EXAMINATION 3
"Antitrust Policy"
April 18, 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, 11 pts total]

(1) The Procter and Gamble-Clorox case (1967) showed the Supreme Court's
a. reluctance to interfere with horizontal mergers.
b. concern for potential competition.
c. willingness to stop mergers even involving small market shares.
d. interest in applying the HHI measure of concentration.
e. tendency to define markets very narrowly.
f. tendency to define markets very broadly.

(2) According to the DOJ-FTC *Horizontal Merger Guidelines*, the ability of a hypothetical monopolist to impose a "small but significant and nontransitory increase in price" should be used to
a. compute a merged firm's Lerner index.
b. define the extent of a market.
c. decide whether a merger should be opposed.
d. compare with any cost savings.
e. regulate price in a market.
f. distinguish vertical, horizontal, and conglomerate mergers.

(3) In the 1997 proposed merger of Staples and Office Depot, the government argued that
a. only cost savings should be considered.
b. the merger was acceptable.
c. the effect of the merger on cost savings and market price should be weighed using the compensation test.
d. only the effect of the merger on market price should be considered.

(4) The view that vertical mergers are generally not a problem, because simple models show that either they are unprofitable or they do not decrease welfare, is called the
a. Traditional or Harvard School view.
b. Chicago School view.
c. Post-Chicago view.
d. Supply-side view.

(5) The U.S. government was most aggressive in preventing vertical mergers
a. in the 1960s.
b. in the 1980s.
c. since 1995.
d. The government has always treated vertical mergers extremely aggressively.

(6) Exclusive dealing arrangements, whereby a retailer agrees not to sell the products of a manufacturer's rivals, are generally
a. legal unless the retailer has very small market share.
b. Illegal unless the manufacturer has very small market share.
c. Cannot be determined from information given.

(7) According to the Areeda-Turner (1975) rule, a firm should be presumed to be engaging in predatory pricing if its price is less than its
a. average variable cost.
b. average fixed cost.
c. average total cost.
d. marginal cost

(8) According to the "essential facilities" doctrine articulated by the circuit court in MCI versus AT&T (1982), a company is guilty of monopolization if one can show all of the following, *except*
a. control of the facility by a monopolist.
b. a difference in price between the monopolist and the competitor.
c. the competitor's inability to duplicate the facility.
d. denial of use of facility to the competitor.
e. the feasibility of providing the facility to the competitor.

(9) Suppose a company has a patent on Product X. According to the Supreme Court in *Kodak v. Image Technical Services*, antitrust law prevents that company from
a. raising the price of Product X "unreasonably" higher than marginal cost.
b. using the patent to gain a monopoly in Product Y.
c. cross-licensing its patent with other companies holding other patents.
d. refusing to license the patent to other would-be producers of Product X.

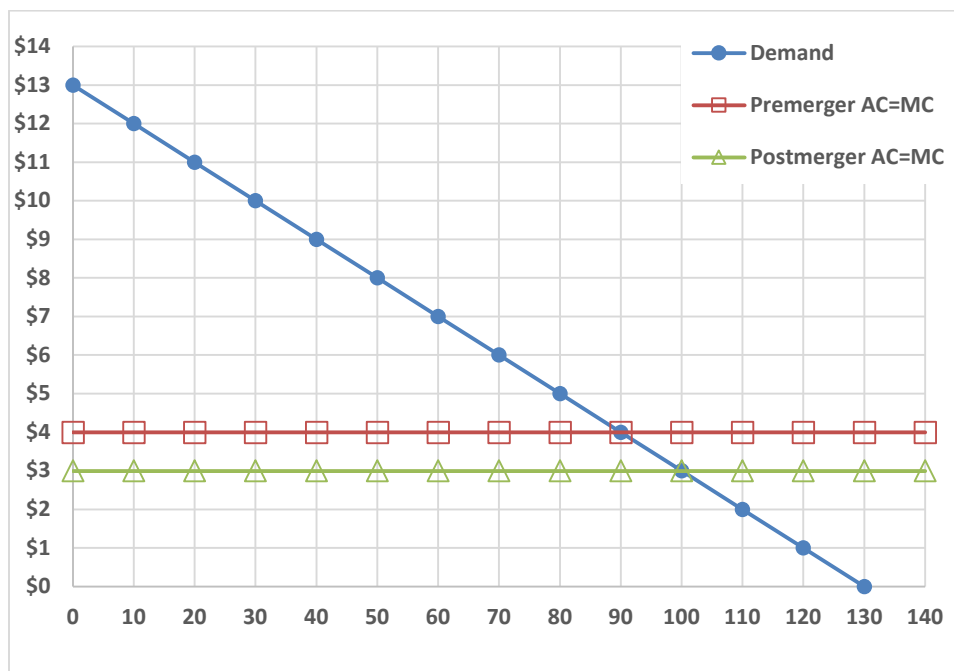(10) In its antitrust settlement of 1995, Microsoft agreed to
a. charge computer companies for the number of copies of Windows actually installed, instead of for the total number of computers sold.
b. decrease the price of Windows by 20%.
c. stop giving Internet Explorer away for free.
d. dissolve into two companies: one for the operating system and one for applications.
e. all of the above.

