

Last Name (Please PRINT):

First Name (PRINT):

Your UM I.D. Number:

INSTRUCTIONS (please read!)

1. Please make sure that you have 8 pages, including this page. Complaints about missing pages will not be accepted.
2. Please answer all the questions. You are not allowed to use any course material. Calculators are permitted.
3. Maximum Time Allowed: 1 hour and 20 minutes (11:40–13:00).
4. Your grade depends on the arguments you develop for supporting your answers. Each answer must be justified by using a logical argument consisting of a model/graph. An answer with no justification will not be given any credit.
5. You must provide all the derivations leading you to a numerical solution.
6. When you draw a graph, make sure that you label the axes with the appropriate notation.
7. Maximum Score: 100 Points
8. Budget your time. If you cannot answer a certain question, skip it and go to the next one.
9. Please always bear in mind that “somebody” has to read and understand your handwriting. Please make sure that your ink is ‘visible’ and that your sentences are properly organized and fit into the designated blank space. If you think that your handwriting is poor, please print each word!
10. **Good Luck !**

(1) [10 pts.] The diaper industry in Albania consists of 5 firms producing identical diapers. Similarly, the diaper industry in Bolivia consists of 6 firms. It has been recently observed that firms' market shares in each country are given by

Country	Firms						Concentration Index	
	1	2	3	4	5	6	I_4	I_{HH}
Albania	40%	15%	15%	15%	15%	0%		
Bolivia	45%	11%	11%	11%	11%	11%		

Fill-in the missing items in the above table (show all your calculations). Then, conclude which industry is more concentrated (and according to which measure).

(2) [10 pts.] Discuss whether it is illegal to price discriminate according to the U.S. Law. Explain which section of the law deals with price discrimination, and how this section should be interpreted.

(3) Firms A and B can choose to adopt a new technology (N) or to adhere to their old technology (O). Formally, firms' action sets are: $t_A \in \{N, O\}$ and $t_B \in \{N, O\}$. The table below exhibits the profit made by each firm under different technology choices.

		Firm B			
		NEW TECHNOLOGY (N)	OLD TECHNOLOGY (O)		
Firm A	NEW	200	0	0	200
	OLD	50	100	100	50

(3a) [10 pts.] Write down the best-response functions of firms A and B , $t_A = R_A(t_B)$ and $t_B = R_B(t_A)$

(3b) [5 pts.] Draw the tree of a two-stage extensive-form game in which firm A chooses its technology t_A in stage I, and Firm B chooses its t_B in stage II (after observing the choice made by firm A). Make sure that you indicate firms' profits at the termination points on the tree. Solve for the subgame-perfect equilibrium of this game. Provide a short proof or an explanation justifying your answer.

(3c) [5 pts.] Draw the tree of a two-stage extensive-form game in which firm B chooses its technology t_B in stage I and Firm A chooses its t_A in stage II (after observing the choice made by firm B). Solve for the subgame-perfect equilibrium of this game. Provide a short proof or an explanation justifying your answer.

(3d) [5 pts.] Compare the equilibrium firms' profit levels of the games played in (3b) and in (3c). Conclude under which game firm A earns a higher profit. Briefly explain your answer.

(4) [10 pts.] The market demand function for Marzipan in Frankenmuth Michigan has a constant elasticity of -3 . More precisely the actual daily demand was estimated to be $Q = 34560p^{-3}$, where p is the price per pound. Each pound costs $c = \$8$ to produce. Frankenmuth is served by a local monopoly producer. Compute the monopoly's profit-maximizing price and the monopoly's profit level. Show your computations.

(5) Consider the market for the G-Jeans (the latest fashion among people in their late thirties). G-Jeans are sold by a single firm that carries the patent for the design. On the demand side, there are $n^H = 200$ high-income consumers who are willing to pay a maximum amount of $V^H = \$20$ for a pair of G-Jeans, and $n^L = 300$ low-income consumers who are willing to pay a maximum amount of $V^L = \$10$ for a pair of G-Jeans. Each consumer chooses whether to buy one pair of jeans or not to buy at all.

(5a) [10 pts.] Draw the market aggregate-demand curve facing the monopoly.

(5b) [10 pts.] The monopoly can produce each unit at a cost of $c = \$5$. Suppose that the G-Jeans monopoly cannot price discriminate and is therefore constrained to set a uniform market price. Find the profit-maximizing price set by G-Jeans, and the profit earned by this monopoly.

(5c) [5 pts.] Compute the profit level made by this monopoly assuming now that this monopoly can price discriminate between the two consumer populations. Does the monopoly benefit from price discrimination. Prove your result!

(6) In Waterville there are two suppliers of distilled water, labeled as firm A and firm B . Distilled water is considered to be a homogenous good. Let p denote the price per gallon, q_A quantity sold by firm A , and q_B the quantity sold by firm B .

Both firms are located close to a spring so the only production cost is the cost of bottling. Formally, each firm bears a production cost of $c_A = c_B = \$3$ per one gallon of water. Waterville's aggregate inverse demand function for distilled water is given by $p = 12 - Q = 12 - q_A - q_B$, where $Q = q_A + q_B$ denotes the aggregate industry supply of distilled water in Waterville.

(6a) [10 pts.] Solve for firm A 's best-response function, $q_A = R_A(q_B)$. Also solve for firm B 's best-response function, $q_B = R_B(q_A)$. Show your derivations.

(6b) [5 pts.] Solve for the Cournot equilibrium output levels q_A^c and q_B^c . State which firm sells more water (if any) and why.

(6c) [5 pts.] Solve for the aggregate industry supply and the equilibrium price of distilled water in Waterville.

(6d) [5 pts.] Solve for the profit level made by each firm, and for the aggregate industry profit. Which firm earns a higher profit and why?

THE END