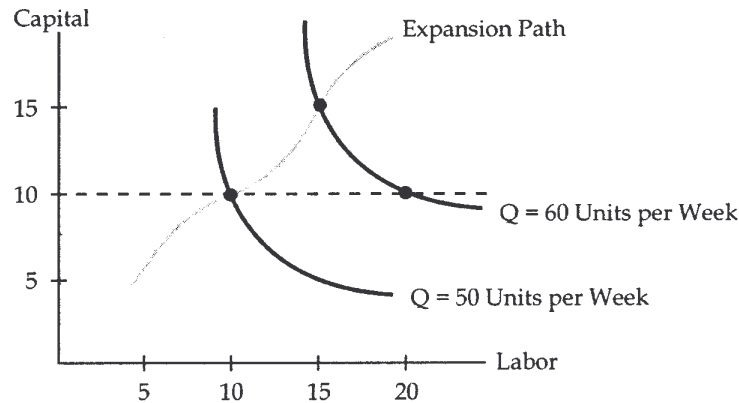


The following exam consists of 25 multiple choice questions and 3 problems on 7 pages. Please check to see that you have all parts of the exam before beginning. The exam is worth 100 points. You have 90 minutes to complete the exam. *Time may be a factor, so do not get stuck on any question.* You may use a calculator. Good Luck.

A. Multiple Choice

(2 points each)

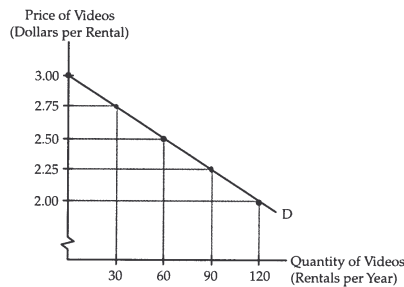
The following questions refer to the diagram below. The wage rate is assumed to be \$12, the rental rate is assumed to be \$6, and capital is assumed to be fixed in the short run at 10.



- Refer to Cost of Production. The short-run average cost of producing 60 units of output per week is
 - \$3 per unit.
 - \$4.50 per unit.
 - \$5 per unit.**
 - \$9 per unit.
- Refer to Cost of Production. The long-run total cost of producing 60 units of output per week is
 - \$180.
 - \$270.**
 - \$300.
 - \$900.
- Refer to Cost of Production. Suppose that instead of experience decreasing returns to scale, this firm was experiencing constant returns to scale. In this case, when the firm increases inputs from 10 to 15 units of labor and capital, output would rise from 50 to _____ units.
 - 60
 - 75**
 - 100
 - we need more information.
- The marginal product of labor is defined to be
 - the additional output attributable to the last unit of labor employed.**
 - the amount of output obtained, on average, from each unit of labor employed.
 - the percentage increase in output caused by a 1% rise in labor usage.
 - the amount of capital that the firm can use to replace one unit of labor.
- The shapes of the total product and marginal product curves are related because
 - An increase in total product pulls marginal product up.
 - Marginal product gives the slope of total product.**
 - Marginal product increases as total product increases.
 - The marginal product curve lies above the total product curve.

6. A competitive firm will exit an industry in the long run when the market price falls below its
- marginal revenue.
 - marginal cost.
 - average cost.**
 - average variable cost.

Use the following information for questions 7 and 8. The diagram below shows Shontel's annual demand for videos. Shontel currently rents videos from Blockpopper's, which charges \$2.50 per rental.



7. How much consumer's surplus does Shontel receive from renting videos?

- \$150
- \$75
- \$30
- \$15**

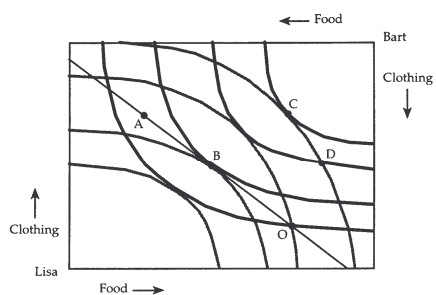
8. Blockpopper's starts a "frequent viewers" club. For a membership fee of \$35 per year, club members can rent as many videos as they wish at the discounted price of \$2 per rental. Should Shontel join the "frequent viewers" club? If yes, how much surplus value would Shontel receive as a club member? If no, what membership fee would Shontel be willing to pay to join the club?

