Indian Institute of Technology Bombay
Department of Humanities & Social Sciences
HS 101: Economics

Academic Year: 2017-18 **Autumn Semester** **Date: 13th Sept 2017**
Max. Marks: 40 **Mid-Semester Exam** **Time: 17:30 to 19:30**

Section-I Short Question

Answer any one question **[Total Marks: 1×5=5]**

Q1) In the class you have studied firm producing a single output. There are numerous examples of firms producing multiple outputs simultaneously. For example Toyota produces cars, trucks, SUVs. Dell produces many different types of computer, laptops, printers etc. Our analysis of single product firm can be used to study the case of multiproduct cost function. In multi product cost function the firm produces (say for the sake of simplicity) only two outputs, Q_1 *and* Q_2. The Cost function is defined as $C(Q_1, Q_2)$, that is the amount of cost incurred to produce Q_1 *and* Q_2 jointly.

Joint production is said to exhibit ***Economies of scope*** if the total cost of production of Q_1 *and* Q_2 together is less than producing Q_1 *and* Q_2 separately *i.e.*

$$C(Q_1, Q_2) < C(Q_1, 0) + C(0, Q_2)$$

Joint production exhibit ***cost complementarities*** when the marginal cost of producing one output reduces when the output of another product is increased. The marginal cost of one output, say of Q_1 is defined as $MC_1(Q_1, Q_2) = \frac{\partial C(Q_1, Q_2)}{\partial Q_1}$, then the cost function is said to exhibit cost complementarities if

$$\frac{\partial MC_1(Q_1, Q_2)}{\partial Q_2} = \frac{\partial^2 C(Q_1, Q_2)}{\partial Q_2 \partial Q_1} < 0.$$

Now answer the following question.

A multiproduct firm's cost function is estimated as

$$C(Q_1, Q_2) = 75 - 0.25Q_1Q_2 + 0.1Q_1^2 + 0.2Q_2^2$$

a. Are there economies of scope producing 10 units of product 1 and 10 units of product 2?
b. Are there cost complementarities in producing product 1 and product 2?
c. Suppose the division selling product 1 is floundering and another company has made an offer to buy the exclusive rights to produce product 2. How the sale of rights to produce product 2 would changes the firm's marginal cost of producing product 1.

Q.2) Consider a monopolist where the market demand for the good is given by the equation P = 1000 – Q and the total cost function for the monopolist is given by TC = 1000 + 100Q + (1/2)Q^2 and the monopolist's MC curve is given by the equation MC = 100 + Q

a. Given that the firm is a single-price monopolist, find the firm's equilibrium output, equilibrium price, and level of profits
b. Given that the firm is a single-price monopolist, find the value of consumer surplus (CS), producer surplus (PS), and deadweight loss (DWL) for the monopolist. (Draw the diagram)
c. Given this firm practices first degree price discrimination, calculate the value of the firm's profit, CS and DWL

Section-II Application Questions

Answers all the 4 questions **[Total Marks=4×2.5=10]**

1) You are the manager of a small pharmaceutical company that received a patent on a new drug three years ago. Despite strong sales ($125 million last year) and a low marginal cost of producing the product ($0.25 per pill), your company has yet to show a profit from selling the drug. This is, in part, due to the fact that the company spent $1.2 billion developing the drug and obtaining FDA approval. An economist has estimated that, at the current price of $1.25 per pill, the own price elasticity of demand for the drug is _2.5. Based on this information, what can you do to boost profits? Explain

2) You are the manager of a small U.S. firm that sells nails in a competitive U.S. market (the nails you sell are a standardized commodity; stores view your nails as identical to those available from hundreds of other firms). You are concerned about two events you recently learned about through trade publications: (1) the overall market supply of nails will decrease by 2 percent, due to exit by foreign competitors; and (2) due to a growing U.S. economy, the overall market demand for nails will increase by 2 percent. Based on this information, should you plan to increase or decrease your production of nails? Explain.

3) The CEO of a major automaker overheard one of his divisional manager makes the following statement regarding the firms' production plan "In order to maximize the profit it is essential that we should operate in the minimum point of out average total cost curve. "If you were the CEO of the automaker would you praise or chastise the manager?" Explain your answer.

