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# 2010 AP® Microeconomics

# Released Exam

## Multiple-Choice Section

# MICROECONOMICS

**Section I**

**Time—70 minutes**

**60 Questions**

**Directions:** Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the one that is best in each case and then fill in the corresponding oval on the answer sheet.

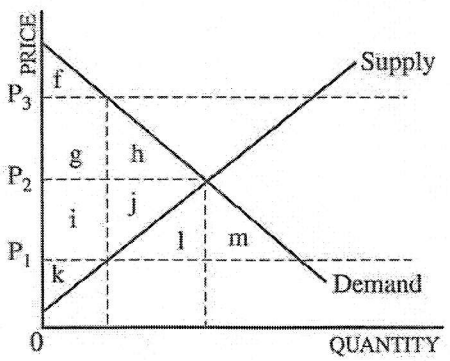
1. Opportunity cost is defined as

   (A) excess demand for a good
   (B) unlimited resources and unlimited wants
   (C) a comparative advantage in the production of a good
   (D) the value of the next best alternative that is forgone when an activity is pursued
   (E) the value of all other possible alternatives that are forgone when an activity is pursued

2. The fundamental difference between a market economy and a command economy lies in which of the following?

   (A) Property rights and protection of private property
   (B) Absolute and comparative advantages
   (C) Specialization and trade
   (D) Taxes and subsidies
   (E) Positive and negative externalities

**Questions 3-4 refer to the diagram below. The letters on the graph represent enclosed areas.**




3. When the market is in equilibrium, the total economic surplus is equal to area

   (A) f + k
   (B) f + g + i + k
   (C) g + h + i + j
   (D) f + g + h + i + j + k
   (E) f + g + h + i + j + k + l + m

4. If a price ceiling is set at $P_1$, which of the following areas represent the resulting consumer surplus, producer surplus, and deadweight loss?

| | Consumer Surplus | Producer Surplus | Deadweight Loss |
|---|---|---|---|
| (A) | f | k | l + m |
| (B) | f + g + h | k + l | h + j |
| (C) | f + g + h | i + j + k | l + m |
| (D) | f + g + i | k | h + j |
| (E) | f + g + i | h + j | l + m |

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5. A change in which of the following will cause a change in the supply of personal computers (PC's) in the short run?

   (A) Technology
   (B) Demand for PC's
   (C) Price of disks, which are a complement to PC's
   (D) Price of PC's
   (E) Consumers' incomes

6. Following a decrease in the supply of oranges, the price of orange juice increased by 20 percent, which resulted in a 10 percent increase in the quantity of apple juice consumed. This implies that the cross elasticity of demand between orange juice and apple juice is

   (A) 0
   (B) 0.5
   (C) 1
   (D) 2
   (E) indeterminate

7. F&D Manufacturing Company increases all its inputs by 50 percent each. If F&D's output increases by 100 percent, then F&D is experiencing

   (A) increasing returns to scale
   (B) constant returns to scale
   (C) diseconomies of scale
   (D) increasing marginal cost
   (E) decreasing profits

8. At 100 units of a firm's output, average total cost is $10, average variable cost is $8, average fixed cost is $2, and marginal cost is $12. How will each of the following change as the firm's output further increases?

| | Average Total Cost | Average Variable Cost | Average Fixed Cost |
|---|---|---|---|
| (A) | Increase | Increase | Increase |
| (B) | Increase | Increase | Decrease |
| (C) | Increase | Decrease | Decrease |
| (D) | Decrease | Increase | Increase |
| (E) | Decrease | Decrease | Decrease |

9. Which of the following is true for a perfectly competitive firm in long-run equilibrium?

   (A) It earns positive economic profit.
   (B) It is allocatively efficient.
   (C) It experiences economic losses.
   (D) It is productively inefficient.
   (E) It maximizes revenues.

10. At the current output level, a firm finds that it has the potential to increase its profit by expanding output. If P = price, MR = marginal revenue, and MC = marginal cost, which of the following must hold at the current output for this firm?

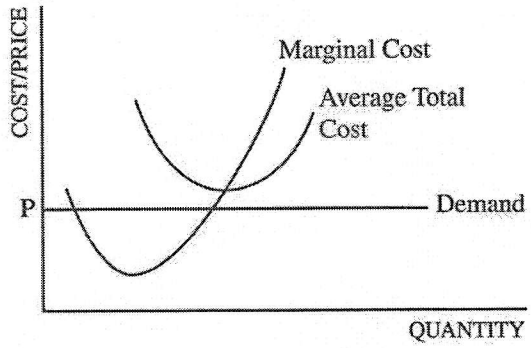
    (A) $P = MR < MC$
    (B) $P = MR = MC$
    (C) $MR = MC$
    (D) $MR > MC$
    (E) $MR < MC$

11. Which of the following is the best example of the free-rider problem?

    (A) A company gives away free samples of a new product.
    (B) A single firm is the sole supplier of corn oil.
    (C) There are economies of scale in the production of passenger elevators.
    (D) It is difficult to exclude those who do not pay for a good from enjoying the benefits of the good.
    (E) There is free entry and exit into production of toothpaste, but products are not homogeneous.

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**Question 12 refers to the graph below, which shows the demand and cost curves for a profit-maximizing firm.**

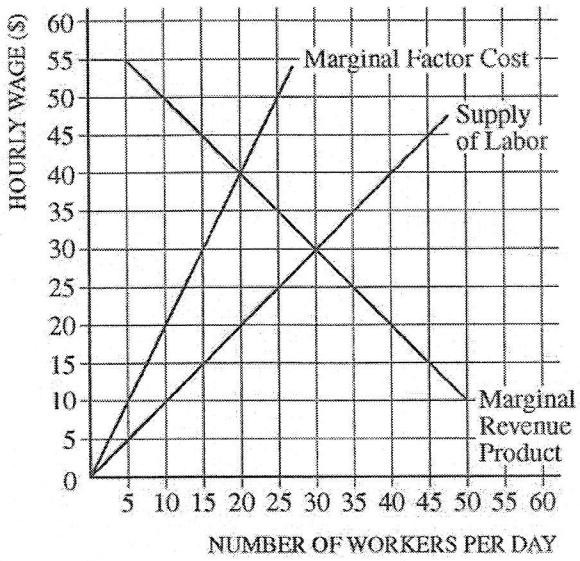



12. Which of the following statements best describes the graph?

(A) Economic losses are incurred, and the firm will increase price until no losses are incurred.
(B) Economic losses are incurred, and exit of firms from the market will cause prices to increase in the long run.
(C) Economic profits are earned, and costs will increase until no profits are earned.
(D) Economic profits are earned, and entry of firms into the market will cause prices to decrease in the long run.
(E) Economic profits are earned, and neither exit nor entry of firms will occur in the long run.

