ECON 451
2001-2004 Exam Questions

1. Please *define* the following concepts:
   a. Structure-conduct-performance paradigm
   b. Economies of scale/returns to scale
   c. Subgame perfect equilibrium
   d. Concentration
   e. Undercut proof equilibrium
   f. Efficiency and productivity
   g. Product differentiation and product diversification
   h. Consistent conjectural variation
   i. Contestable market
   j. Technical and allocative efficiency
   k. Conjectural variation
   l. Transaction costs
   m. Ray average cost
   n. Volume and product flexibility
   o. Bundling/tying

2. Consider a market served by a monopolist firm. Demand function is given by P = 100 - Q and the cost function of the monopolist firm is given by $C_m=500+20q_m$
Suppose that there is a firm planning to enter into this market. The cost function of the potential firm is given by $C_p=600+15q_p$
a) Assume that if the potential firm enters, the incumbent (the monopolist) and the new firm will behave as in the Cournot model (q-setting). Find the equilibrium price and profits.
b) Assume that if the potential firm enters, the incumbent (the monopolist) will behave as a leader , and the new firm will behave as a follower (q-setting). Find the equilibrium price and profits.
c) Assume that if the potential firm enters, the incumbent (the monopolist) and the new firm will behave as in the Bertrand model (p-setting). Find the equilibrium price and profits.

3a) Consider a competitive market. The demand function is given by p = a – Q. All firms have the same marginal cost, *c*. Suppose that the government imposes a specific tax of *t* TL on each unit of output sold to consumers. How much would the price paid by consumers be raised after the imposition of the tax?

b) Consider a monopolist market. The demand function is given by p = a – Q. The marginal cost of the monopolist firm is equal to *c*. Suppose that the government imposes a specific tax of *t* TL on each unit of output sold to consumers. How much would the price paid by consumers be raised after the imposition of the tax?

c) Consider a monopolist market. The demand function is given by $p = Q^{-2}$. The marginal cost of the monopolist firm is equal to *c*. Suppose that the government imposes a specific tax of *t* TL on each unit of output sold to consumers. How much would the price paid by consumers be raised after the imposition of the tax?

4. Let the demand curves in two countries (Country A and Country B) be
$P_A = 100 - Q_A$ and $P_B = 200 - Q_B$
where Q_A is quantity demanded in Country A and Q_B is quantity demanded in Country B. There are two firms with the following total cost functions.
$C_A = 100 + 20q_A$ and $CB = 50 + 20q_B$
where Firm A produces only in Country A, and Firm B produces only in Country B.
a) Assume that there is no trade between Country A and Country B so that both firms have monopolist positions in their own countries. Calculate the equilibrium price-quantity combinations for both markets.
b) Suppose that Firm A now exports to Country B, and Firm A and Firm B act as Cournot duopolists in Country B. Calculate the resulting equilibrium price in Country A. What is the welfare consequences of trade for Country A?
c) Assume that Country A provides export subsidies (s = 10 TL per unit of exports). Will the export subsidy improve the welfare of Country A?

5. Assume that you are the owner of a large firm and you hire a top manager to manage the company.
a) Why might you link the pay of this manager to the size of the firm? If you did, what measure of size would you use?
b) Why might you link the pay of this manager to the profits of the firm? If you did, how would you decide what the link between profits and compensation should be?
c) Which one of the above two explanations of compensation is consistent with the empirical evidence? Explain.

6. Suppose that you produce an information product (for example, stock market information) and there are 100 customers, of which 40 are impatient and 60 are patient. The impatient customers will pay $100 for immediate information, but only $40 for delayed information. In contrast, the patient customers will pay $50 for immediate information and $30 for delayed information. The fixed cost of providing the information product (for example, setting a web site) is $4200. There is no marginal cost.
a) Suppose that you can only use a single version, single-price strategy. Will you just offer the immediate version or the delayed version? At which price will you sell it? How much revenue does this strategy generate?
b) Suppose next that you have a way of determining whether any particular customer is impatient or is patient (imagine, for instance, that the impatient customers all work at investment houses and the patient customers teach in schools). To whom will you sell each version of the product, and at which price? What revenue will you earn?
c) What happens if you cannot identify the high-value and low-value users based on observable characteristics such as type of business, age, location, or gender? Resorting to versioning, what prices should you charge for the immediate and delayed versions? Will this strategy improve the welfare of the society compared to the first case (Case A)?

7. Consider a market served by two firms. Demand for their product is estimated to be
$P(Q)=100-Q$,
with $Q=q_1+q_2$. Assume that production costs are symmetric and given by $C(q)=10q$.
a) Assume these firms compete a la Cournot. Show that the total amount sold in the market is greater than if the two firms merged. Show also that the two firms have indeed an incentive to merge. Discuss.

b) Suppose firm 1 was given the opportunity to commit to its output level before firm 2 chooses its quantity. Show that firm 1 has indeed an incentive to become a market leader by setting its quantity first. In this case, do the two firms have the same incentives to merge?

