lower the market price to the competitive level for a long time.
- d. admit new members to the cartel.

(9) Under the Department of Justice's corporate leniency program, amnesty can be given to

- a. the first cartel member that cooperates with the government investigation.
- b. the last cartel member that cooperates with the government investigation.
- c. any cartel participants that cooperate with the government investigation.
- d. any cartel participants that agree to leave the cartel.

(10) In private antitrust suits against price-fixing, injured parties can collect damages

- a. multiplied by two.
- b. multiplied by three.
- c. multiplied by four.
- d. multiplied by ten.

(11) Which hypothesis claims that higher industry concentration is associated with a loss of social welfare?

- a. collusion hypothesis.
- b. differential efficiency hypothesis.
- c. Both of the above.
- d. None of the above.

(12) Suppose an industry is a Cournot oligopoly but entry is possible after firms pay a fixed, sunk entry cost. The higher that entry cost, the

- a. greater the number of firms, in long-run equilibrium.
- b. smaller the number of firms, in long-run equilibrium.
- c. The entry cost is unrelated to the entry cost.
- d. Cannot be determined from information given.

(13) Suppose a dominant firm shares a market with a competitive fringe of smaller firms. The dominant firm's market power is greater,

- a. the more elastic is total market demand curve.
- b. the more elastic is the competitive fringe's supply curve.
- c. Both of the above.
- d. None of the above.

(14) According to the model of "dynamic limit pricing," a dominant firm can slow the rate of entry of competitive rivals by setting a

- a. low price.
- b. high price.
- c. The dominant firm's price has no effect on the entry of competitive rivals.
- d. Cannot be determined from information given.

(15) According to Dixit's model, an incumbent firm can deter entry of other firms, while still enjoying high profit, by

- a. maintaining its output level high.
- b. keeping its price close to marginal cost.
- c. investing in extra production capacity.
- d. keeping its fixed cost as low as possible.

**II. Problems:** Please insert your answer to each question in the box provided. Use margins and graphs for scratch work. Only the answers in the boxes will be graded. Work carefully—partial credit is not normally given for questions in this section.

(1) [Monopoly, markup formula, Lerner index: 4 pts] Wipeout Ski Hill enjoys a local monopoly. Its marginal cost per customer is \$12.00. The management believes the elasticity of demand for its lift tickets is -4.

a. What admission price should Wipeout set, to maximize profit?

\$

b. Compute Wipeout's Lerner index of market power [  $(P-MC)/P$  ].

(2) [Antitrust statutes: 4 pts] Insert one of the following statutes in each box. You may insert the same statute into more than one box.

*Sherman Act Section 1*  
*Clayton Act Section 7*

*Sherman Act Section 2*  
*Federal Trade Commission Act*

a. "Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce ... shall be deemed guilty of a felony..."

b. "Unfair methods of competition in or affecting commerce, and unfair or deceptive acts or practices in or affecting commerce, are declared unlawful."

c. "No corporation engaged in commerce shall acquire, directly or indirectly, the whole or any part of the stock ... of another corporation engaged also in commerce, where ... the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly."

d. "Every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce ... is declared to be illegal."


(3) [Cournot duopoly: 14 pts] Suppose a market is served by only two firms: Acme Products Company and Best Products Company. Suppose the two firms form a *symmetric Cournot duopoly*, each firm setting its own quantity while taking the other firm's quantity as given. Let  $q_A$  = Acme's quantity and  $q_B$  = Best's quantity, so that total market quantity  $Q = q_A + q_B$ . The market demand curve is  $P = 15 - (Q/10)$ . Each firm has constant marginal and average cost equal to \$3. Circle your final answers. Use the space at the bottom of the next page for scratch work.

- a. Find an expression for Acme's revenue, as a function of its own quantity and the quantity produced by the other firm:  $TR_A(q_A, q_B)$ . [Hint: By definition,  $TR_A = P q_A$ . Here, replace  $P$  by the equation for the demand curve, and then replace  $Q$  by  $(q_A + q_B)$ .]