13. If the three largest widget producers control 85 percent of the total widget market, then these producers are operating in

(A) an oligopoly
(B) monopolistic competition
(C) perfect competition
(D) a monopoly
(E) a cartel




14. The graph above shows a monopsony labor market. In the absence of any regulations, which of the following represents the number of workers the firm will hire and the wage rate it will offer to those workers?

| | Number of Workers | Wage Rate |
|---|---|---|
| (A) | 15 | $30 |
| (B) | 20 | $20 |
| (C) | 20 | $40 |
| (D) | 30 | $30 |
| (E) | 40 | $40 |

15. To correct for positive externalities, the government should

(A) do nothing, since no harm is done by positive externalities
(B) levy a tax on the output of the good or service
(C) pay a subsidy equal to the marginal external benefit
(D) impose a price ceiling on the good to discourage its production
(E) impose a price floor on the good at which the marginal private benefit equals the marginal social cost

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16. Carlos has a van with 20 seats and charges $10 per person per ride to the airport from downtown. Carlos' cost of the trip is $140 for any number of passengers. On one trip, Carlos has 19 seats filled when a person offers him $5 for the last seat. Should Carlos accept the offer?

(A) No, since the $5 fare offered is below his average cost of $7.
(B) No, since the average variable cost is greater than $5.
(C) No, since it is illegal to charge different prices for the same service.
(D) Yes, since the marginal benefit exceeds the marginal cost.
(E) Yes, since his total revenue exceeds his total cost by $5.

17. A decrease in raw material prices will change the equilibrium price and quantity in a market in which of the following ways?

| | Price | Quantity |
|---|---|---|
| (A) | Increase | Increase |
| (B) | Increase | Decrease |
| (C) | Decrease | Increase |
| (D) | Decrease | Decrease |
| (E) | No change | Increase |

18. A monopolist produces two unrelated goods, X and Y. The demand for X is currently price elastic and the demand for Y is currently price inelastic. To increase its total revenue, the firm should change the price of X and Y in which of the following ways?

| | Price of X | Price of Y |
|---|---|---|
| (A) | Increase | No change |
| (B) | Increase | Decrease |
| (C) | Increase | Increase |
| (D) | Decrease | Increase |
| (E) | Decrease | Decrease |

19. In microeconomics, the short run is defined as which of the following?

(A) A period that is less than one year
(B) A period that is between one year and four years
(C) A period that is too short for a firm to be able to change its level of output
(D) A period during which some inputs in a firm's production process cannot be changed
(E) A period during which a firm's fixed costs exceed its variable costs

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**Questions 20-21 are based on the information below, which shows the marginal utilities a student receives from the consumption of pizza and pens. Assume that the marginal utility of each good is independent of the quantity of the other good consumed.**

| Units of Pizza | Marginal Utility of Pizza | Units of Pens | Marginal Utility of Pens |
|---|---|---|---|
| 1 | 20 | 1 | 8 |
| 2 | 18 | 2 | 7 |
| 3 | 16 | 3 | 6 |
| 4 | 14 | 4 | 5 |
| 5 | 12 | 5 | 4 |
| 6 | 10 | 6 | 3 |
| 7 | 9 | 7 | 2 |
| 8 | 8 | 8 | 1 |

20. The student has \$10 and spends it all on pizza and pens. If the price of a unit of pizza is \$2 and the price of a unit of pens is \$1, the student will maximize utility by purchasing which of the following combinations of pizzas and pens?

| | Pizzas | Pens |
|---|---|---|
| (A) | 5 | 3 |
| (B) | 4 | 2 |
| (C) | 3 | 4 |
| (D) | 3 | 1 |
| (E) | 2 | 6 |

21. If the student purchases 2 units of pizza and 2 units of pens, the student's total utility will be

(A) 4 utils
(B) 25 utils
(C) 28 utils
(D) 50 utils
(E) 53 utils

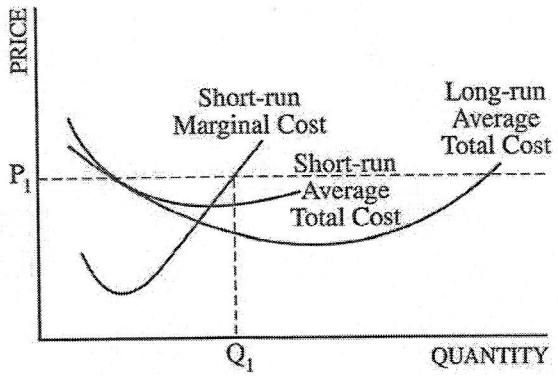
22. After the government imposed a \$0.20 per gallon tax on gasoline, the price of a gallon of gasoline increased from \$1.00 to \$1.15. Which of the following statements is true?

(A) Consumers bear the entire burden of the tax, since producers can pass the tax along to consumers.
(B) Consumers and producers share the tax burden equally.
(C) Consumers bear most, but not all, of the tax burden.
(D) Producers bear the entire burden of the tax, since the tax was levied on producers, not consumers.
(E) There is no tax burden, since gasoline is a normal good.

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Section I

**Questions 23-24 refer to the graph below, which shows the cost curves of a firm.**




23. If the firm produces $Q_1$ units of output with two inputs, the firm will be experiencing which of the following in the short run and in the long run?

| | Short Run | Long Run |
|---|---|---|
| (A) | Increasing marginal returns | Economies of scale |
| (B) | Increasing marginal returns | Diseconomies of scale |
| (C) | Diminishing marginal returns | Economies of scale |
| (D) | Diminishing marginal returns | Diseconomies of scale |
| (E) | Constant marginal returns | Diseconomies of scale |

24. Which of the following will be true if the firm is in a perfectly competitive market and the price is $P_1$ ?

(A) The firm will earn short-run profits but suffer long-run losses.
(B) In the long run, existing firms in the industry will produce an output level greater than $Q_1$.
(C) In the long run, existing firms will leave the industry.
(D) Firms will leave the industry until profits are increased.
(E) New firms will be dissuaded from entering the industry, at least until the price increases.

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25. A perfectly competitive firm is currently in long-run equilibrium. Its total revenue is $100,000, and the average total cost of production is $100. Which of the following can be concluded from this information?

(A) The firm's marginal cost is $1,000, and its profit is positive.
(B) The firm's marginal cost is $1,000, and its profit is zero.
(C) The firm's output is 1,000 units, and its profit is negative.
(D) The firm's output is 1,000 units, and its profit is zero.
(E) The firm's output is 1,000 units, and its profit is positive.