8. Consider a market served by a monopolist firm. Demand function is given by $P = 100 - \frac{1}{2} Q$ and the cost function of the monopolist firm is given by $C_m=10+10q_m$
a) Find the profit of the monopolist firm.
b) Suppose that there is a firm planning to enter into this market. The cost function of the potential firm is given by $C_p=8q_p$
If the potential firm enters into the market, the incumbent (the monopolist) and the new firm will behave as in the Cournot model. In this market, advertising does not increase total industry demand but instead induces consumers to switch among the products of different firms. Thus, if both firms advertise the same amount, the two advertising campaigns will simply offset each other. However, if one firm advertises more, it gets all consumers.
Find how the monopolist firm can deter entry. Check if this strategy is rational for the monopolist firm.

9. Suppose that 50% of senior citizens are healthy and 50% are sick. A healthy person has medical expenses of 500 TL per year, and a sick person has medical expenses of 2000 TL per year. It costs the insurance company 300 TL per year to provide coverage for a healthy person and 1500 TL per year to provide health coverage for a sick person.

a) Suppose that neither the insurance company nor senior citizens themselves know whether they are healthy or sick. What is the maximum price that the insurance company can charge for health coverage that every senior citizen agrees to buy? Will the insurance company find it worthwhile to sell coverage to everybody for this price?
b) By contrast, assume that senior citizens *know* whether they are healthy or sick, but the insurance company does not. What is the minimum price at which the insurance company agrees to provide coverage for senior citizens? At this price, do all senior citizens choose to purchase the health coverage? What is the *equilibrium* price of a health insurance policy (assume this to be the maximum price that the insurance company can charge to cover all types of people who choose to purchase the coverage at this price)?

10. DayQui ice cream parlor is a monopoly. It sells to two types of customers: H and L. Consumer H enjoys ice cream more than consumer L. In particular, the net utility (measured in TL) of customer of type *i* (i is either H or L) is the consumer surplus from having *q* kg of ice cream minus the price *p* paid for it:

$$U_i = [v_i - (q/200)]q - p$$

where $v_H = 0.28$ and $v_L = 0.20$.

Assume that DayQui does not know which customer is which type and would like to offer two different ice cream serving sizes sold at different prices (p_H, q_H) and (p_L, q_L) intended for different customer types.

a) Suppose that 10 kg ice cream is offered at the price of 1.5 TL and 16 kg ice cream is offered at the price of 3.2 TL. Will it work? Why or why not?

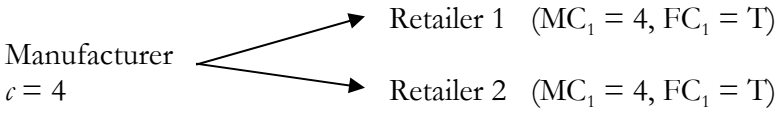
b) Suppose that DayQui decides to offer a 10 kg portion for 1.5 TL and it is intended for the L type. What is the profit maximizing price for the 16 kg portion?
c) Assume that DayQui's marginal cost is zero. If it were to serve *only* customers H, what optimal size portion would it choose and at what price?

11. A manufacturer whose marginal cost is $c = 4$ sells his products to two retailers. These companies are Cournot competitors. Each retailer simultaneously and independently decides what quantity to sell and whether or not to launch an advertisement campaign. If *at least* one retailer pays for the advertisement campaign, market demand is high:

$$p = 16 - Q$$

Otherwise, demand is low $p = 10 - Q$ [Q is total quantity demanded]

The advertisement campaign costs S = 13. Each retailer gets the product from the manufacturer for the price of 4 and pays a franchise fee T [a fixed cost for the retailers].



a) Show that the only Nash equilibrium on the retail market is for neither retailer to pay for the advertisement campaign. What is the total quantity sold? What are the retailers' equilibrium profits? What is the maximum franchise fee that the manufacturer can extract?
b) Now suppose that the manufacturer makes an exclusive dealing agreement with one of the retailers so that that retailer becomes a monopolist. As part of the agreement, the exclusive dealer receives the product for the marginal cost $c = 4$ and pays a flat franchise fee. Does the retailer launch an advertisement campaign? What is his profit? What is the quantity sold? What is the maximum franchise fee that the manufacturer can extract?
c) Consider the first case (Case "a" with two retailers). Suppose that the manufacturer imposes the price $p^* = 10$ on retailers' sales. As before, each retailer receives the product for the marginal cost $c = 4$ and pays a flat franchise fee, T. Show that at this value of p^* (=10) someone pays for the advertisement campaign. What are retailers' profits? What is the maximum franchise fee that the manufacturer can extract? If the manufacturer cares about maximizing the total franchise fee that he can extract, did he choose p^* optimally?

12. Discuss the main characteristics of neo-classical and managerial theories of the firm

13. Calculate the 4-firm concentration ratio and the Herfindahl index for the following market:

Firm	Total sales (TL)
A	30
B	60
C	20
D	50
E	10
F	40

14. X is a monopolist firm. The inverse demand function for Firm X's product is defined by

$P = 4 - Q/z$

where P is the price per unit, Q the quantity demanded, and z the quality of the product. Firm X's costs are independent of how many units it produces, but they do rise with quality. More specifically, Firm X's total costs are given by

$C = z^2$

a) Draw the inverse demand curve for a given quality, z. How do increases in z affect the demand function?
b) Find the profit maximizing levels of output and quality
c) Find the social welfare maximizing levels of output and quality.