4) The owner of Italian restaurant has been notified by her landlord that the monthly lease on the building in which the restaurant operates will increase by 20% at the beginning of the year. Her current prices are competitive with nearby restaurant of similar quality. However she is considering raising prices by 20% to offset the increase of monthly rent. Would you recommend her to raise the price? Would you have recommended her to raise the price if she was the only Italian restaurant in the town?

Section III-Multiple Choice Questions

Choose the one alternative that best completes the statement **[Total: 50×0.5=25]**
Total Number of Questions: 50
Each correct answer carries 0.5 marks
Each incorrect answer will be negatively graded and 0.25 marks will be deducted

1. The defining characteristic of a natural monopoly is
   a. constant marginal cost over the relevant range of output.
   b. economies of scale over the relevant range of output.
   c. constant returns to scale over the relevant range of output.
   d. diseconomies of scale over the relevant range of output.

2. Allowing an inventor to have the exclusive rights to market her new invention will lead to
(i) a product that is priced higher than it would be without the exclusive rights.
(ii) desirable behavior in the sense that inventors are encouraged to invent.
(iii) higher profits for the inventor.
a. (i) and (ii) b. (ii) and (iii) c. (i) and (iii) d. (i), (ii), and (iii)

Scenario 1

Consider a transportation corporation named C.R. Evans that has just completed the development of a new subway system in a medium-sized town in the Northwest. Currently, there are plenty of seats on the subway, and it is never crowded. Its capacity far exceeds the needs of the city. After just a few years of operation, the shareholders of C.R. Evans experienced incredible rates of return on their investment, due to the profitability of the corporation.

3. **Refer to Scenario 1**. Which of the following statements are most likely to be true?
(i) New entrants to the market know they will earn a smaller piece of the market than C.R. Evans currently has.
(ii) C.R. Evans is most likely experiencing increasing average total cost.
(iii) C.R. Evans is a natural monopoly.

a. (i) and (ii) b. (ii) and (iii) c. (i) and (iii) d. (i), (ii), and (iii)

4. **Refer to Scenario 1**. C.R. Evans will continue to be a monopolist in the subway transportation industry only if
a. population growth leads to an overcrowding of the subway cars.
b. there are no new entrants to the market.
c. demand for transportation services decreases.
d. All of the above are correct.

5. Which of the following is *not* a reason for the existence of a monopoly?
a. Sole ownership of a key resource
b. Patents
c. Copyrights
d. Diseconomies of scale

6. When a monopolist increases the number of units it sells, there are two effects on revenue. They are the
a. demand effect and the supply effect.
b. competition effect and the cost effect.
c. competitive effect and the monopoly effect.
d. output effect and the price effect.

7. When a monopolist increases the amount of output that it produces and sells, its average revenue
a. increases and its marginal revenue increases.
b. increases and its marginal revenue decreases.
c. decreases and its marginal revenue increases.
d. decreases and its marginal revenue decreases.

Table 1

Quantity	Price	Total Revenue	Average Revenue	Marginal Revenue
1	**35**	**35**		
2		64	32	29
3	29			
4				17
5	23			11
6		120		
7	17			-1
8				-7
9		99	11	-13
10		80	8	

8. **Refer to Table -1**. What is the marginal revenue for the monopolist for the sixth unit sold?

a. 3 b. 5 c. 11 d. 17

9. **Refer to Table -1**. Assume this monopolist's marginal cost is constant at $12. What quantity of output (Q) will it produce and what price (P) will it charge?

a. Q = 4, P = $29 b. Q = 4, P = $26 c. Q = 5, P = $23 d. Q = 7, P = $17

10. For a monopoly firm, the shape and position of the demand curve play a role in determining
(i) the profit-maximizing price.
(ii) the shape and position of the marginal cost curve.
(iii)the shape and position of the marginal revenue curve.

a. (i) and (ii) b. (ii) and (iii) c. (i) and (iii) d. (i), (ii), and (iii)

11. Competitive firms differ from monopolies in which of the following ways?
(i) Competitive firms do not have to worry about the price effect lowering their total revenue.
(ii) Marginal revenue for a competitive firm equals price, while marginal revenue for a monopoly is less than the price it is able to charge.
(iii)Monopolies must lower their price in order to sell more of their product, while competitive firms do not.
a. (i) and (ii) b. (ii) and (iii) c. (i) and (iii) d. (i), (ii), and (iii)

12. Suppose a firm has a monopoly on the sale of widgets and faces a downward-sloping demand curve. When selling the 100th widget, the firm will always receive
a. less marginal revenue on the 100th widget than it received on the 99th widget.
b. more average revenue on the 100th widget than it received on the 99th widget.
c. more total revenue on the 100 widgets than it received on the first 99 widgets.
d. a lower average cost per unit at 100 units output than at 99 units of output.