26. Game theory is a useful model to explain the behavior of firms in a market when the firms are

(A) independent of one another
(B) price takers
(C) regulated by government
(D) altruistic
(E) interdependent

27. Motivated by lower import prices, United States manufacturers increase their imports of steel from other steel-producing countries. Which of the following best describes the impact of the increased steel imports on the labor market for steelworkers in the United States?

(A) Jobs in the United States steel industry will become less attractive, so wages will have to increase in this market to attract more workers to the United States steel industry.
(B) Domestic steel prices will fall, leading to an increase in sales of domestically produced steel, which increases demand and employment of steelworkers.
(C) The supply of steelworkers will increase, lowering the steelworker wage in the United States.
(D) The supply of steelworkers will decrease, increasing the steelworker wage in the United States.
(E) The demand for United States steelworkers will decline, putting downward pressure on steelworker wages.

28. When labor supply in a competitive labor market increases, the equilibrium wage rate and employment will change in which of the following ways?

| | Wage Rate | Employment |
|---|---|---|
| (A) | Increase | Increase |
| (B) | Increase | Decrease |
| (C) | Decrease | Increase |
| (D) | Decrease | Decrease |
| (E) | Decrease | No change |

29. Which of the following would create a positive externality?

(A) Congestion on city highways
(B) Water pollution
(C) A neighbor's loud music that wakes you up
(D) Flu vaccination
(E) The greenhouse effect and global warming

30. If government regulators set price such that a natural monopolist earns only normal profits, price will be set equal to

(A) marginal revenue
(B) marginal cost
(C) average total cost
(D) average revenue
(E) average variable cost

31. A farmer in Country A can harvest 20 bushels of wheat or 10 bushels of corn in a day, while a farmer in Country B can harvest 8 bushels of wheat or 8 bushels of corn in a day. If Country A and Country B specialize and trade, Country A will

(A) export wheat and import corn
(B) export corn and import wheat
(C) export both wheat and corn
(D) import both wheat and corn
(E) benefit more from trade than will Country B

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32. Which of the following changes in the demand for and the supply of a good will necessarily result in an increase in both the equilibrium price and quantity of the good in a market?

| | Demand | Supply |
|---|---|---|
| (A) | Increase | Increase |
| (B) | Increase | No change |
| (C) | No change | Increase |
| (D) | Decrease | Increase |
| (E) | No change | Decrease |

33. The additional satisfaction received from consuming an additional unit of a good is called the

(A) marginal utility
(B) marginal product
(C) average product
(D) average utility
(E) total utility

34. Assume that apple juice and grape juice are substitutes. Which of the following will cause an increase in the quantity of apple juice supplied?

(A) A decrease in subsidies to apple juice producers
(B) A decrease in the price of grape juice
(C) An increase in the price of apple juice
(D) An increase in the price of insecticides used on apple trees
(E) The imposition of a price ceiling in the market for apple juice

35. The long-run average cost curve will be sloping downward if a firm experiences

(A) diminishing marginal returns
(B) decreasing returns to scale
(C) constant returns to scale
(D) diseconomies of scale
(E) economies of scale

36. A decrease in the supply of oranges raised the price of oranges in the market. The substitution effect of the price increase will motivate consumers to

(A) raise their real income to offset the price effect
(B) decrease their demand for oranges
(C) demand that the government set a price ceiling for oranges
(D) increase the quantity of other fruits demanded and decrease the quantity of oranges demanded
(E) decrease the quantity of other fruits demanded and increase the quantity of oranges demanded

| Units of Labor Input | Units of Output |
|---|---|
| 1 | 8 |
| 2 | 20 |
| 3 | 30 |

37. The table above shows the amount of labor inputs necessary to produce given levels of output. If the cost of a unit of labor is $20 and total fixed cost is $100, the average total cost of producing 20 units of output is

(A) $1
(B) $2
(C) $7
(D) $40
(E) $120

38. Assume that a profit-maximizing monopoly is charging a single price. If the monopoly can price discriminate and charge each consumer what he or she is willing to pay, which of the following will occur?

(A) The quantity of output produced will increase.
(B) Total cost will decrease.
(C) Economic profit will decrease.
(D) Consumer surplus will increase.
(E) Demand will decrease.

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| PAM'S PRICE POLICY | TARA'S PRICE POLICY: High | TARA'S PRICE POLICY: Low |
|---|---|---|
| High | \$40, \$40 | \$20, \$70 |
| Low | \$70, \$20 | \$30, \$30 |

39. Pam and Tara run two competing lemonade stands in a town. In the payoff matrix above, the first entry in each cell shows the profits to Pam, and the second entry in each cell shows the profits to Tara. According to the information, which of the following is true?

(A) If Pam sets the high price, Tara will do best by charging the low price.
(B) If Pam sets the low price, Tara will do best by charging the high price.
(C) The dominant strategy for both is to charge the high price.
(D) The dominant strategy for Tara is to set the low price and for Pam is to set the high price.
(E) Neither Tara nor Pam has a dominant strategy.

40. Which of the following statements is true for both a monopolistically competitive firm and a perfectly competitive firm in long-run profit-maximizing equilibrium?

(A) Economic profits equal zero, and price equals marginal cost.
(B) Economic profits equal zero, and price equals marginal revenue.
(C) Marginal revenue equals marginal cost, and profits are positive.
(D) Economic profits equal zero, and marginal revenue equals marginal cost.
(E) Economic profits equal zero, and price exceeds marginal cost.

41. A well-known fast-food franchise substantially increases the price of its hamburgers, and loses only some of its customers. Which of the following best explains why the franchise has not lost all of its customers?

(A) Its hamburgers are a perfect substitute for other types of fast food.
(B) Its hamburgers are differentiated.
(C) The demand for its hamburgers is perfectly elastic.
(D) The other competitive fast-food restaurants decrease the price for their hamburgers.
(E) The barriers to entry are very low for entrepreneurs trying to enter the fast-food business.

42. If a single firm can produce and supply an entire market at a lower unit cost than many small firms can, the long-run average total cost must be

(A) increasing as firm size increases
(B) remaining constant as firm size increases
(C) decreasing as the firm's output increases
(D) inelastic due to specialization
(E) constant and equal to marginal cost

43. An increase in the demand for automobiles will cause the demand for skilled automobile workers and the wage rate of skilled automobile workers to change in which of the following ways?