(11) The most frequent antitrust issues in the "new economy" of software and internet-based businesses relate to
a. horizontal mergers.
b. vertical mergers.
c. monopolization.
d. resale price maintenance.

II. Problems: 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) [Welfare tradeoffs of mergers: 14 pts] Consider the industry depicted in the graph below.

A proposed merger in this industry would have two effects. First, it would change the industry from a competitive market to a monopoly. Second, it would reduce AC and MC from $4 to $3 due to various efficiencies.

a. What price would the monopoly charge? [Hint: draw the MR curve carefully.]	$
b. Compute the total loss of consumer surplus as a result of monopoly pricing.	$
c. How much of this loss is a transfer to the monopoly producer?	$
d. Compute the deadweight loss as a result of monopoly pricing (without considering cost savings).	$
e. Compute the cost savings in producing the monopoly level of output as a result of the merger.	$
f. Does net social welfare *increase or decrease* as a result of the merger?	
g. By how much?	$

(2) [HHI and merger guidelines: 12 pts] Suppose the market shares of the largest firms in an industry are as follows.

Firm	A	B	C	D	E	F	G	H
Market share	30%	20%	5%	5%	5%	5%	5%	5%

Assume the shares of the remaining firms are so small that they have a negligible effect on calculations below.

a. Compute the current value of the Hirschman-Herfindahl index.

b. Under the 2010 DOJ-FTC *Horizontal Merger Guidelines*, would this industry be classified as "unconcentrated," "moderately concentrated," or "highly concentrated"?

Now suppose Firm A were to merge with Firm B.
c. Compute the postmerger value of the Hirschman-Herfindahl index.

d. Under the 2010 *Guidelines*, would this industry now be classified as "unconcentrated," "moderately concentrated," or "highly concentrated"?

e. On the basis of these calculations alone, under the 2010 *Guidelines*, would this merger be deemed "**unlikely to have adverse competitive effects**," or would it "**raise significant competitive concerns**," or would it be "**presumed to be likely to enhance market power**"? Why?

(3) [Upward pricing pressure: 8 pts] Suppose Firm A has 40% market share and Firm B has 30% market share. Assume that all customers buy from *some* firm in this market.

a. Compute an estimate of the diversion ratio D_{AB} –that is, the number of units lost by Firm B when Firm A sells one more unit.
b. Compute an estimate of the diversion ratio D_{BA} –that is, the number of units lost by Firm A when Firm B sells one more unit.

Further assume the following.
* Firm A's price and marginal cost are $25 and $17 respectively.
* Firm B's price and marginal cost are $20 and $14, respectively.
* It is estimated that a merger would lower Firm A's marginal cost to $15, and would lower Firm B's marginal cost to $13.

Suppose Firms A and B were to merge. Compute the consequences for **Firm A**'s pricing.
c. Compute the upward pricing pressure on Firm A caused by the merger (UPP_A).