13. The profit-maximization problem for a monopolist differs from that of a competitive firm in which of the following ways?
a. A competitive firm maximizes profit at the point where marginal revenue equals marginal cost; a monopolist maximizes profit at the point where marginal revenue exceeds marginal cost.
b. A competitive firm maximizes profit at the point where average revenue equals marginal cost; a monopolist maximizes profit at the point where average revenue exceeds marginal cost.
c. For a competitive firm, marginal revenue at the profit-maximizing level of output is equal to marginal revenue at all other levels of output; for a monopolist, marginal revenue at the profit-maximizing level of output is smaller than it is for larger levels of output.
d. For a profit-maximizing competitive firm, thinking at the margin is much more important than it is for a profit-maximizing monopolist.

14. Suppose when a monopolist produces 50 units its average revenue is $8 per unit, its marginal revenue is $4 per unit, its marginal cost is $4 per unit, and its average total cost is $3 per unit. What can we conclude about this monopolist?
a. The monopolist is currently maximizing profits and its total profits are $200.
b. The monopolist is currently maximizing profits and its total profits are $250.
c. The monopolist is not currently maximizing its profits; it should produce more units and charge a lower price to maximize profit.
d. The monopolist is not currently maximizing its profits; it should produce fewer units and charger a higher price to maximize profit.

15. Consider a profit-maximizing monopoly pricing under the following conditions. The profit-maximizing price charged for goods produced is $12.The intersection of the marginal revenue and marginal cost curves occurs where output is 10 units and marginal cost is $6. The socially efficient level of production is 12 units. The demand curve and marginal cost curves are linear. What is the deadweight loss?

a. $4 b. $6 c. $12 d. $16

16. Which of the following statements is correct?
    a. The benefits that accrue to a monopoly's owners are equal to the costs that are incurred by consumers of that firm's product.
    b. The deadweight loss that arises in monopoly stems from the fact that the profit-maximizing monopoly firm produces a quantity of output that exceeds the socially-efficient quantity.
    c. The deadweight loss caused by monopoly is similar to the deadweight loss caused by a tax on a product.
    d. The primary social problem caused by monopoly is monopoly profit.

Scenario 2

Black Box Cable TV is able to purchase an exclusive right to sell a premium movie channel (PMC) in its market area. Let's assume that Black Box Cable pays $150,000 a year for the exclusive marketing rights to PMC. Since Black Box has already installed cable to all of the homes in its market area, the marginal cost of delivering PMC to subscribers is zero. The manager of Black Box needs to know what price to charge for the PMC service to maximize her profit. Before setting price, she hires an economist to estimate demand for the PMC service. The economist discovers that there are two types of subscribers who value premium movie channels. First are the 4,000 die-hard TV viewers who will pay as much as $150 a year for the new PMC premium channel. Second, the PMC channel will appeal to about 20,000 occasional TV viewers who will pay as much as $20 a year for a subscription to PMC.

17. **Refer to Scenario 2**. If Black Box Cable TV is unable to price discriminate, what price will it choose to maximize its profit, and what is the amount of the profit?
    a. price = $20; profit = $400,000
    b. price = $20; profit = $330,000
    c. price = $150; profit = $450,000
    d. price = $150; profit = $600,000

18. A perfectly price-discriminating monopolist is able to
    a. maximize profit and produce a socially-optimal level of output.
    b. maximize profit, but not produce a socially-optimal level of output.
    c. produce a socially-optimal level of output, but not maximize profit.
    d. exercise illegal preferences regarding the race and/or gender of its employees.