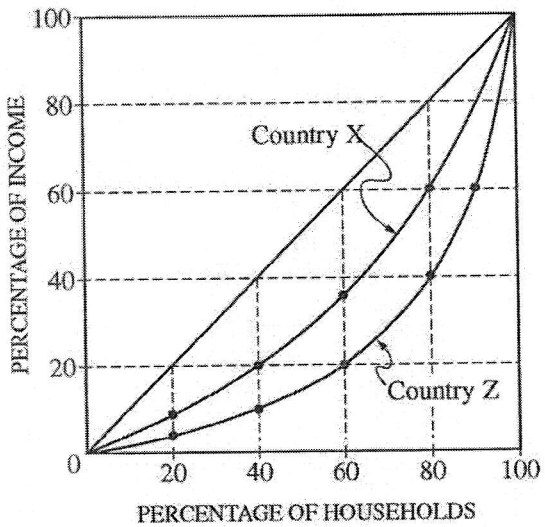
| | Demand For Workers | Wage Rate |
|---|---|---|
| (A) | Decrease | Increase |
| (B) | Decrease | Not change |
| (C) | Increase | Decrease |
| (D) | Increase | Increase |
| (E) | Not Change | Increase |

44. Under an efficient policy to address the problem of pollution created from manufacturing good X, which of the following is true?

(A) Pollution is completely eliminated.
(B) The marginal private cost of producing good X exceeds the marginal revenue from its sale.
(C) The marginal private cost of producing good X equals the marginal revenue from its sale.
(D) The marginal social benefit of pollution reduction exceeds the marginal social cost of pollution reduction.
(E) The marginal social benefit of pollution reduction equals the marginal social cost of pollution reduction.

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## Section I




45. Based on the information in the Lorenz curve above, which of the following is true?

(A) People in Country X make more money than people in Country Z.
(B) Income is more equally distributed in Country X than in Country Z.
(C) The top 20 percent of households in Country X received 60 percent of the total income.
(D) The top 20 percent of households in Country Z received 40 percent of the total income.
(E) The average income in Country X is higher than the average income in Country Z.

46. The table below shows the total labor hours required to produce a unit of gold and the total labor hours required to produce a unit of sugar in Portugal and Spain, respectively.

| | Portugal | Spain |
|---|---|---|
| Gold | 1 hour | 2 hours |
| Sugar | 4 hours | 3 hours |

Which country has an absolute advantage in sugar production?

(A) Neither Spain nor Portugal, because both require fewer labor hours to produce a unit of gold than to produce a unit of sugar.
(B) Spain, because the opportunity cost of sugar in terms of gold is lower.
(C) Spain, because it requires fewer total labor hours than Portugal to produce a unit of sugar.
(D) Portugal, because it requires more total labor hours than Spain to produce a unit of sugar.
(E) Portugal, because it takes only a quarter of an hour to produce a unit of sugar.

47. A production possibilities curve is bowed out, indicating increasing opportunity cost because of

(A) the law of demand
(B) the law of diminishing marginal utility
(C) the existence of unemployment
(D) differences in consumer tastes
(E) imperfect adaptability of resources to alternative uses

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48. Assume that the demand for a certain good is perfectly inelastic and the supply curve of the good is upward sloping. Which of the following occurs in the market for the good if the price of an input used to produce the good increases?

(A) A decrease in both the quantity supplied and the equilibrium amount consumed
(B) A decrease in the quantity supplied and an increase in the equilibrium price
(C) A decrease in the supply and an increase in the equilibrium price
(D) A decrease in both the demand and the equilibrium amount consumed
(E) A decrease in both the quantity demanded and the equilibrium price

49. An increase in which of the following will cause a firm's marginal cost curve to shift upward?

(A) The price of a variable input
(B) The price of a fixed input
(C) The level of output
(D) Labor productivity
(E) The demand for the firm's product

50. Assume that a monopolist is producing in the inelastic portion of its demand curve. Which of the following will occur if the monopolist decreases its price?

(A) Marginal revenue will decrease, but profits will increase.
(B) Marginal revenue will increase, but profits will decrease.
(C) Total revenue will decrease, but profits will increase.
(D) Both total revenue and profits will decrease.
(E) Both total revenue and profits will increase.

51. In the short run, a profit-maximizing firm should shut down if which of the following is true?

(A) It is not making an economic profit.
(B) It is not making a normal profit.
(C) Its total revenue is less than its total cost.
(D) Its product price is less than its average variable cost.
(E) Its product price is greater than its average variable cost but less than its average total cost.

52. Beyond a certain level of output, the short-run marginal cost will rise because

(A) there is no fixed input and costs will increase
(B) at least one input is fixed and eventually diminishing returns will occur
(C) the cost of the variable input increases when marginal product increases
(D) the demand for the good decreases when production is limited
(E) input prices increase when production increases and consumption is limited

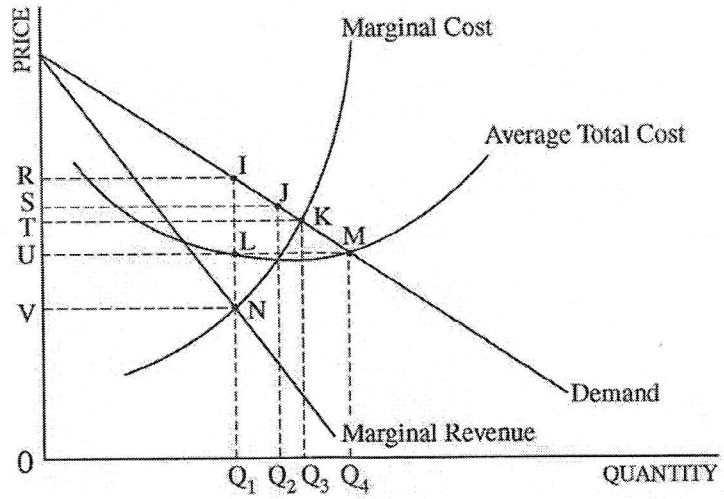
53. An industry consists of 100 small firms, and the largest firm accounts for only 2 percent of sales. Brand names are considered a signal of quality. The industry described is best classified as

(A) monopoly
(B) perfectly competitive
(C) monopolistically competitive
(D) oligopolistic
(E) monopsonistic

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## Section I

**Questions 54-55 are based on the graph below, which shows the cost and revenue curves of a monopoly firm.**




54. The economic profit of the profit-maximizing monopolist is given by the area

(A) RSJI
(B) R0$Q_1$I
(C) RULI
(D) RVNI
(E) U0$Q_4$M

55. If this were a perfectly competitive industry with the same costs as shown on the graph, the equilibrium price and output would be which of the following?

| | Price | Output |
|---|---|---|
| (A) | 0R | $Q_1$ |
| (B) | 0S | $Q_2$ |
| (C) | 0T | $Q_3$ |
| (D) | 0U | $Q_1$ |
| (E) | 0U | $Q_4$ |

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56. A collusive agreement to fix prices among firms in an oligopolistic industry is most likely to be broken under which of the following conditions?

(A) It is easy for new firms to enter into the industry.
(B) All of the firms have identical costs.
(C) The number of firms is few.
(D) Firms' sales are widely reported.
(E) The market demand is stable.

