ECN 453: Final Exam (Practice)

Instructions:

- You have **110 minutes**
- Please write your final answer in the underlined section provided.
- You may bring a calculator and notes on a two-sided cheat-sheet on letter-size paper.
- Please be neat. If your work is too messy it will not be graded.
- Be sure to show your working.
- This is a long exam, so there are lots of ways to get points. If you get stuck, move on!
- Good luck!

Name: _____

Question:	1	2	3	4	5	6	Total
Points:	45	30	30	30	30	30	195
Score:							

Short Answer Questions (45 points)

1. Depending on the question, write either:

   - a number
   - one of: True, False, or NEI (Not Enough Information)
   - a definition (i.e. one or a few words)

   (a) (3 points) If entry costs are endogenous, then the equilibrium number of firms is less sensitive to changes in market size than if entry costs are exogenous.

   (a) _____

   (b) (3 points) Give one reason why, in reality, observed market structure might depart from the simple theoretical example we discussed in class.

   (b) _____

   (c) (3 points) Suppose there is an upstream manufacturer M selling an input to two downstream retailers R_1 and R_2 (and these downstream retailers are competing against each other). If the manufacturer merges with R_1, would you expect the downstream price of R_1 (p_1) to *increase, decrease, or is the effect ambiguous,* compared to vertical separation?

   (c) _____

   (d) (3 points) Consider again the merger in the previous question. Given the reason discussed in class why we would expect the downstream price between M and R_2 to increase, compared to vertical separation?

   (d) _____

   (e) (3 points) True, False, or Not Enough Information: Suppose that two firms choose to become on firm using a horizontal merger. This merger will *always* increase the joint profits of the merging firms.

   (e) _____

   (f) (3 points) Put yourself in the position of a lawyer trying to convince a judge to approve the 1996 Staples and Office Depot merger discussed in class. Would you argue that Staples and Office Depot compete using a (i) broad market definition (e.g. stores that sell office supplies) or (ii) a narrow market definition (e.g. office superstores)?

   (f) _____

   (g) (3 points) Suppose there are three firms in a market with market shares 0.4, 0.3, and, 0.3, respectively. Compute the Herfindahl-Hirschman Index.

   (g) _____

   (h) (3 points) What is the value of the Lerner index under perfect competition?

   (h) _____

   (i) (3 points) What is the value of the Herfindahl–Hirschman Index under monopoly?

   (i) _____

   (j) (3 points) Consider an identical n-firm Cournot market with market size $S = 1$, total demand $p = 20 - Q$ (where Q is the total market quantity), and the total cost for each firm is $C(q) = 2 + 2q$.

Assuming that firms continue to enter so long as profit is not negative, how many firms will enter the market in equilibrium?

(j) _____

(k) (3 points) Consider an identical n-firm Cournot market with market size $S = 1$, total demand $p = 15 - Q$ (where Q is the total market quantity), and the total cost for each firm is $C(q) = 2 + q$. Assuming that firms continue to enter so long as profit is not negative, what is the equilibrium price?

(k) _____

(l) (3 points) True, False, or Not Enough Information: Consider an identical n-firm Cournot market with market size $S = 1$ and exogenous entry costs. Suppose that the market size doubles so that $S = 2$. Then, the equilibrium number of firms in the market will *less than double*.

(l) _____

(m) (3 points) Give an example of a *unilateral effect* of a merger.

(m) _____

(n) (3 points) Give an example of an endogenous entry cost.

(n) _____

(o) (3 points) True, False, or Not Enough Information: Provide one benefit (that we discussed in class) that a regulator might consider when deciding whether to approve a merger.

(o) _____

Movie Theater Question (30 points)

2. Suppose you are the owner of a movie theater. There are two types of customers: students (denoted 's') and non-students (denoted 'ns'). The demand for movie seats for each of these segments is:

$$\text{Student: } q_s = 80 - 2p_s$$
$$\text{Non-student: } q_{ns} = 85 - p_{ns}$$

   (a) (30 points) Assume that you cannot distinguish between students and non-students, and so you can only set a single *uniform price* for all consumers. Assume that the marginal cost of a seat is \$15. What is the optimal uniform price?

(a) _____

Stackelberg Competition (30 points)

3. There are two firms in a market with total demand $p = 100 - Q$. Firm 1 in an incumbent and so moves first. Firm 2 is a potential entrant and so moves second. Firm 1's total cost is $C(q_1) = q_1^2$. Firm 2's total cost is $C(q_2) = 0$.

   (a) (15 points) Suppose that the firms compete in a Stackelberg equilibrium. What is the equilibrium quantity for Firm 1?

(a) _____

(b) (15 points) Suppose now that Firm 2 (the potential entrant) now chooses whether to enter after Firm 1 makes its production decision. If Firm 2 enters then it pays an entry cost $E = 16$. Which values of q_1 deter Firm 2's entry?

(b) _____

Hotelling Model (30 points)

4. Suppose 100 consumers are uniformly distributed on a 1 mile stretch of road. There are two supermarkets on the road: Supermarket 1 is located at the west end of the road (at location = 0), and Supermarket 2 is part way along the road (at location = 0.6). Transport costs for consumers are $1.0 per mile. The supermarkets' marginal costs are 0. The supermarkets compete on prices: denote Supermarket 1's price p_1 and Supermarket 2's price p_2.

   (a) (15 points) What is the demand for each supermarket?[1]

(a) _____

[1] When computing consumer choices, only consider the transport costs to get to the supermarket, don't worry about the return journey.

(b) (15 points) What are the equilibrium prices?

(b) _____

Collusion (30 points)

5. Consider the following game and suppose that it is repeated an infinite number of times. Players have a discount value of δ. Suppose that x is a number.

		Player 2: L	Player 2: R
Player 1	T	8, 8	9, 0
	B	0, 9	x, x

(a) (15 points) Suppose that $\underline{x=0}$. For what values of δ can collusion on (T,L) be sustained under the following grim trigger strategy:

- Play (T,L) if (T,L) has been played in all previous periods
- Otherwise play (B,R).

(a) _____

(b) (15 points) Suppose that $\delta = 0.5$. For what values of x can collusion on (T,L) by sustained using the grim trigger strategy from Part (a)?

(b) _____

Vertical Relationships (30 points)

6. Suppose that there are two firms in a supply chain: a manufacturer who sells to a retailer. The timing is as follows:

    1. Manufacturer has a constant marginal cost $c = 0$ and sets input price w to maximize profit.
    2. Retailer buys input from manufacturer for price w. Retailer sets price p to maximize profit with demand $D(p) = 10 - 0.5p$.

    (a) (20 points) What are the joint profits of the firms (i.e. the sum of the profit of the manufacturer and the retailer) under vertical separation?

(a) _____

(b) (10 points) What are the joint profits of the firms under vertical integration?

(b) _____