19. It is not uncommon to find that prescription drugs sell for more in the United States than they do in other countries. Which of the following statements about this issue is most likely to be true?
    a. Drug companies are engaging in price discrimination, and this practice certainly reduces global social welfare.
    b. Global social welfare could be improved if the price in the United States were reduced to the price charged in other countries.
    c. Global social welfare could be improved if the price in the other countries were increased to the price charged in the United States.
    d. Drug companies are engaging in price discrimination, but this might improve global social welfare if it gives more people access to the drugs

20. An airline knows that there are two types of travelers: business travelers and vacationers. For a particular flight, there are 100 business travelers who will pay $600 for a ticket while there are 50 vacationers who will pay $300 for a ticket. There are 150 seats available on the plane. Suppose the cost to the airline of providing the flight is $20,000, which includes the cost of the pilots, flight attendants, fuel, etc. How much additional profit can the firm earn by charging each customer their willingness to pay relative to charging a flat price of $600 per ticket?

    a. $15,000
    b. $25,000
    c. $40,000
    d. $70,000

Scenario 3

In March of 2000 a study sponsored by the Food Consumer Safety Board found that consumption of irradiated grapefruit increased the health of laboratory rats. As a result of national press coverage of the report, the demand for irradiated grapefruit increased dramatically. Organic farmers were able to switch from organic production of grapefruit to irradiated production with no additional cost. Assume that the grapefruit market satisfies all of the attributes of perfect competition.

21. **Refer to Scenario 3**. As a result of the increase in the demand for grapefruit, we would predict that in the short run that the
    a. production of grapefruit would be at efficient scale.
    b. price of grapefruit would rise.
    c. total cost for existing irradiated grapefruit producers must rise.
    d. number of firms in the market would fall as prices fall and firms exit the market.

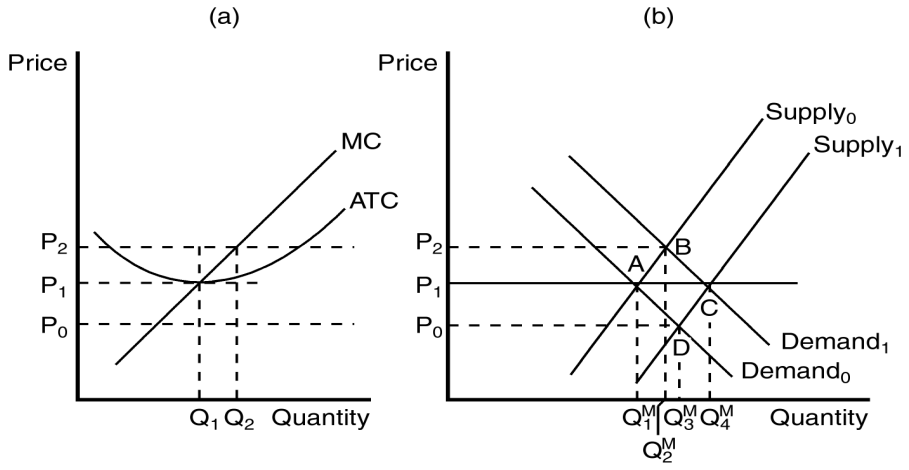
22. **Refer to Scenario 3.** If the increased production of irradiated grapefruit caused a rise in the marginal transportation costs of moving irradiated grapefruit to market, the
    a. short-run market supply curve for irradiated grapefruit would be affected, but not the long-run market supply.
    b. long-run market supply curve for irradiated grapefruit would be perfectly elastic.
    c. long-run market supply of irradiated grapefruit would be downward sloping.
    d. long-run market supply of irradiated grapefruit would be upward sloping.

23. The exit of existing firms from a competitive market will
    a. increase market supply and increase market prices.
    b. increase market supply and decrease market prices.
    c. decrease market supply and increase market prices.
    d. decrease market supply and decrease market prices.

24. Suppose a competitive market is comprised of firms that face identical cost curves. The firms experience an increase in demand that results in positive profits for the firms. Which of the following events are then most likely to occur?
    (i) New firms will enter the market.
    (ii) In the short run, price will rise; in the long run, price will rise further.
    (iii)In the long run, all firms will be producing at their efficient scale.

    a. (i) and (ii) only b. (i) and (iii) only c. (ii) and (iii) only d. (i), (ii) and (iii)

Figure 1



25. **Refer to Figure 1**. Assume that the market starts in equilibrium at point A in panel (b). An increase in demand from $Demand_0$ to $Demand_1$ will result in
a. a new market equilibrium at point D.
b. an eventual increase in the number of firms in the market and a new long-run equilibrium at point C.
c. rising prices and falling profits for existing firms in the market.
d. falling prices and falling profits for existing firms in the market.

26. **Refer to Figure 1**. If the market starts in equilibrium at point C in panel (b), a decrease in demand will ultimately lead to
a. more firms in the industry, but lower levels of production for each firm.
b. fewer firms in the market.
c. a new long-run equilibrium at point D in panel (b).
d. lower prices once the new long-run equilibrium is reached.