57. Assume that the last worker a firm hired produces 60 additional units of output per hour and the last machine rented produces 6,000 units of output per hour. A worker's hourly wage rate is $12, and the rental cost of a machine is $1,000 per hour. In order to minimize the cost of its current output, the firm should

(A) do nothing, because the costs of production are minimized
(B) increase the use of labor and decrease the use of capital
(C) increase the use of capital and decrease the use of labor
(D) increase the use of labor and increase the use of capital
(E) decrease the use of labor and decrease the use of capital

58. A perfectly competitive profit-maximizing firm will continue to hire additional units of an input as long as the

(A) marginal product of the input is maximized
(B) marginal cost of employing the input is maximized
(C) value of the marginal product of the input exceeds the price of the input
(D) revenue associated with the employment of the last unit of the input is maximized
(E) price of the product is greater than the marginal cost of the input

59. Which of the following is a government policy that is intended to address a market failure?

(A) Taxing the use of toxic pesticides by farmers
(B) Fining firms that outsource jobs to lower labor costs
(C) Subsidizing corn farmers who face increasing production costs
(D) Taxing short-run profits in competitive markets
(E) Subsidizing entry of firms into a market with an existing natural monopoly

60. Public goods are typically provided by the government, because private markets tend to

(A) produce them at higher cost
(B) produce less than the socially optimum quantity
(C) produce more than the socially optimum quantity
(D) charge a monopoly price that is greater than the marginal social cost
(E) charge a monopoly price that is less than the marginal social cost

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# AP® Microeconomics
# 2010 Free-Response Questions

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## MICROECONOMICS

**Section II**

**Planning time—10 minutes**

**Writing time—50 minutes**

**Directions:** You have 50 minutes to answer all three of the following questions. It is suggested that you spend approximately half your time on the first question and divide the remaining time equally between the next two questions. In answering the questions, you should emphasize the line of reasoning that generated your results; it is not enough to list the results of your analysis. Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. Use a pen with black or dark blue ink.

1. Assume that corn is produced in a perfectly competitive market. Farmer Roy is a typical producer of corn.
   (a) Assume that Farmer Roy is making zero economic profit in the short run. Draw a correctly labeled side-by-side graph for the corn market and for Farmer Roy and show each of the following.
      (i) The equilibrium price and quantity for the corn market, labeled as $P_{M1}$ and $Q_{M1}$, respectively
      (ii) The equilibrium quantity for Farmer Roy, labeled as $Q_{F1}$
   (b) For Farmer Roy's corn, is the demand perfectly elastic, perfectly inelastic, relatively elastic, relatively inelastic, or unit elastic? Explain.
   (c) Corn can be used as an input in the production of ethanol. The demand for ethanol has significantly increased.
      (i) Show on your graph in part (a) the effect of the increase in demand for ethanol on the market price and quantity of corn in the short run, labeling the new equilibrium price and quantity as $P_{M2}$ and $Q_{M2}$, respectively.
      (ii) Show on your graph in part (a) the effect of the increase in demand for ethanol on Farmer Roy's quantity of corn in the short run, labeling the quantity as $Q_{F2}$.
      (iii) How does the average total cost for Farmer Roy at $Q_{F2}$ compare with $P_{M2}$?
   (d) Corn is also used as an input in the production of cereal. What is the effect of the increased demand for ethanol on the equilibrium price and quantity in the cereal market in the short run? Explain.

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2. The John Lamb Company, a profit-maximizing firm producing widgets, is in a perfectly competitive widget market. Assume John Lamb employs a fixed number of employees and rents a machine for a variable number of hours from a perfectly competitive market.

   (a) Using correctly labeled side-by-side graphs of the factor market for machines and the John Lamb Company, show each of the following.

      (i) The equilibrium rental price of machines in the factor market, labeled as $P_R$

      (ii) John Lamb's equilibrium rental quantity of machines, labeled as $Q_L$

   (b) Assume that the popularity of widgets declines, decreasing the demand for widgets. What will happen to each of the following?

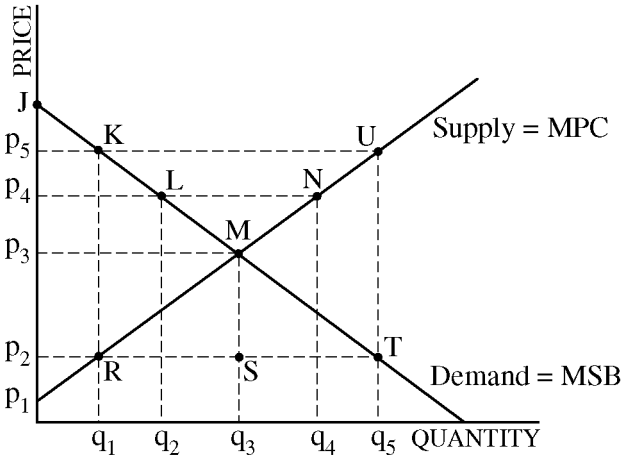
      (i) Marginal product curve for machine-hours

      (ii) Marginal revenue product curve for machine-hours. Explain.

   (c) John Lamb is employing the cost-minimizing combination of inputs. The marginal product of labor is 28 widgets per worker hour and the wage rate is $14 per hour. The marginal product of the machine is 60 widgets per machine-hour. What is the hourly rental price of a machine?

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3. The graph above shows the perfectly competitive market for hard candies in Country Alpha. In the graph the letters correspond to points, not areas. MPC denotes marginal private cost and MSB denotes marginal social benefit.

   (a) Using the labeling on the graph, identify the area representing each of the following at the market equilibrium.

      (i) The consumer surplus

      (ii) The producer surplus

   (b) Assume that the production of each unit of candy creates a negative externality equal to ($p_5$-$p_2$). Using the labeling on the graph, identify the socially optimal quantity.

   (c) Assume that the government imposes a per-unit tax of ($p_5$-$p_2$) to correct for the negative externality. Using the labeling on the graph, identify the area representing each of the following.

      (i) The consumer surplus

      (ii) The deadweight loss

**STOP**

**END OF EXAM**

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# **Chapter III:** Answers to the 2010 AP Microeconomics Exam

- Section I: Multiple Choice
  - Section I Answer Key and Percent Answering Correctly
  - Analyzing Your Students' Performance on the Multiple-Choice Section
  - Diagnostic Guide for the 2010 AP Microeconomics Exam
- Section II: Free Response
  - Comments from the Chief Reader
  - Scoring Guidelines, Sample Student Responses and Commentary

## Section I: Multiple Choice

Listed below are the correct answers to the multiple-choice questions, the percent of AP students who answered each question correctly by AP score, and the total percent answering correctly.

