SIMON FRASER UNIVERSITY

ECON 301E: Intermediate Microeconomics.

FINAL EXAM

Instructor: Alex Jameson Appiah April 11, 1996.
Time: 180 mins.

Name: --

St. Number #--

TA's Name/Tut --

Signature --

Instructions: The Examination consists of **two** parts. Students must attempt **all** questions in **Part I.** In **Part II**, students must answer any **five** questions. For questions requiring calculations, students must write the formula they will be using as well as provide the steps and results of the calculations. If more space is required, the back of the page should be used.

Do not write below this line

Question No.				
	PART I		PART II: **5** of **6**	
	Maximum Marks	Marks Obtained	Maximum Marks	Marks Obtained
	50			
1			**10**	
2			**10**	
3			**10**	
4			**10**	
5			**10**	
6			**10**	
TOTAL	**50**		**50**	
				/100

<u>Part II: Answer any five questions.</u>

1. [10 pts.]

Using appropriate diagrams,

(a). derive a *compensated* demand curve.

(b). show a perfectly competitive firm in a long-run equilibrium.

(c). derive the Engel curve for perfect substitutes. What is the slope?

(d). show the following cost functions: *short-run marginal cost*, *short-run average total cost*, *short-run average variable cost* and *average fixed cost* (all in the same diagram).

(e). derive the long-run supply curve of an increasing-cost, perfectly competitive industry.

2. [10 pts.]

In a perfectly competitive industry, the market demand and supply are given by the following functions:

$$Q^d = 15{,}000 - 400P$$
$$Q^s = 5{,}000 + 600P$$

(a). What is the equilibrium price and industry output?

Assume that a new firm is considering the industry. It has the following marginal cost function:

$$MC = -10 + 4Q$$

(b). If it does enter the industry, what output should it produce to maximize profits? What price should it charge?

(c). How much profit will it make?

(d). Should it enter the industry? Why?

3. [10 pts.]

(a)

Fill in the following table relating number of workers to total product (*TP*), marginal physical product (MP_L), average product (AP_L) and marginal revenue product (MRP_L). Assume the competitive firm faces a price of $2 for its good.

Number of Workers	Total Product (*TP*)	Marginal Product (MP_L)	Average Product (AP_L)	Marginal Revenue Product (*MRP*)
0	10			
2	19			
3		8		
4			8.5	
5				12

(b)

Your manager comes in with three sets of proposals for a new production process. Each process uses three inputs: land, labor and capital. Under Proposal A, the firm would be producing an output level where the marginal productivities would be 30 for land, 42 for labor, and 36 for capital. Under Proposal B, at the output produced, the marginal productivities would be 20 for land, 35 for labor and 96 for capital. Under Proposal C, the marginal productivities would be 40 for land, 56 for labor, and 36 for capital. Inputs' costs per hour are $5 for land, $7 for labor, and $6 for capital.

(i). Which proposal would you adopt?

(ii). If the price of labor rises to $14, how will your answer change?

4. [10 pts.]
A monopolist whose demand and cost functions are given below is able to separate his consumers into two distinct markets, Market 1 and Market 2:

$$p_1 = 80 - 5q_1$$
$$p_2 = 180 - 20q_2$$
$$C = 50 + 20(q_1 + q_2)$$

where q_1 and q_2 are the quantities which he sells in the two markets, and $C(q_1 + q_2)$ is his cost function. Solve for the profit-maximizing levels of q_1, q_2, p_1, and p_2. Find the maximum profit. Find the price elasticity of demand for each market.

5. [10 pts.] A duopolistic industry (an industry of only two sellers) is characterized by the following demand and cost functions:

$$p = 100 - 0.5(q_1 + q_2)$$
$$C_1 = 5q_1$$
$$C_2 = 0.5q_2^2$$

where C_i and q_i, $i = (1,2)$ are the cost function and output of firm i, respectively.

(a). Find the best response functions of the two firms.
(b). Solve for the Cournot-Nash equilibrium solution. (Note: Find p^*, q_1^*, q_2^*, π_1^*, π_2^*)
(c). Solve for the collusive solution (when both firms jointly maximize profit).
(d). Compare the results in part (b) with those of part (c).

6. [10 pts.]
A monopsonist's production function is given by

$$q = 6L + 3L^2 - 0.02L^3$$

and the labor supply function is

$$L = -20 + \frac{w}{3}$$

He sells his output in a perfectly competitive market at a price of \$2. Determine the equilibrium levels of labor, output and the wage rate. What is the amount of monopsonistic exploitation?

(*Hint*: The quadratic equation for the solution of this problem has two roots. Check if the second-order condition for maximization is satisfied. The second-order condition is that the slope of the marginal factor cost function should be greater than that of the marginal revenue product at the point of equilibrium).