27. When new entrants into a competitive market have higher costs than existing firms,
a. accounting profits will be the primary determinant of entry into the market.
b. sunk costs become an important determinant of the short-run entry strategy.
c. market price must be rising.
d. all firms will earn zero economic profit once the new equilibrium is reached.

28. Comparison of marginal revenue to marginal cost
(i) reveals the contribution of the last unit of production to total profit.
(ii) is helpful in making profit-maximizing production decisions.
(iii)tells a firm whether its fixed costs are too high.

a. (i) only b. (i) and (ii) only c. (ii) and (iii) only d. (i) and (iii) only

29. Which of the following statements regarding a competitive firm is *true*?
a. Since demand is downward sloping, if a firm increases its level of output, the firm will have to charge a lower price to sell the additional output.
b. If a firm raises its price, the firm may be able to increase its total revenue even though it will sell fewer units.
c. By lowering its price below the market price, the firm will benefit from being able to sell more units at the lower price than it could have sold by charging the market price.
d. For all firms, average revenue equals the price of the good.

30. If the market elasticity of demand for potatoes is -0.3 in a perfectly competitive market, then the individual farmer's elasticity of demand
a. will also be -0.3. b. depends on how large a crop the farmer produces.
c. will range between -0.3 and -1.0. d. will be infinite.

31. If a competitive firm is (i) selling 1,000 units of its product at a price of $9 per unit and (ii) earning a positive profit, then
a. its total cost is less than $9,000.
b. its marginal revenue is less than $9.
c. its average revenue is greater than $9.
d. the firm cannot be a competitive firm since competitive firms can only earn zero profit.

32. When total revenue is less than variable costs, a firm in a competitive market will
a. continue to operate as long as average revenue exceeds marginal cost.
b. continue to operate as long as average revenue exceeds average fixed cost.
c. shut down.
d. raise its price.

33. Shrimp Galore, a shrimp harvesting business in the Pacific Northwest, has a 30-year loan on its shrimp harvesting boat. The annual loan payment is $25,000 and the boat has a market (salvage) value that exceeds its outstanding loan balance. Prior to the 2001 shrimp harvesting season, Shrimp Galore's accountant predicted that at expected market prices for shrimp, Shrimp Galore would have a net loss of $75,000 dollars after paying all 2001 expenses (including the annual loan payment). In this case, Shrimp Galore should
a. produce nothing and experience a loss of $25,000.
b. produce nothing and experience a loss of $75,000.
c. continue to operate because expected profits will rise in the future.

d. continue to operate even though it predicts a loss of $75,000.

34. Profit-maximizing firms enter a competitive market when, for existing firms in that market,
a. total revenue exceeds fixed costs.
b. total revenue exceeds total variable costs.
c. average total cost exceeds average revenue.
d. price exceeds average total cost.

35. A profit-maximizing firm in a competitive market is able to sell its product for $7. At its current level of output, the firm's average total cost is $10. The firm's marginal cost curve crosses its marginal revenue curve at an output level of 9 units. The firm experiences a
a. profit of more than $27.
b. profit of exactly $27.
c. loss of more than $27.
d. loss of exactly $27.

36. A certain competitive firm sells its output for $20 per unit. The 50th unit of output that the firm produces has a marginal cost of $22. Which of following is *not* necessarily true?
a. Production of the 50th unit of output increases the firm's total revenue by $20.
b. Production of the 50th unit of output increases the firm's total cost by $22.
c. Production of the 50th unit of output decreases the firm's profit by $2.
d. Production of the 50th unit of output increases the firm's average variable cost.

37. In a competitive market with identical firms,
a. an increase in demand in the short run will result in a new price above the minimum of average total cost allowing firms to earn a positive economic profit in the long run.
b. firms cannot earn positive economic profit in either the short run or long run.
c. firms can earn positive economic profit in the long run if the long-run market supply curve is upward sloping.
d. free entry and exit into the market requires that firms earn zero economic profit in the long run even though they may be able to earn positive economic profit in the short run.

38. In which of the following market structures does free entry and exit play an important role in the long-run equilibrium outcome?
(i) Perfect competition
(ii) Monopolistic competition
(iii) Monopoly
a. (i) only
b. (i) and (ii) only
c. (ii) and (iii) only
d. (i), (ii), and (iii)

39. Product differentiation causes the seller of a good to face what type of demand curve?
a. Downward sloping
b. Vertical
c. Horizontal
d. Any of the above could be correct since product differentiation does not affect the shape of the demand curve.

