Economics 121 MIDTERM EXAM

<u>GENERAL INSTRUCTIONS</u>: Write <u>your name</u> and <u>your TA's name</u> on the front cover of each of TWO BLUE BOOKS. The exam has 3 parts. Put Part I and Question II.1 in one blue book, and Question II.2 and Part III in a second. The exam is worth 100 points. Point assignments are given in the instructions for each part. Check your calculations on scratch paper but be certain to <u>put all of your answers in the bluebooks</u>.

- I. <u>TRUE or FALSE or UNCERTAIN and EXPLAIN</u>: Choose 4 of the following 6 statements, decide whether each is true or false or uncertain, and then explain the reasoning behind your answer in a few sentences; provide any assumptions you may think necessary to draw your conclusion. We will only grade the first 4 that appear in your bluebook. Each question is worth 7 points for a total of 28 points.
- 1. While retail sales of ready-to-eat breakfast cereals in the Bay Area exhibits an HHI of 1,840, this figure likely <u>overstates</u> the extent of concentration in this market.
- 2. When firms in an industry act as price takers, their index of scale economies, s, will be less than 1 when the industry reaches in equilibrium.
- 3. It is never profitable to sell a product <u>below</u> its cost of production and below the price charged by competitive firms.
- 4. A single-product monopolist who controls the quantity and the quality of its product will supply too little of both relative to the social optimum.
- 5. An auto manufacturer would never create a slow version of its popular sports car by merely disabling the fifth gear because all of its potential customers would prefer the faster version.
- 6. When two duopolists compete by setting price of their <u>undifferentiated</u> products, the industry will result in the Bertrand paradox.

II. <u>MULTI-PART QUESTIONS</u>: Answer <u>all of the four parts</u> of <u>both</u> of the following two questions. The point assignment for each subpart is given in [square brackets]. Together, the two are worth 48 points.

- 1. Suppose a dominant firm resides in an industry with (inverse) market demand of: P(Q) = 100 Q. Each of 10 competitive fringe firms has marginal cost given by: $MC(q_f) = 80 + 10q_f$. Neither type of firm incurs fixed costs.
 - a) [4] Derive the <u>supply curve</u> of the competitive fringe: $S_t(P) = P 80$.

- b) [4] Draw a <u>large</u> price-quantity diagram and insert industry demand and competitive fringe supply curves, carefully and completely labeling all points and lines.
- c) [6] On a second diagram, draw in the <u>residual demand</u> of the dominant firm and clearly label it, and then add the dominant firm's corresponding <u>marginal revenue</u> into this second diagram.
- d) [6] Draw two marginal cost curves for the dominant firm in your second diagram that result in the following outcomes:
 - i) MC_1 : The dominant firm chooses the same price and quantity as a monopolist
 - ii) MC_2 : The fringe produces a positive amount.

- 2. Consider a Hotelling town served by two firms, one located at the *far left end* (firm L at z = 0) and another at the *far right end* (firm R at z = 1) of the one-mile town. As usual, *M* potential customers are evenly distributed along the mile interval, each one places a value of *V* on the homogeneous good sold by the firms, and incurs a per-mile transportation charge of *t*. The prices charged by firms L and R, respectively, are p_L and p_R . For simplicity, assume that all costs are sunk and that the entire market will be served.
 - a) **[4]** Draw a diagram illustrating the Hotelling town being sure to <u>label all points and lines</u>. Indicate the "effective" or "delivered" prices for both firms (as seen by the various customers located along the line) and give the <u>algebraic expressions</u> for those prices.
 - b) [8] Derive the location of the "marginal consumer": $z = (p_R p_L + t)/2t$ (assuming V is large enough relative to prices that everyone in town makes a purchase). Then use this location to write down Firm L's profit and show that its profit-maximizing price (given the price of Firm R) is: $p_L = \frac{1}{2}(p_R + t)$
 - c) [8] Solve for the equilibrium prices charged by the two firms and explain how and why they vary with transportation cost t.
 - d) **[8]** Suppose now that firms L and R <u>merge</u> to form a <u>monopoly with two locations</u>. Compute the prices that will now be charged by the monopolist and compare to the pre-merger prices. Do they rise or fall? Explain why.

III. <u>INDUSTRY STUDIES</u>: Choose just one of the three industries—BEER or STEEL or BREAKFAST CEREALS—and then answer all of the questions below for the chosen industry. This section has a total of 24 points.

- 1. **[8]** Describe the extent of <u>scale economies</u> in the industry, and give one cause for:
 - a) increasing returns to scale,
 - b) decreasing returns to scale.
- 2. **[6]** Give <u>one example</u> of likely <u>scope economy</u> that occurs in the production of products in this industry, and identify the <u>source</u> of that scope economy.
- 3. **[10]** Briefly describe the pattern of <u>concentration</u> over time in this industry in the U.S. Be certain to identify the significant events and economic forces underlying the major changes in concentration that

have occurred.