- b. Find an expression for Acme's marginal revenue, as a function of its own quantity and the quantity produced by the other firm:  $MR_A(q_A, q_B)$ . [Hint:  $MR_A = dTR_A / dq_A$ .]

- c. Find an expression for Acme's reaction function (or best reply function), showing how much Acme will produce for any given level of quantity set by the other firm:  $q_A^* = f(q_B)$ . [Hint: Set  $MR_A = MC$  and solve for  $q_A$  as a function of  $q_B$ .]

- d. Assume the equilibrium is symmetric (that is, assume  $q_A^* = q_B^*$ ) and compute Acme's equilibrium quantity  $q_A^*$ .

Question continues on next page.

e. Compute total market quantity  $Q^*$  and the equilibrium price  $P^*$ .

f. Compute the Lerner index of market power  $[(P-MC)/P]$ .

g. Compute the social deadweight loss from Cournot duopoly.



(4) [Joint profit maximization: 10 pts] Suppose the two firms in the previous problem form a cartel to maximize the sum of their profits. Show your work and circle your final answers.

a. Find the cartel's marginal revenue function.

b. Compute the cartel's profit-maximizing level of output  $Q^*$ .

c. Compute the cartel's profit-maximizing price  $P^*$ .

d. Compute the cartel's Lerner index of market power  $[(P-MC)/P]$ .

e. Compute the social deadweight loss from the cartel.

(5) [Price-setting (Bertrand) duopoly with differentiated products: 15 pts] Firm A and Firm B produce similar items, but their designs are distinctive, so their products are not perfect substitutes. Firm A's demand is given by  $Q_A = 300 - 20 P_A + 10 P_B$ . Firm B's demand is given by  $Q_B = 300 - 20 P_B + 10 P_A$ . Each firm sets its own *price*, taking as given the *price* of the other firm. Assume the firms have no costs, so each firm simply seeks to maximize its own revenue.

a. Give an expression for Firm A's revenue  $TR_A$ , in terms of  $P_A$  and  $P_B$ .

b. What price should Firm A set, given Firm B's price  $P_B$ ? Give an expression in terms of  $P_B$ . In other words, give Firm A's *best reply function*.

c. Compute the (Nash) equilibrium prices  $P_A^*$  and  $P_B^*$ . [Hint: you may assume this equilibrium is symmetric:  $P_A^* = P_B^*$ .]

d. Compute  $Q_A^*$  and  $Q_B^*$ . [Again, assume symmetry.]

e. Compute the revenue of each firm.

(6) [Measures of concentration: 6 pts] Statistica.com reported that shares of U.S. automobile manufacturers in 2018 were as follows.

<b>Manufacturer</b>	<b>Market share</b>
General Motors	17%
Toyota Motor Corporation	15%
Ford Motor Company	14%
FCA/Chrysler Group	13%
Nissan/Mitsubishi	9%
Honda Motor Company	9%
Hyundai-Kia	7%
Subaru	4%
Volkswagen Group	4%
Daimler	2%

