

# **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.

## **2003 AP® MICROECONOMICS FREE-RESPONSE QUESTIONS**

2. (a) Draw a correctly labeled graph showing a typical monopoly that is maximizing profit and indicate each of the following.
- (i) Price
  - (ii) Quantity of output
  - (iii) Profit
- (b) Describe and explain the relationship between the monopolist's demand curve and marginal revenue curve.
- (c) Label each of the following on your graph in part (a).
- (i) Consumer surplus
  - (ii) Deadweight loss
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3. Assume that Company XYZ is a profit-maximizing firm that hires its labor in a perfectly competitive labor market and sells its product in a perfectly competitive output market.
- (a) Define the marginal revenue product of labor ( $MRP_L$ ).
- (b) Using correctly labeled side-by-side graphs, show each of the following.
- (i) The equilibrium wage in the labor market
  - (ii) The labor supply curve the firm faces
  - (iii) The number of workers the firm will hire
- (c) Company XYZ develops a new technology that increases its labor productivity. Currently this technology is not available to any other firm. For Company XYZ, explain how the increased productivity will affect each of the following.
- (i) Wage rates
  - (ii) Number of workers hired

**END OF EXAMINATION**

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**Question 1**

**Correct Answers:**

**Part a:** The market graph should have a downward-sloping demand curve and an upward-sloping supply curve with an equilibrium price and quantity clearly labeled. The firm graph should have a perfectly elastic (or horizontal) demand curve at the equilibrium market price. The firm's profit-maximizing quantity is found at the intersection of this demand or marginal revenue curve with the firm's marginal cost curve.

**Part b:** The firm's profits are represented by the rectangle that has a height (or vertical distance) of ( $P - ATC$ ) multiplied by the firm's profit-maximizing output or  $q$ .

**Part c:** With profits being earned, new firms will enter the smoke alarm market. The market supply will increase (shift out to the right) and the equilibrium price will fall and quantity will increase. As the market price falls, the firm has a downward shift in its horizontal demand curve. The process continues until price of output has fallen to the minimum of the average total cost of the firm.

**Part d:** With a positive consumption externality in the market for smoke alarms, the demand curve with marginal social benefits should lie above the demand curve with only marginal private benefits. Thus, the socially optimal output level will exceed the output level produced by an unregulated private market.

**Part e:** To increase the market output to the socially optimal output, the government could subsidize the consumption or production of smoke alarms.

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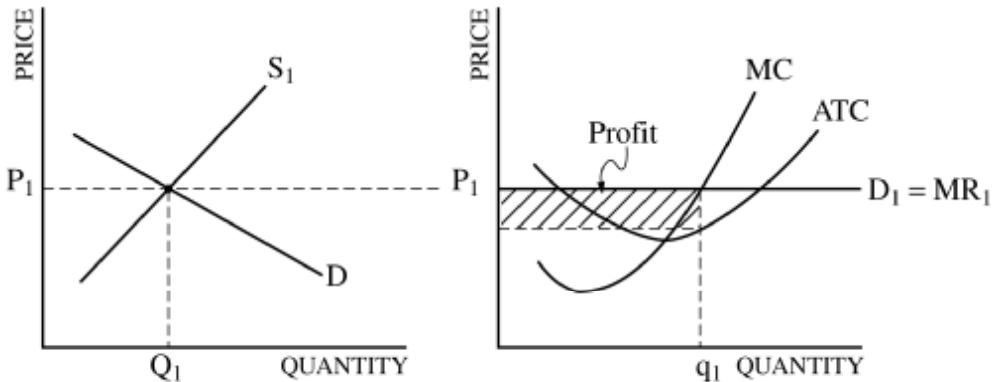
**Question 1 (cont'd)**

**Grading Rubric:**

Point allocations: (12 points: 4+1+4+2+1)

**(a) 4 points:**

- 1 point for the market graph ( $S_1$ ,  $D$ ) with a downward-sloping demand curve and an upward sloping supply curve.
- 1 point for correctly labeling equilibrium  $P$  and  $Q$  for the market.
- 1 point for the firm graph (Horizontal  $D$  or  $P$  curve).
- 1 point for applying  $MR=MC$  to find equilibrium quantity.
  - $MR$  must be logically consistent with demand curve



**(b) 1 point** for showing the AREA of economic profit for the firm.

- Must use  $P$ ,  $ATC$ , and  $q$ .

**(c) 4 points: (2 +2)**

**(i) 2 points:**

- 1 point for showing an increase in supply on market graph  
(resulting from the entry of new firms).

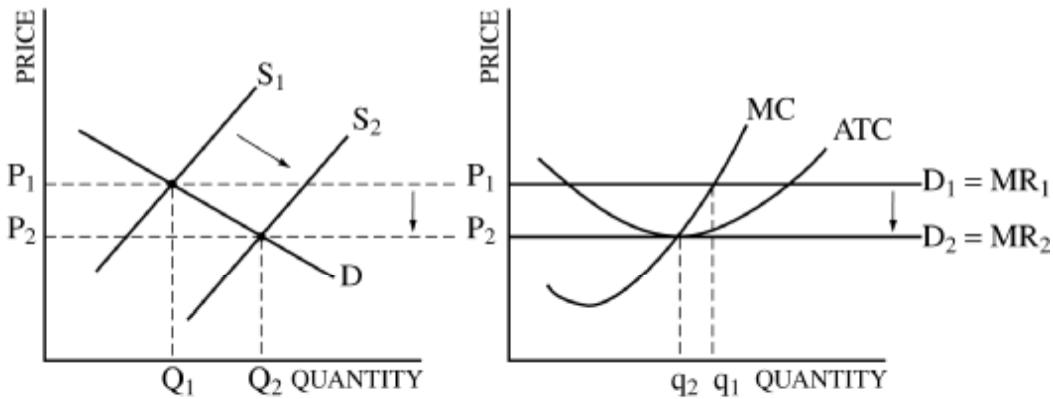
- 1 point for showing both a lower  $P$  and higher  $Q$  due to an increase in supply.

**(ii) 2 points:**

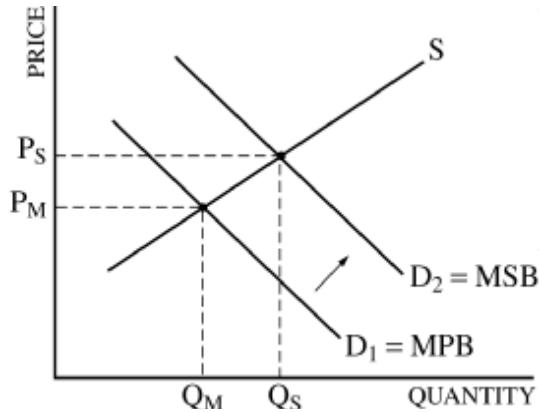
- 1 point for the downward shift in the firm's demand curve ( $P$  or  $MR$  or  $D$ )
- 1 point for  $q$  (for firm) where  $P = \min ATC$  for firm

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**Question 1 (cont'd)**



**(d) 2 points:**



1 point for showing that  $Q_S > Q_M$ .

1 point for having two marginal benefit curves: one with and without the positive externality.

**(e) 1 point** for any of the following: Subsidize sellers or buyers, mandatory smoke alarm system, or tax relief.