$

d. Compute the hypothetical value of efficiencies (that is, the change in Firm A's marginal cost) that would be required to reduce UPP_A to zero.

$

(4) [Monopoly extension with fixed proportions: 17 pts] Suppose an upstream monopoly firm produces a patented component that is used by a downstream industry to make appliances. The upstream firm has constant marginal cost (equal to average cost) of $MC_C = \$2$. Each appliance requires exactly one component and $4 of other inputs in fixed proportion. Therefore the downstream industry has constant marginal cost (equal to average cost) of $4 plus the price of the component, P_C, which is set by the upstream monopolist. The key assumptions are

Marginal and average cost of component: MC_C $= AC_C$ $= \$2.$
Marginal and average cost of appliance: MC_A $= AC_A$ $= \$4 + P_C$
Demand for appliance: P_A $= 12 - (Q/100).$

a. [2 pts] Find the equation for the marginal revenue curve for the appliance.

$$MR_A =$$

Now compare market outcomes under two scenarios: (i) upstream market is monopolized but downstream market is competitive, and (ii) upstream and downstream are served by a vertically-integrated monopoly.

(i) First suppose the upstream market is monopolized but the downstream market is competitive, so that $P_A = MC_A = \$4 + P_C$.

b. [2 pts] Find the equation for the derived demand curve for components.

$$P_C =$$

c. [2 pts] Find the equation for the marginal revenue curve for components.

$$MR_C =$$

Compute the quantity of components (and thus appliances) sold Q, the price of components P_C, the upstream component monopolist's profit, the price of appliances P_A, and the downstream industry's profit. Insert your answers in column (i) in the **Table of Results** below.

(ii) Second, assume the upstream and downstream industries are served by a vertically-integrated monopoly. The marginal cost of appliances for the vertically-integrated monopoly is therefore $MC = \$2 + \$4$. Compute the quantity of appliances, the price of appliances P_A, and the integrated monopolist's profit.   Insert your answers in column (ii) of the Table of Results below.

Table of Results [8 pts]	(i) Upstream monopoly, downstream competition	(ii) Vertically integrated monopoly
Q = quantity of components (and appliances)		
P_C = price of components	$	NA
Profit of upstream firm	$	
P_A = price of appliances	$	$
Profit of downstream firm	zero	NA
Total upstream + downstream profits	$	$

d. [3 pts] Suppose this industry were initially organized as a monopoly in the upstream market but competitive in the downstream market (i). Then suppose the upstream monopoly proposed to merge with all firms in the downstream market, and thereby form a vertically integrated monopoly (ii). Would this merger be profitable? Would it harm social welfare? Explain.

(5) [Tying: 14 pts] Suppose a cable television company believes representative households are willing to pay the following amounts for three channels.

	Comedy channel	Action channel	Sports channel
Household A	$25	$10	$20
Household B	$15	$20	$5
Household C	$5	$10	$25

Suppose each channel were priced separately, and suppose the cable TV company wishes to maximize revenue.

a. What price should the company set for the comedy channel? $

b. What price should the company set for the action channel? $

c. What price should the company set for the sports channel? $

d. How much revenue would the company receive in total for all three channels and all three households? $

Suppose all three channels were bundled and priced as a single package, and again suppose the cable TV company wishes to maximize revenue.

e. What price should the company set for the package of three channels? $

f. How much revenue would the company receive in total for all three households? $

g. Should the company sell the three channels *separately* or as a *package*? (Assume the marginal cost of all programs is zero.)

