NOVA SCHOOL OF BUSINESS & ECONOMICS

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Time: 2:00

INDUSTRIAL ORGANIZATION
(B.S. in Economics and B.S. in Management)

Midterm exam

Answer each question on a separate sheet of paper. Good luck!

1. [15 minutes; 4 points] The following statement was recently made by a former student of this course:

> "Increasing the quality of a differentiated product traded in a monopolistic competition market does *not* increase profits, either in the short or in the long run."

Comment in no more than ten lines (graphs, if any, excluded) while agreeing or disagreeing.

2. [15 minutes; 4 points] Jane Theory, the best student in her class, said:

> "A very inefficient competitive fringe may be almost useless from a social welfare viewpoint: its supply curve may be "too high up" in the price-quantity space."

Comment in no more than ten lines (graphs, if any, excluded) while agreeing or disagreeing.

3. [45 minutes; 6 points] A monopolist franchisee sells burgers in a market whose demand equals $q = 10 - p$. To produce it, it needs two types of input: general inputs (ground beef, buns, mayonnaise, etc.) that it buys at a constant marginal and average cost of 2, and a special input—the brand—that it must "rent" from the franchisor. The franchisor charges c per burger sold by the franchisee.

The franchisor does not incur an additional cost when it "rents" the brand to a franchisee (all the costs of creating and maintaining the brand—design, advertising, etc.—are independent of the number of franchisees that rent it and how many burgers they sell, hence are fixed).

(i) How many burgers will the franchisee sell as a function of the franchisor's renting fee c? Quantify.

(ii) Formulate the franchisor's problem regarding its choice of c and solve it. What value does the franchisor set for c? Quantify.

(iii) What is the franchisee's profit? And the franchisor's? And the consumers' surplus? Quantify.

The franchisor decides to apply a new pricing scheme whereby it charges a fixed fee, F, as a "rent", instead of a per-unit-of-output fee, as was previously the case with c.

(iv) How many burgers will the franchisee sell? Quantify.

(v) What value does the franchisor set for F? Quantify and explain.

(vi) What is the franchisee's profit? And the franchisor's? And the consumers' surplus? Quantify.

(vii) Is the new scheme socially better or worse than the old one? Quantify and explain intuitively.

4. [45 minutes; 6 points] Two firms sell imperfectly differentiated products, denoted 1 and 2, whose demand functions are $q_1 = 10 - p_1 + p_2$ and $q_2 = 10 - p_2 + p_1$, respectively. Each produces its product at a constant marginal and average cost of 6, i.e., $c_1 = 6 = c_2$. They compete in prices, which they set simultaneously and independently.

(i) What price will each firm set? How much will each sell? What profit will each attain? Quantify.

Firm 1 has embarked on an R&D project that has lowered its constant marginal and average cost to 2.

(ii) What price will each firm set? How much will each sell? What profit will each attain? Quantify.

Suppose that firm 2 is unaware of firm 1's R&D project. This gives rise to the direct effect. Suppose now that firm 2 becomes aware of the R&D project. This would give rise to additional price changes, which constitute the strategic effect. The two together yield the total effect of the R&D project.

(iii) What is the direct effect of the R&D project on firm 1's decision variable, i.e., its price? And the strategic effect? Quantify and explain.

(iv) What is the direct effect of the R&D project on firm 1's profit? And the strategic effect? Quantify and explain.