- Yes, she would get \$60 in surplus.
- Yes, she would get \$25 in surplus.**
- No, she would be willing to pay \$30 to join.
- No, she would be willing to pay \$25 to join.

9. Suppose that the pizza business is a competitive, constant-cost industry. An increase in demand for pizza, will, in the long-run lead to

- an increase in price and industry output, but no increase in the output of existing firms.
- no increase in price, no increase in the output of existing firms but an increase in industry output because of new firms.**
- no increase in price and an increase in industry output as each existing firm produces more.
- no changes in price, output of existing firms or the number of firms in the industry.

Questions 10-12 refer to the following diagram which shows an Edgeworth box economy. The initial endowment is point O.



10. Which of these points do Bart and Lisa both prefer to the endowment point O?

- a. A,B,C,D
- b. A,B**
- c. B
- d. B,C

11. Which of these points are Pareto optimal?

- a. A,B,C,D
- b. A,B
- c. B
- d. B,C**

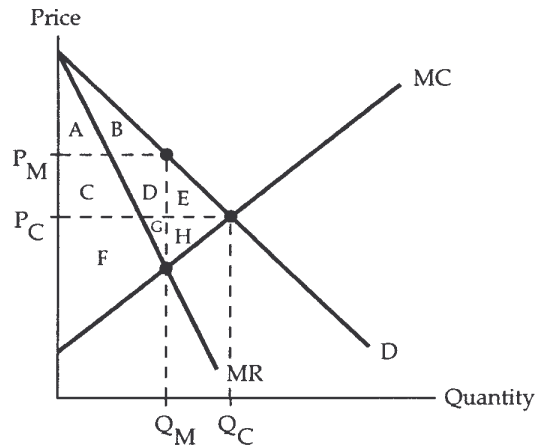
12. Which of these points are competitive equilibria?

- a. A,B
- b. B**
- c. C
- d. B,C

13. In an Edgeworth box, points along the contract curve represent

- a. the initial endowment points.
- b. allocations that both consumers prefer to the initial endowment.
- c. competitive equilibria.
- d. Pareto-optimal allocations of goods.**

Questions 14 through 16 refer to the accompanying market diagram. P_C and Q_C are the equilibrium price and quantity if the firm behaves competitively, and P_M and Q_M are the equilibrium price and quantity if the firm is a simple monopoly.



14. Refer to Market Diagram. What area represents the total surplus earned in the competitive equilibrium?

- a. Area A + B + C + D + E
- b. Area A + B + C + D + E + F + G + H**
- c. Area A + B + C + D + F + G
- d. Area F + G + H

15. Refer to Market Diagram. What area represents the producer's surplus earned in the monopoly equilibrium?

- a. Area A + C + F.
- b. Area C + F.
- c. Area C + D + F + G.**
- d. Area C + D + E.

16. Refer to the market diagram. Relative to the surplus they would receive in a competitive market, consumers lose how much surplus because there is a monopoly?

- a. Area F+G+H
- b. Area C+D+E**
- c. Area E+H
- d. Area A+B

17. Which of the following is the best example of second-degree price discrimination?

- a. A car salesperson's attempts to discover and charge the highest price that the customer is willing to pay.
- b. A sub shop that gives you a half-price sandwich on every sixth visit.**
- c. Manufacturers' use of discount coupons printed in Sunday newspapers.
- d. Polaroid cameras and film.

18. In order to practice any form of price discrimination, a monopoly must be able to

- a. identify the maximum price that each customer is willing to pay.
- b. separate its customers into distinct groups.
- c. prevent resale of its product.**
- d. establish a legal barrier to entry.