(6) [Price discrimination: 6 pts] Suppose a software company believes Market Segment A has an elasticity of demand for its product equal to -4, and Market Segment B has an elasticity of -2. The marginal cost of delivering the software to either segment is $6.
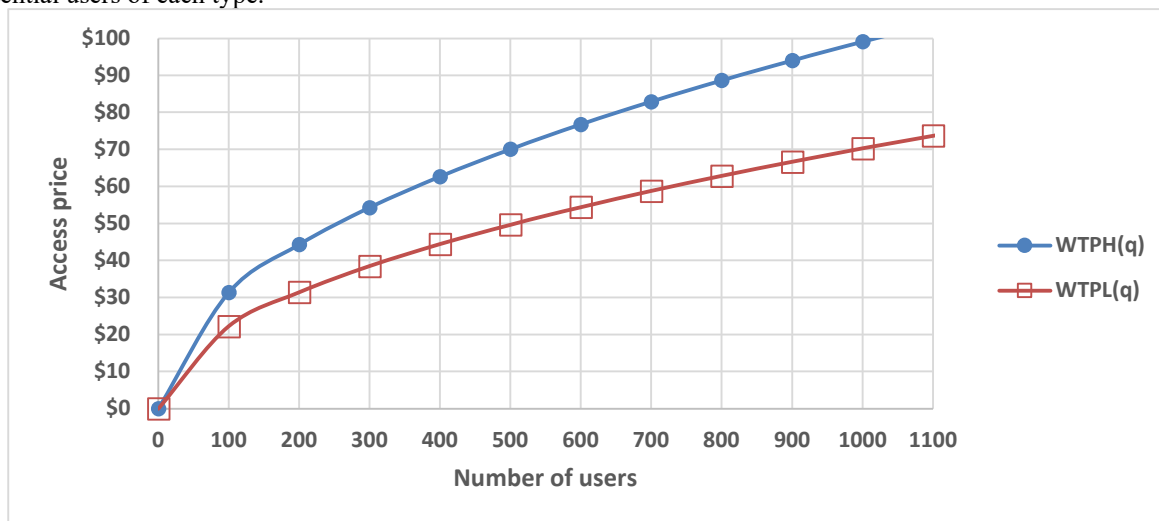
a. Which market segment should get the higher price?

b. Compute the profit-maximizing price for Market Segment A. $

c. Compute the profit-maximizing price for Market Segment B. $

(7) [Network effects: 8 pts] The following graph shows willingness to pay for access to a network for two representative users, a high-intensity user (WTPH) and a low-intensity user (WTPL). Assume there are 500 potential users of each type.

a. Explain why these curves slope upward.

b. What range of access prices (P) would be compatible in equilibrium with no users on the system?

$ \qquad < P < $ \qquad

c. What range of access prices would be compatible in equilibrium with 500 users on the system?

$ \qquad < P < $ \qquad

d. What range of access prices would be compatible in equilibrium with 1000 users on the system?

$ \qquad < P < $ \qquad

(8) [Two-sided platforms: 8 pts] Suppose demand for access to a platform by two user groups is given by

$$\text{User group 1 demand:}\quad q_1 = 1000 - 20\,p_1 + 0.5\,q_2$$
$$\text{User group 2 demand:}\quad q_2 = 1200 - 30\,p_2 \quad\text{or equivalently}\quad p_2 = 40 - (q_2/30)\,.$$

Note that in this case, demand by group 1 depends on the number of people from group 2 that are on the platform, but demand by group 2 does not depend on the number of people from group 1. Suppose the price for group 1 is currently set at $p_1 = \$5$ and the price for group 2 is currently set at $p_2 = \$20$. Compute the following. Show your work and circle your final answers.

a. Compute the quantities demanded by each group: q_1 and q_2 .

b. Compute the value of the marginal revenue from one more user of group 2, ignoring any revenue from the other group.

c. Compute the value of the marginal revenue from one more user of user group 2, *including* any additional revenue from group 1, and holding p_1 constant at $5.

d. Suppose the marginal cost of serving group 2 is $MC_2 = \$1$ and there is no cost of serving group 1. To increase profit, would you recommend raising or lowering the price for group 2 (p_2) ? Justify your answer.

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. [2 pts]

(1) In merger court cases, the government usually argues for a narrow definition of the relevant market and the merging firms usually argue for a broad definition of the relevant market. Why?

(2) Why might a company that makes luxury handbags insist that all retail stores charge a *minimum* price for its handbags? How might such a policy increase the company's profit?

[end of exam]