### Section I Answer Key and Percent Answering Correctly

| Item No. | Correct Answer | Percent Correct by Score | | | | | Total Percent Correct |
|---|---|---|---|---|---|---|---|
| | | 5 | 4 | 3 | 2 | 1 | |
| 1 | D | 79 | 63 | 52 | 47 | 37 | 55 |
| 2 | A | 83 | 68 | 54 | 44 | 31 | 55 |
| 3 | D | 99 | 95 | 87 | 77 | 53 | 82 |
| 4 | D | 91 | 74 | 57 | 43 | 24 | 57 |
| 5 | A | 87 | 79 | 70 | 56 | 30 | 64 |
| 6 | B | 81 | 64 | 54 | 49 | 37 | 56 |
| 7 | A | 95 | 85 | 73 | 63 | 42 | 71 |
| 8 | B | 90 | 63 | 40 | 26 | 22 | 47 |
| 9 | B | 94 | 84 | 70 | 55 | 35 | 67 |
| 10 | D | 87 | 61 | 42 | 35 | 27 | 49 |
| 11 | D | 98 | 95 | 89 | 80 | 58 | 83 |
| 12 | B | 98 | 88 | 69 | 50 | 28 | 66 |
| 13 | A | 95 | 87 | 76 | 67 | 45 | 73 |
| 14 | B | 70 | 40 | 21 | 11 | 10 | 29 |
| 15 | C | 89 | 66 | 43 | 27 | 17 | 47 |
| 16 | D | 81 | 68 | 65 | 63 | 52 | 65 |
| 17 | C | 93 | 84 | 73 | 62 | 41 | 70 |
| 18 | D | 94 | 88 | 79 | 65 | 39 | 72 |
| 19 | D | 84 | 64 | 46 | 33 | 20 | 48 |
| 20 | B | 90 | 72 | 52 | 40 | 25 | 55 |
| 21 | E | 91 | 70 | 47 | 29 | 10 | 48 |
| 22 | C | 97 | 91 | 85 | 78 | 55 | 80 |
| 23 | C | 76 | 43 | 25 | 18 | 18 | 35 |
| 24 | B | 75 | 51 | 33 | 23 | 20 | 40 |
| 25 | D | 94 | 81 | 61 | 46 | 22 | 60 |

| Item No. | Correct Answer | Percent Correct by Score | | | | | Total Percent Correct |
|---|---|---|---|---|---|---|---|
| | | 5 | 4 | 3 | 2 | 1 | |
| 26 | E | 92 | 83 | 73 | 61 | 34 | 68 |
| 27 | E | 88 | 76 | 63 | 55 | 32 | 62 |
| 28 | C | 90 | 78 | 69 | 61 | 44 | 68 |
| 29 | D | 100 | 98 | 95 | 90 | 71 | 90 |
| 30 | C | 82 | 61 | 47 | 35 | 26 | 49 |
| 31 | A | 95 | 88 | 78 | 68 | 44 | 74 |
| 32 | B | 98 | 91 | 79 | 61 | 30 | 71 |
| 33 | A | 100 | 100 | 98 | 94 | 65 | 90 |
| 34 | C | 73 | 46 | 30 | 21 | 16 | 36 |
| 35 | E | 94 | 75 | 49 | 29 | 11 | 51 |
| 36 | D | 93 | 89 | 83 | 77 | 50 | 78 |
| 37 | C | 94 | 74 | 47 | 29 | 15 | 51 |
| 38 | A | 82 | 59 | 43 | 35 | 22 | 47 |
| 39 | A | 94 | 82 | 67 | 51 | 28 | 64 |
| 40 | D | 84 | 67 | 55 | 42 | 21 | 53 |
| 41 | B | 95 | 86 | 72 | 58 | 31 | 68 |
| 42 | C | 89 | 66 | 45 | 35 | 20 | 50 |
| 43 | D | 98 | 91 | 82 | 75 | 52 | 79 |
| 44 | E | 84 | 63 | 45 | 32 | 19 | 48 |
| 45 | B | 95 | 79 | 57 | 41 | 22 | 58 |
| 46 | C | 91 | 77 | 67 | 59 | 48 | 68 |
| 47 | E | 86 | 63 | 42 | 26 | 13 | 45 |
| 48 | C | 92 | 72 | 51 | 34 | 21 | 53 |
| 49 | A | 88 | 65 | 47 | 37 | 22 | 50 |
| 50 | D | 79 | 64 | 50 | 39 | 21 | 50 |

*continued on the next page*

## Section I Answer Key and Percent Answering Correctly *(continued)*

| Item No. | Correct Answer | Percent Correct by Score | | | | | Total Percent Correct |
|---|---|---|---|---|---|---|---|
| | | 5 | 4 | 3 | 2 | 1 | |
| 51 | D | 96 | 88 | 72 | 49 | 19 | 64 |
| 52 | B | 75 | 57 | 43 | 34 | 20 | 45 |
| 53 | C | 94 | 75 | 52 | 35 | 21 | 55 |
| 54 | C | 90 | 79 | 67 | 52 | 31 | 63 |
| 55 | C | 78 | 60 | 49 | 42 | 32 | 51 |

| Item No. | Correct Answer | Percent Correct by Score | | | | | Total Percent Correct |
|---|---|---|---|---|---|---|---|
| | | 5 | 4 | 3 | 2 | 1 | |
| 56 | A | 57 | 41 | 34 | 31 | 25 | 37 |
| 57 | C | 80 | 64 | 53 | 46 | 31 | 54 |
| 58 | C | 66 | 49 | 38 | 33 | 24 | 41 |
| 59 | A | 57 | 25 | 12 | 7 | 8 | 20 |
| 60 | B | 85 | 64 | 44 | 30 | 16 | 47 |

### Analyzing Your Students' Performance on the Multiple-Choice Section

If you give your students the 2010 exam for practice, you may want to analyze the results to find overall strengths and weaknesses in their understanding of AP Microeconomics. The following diagnostic worksheet will help you do this. You are permitted to photocopy and distribute it to your students for completion.

1. In each section, students should insert a check mark for each correct answer.
2. Add together the total number of correct answers for each section.
3. To compare the student's number of correct answers for each section with the average number correct for that section, copy the number of correct answers to the "Number Correct" table at the end of the Diagnostic Guide.

In addition, under each item, the percent of AP students who answered correctly is shown, so students can analyze their performance on individual items. This information will be helpful in deciding how students should plan their study time. Please note that one item may appear in several different categories, as questions can cross over different topics.




