SIMON FRASER UNIVERSITY

ECON 301: Intermediate Microeconomics.

FINAL EXAM

Instructor: Alex Jameson Appiah

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Time: 180 mins.

Instructions: The Examination consists of **two** parts. Students must attempt **all** questions in **Part I** and **six** questions in **Part II.**

Part I: 40 Points

1. Beth consumes two goods, x_1 and x_2, and her income is \$120. The price of x_1 is \$10, and the price of x_2 is \$5. The opportunity cost of x_2 is:

a) 2 units of x_1. b) 0.5 units of x_1.
c) 0.25 units of x_1. d) 1 unit of x_1.

2. Which of the following is a false statement about the substitution effect associated with an increase in the price of good x?

a) Dominates the income effect if x is a Giffen good.
b) Does not lead the individual to buy more x.
c) Operates in the same direction as the income effect if it is normal.
d) Is dominated by the income effect if it is a Giffen good.

3. A risk-inclined individual is characterized by a utility function that exhibits:

a) Falling total utility of wealth.
b) Falling marginal utility of wealth.
c) Rising marginal utility of wealth.
d) Constant marginal utility of wealth.

4. Modern theories of the firm are based on the hypothesis that:

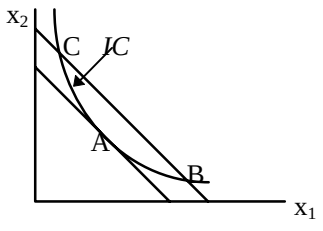
a) Firms cannot recognize Pareto-preferred organizational forms.
b) Employees pursue their own self-interest.
c) Employees choose actions which maximize the firm's profits.
d) Given any bundle of inputs, the maximum possible output is produced.

5. The higher the level of FC:

a) The higher the level of output at which AFC reaches a minimum.
b) The lower the level of output which minimizes MC.
c) The more likely a firm will substitute variable for fixed factors.
d) None of the above.

6. Point B in the Figure is:

a) Feasible but not optimal. b) Infeasible and not optimal.
c) Optimal but marginal. d) Optimal but not feasible.



7. An isocost line is defined as the set of input bundles that:

a) Generate one particular level of output.
b) Can be produced at some specified cost.

c) Produce the profit-maximizing level of output.
d) Can be purchased with a specified sum of money.

8. A market is composed of five demanders with the following reservation prices, $30, $25, $40, $75, and four suppliers' supplies with the following reservation prices, $75, $55, $80 and $85. Which of the following is a competitive equilibrium price?
a) $30. b) $60. c) $40. d) $50.

9. An increase in the price of a variable input employed in a perfectly competitive industry will:
a) Have no effect on long-run equilibrium price under constant-costs.
b) Reduce the amount produced by each firm in long-run equilibrium.
c) Shift the short-run industry supply curve up and to the left.
d) Have no effect on supply under fixed proportions production.

10. In a perfectly competitive industry, an increase in market demand increases:
a) Price in both the short and the long-run.
b) Price in the short-run, but has no effect on the long-run price.
c) Each of the firm's share of total output in the long-run.
d) Quantity supplied in both the short and the long-run.

11. The fundamental difference between a perfectly competitive and monopolistic profit-maximization problem is that, in a competitive market MR:
a) Diminishes as quantity increases while in a monopoly it increases.
b) Diminishes as quantity increases while in a monopoly it is fixed.
c) Increases as quantity increases while in a monopoly it is fixed.
d) Is fixed while in a monopoly it diminishes as quantity increases.

12. All but which one of the following statements are true, given a downward-sloping linear demand function?
a) When TR is falling, price exceeds MR.
b) MR is less than AR for all positive quantities.
c) When TR is at a maximum, MR is zero.
d) When the TR is increasing, AR is falling.

13. Suppose a specific excise tax is imposed on a monopolist's product. In order to maximize profits, the monopolist will produce:
a) More output and charge a lower price.
b) Less output and charge a higher price.
c) The same output and charge a higher price.
d) The same output and charge the same price as before the tax.

14. Which of the following is an efficient regulatory mechanism for a monopolistic industry?
a) Distributing supranormal profits to consumers.
b) Average-cost pricing.
c) Rate of return regulation.
d) A regulatory mechanism which makes MR coincide with market demand.