40. Suppose there is currently a tax of $50 per ticket on airline tickets. The supply curve for airline tickets slopes upward and the demand curve for airline tickets slopes downward. Sellers of tickets are required to pay the tax to the government. If the tax is reduced from $50 per ticket to $30 per ticket, then

a. the demand curve will shift upward by $20 and the price paid by buyers will decrease, but the decrease will be less than $20.
b. the demand curve will shift upward by more than $20 and the price paid by buyers will decrease by $20.
c. the supply curve will shift downward by $20 and the price paid by buyers will decrease, but the decrease will be less than $20.
d. the supply curve will shift downward by more than $20 and the effective price received by sellers will increase by $20.

41. In general, a tax burden falls more heavily on the side of the market that
a. has a fewer number of participants.
b. is more elastic.
c. is unit elastic.
d. is less elastic.

42. Suppose the demand for macaroni is inelastic and the supply of macaroni is elastic, and the demand for cigarettes is inelastic and the supply of cigarettes is elastic. If a tax were levied on the sellers of both of these commodities, we would expect that the
a. burden of both taxes would fall more heavily on the buyers than on the sellers.
b. burden of the macaroni tax would fall more heavily on the sellers than on the buyers, and the burden of the cigarette tax would fall more heavily on the buyers than on the sellers.
c. burden of the macaroni tax would fall more heavily on the buyers than on the sellers, and the burden of the cigarette tax would fall more heavily on the sellers than on the buyers.
d. burden of both taxes would fall more heavily on the sellers than on the buyers.

43. Which of the following statements is correct regarding a tax on a good and the resulting deadweight loss?
a. The greater are the price elasticities of supply and demand, the greater is the deadweight loss.
b. The greater is the price elasticity of supply and the smaller is the price elasticity of demand, the greater is the deadweight loss.
c. The smaller are the decreases in quantity demanded and quantity supplied, the greater the deadweight loss.
d. The smaller is the wedge between the effective price to sellers and the effective price to buyers, the greater is the deadweight loss.

44. You have just been hired as a business consultant to determine what pricing policy would be appropriate in order to increase the total revenue of a major shoe store. The first step you would take would be to
a. increase the price of every shoe in the store.
b. look for ways to cut costs and increase profit for the store.
c. determine the price elasticity of demand for the store's products.
d. determine the price elasticity of supply for the store's products

45. Last year, Joan bought 50 pounds of hamburger when her household's income was $40,000. This year, her household income was only $30,000 and Joan bought 60 pounds of hamburger. All else constant, Joan's income elasticity of demand for hamburger is
a. positive, so Joan considers hamburger to be an inferior good.
b. positive, so Joan considers hamburger to be a normal good and a necessity.
c. negative, so Joan considers hamburger to be an inferior good.
d. negative, so Joan considers hamburger to be a normal good, but not a necessity.

46. Thirsty Thelma owns and operates a small lemonade stand. When Thelma is producing a low quantity of lemonade she has few workers and her equipment is not being fully utilized. Because she can easily put her idle resources to use,
a. the marginal cost of an extra worker is large.
b. the marginal cost of one more glass of lemonade is smaller than if output were high.
c. the marginal product of an extra worker is small.
d. her lemonade stand is likely to be crowded with workers

47. Miller Technologies has average variable costs of $1 and average total costs of $3 when it produces 500 units of output. The firm's total fixed costs equal
a. $500
b. $1,000
c. $1,500
d. $2,000

48. When the marginal product of an input declines as the quantity of that input increases, the production function exhibits
    a. increasing returns to scale.
    b. decreasing returns to scale.
    c. diminishing total product.
    d. diminishing marginal product.

49. For a competitive firm that finds it worthwhile to operate rather than shut down, profit maximization requires that
    a. output price = marginal cost.
    b. wage = value of marginal product of labor.
    c. wage/marginal product of labor = P.
    d. All of the above are correct.

50. You have been asked by your economics professor to graph the market for lumber and then to analyze the change that would occur in equilibrium price as a result of recent forest fires in the west. Your first step would be to
    a. decide which direction to shift the curve.
    b. decide whether the fires affected demand or supply.
    c. graph the shift to see the affect on equilibrium.
    d. None of the above are correct