NOVA SCHOOL OF BUSINESS & ECONOMICS

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Time: 2:00

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

Final exam (resit season)

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:

> "Concentration measures cannot tell us whether firms are tacitly colluding or not."

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:

> "The equilibrium price resulting from the static Bertrand model, as well as from its infinitely-repeated version, *may* decrease as the number of firms increases, but may also stay constant."

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

3. [45 minutes; 6 points] An incumbent monopolist, denoted I, produces a good whose demand equals $q = 10 - p$, doing so at a marginal and average cost of 2. Moreover, the monopolist has a capacity in excess of 10 physical units.

(i) What quantity will the monopolist produce? What will its profit be? Quantify.

An entrant, denoted E, is considering whether to also offer this homogeneous good. Its technology allows it to produce it at a constant marginal and average cost of 4. The entrant and the (former) incumbent monopolist compete in quantities, which they set sequentially, with the incumbent being the leader.

(ii) Can the incumbent *deter* entry, i.e., lead the entrant to produce 0 output? Which quantity will it then produce? Quantify.

(iii) Can the incumbent *accommodate* entry, i.e., allow the entrant to produce a strictly positive quantity? Which quantity will it then produce? Quantify.

(iv) Which of the two strategies will the incumbent follow? Quantify and explain.

Suppose now that the incumbent monopolist installed initially a capacity equal to the quantity that it produced before the entry threat materialized (which you computed when answering (i) above).

(v) Can the incumbent *deter* entry, i.e., lead the entrant to produce 0 output? Explain.

(vi) Can the incumbent *accommodate* entry, i.e., allow the entrant to produce a strictly positive quantity? Which quantity will it produce? Quantify.

(vii) Taking into account all the previous answers, can we argue that installing a capacity larger than the monopoly quantity is an optimal strategy for firm I? Explain.

4. [45 minutes; 6 points] Two firms, 1 and 2, compete in a homogeneous good's market whose *yearly* demand is $q = 10 - p$ by simultaneously and independently choosing the price that they wish to quote each year. Both firms produce at a constant marginal and average cost of 6, a fact that is common knowledge. Both firms expect to serve this market forever. [Denote the discount factor by δ.]

(i) Under which condition can the two firms tacitly collude? Quantify and explain.

(ii) What is the optimal collusion price? What profit will each then make? Quantify.

Assume that the two firms are indeed tacitly colluding around the optimal collusive price. Firm 1 has embarked on a R&D project that can lower its constant marginal and average cost either to 5.5, with probability 1/2, or 2, with probability 1/2. Firm 1's decision to do this R&D project is common knowledge.

(iii) Will the R&D project prevent the two firms from continuing to tacitly collude under *all* circumstances? Quantify and explain.

(iv) Can the R&D project be harmful to firm 2? Will it always be so? Explain.

(v) Can the R&D project be beneficial to consumers? Will it always be so? Explain.