15. The equilibrium arrived at in the prisoner's dilemma game is a:
a) Nash equilibrium. b) Cournot equilibrium.
c) Bertrand equilibrium. d) Collusive equilibrium.

16. Oligopolists have clear incentives to:
a) Collude.
b) Cheat on collusive agreements.

c) Collude and cheat on collusive agreements.
d) Merge with their competitors.

17. A residual demand function represents the demand for:
a) Statistical errors.
b) The next firm to enter a market.
c) The least profitable firm in a market.
d) The last firm to enter a market.

18. Given constant unit costs of production, which of the following solutions to the duopoly problem generates the greatest benefits to consumers?
a) Bertrand equilibrium. b) Collusive equilibrium.
c) Cournot equilibrium. d) Nash equilibrium in quantities.

19. A firm which is a monopolist in its output market and a competitor in an input market is:
a) Efficient.
b) Inefficient because MFC > w.
c) Inefficient because VMP > MRP.
d) Inefficient because VMP > MRP and MFC > w.

20. The price of z is $45 per unit, its marginal product in firm A is $15, and the price of firm A's output is $3. Firm A:
a) Is maximizing profit if it is a monopsonist in the market for z.
b) Could not be maximizing profit.
c) Is not maximizing profit if it is a monopolist.
d) Is necessarily maximizing profit.

Part II: 60 Points. Answer any six (6) questions.

1.
(a) Why is water, which is essential to life, so cheap while diamonds, which are not essential to life, so expensive? (*This is the famous 'Water-Diamond Riddle'*).

(b) The production of synthetic dye is dominated by two multinational firms, A and B. They have found over the year that price and output competition between them has resulted in the fall of market price of the dye to $10 per liter leaving a profit of only $300,000 between them. As a result, they have decided to form a centralized cartel and maximize joint-profit. The demand function for the cartel is Q = 200 - 10P where P is price in dollars and Q is in millions of liters. The total cost functions for A and B are $C_A = 6Q_A + 0.1Q^2_A$, and $C_B = 2Q_B + 0.1Q^2_B$, respectively.
(i) Determine the equations for the marginal revenue and marginal cost of the centralized cartel.
(ii) Calculate the common price and total output of the cartel. In what proportions would this be shared between A and B?
(iii) Determine the share of total profits which will go to each company. Has the formation of the cartel been successful for the companies?

2. (a)
(i) What constraint does a the consumer face in seeking to maximize the total utility from expenditures?
(ii) Express mathematically the condition for consumer equilibrium.
(iii) Explain the meaning of your answers to part (ii)

(b)
Given that the total cost function of fertilizer company is in the form: $TC = 300 + 50Q - 10Q^2 + Q^3$ where Q = is in tons per hour of nitrates produced:
(i). Find the value of total fixed costs and expressions for the Average Total Cost, Total Variable Cost, Average Variable Cost and marginal cost functions.
(ii). Show that the AVC curve is U-shaped and that the MC curve will intersect the AVC curve at the lowest point of the latter.
(iii). What is the short-run supply function?

3.
(a) If the total product curve is a straight line through the origin, what do the AP and MP curves look like? What principle would lead you to expect that the TP curve would never have this shape?

(b) Assume that $Q_a = -2 + P_a/5$ is the supply function of factor A facing a monopsonist buyer (where P_a is the per unit factor price)
(i) Find the equations of the monopsonist's supply and marginal factor curves.
If factor A is the monopsonist's only variable factor and his MRP_a is \$60 at $Q_a = 4$ and \$40 at $Q_a = 6$,
(ii) Determine how many units of factor A this monopsonist will employ to maximize profits. What P_a will he pay? What is the amount of monopsonistic exploitation (excess of MRP over P_a)?
(iii) What is the profit-maximizing level of output?

4.
(a) Every point on Chrysler's long-run cost curve corresponds to a point on some short-run cost curve, but not every point on the short-run cost curve corresponds to a point on the long-run cost curve. True, False or Uncertain? Explain.