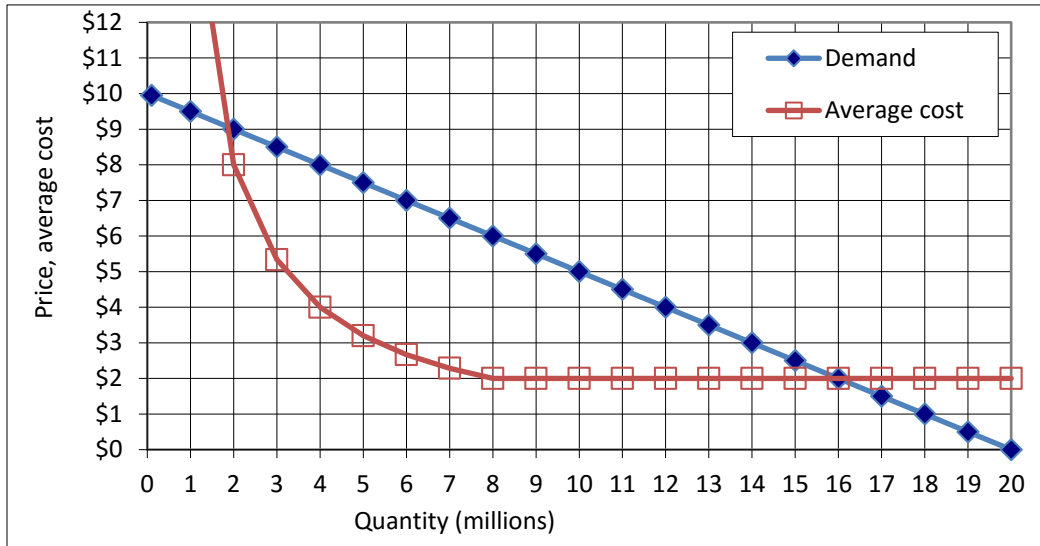
The total sums to 94%. Assume the remaining manufacturers are very small and may be ignored in the following calculations.

- a. Compute the four-firm concentration ratio.
- b. Compute the eight-firm concentration ratio.
- c. Compute the Hirschman-Herfindahl Index.

%
%



(7) [Entry barriers and contestable markets: 26 pts] The graph below shows a market where the incumbent firm now produces ten million units of output and sets a price of \$5. The average cost curve applies to the incumbent and to any other firm that tries to enter this market.



a. What is minimum average cost?

\$
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b. What is the minimum efficient scale?

million
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c. Assume  $MC=AC$  and compute the incumbent's Lerner index (or "price-cost margin").

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First, suppose a second firm enters the market and produces four million units of output. Assume the Bain-Sylos postulate: the incumbent firm keeps its output level fixed at ten million and lets the market price fall.

d. What is the new market price?

\$
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e. What is the entrant's average cost?

\$
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f. Does the entrant make a profit or a loss?

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g. How much?

\$ million
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Alternatively, suppose a second firm enters the market and offers a price of \$4. Do not assume the Bain-Sylos postulate. Instead assume the market is *contestable* and the incumbent firm keeps its price fixed at \$5.

h. What is the entrant's quantity?

million
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i. What is the entrant's average cost?

\$
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j. Does the entrant make a profit or a loss?

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k. How much?

\$ million
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l. What price *should* the incumbent set to prevent entry?

\$
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m. Compute the incumbent's Lerner index (or "price-cost margin") assuming it sets price as in part (l).

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**III. Critical thinking:** Write a one-paragraph essay answering *just one* question below (your choice). Full credit requires correct economic reasoning, legible writing, good grammar including complete sentences, and accurate spelling. [6 pts]

- (1) Use the same demand and cost assumptions as in problem (5), but now assume that Firm A and Firm B coordinate their prices to maximize the combined total revenue ( $TR=TR_A+TR_B$ ) of both companies.
  - a. Compute the prices  $P_A^*$  and  $P_B^*$  that maximize TR. [Hint: Set  $\partial TR/\partial P_A = 0$ , and assume symmetry:  $P_A^* = P_B^*$ .]
  - b. Compute  $Q_A^*$  and  $Q_B^*$ , the corresponding quantities.
  - c. Compute  $TR^*$ , the maximum combined total revenue.
  
- (2) Suppose a market is currently served by only one firm, Firm A, whose average and marginal cost is \$5, but whose price is currently \$8. Firm B, with similar costs, is considering entering the market. To preserve its monopoly, Firm A tells Firm B that if Firm B enters the market, then Firm A will lower the price to \$4 to make sure that Firm B loses money.
  - a. Define the term *credible threat*.
  - b. Is Firm A's threat *credible*? Why or why not?

[end of exam]