# AP® Microeconomics
# 2010 Scoring Guidelines

## The College Board

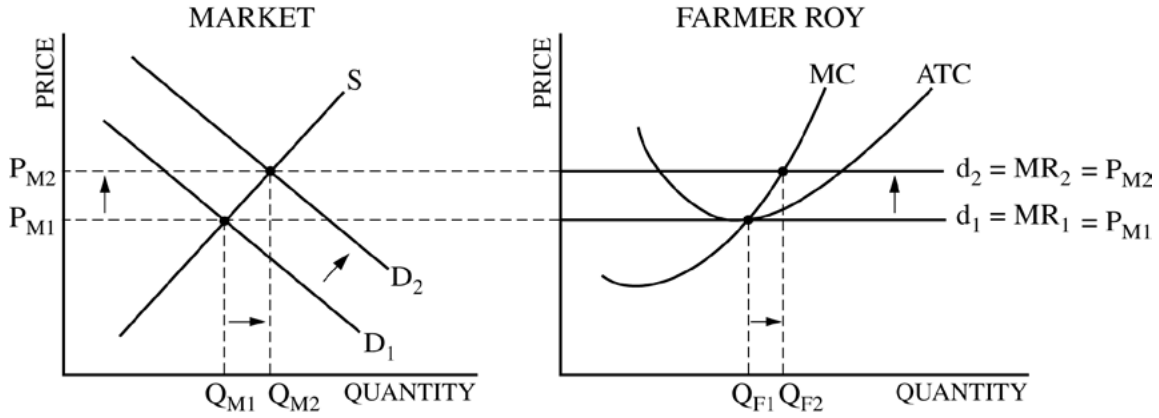
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## Question 1

**10 points** (4+1+4+1)




(a) 4 points:

- One point is earned for a correctly labeled graph of the corn market (S, D, $P_{M1}$, $Q_{M1}$).
- One point is earned for the graph of the firm with a horizontal demand curve at $P_{M1}$.
- One point is earned for showing the profit-maximizing quantity, $Q_{F1}$, at MC = MR.
- One point is earned for showing minimum ATC on the horizontal demand curve at $Q_{F1}$.

(b) 1 point:

- One point is earned for stating that the demand curve for Farmer Roy's corn is perfectly elastic because Farmer Roy is a price taker or because he can sell all that he wants at the market price.

(c) 4 points:

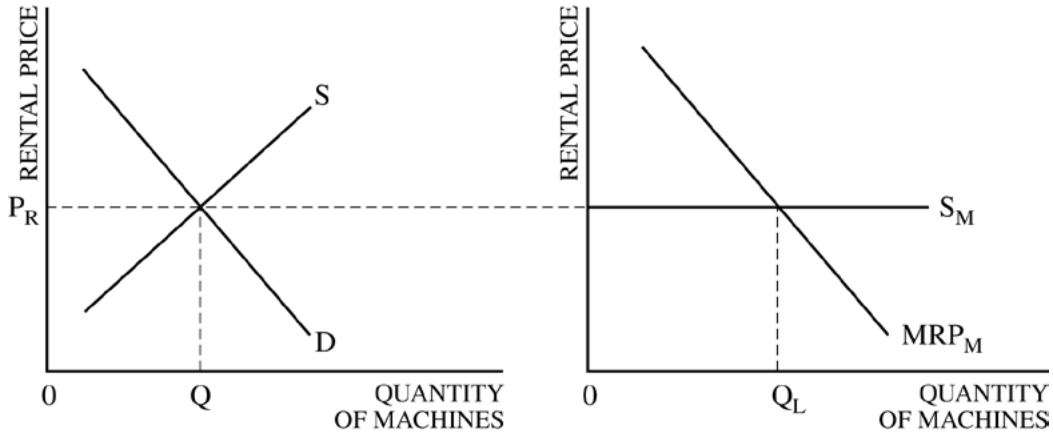
- One point is earned for shifting the market demand curve to the right and showing $P_{M2}$ and $Q_{M2}$.
- One point is earned for shifting the firm's demand curve upward to the level of $P_{M2}$.
- One point is earned for showing the profit-maximizing quantity, $Q_{F2}$, at MC = new MR.
- One point is earned for stating that ATC at $Q_{F2}$ is lower than $P_{M2}$.

(d) 1 point:

- One point is earned for stating that the equilibrium quantity will decrease and the equilibrium price will increase, because the increase in the price of corn causes a decrease in the supply of cereal.

## Question 2

**5 points** (2+2+1)




(a) 2 points:

- One point is earned for the correct side-by-side graphs with a horizontal machine supply curve for John Lamb (S, D, $P_R$, $S_M$).
- One point is earned for showing the equilibrium rental quantity of machines, $Q_L$, at the intersection of MRP and the horizontal supply curve.

(b) 2 points:

- One point is earned for stating that there will be no change to the marginal product curve for machine-hours.
- One point is earned for explaining that the MRP curve for machine-hours will decrease (shift to the left) because the decrease in demand decreases the price of widgets.

(c) 1 point:

- One point is earned for correctly calculating the rental price of a machine: $MP_L/w = MP_K/r = 28/14 = 60/r$. Therefore, r = \$30.

## Question 3

**5 points** (2+1+2)

(a) 2 points:
- One point is earned for identifying the consumer surplus as $P_3JM$.
- One point is earned for identifying the producer surplus as $P_1P_3M$.

(b) 1 point:
- One point is earned for identifying the socially optimal quantity as $q_1$.

(c) 2 points:
- One point is earned for identifying the consumer surplus as $P_5JK$.
- One point is earned for indicating that there is no deadweight loss.




# AP® Microeconomics
# 2010 Free-Response Questions
# Form B

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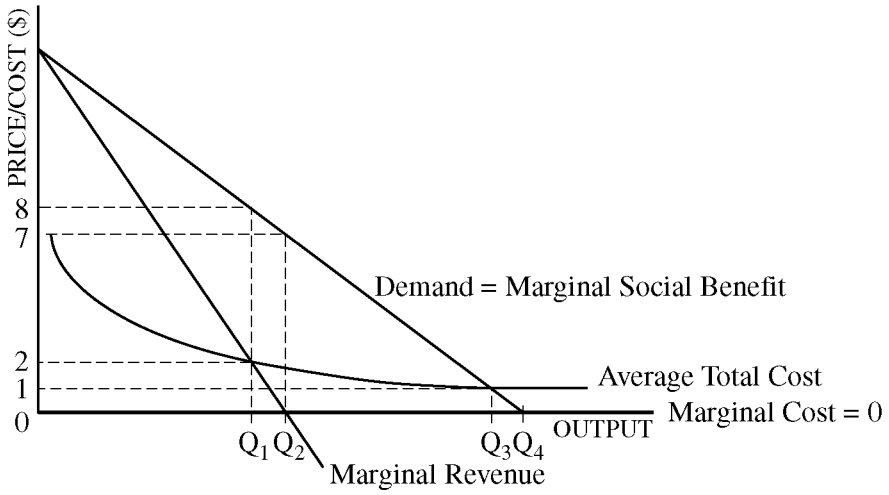
## MICROECONOMICS

**Section II**

**Planning time—10 minutes**

**Writing time—50 minutes**

**Directions:** You have 50 minutes to answer all three of the following questions. It is suggested that you spend approximately half your time on the first question and divide the remaining time equally between the next two questions. In answering the questions, you should emphasize the line of reasoning that generated your results; it is not enough to list the results of your analysis. Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. Use a pen with black or dark blue ink.