15. A cable company has two services, the Basic Service and the Movie Channel. The demands for the two services are completely unrelated for each and every consumer. Each buyer is chracterized by a pair of reservation prices as shown in the following table:

	Basic Service (TL)	Movie Channel (TL)
Students	5	15
Families	11	9
Hotels	14	6
Schools	4	16
Young Adults	0	17
Pensioners	17	0

The marginal cost of each service is 3 TL. Assume there are equal number of consumers in each category.

a) If the services are sold separately, what price should the cable operator set for each service?
b) Suppose that the operator decides to pursue a mixed bundling strategy. What price should be set for the bundled service? What price should be set for each service if purchased individually?
c) Assume that a new firm enters the market and provides only the Basic Service. The marginal cost of the new firm is 3 TL. Can the incumbent cable operator apply the mixed bundling strategy? (Assume price setting behavior.)

16. Suppose that demand for product Y is described by

$P = 130 - Q$

There are 20 identical firms producing Y. The unit cost of production is constant and equal to 30 TL. Firms in this industry compete in quantities.
a) Find the profit of each firm.
b) Now assume that six firms in the market merge. Show that the profit earned by the merged firm is insufficient to compensate all the shareholders/owners who owned the six original firms.
c) Find the number of firms that can increase the postmerger profits of the merged firms.

17. The day is divided into 3 sub-periods (1 night, 2 morning and 3 afternoon). The inverse demand functions are given as follows.

$P_1 = 200 - 2q_1$
$P_2 = 200 - q_2$
$P_3 = 240 - q_3$
The operating cost per unit for each sub-period is defined by
$C_1 = 40q_1 + 2q_1^2$
$C_2 = 40q_2$
$C_3 = 40q_3$
The cost of installing K units of capacity is rK.

a) Write down the firm's optimization problem and the constraints it faces.
b) What would be the output in each sub-period if there were no capacity costs (r = 0)?
c) What would be the output in each sub-period if there the unit cost of capacity is equal to 30 TL (r = 30)?

18. Explain how a monopolist firm can use its excess capacity to deter entry.

19. Consider the model of quantity-setting duopoly. Suppose firms maximize profit assuming the other firm's output as given. Let the cost functions of the two firms be
$C_1 = 5q_1$ and $C_2 = 0.5q_2^2$
where C_i is the total cost of the i^{th} firm, and q_i the output of the i^{th} firm.
The market demand curve is given by
$P = 100 - q_1 - q_2$
a) What will be the equilibrium market price and the profits for each firm if they do not collude.
b) What will be the equilibrium market price and the profits for each firm if they form a cartel and maximize joint profits.
c) Is the cartel stable? Can these two firms form a cartel? Why/how?

20. Consider the model of price-setting duopoly with product differentiation. Suppose firms maximize profit assuming the other firm's price is given. Let the cost functions of the two firms be
$C_1 = 2q_1$ and $C_2 = q_2$
where C_i is the total cost of the i^{th} firm, and q_i the output of the i^{th} firm.
The market demand curves are given by
$P_1 = 100 - q_1 - 0.5q_2$ and $P_2 = 100 - q_2 - 0.5q_1$.
a) What will be the equilibrium market prices and the profits for each firm.
b) Suppose now that firm 1 understands that firm 2 assumes firm 1's price is given in the profit-maximization decision. What will be firm 1's profit-maximizing price?
c) Suppose that firm 1 adopts price-setting behavior (taking firm 2's output as given), and firm 2 adopts quantity setting behavior (taking firm 1's price as given). Find the equilibrium market prices.

21. Consider the model of quantity-setting duopoly. Let the total cost functions of the two firms be
$C_i = 4 + 0.5q_i^2$
where i denotes the i^{th} firm, C total cost, and q output. The market demand function is given by
$Q = 20 - 2P$

where Q is the quantity demanded, and P the product price.

a. Find the reaction functions and the equilibrium price level.
b. Assume that there are now n firms in the market. Find the equilibrium price as a function of the number of firms.
c. Assume free entry and exit. Find the equilibrium number of firms in the market.

22. Consider the airline industry. There are 240 customers and each customer has an ideal time for travel. If a customer's ideal flight is not available, he/she will choose the flight which is scheduled to depart at the time nearest to his/her ideal. Assume that customers' preferences are uniformly distributed over a day (24 hours). Demand is completely inelastic. The cost function for a flight is given as follows:
$C = 50 + 5q$ where C is the total cost of the flight, and q is the number of customers on the flight. The price of a ticket is 10 units and set by the government.

a. Assume that there is only one firm in the market, and the firm schedules only one flight a day. What is the optimal schedule?
b. Assume now that a new firms enters into the market with one flight a day. What is the optimal schedule for the entrant?
c. Consider the monopolist case. Find the optimum number of flights for the monopolist firm.