(b) When the price of gasoline is \$5 per gallon, Fabio consumes 1,000 gallons per year. The price rises to \$5.5, and to offset the harm to Fabio, the government gives him a cash transfer of \$500 a year. Will Fabio be better off or worse after the price rise plus the transfer? What happens to his gasoline consumption?

5.
(a) Is a repeated- or single-period game more appropriated for the study of oligoplies? In which setting is collusion more likely to be a stable outcome?

(b) A monopolist, selling in two separate markets, faces the following demand functions: $Q_1 = 24 - 2P$ and $Q_2 = 16 - P$. The monopolist operates a single plant with LTC as in the Table below

Q	10	11	12	13	14	15
LTC(\$)	82.5	88	94.50	104	119	142.5

(i). Find the LMC and the LAC schedules for this monopolist.
(ii). Find the best level of output for the monopolist: how much of this output should be sold in each market? At what price should the output be sold in each market? How much profit will he make in each market? Compute the Lerner Index of Monopoly power in each market.

6.
(a) "If Mexicans are allowed to immigrate into the US, they will take jobs away from American citizens" Evaluate this statement. (*Hint: What factors determine a firm's demand for an input?*)

(b) Along a downward-sloping competitive industry's demand curve for labor, firm profits will be greater the lower the wage rate" True, False or Uncertain? Explain.

(c) Fill in the blanks in the accompanying table, where Q denotes output and all other variables are as defined in the course text.

Q	*TFC*	*TVC*	*TC*	*MC*	*AFC*	*AVC*	*ATC*
1	$100	$50					
2				$30			
3						$40	
4			$270				
5							$70

7.

(a) When a firm's output expansion path has a negative slope, input 2 is inferior. True, False or Uncertain? Explain.

(b) Air Canada produces a round-trip transportation (T) between Toronto and Vancouver using 3 inputs: capital (K), labor (L) (pilots, flight attendants, etc.), and fuel (F). Suppose that Air Canada's production function has the following Cobb-Douglas form:

$$T = AK^bL^cF^d = 0.02K^{.25}L^{.2}F^{.55}$$

a. What is the nature of returns to scale?

b. If Air Canada currently employs K = 100, L = 500 and F = 20,000, calculate the marginal products associated with the inputs.

c. What is Air Canada's marginal rate of technical substitution (MRTS) between K and L? How about between K and F?

d. For profit to be maximized, what condition must be satisfied by Air Canada?

e. Given that the exponent associated with F is larger than that associated with L, would it be wise for Air Canada to spend all its money on fuel and capital and none on labor? Explain.

33 The production function provides estimates of maximum weekly output of a company producing embroidery shirts, given in combination of labor and capital.

Capital	Output					
60	12	28	32	40	48	50
50	18	30	40	48	52	48
40	18	30	40	48	48	40
30	14	32	36	40	40	30
20	8	24	30	32	30	24
10	2	8	18	24	24	18
	10	20	30	40	50	60 Labor

If the total cost of producing shirts is $1200 per week, the wage rate is $20 per week, and then the rent on machinery is $60 per week, complete the following:
(a). Derive the isocost line in the form of a straight line relating K to L.
(b). Write down the actual isocost equation for this firm using the information provided. Draw this isocost. If the rental rate halves while the wage rate remains constant, draw the new isocost line.
(c). Draw the production isoquants at the levels of 18, 30 and 40 shirts per week and connect the points on each isoquant with a smooth curve. Read off from the graph the optimal number of shirts which could be produced when the wage rate is $20 per week and the rental rate on capital rate is $60 per week. What would be the optimum weekly output if the rental rate was halved?
(d). What are the values of the marginal rate of technical substitution at the optimal points noted in (c)?
(e). Compare the two optimum positions in terms of the capital and labor used. Does this help us understand the difficulties in using only labor productivity as a measure of efficiency?

4. Show how a long-run total cost function can be derived from an isoquant map
5.
a. Would decreasing returns to scale imply the law of diminishing returns?

8.
How can the government reduce the consumption of schooling by providing schooling at no cost?

19. If $Q = 100/P$ and $C(Q) = Q^2$, what is the optimal level of output of the monopolist? What if demand is $Q = 10P^{-3}$ and the cost function $C(Q) = 2Q$?