1. The diagram above shows the cost and revenue curves for a bridge to a popular island. The marginal cost of crossing the bridge is zero and is indicated in the diagram as the horizontal axis. The price is the toll to cross the bridge, and the output is the number of autos that cross the bridge each day.

   (a) Assume that a private firm owns the bridge and maximizes profits. Based on the diagram, determine each of the following.

   (i) Output

   (ii) Price

   (b) Now assume that a municipality owns the bridge and sets the price to achieve allocative efficiency. Based on the diagram, determine each of the following.

   (i) Output

   (ii) Price

   (c) At a price of $1, is the municipality's accounting profit positive, negative, or zero? Explain.

   (d) Suppose that the municipality sets a break-even price that generates revenues to just cover all economic costs.

   (i) Based on the diagram, determine the break-even output.

   (ii) At the output you determined in part (d)(i), is the demand relatively elastic, relatively inelastic, unit elastic, perfectly elastic, or perfectly inelastic?

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(e) If a company begins to provide access to the island via commercial watercraft, what will happen to each of the following in the diagram?

(i) The demand curve for bridge crossings

(ii) The profit-maximizing output

(f) Suppose the long-run average total cost is strictly downward sloping. Would it be efficient to build a second bridge? Explain.

---

| Number of Workers | Marginal Revenue Product per Day |
|---|---|
| 1 | $450 |
| 2 | $500 |
| 3 | $450 |
| 4 | $400 |
| 5 | $300 |
| 6 | $100 |

2. The table above gives the short-run marginal revenue product of labor per day for a perfectly competitive firm. The firm is currently selling its product at the market price of $5.

(a) Calculate the marginal (physical) product of the third worker.

(b) Define the law of diminishing marginal returns and explain why it occurs.

(c) Diminishing marginal returns first occur with the hiring of which worker for the firm?

(d) What is the highest daily wage that the firm is willing to pay to hire the fifth worker?

(e) What will happen to the demand for labor if the market price of the product increases? Explain.

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3. (a) The table below gives the quantity of good X demanded and supplied at various prices.

| Price (dollars) | Quantity Demanded (units) | Quantity Supplied (units) |
|---|---|---|
| 30 | 1 | 3 |
| 20 | 3 | 3 |
| 10 | 4 | 3 |

(i) Is the demand for good X relatively elastic, relatively inelastic, unit elastic, perfectly elastic, or perfectly inelastic when the price decreases from $30 to $20 ? Explain.

(ii) Is the supply of good X relatively elastic, relatively inelastic, unit elastic, perfectly elastic, or perfectly inelastic when the price decreases from $30 to $20 ? Explain.

(iii) If a per-unit tax is imposed on good X, how is the burden of the tax distributed between the buyers and sellers of good X?

(b) Assume that the income elasticity of demand for good Y is –2. Using a correctly labeled graph of the market for good Y, show the effect of a significant increase in income on the equilibrium price of good Y in the short run.

**STOP**

**END OF EXAM**

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## Question 1

**10 points** (2 + 2 + 1 + 2 + 2 + 1)

(a) 2 points:
- One point is earned for identifying the output as $Q_2$.
- One point is earned for identifying the price as \$7.

(b) 2 points:
- One point is earned for identifying the output as $Q_4$.
- One point is earned for identifying the price as \$0.

(c) 1 point:
- One point is earned for stating that the accounting profit is positive, because the firm earns zero economic profit. (Economic profit = Total revenue - Explicit costs - Implicit costs.)

(d) 2 points:
- One point is earned for identifying the break-even quantity as $Q_3$.
- One point is earned for stating that the demand at $Q_3$ is relatively inelastic.

(e) 2 points:
- One point is earned for stating that the demand curve for bridge crossings will shift down or to the left.
- One point is earned for stating that the profit-maximizing output will fall.

(f) 1 point:
- One point is earned for stating that building a second bridge would be inefficient and for explaining that, because there are economies of scale, building a second bridge would raise the average total cost.

## Question 2

**6 points** (1 + 2 + 1 + 1 + 1)

(a) 1 point:

- One point is earned for calculating the marginal product of the third worker: $450/$5 per unit = 90 units.

(b) 2 points:

- One point is earned for defining the law of diminishing returns: as more and more units of a variable input are added to a fixed input, the output increases at a decreasing rate.
- One point is earned for the explanation that diminishing returns occur because of the overuse of the fixed input.

(c) 1 point:

- One point is earned for stating that diminishing marginal returns first occur with the hiring of the third worker.

(d) 1 point:

- One point is earned for stating $300.

(e) 1 point:

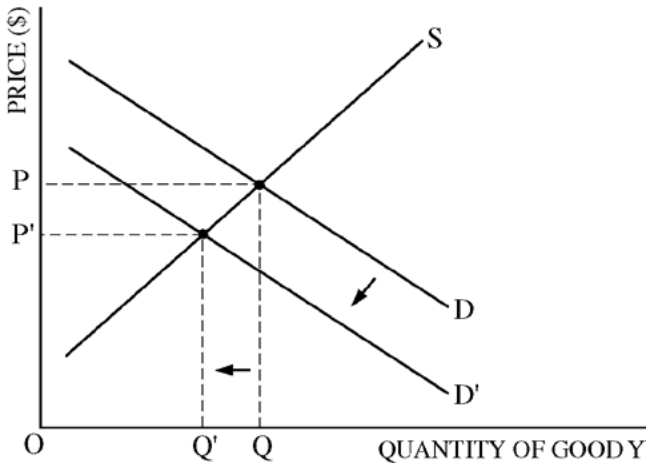
- One point is earned for stating that the demand for labor will increase because the increase in the product price raises the marginal revenue product of labor.

## Question 3

**5 points** (3 + 2)

(a) 3 points:

- One point is earned for stating that the demand for good X is relatively elastic, because the elasticity coefficient > 1 OR because total revenue rises as price decreases from $30 to $20.
- One point is earned for stating that supply is perfectly inelastic, because there is no change in the quantity supplied as the price changes OR because the supply elasticity is zero.
- One point is earned for stating that all of the burden of a per-unit tax falls on sellers.




(b) 2 points:

- One point is earned for a correctly labeled graph of supply and demand.
- One point is earned for showing a leftward shift of the demand curve and a decrease in the equilibrium price.

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