2. Two airline companies, Airtouch and Windward, operate a route from City X to City Y, transporting a mix of passengers and freight. They must file their schedules with the National Transportation Board each year and cannot alter them during that year. Those schedules are revealed only after both companies have filed. Each airline must choose between a morning and an evening departure. The relevant payoff matrix appears below, with the first entry in each cell indicating Airtouch's daily profit and the second entry in each cell indicating Windward's daily profit.

		Windward: Morning	Windward: Evening
Airtouch	Morning	$1,000, $700	$700, $600
	Evening	$750, $950	$900, $800

(a) In which market structure do these firms operate? Explain.

(b) If Windward chooses an evening departure, which departure time is better for Airtouch?

(c) Identify the dominant strategy for Windward.

(d) Is choosing an evening departure a dominant strategy for Airtouch? Explain.

(e) If both firms know all of the information in the payoff matrix but do not cooperate, what will be Windward's daily profit?

3. For each of the following statements, indicate whether it is true, false, or uncertain and explain why.

(a) Average total cost is always greater than average variable cost by a constant amount.

(b) In the short run, a perfectly competitive firm always maximizes profit when average total cost is at minimum.

(c) If a firm shuts down in the short run, its profits will equal zero.

STOP

END OF EXAM

3. Leadmill Company is a perfectly competitive pencil-manufacturing firm. Leadmill can sell all of the pencils it produces at a market price of $2 per dozen and can hire all the workers it needs at a wage rate of $8 per hour. The output of the workers at Leadmill is given in the table below.

Number of Workers	Output (dozens)
0	0
1	8
2	15
3	21
4	26
5	30
6	33
7	35
8	36

(a) Using marginal analysis, state the condition for employing the profit-maximizing number of workers.

(b) How many workers should Leadmill hire to maximize profit? Explain how you derived that number.

(c) If the wage rate decreased to $6 dollars per hour, how many workers would Leadmill employ?

(d) If the wage rate was $6 per hour and the price of pencils decreased to $1 per dozen, how many workers would Leadmill employ?

END OF EXAMINATION

2003 AP® MICROECONOMICS FREE-RESPONSE QUESTIONS

MICROECONOMICS

Section II

Planning time—10 minutes

Writing time—50 minutes

Directions: You have fifty 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.

1. J & P Company operates in a perfectly competitive market for smoke alarms. J & P is currently earning short-run positive economic profits.

   (a) Using correctly labeled side-by-side graphs for the smoke alarm market and J & P Company, indicate each of the following for both the market and the J & P Company.

   (i) Price

   (ii) Output

   (b) In the graph in part (a) for J & P, indicate the area of economic profits that J & P Company is earning in the short run.

   (c) Using a new set of correctly labeled side-by-side graphs for the smoke alarm market and J & P Company, show what will happen in the long run to each of the following.

   (i) Long-run equilibrium price and quantity in the market

   (ii) Long-run equilibrium price and quantity for J & P Company

   (d) Assume that purchases of smoke alarms create positive externalities. Draw a correctly labeled graph of the smoke alarm market.

   (i) Label the market equilibrium quantity as Q_m.

   (ii) Label the socially optimum equilibrium quantity as Q_s.

   (e) Identify one government policy that could be implemented to encourage the industry to produce the socially optimum level of smoke alarms.

GO ON TO THE NEXT PAGE.

MICROECONOMICS

Section II

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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. Callahan's Orchard grows apples and operates in a constant-cost, perfectly competitive apple industry. Callahan's Orchard is currently in long-run equilibrium.

   (a) Draw correctly labeled side-by-side graphs for the apple market and Callahan's Orchard, and show each of the following.

      (i) Market output and price, labeled as "Q_M" and "P_M", respectively

      (ii) Callahan's output and price, labeled as "Q_F" and "P_F", respectively

   (b) Now assume that the government provides farm support to apple growers by granting an annual lump-sum subsidy to all apple growers. Indicate the effect the subsidy would have on each of the following in the short run.

      (i) Callahan's quantity of output. Explain.

      (ii) Callahan's profit

      (iii) The number of firms in the industry

   (c) Indicate how each of the following will change in the long run as a result of the lump-sum subsidy.

      (i) The number of firms in the industry. Explain.

      (ii) Price

      (iii) Industry output

GO ON TO THE NEXT PAGE.