19. When first-degree price discrimination is perfectly implemented

- a. social gain is maximized, with all gains going to the monopoly.**
- b. consumers' surplus and producer's surplus are both larger than in the case of simple monopoly.
- c. the resulting deadweight loss is larger than if the monopoly did not price discriminate.
- d. the consumers' and producer's gains from trade are identical to those in a competitive market.

20. When a firm with market power practices third-degree price discrimination, it charges the highest price to the group that

- a. has the most elastic demand.
- b. has the most inelastic demand.**
- c. purchases the highest quantity.
- d. purchases the lowest quantity.

Questions 21 through 24 refer to the game matrix II below. Player A can play the strategies "High" and "Low," and Player B can play the strategies "Odd" and "Even."

Game Matrix II

		Player B's Strategies	
		Odd	Even
Player A's Strategies	High	A gets 0 B gets 0	A gets 3 B gets 3
	Low	A gets -2 B gets 2	A gets 4 B gets -4

21. Refer to Game Matrix II. Which outcomes in this game are Pareto optimal?

- a. The upper right-hand corner only.
- b. The lower right-hand corner only.
- c. Both the upper and lower right-hand corners.**
- d. All outcomes except the upper left-hand corner.

22. Refer to Game Matrix II. Which outcomes in this game are Nash equilibria?

- a. The upper right-hand corner only.
- b. The upper left-hand corner only.
- c. Both the upper right-hand and lower left-hand corners.
- d. This game has no Nash equilibria.**

23. Refer to Game Matrix II. When would the upper left-hand corner be the likely outcome of this game?
- When the game is played sequentially, with A being the first player.
 - When the game is played sequentially, with B being the first player.**
 - When the players choose their strategies simultaneously.
 - The upper left-hand corner would never be the likely outcome, because the upper right-hand corner makes both player better off.
24. Refer to Game Matrix II. Assume this game is played sequentially. When is the Stackelberg equilibrium of this game also Pareto optimal?
- Always.
 - When A is the first player.**
 - When B is the first player.
 - Never.
25. Consider an outcome in which it is impossible to make one player better off without simultaneously making the other player worse off. We can conclude that this outcome
- cannot be a Nash equilibrium.
 - must be Pareto optimal.**
 - will not occur when the players use mixed strategies.
 - is a Stackelberg equilibrium.

B. 10 points.

A firm has the production function $Q = L^4 K^3$. Using calculus, the $MPL = 4L^3 K^3$, and the $MPK = 3L^4 K^2$. The wage rate is \$5 per hour and the rental rate is \$15 per hour. The firm decides to spend \$140 on its inputs.

i. Write the two equations needed to solve this problem:

1.) $140 = 15K + 5L$ _____ 2pts

2.) $L = 4K$ _____ 2pts

ii. What is the optimal level of K and L? $k=4, l=16$ _____ 2pts

iii. What is the firm's total level of production? 4194304 _____ 2pts

iv. Does this production function $Q = L^4 K^3$ exhibit increasing, decreasing, or constant returns to scale?
increasing _____ 2pts.

SHOW YOUR WORK HERE:

C. 20 Points.

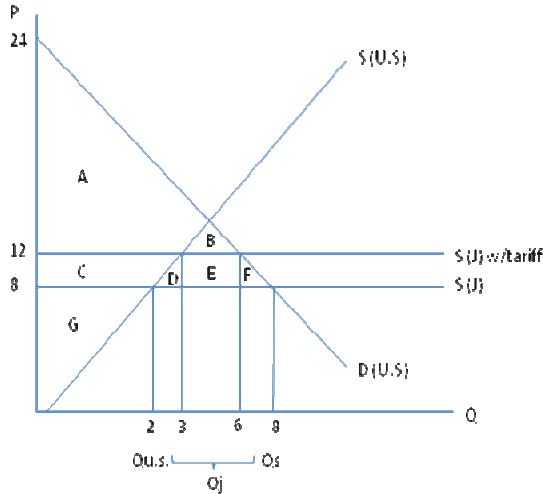
Suppose that computer chips are manufactured by Japanese and U.S. firms. To the consumer, computer chips from the two countries are viewed as perfect substitutes. The total supply of computer chips in the U.S. is characterized by an upward sloping domestic supply curve and a perfectly elastic Japanese supply curve. U.S. demand is characterized by a normal downward sloping demand curve. These curves are given by the following equations:

U.S. Demand equation: $P = -2Q + 24$

U.S. Supply equation: $P = 4Q$

Japanese Supply equation: $P = 8$

i. Given the equations above, illustrate the computer chip market in the U.S. Label the total quantity supplied, Q_s , the quantity supplied by U.S. producers as $Q_{u.s.}$ and the quantity supplied by Japanese producers as Q_j . 4pts



ii. At what price will computer chips be sold? \$8 2pts

iii. Given this price, how many computer chips are produced by domestic producers ($Q_{u.s.}$)? 8=4Q, Qu.s=2 2pts

iv. How many computer chips are produced by Japanese manufacturers (Q_j)? Qs-Qu.s= Qj, 8=-2Qs+24, Qs=8, Qu.s=2, so Qj=6 2pts

v. Assuming we care only about the welfare of America, what is social welfare under this initial scenario? CS+PS= .5(24-8)*8 + .5(8*2) = 72 (ABCG) 2pts

A government official recommends that a \$4 per unit tariff be imposed on imports from Japan and the resulting revenues be redistributed to Americans. If this tariff is imposed, 3 units will be sold by U.S. firms and 3 units will be sold by Japanese firms at a price of \$12 per chip.

vi. What is the post-tariff level of consumer surplus? .5(24-12)*6= \$36 (AB) 2pts

vii. How much tariff revenue is created? \$4*4= \$12 (E) 2pts

viii. According to the efficiency criterion (and assuming we care only about the welfare of Americans) should we reject or accept this proposed tariff? Why? 4pts

Reject, US welfare before tariff (\$72) is greater than the post-tariff welfare (\$36+\$18+\$12=\$66)

SHOW YOUR WORK HERE:

D. 20 Points. (2 points each)

Widgets are provided by a competitive constant cost industry. **Each firm has \$100 in fixed costs.** The following charts show the industry-wide demand curve and the marginal and cost curves of a typical firm. The blank columns are to be used to help answer the questions below.

Firm Costs		SCRAP SPACE			Industry Demand	
q	MC	TC	ATC		Price	Q
1	\$5	105	105		\$5	900
2	15	120	60		15	800
3	25	145	48.33		25	700
4	35	180	45		35	600
5	45	225	45		45	500
6	55	280	46.66		55	400
7	65	345	49.28		65	300

Suppose the initial market price of a widget is \$35.

i. If the firms produce, how many widgets will each firm produce (q)? 4

ii. How much profit will each firm earn if they produce? $4(35-45) = -40$ \$

iii. Is the industry in the short run or long run? How do you know?

Short-run, $p < atc$. Firms are earning negative profit. Firms earn zero profit in the long-run so they must be in the short run.

iv. Will firms shutdown? Why or why not?

No. $P (\$35) > AVC (\$20)$

v. How many firms are initially in the industry? $600/4 = 150$

vi. On the industry-wide short-run supply curve, what quantity (Qs) corresponds to a price of \$25? $150 * 3 = \$450$

vii. What is the long-run price of widgets? $p = mc = atc = \$45$

viii. What is each firm's output (q) in the long-run? 5

ix. In the long-run, do firms exit or enter the industry? If so, how many? *50 exit, there are now $500/5 = 100$ firms*

x. Suppose the fixed costs were a function of the number of firms in the industry instead of the fixed \$100, specifically, $FC = N * 12$, (where N = the number of firms), would this be an increasing, decreasing, or constant cost industry? *increasing- as more firms enter, industry costs rise*