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2022

AP CollegeBoard

AP® Microeconomics

Sample Student Responses and Scoring Commentary Set 2

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Free-Response Question 3

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Question 3: Short — 5 points

(a)		State that the firm is experiencing economies of scale and explain that the long-run average total cost (LRATC) curve is downward sloping over the range of 0 to 60 units.	**1 point**
(b)		State that the price is \$15 and the quantity is 50 units.	**1 point**
(c)	**(i)**	Calculate the total revenue at the socially optimal quantity as \$600 and show your work. $\text{Total Revenue} = \text{Price} \times \text{Quantity} = \$10 \times 60 = \$600$	**1 point**
	(ii)	Explain that at the socially optimal quantity, the firm is earning negative economic profit in the short run because price is less than average total cost.	**1 point**
	(iii)	Calculate the lump-sum subsidy as \$180 and show your work. $\text{Lump-sum Subsidy} = (\text{LRATC} - \text{Price}) \times \text{Quantity} = (\$13 - \$10) \times 60 = \$180$	**1 point**
		Total for part (c)	**3 points**
		Total for question 3	**5 points**

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Important: Completely fill in the circle that corresponds to the question you are answering on this page.

Question 1 ○ Question 2 ○ Question 3 ●

Begin your response to each question at the top of a new page.

a) Firm is experiencing economies of scale as the LRATC decreases as more quantity is produced.

b) At price $15 and quantity of 50, the monopolist earns zero economic profit.

c) i) (60 × 10) = $600 total revenue

ii) The firm is producing at a price lower than LRATC and is thus incurring losses. A subsidy is needed to support the company's losses and allow them to continue producing in long run.

iii) (3 × 60) = $180 subsidy

Use a pen with black or dark blue ink only. Do NOT write your name. Do NOT write outside the box.

0088799

Q5320/05

Important: Completely fill in the circle that corresponds to the question you are answering on this page.

Question 1 ○ Question 2 ○ Question 3 ●

Begin your response to each question at the top of a new page.

(a) This firm is experiencing economies of scale because as quantity increases, LRATC decreases.

(b) The price & quantity where the monopolist earns 0 economic profit is at $15 & 50 units.

(c) i. TR = P x Q

P = $10, Q = 60 units

TR = 10 x 60 = $600

ii. the firm requires a subsidy because it is unable to sustain that low of a price & a non-profit maximizing quantity. with the subsidy, the firm can produce at the profit maximizing price & output

iii. current price = 10 23 - 10

wanted price = $23

lump-sum subsidy = $13

Use a pen with black or dark blue ink only. Do NOT write your name. Do NOT write outside the box.

0089806

Q5320/06

Important: Completely fill in the circle that corresponds to the question you are answering on this page.

Question 1 ○ Question 2 ○ Question 3 ●

Begin your response to each question at the top of a new page.

3. a) They are experiencing diseconomies of scale because their Demand is above their LRATC at the point where they are producing in the range of 0-60 units.

b) The monopolist earns zero econ profit at Q=50 and P=15.

c) i) The TR = 34 × 10 = 340.

ii) the firm requires a subsidy to elevate their revenue to keep being able to buy capital to produce an amount where they make profit.

iii) The lump sum subsidy needed is 23 - 10 = $13.

Use a pen with black or dark blue ink only. Do NOT write your name. Do NOT write outside the box.

Question 3

Note: Student samples are quoted verbatim and may contain spelling and grammatical errors.

Overview

The question assessed students' understanding of natural monopoly and regulation. The concepts in the question included economies of scale, zero economic profit, socially optimal quantity, price ceilings, total revenue, and lump-sum subsidies.

The question provided a graph showing a natural monopoly with a demand (D) curve, marginal revenue (MR) and marginal cost (MC) curves, and a long-run average total cost (LRATC) curve that is downward sloping through the relevant range of market demand. The graph is labeled to show quantities from 0 to 60 units and prices from 0 to $40.

In part (a) students were asked to identify whether the firm is experiencing economies of scale, diseconomies of scale, or constant returns to scale over the output range of 0 to 60 units, and they were asked to explain their response. Students were required to explain that the firm is experiencing economies of scale over the output range of 0 to 60 units because the LRATC curve is decreasing throughout this range.

Part (b) asked students to identify the price and quantity at which the monopolist earns zero economic profit, where the LRATC curve intersects the demand curve. Students were required to identify a price of $15 and a quantity of 50 units.

Part (c) introduced a price ceiling that results in the firm producing the socially optimal quantity in the short run. In part (c)(i), students were asked to calculate total revenue at the price ceiling, where the MC curve intersects the demand curve. Students were required to show their calculation of total revenue with a price of $10 and a quantity of 60 units. In part (c)(ii), students were asked to explain why the firm requires a subsidy to continue producing the socially optimal quantity in the long run. Students were asked to explain that the firm requires a subsidy because it is earning negative economic profit (loss), since the price is less than LRATC at the socially optimal quantity. In (c)(iii) students were asked to calculate the lump-sum subsidy necessary for the monopoly to produce the socially optimal quantity in the long run. Students were required to calculate the lump-sum subsidy that would cover the economic loss incurred by the firm by multiplying the quantity by the difference between LRATC and the price ceiling.

Sample: 3A
Score: 5

Part (a): 1 point

The response earned the point in part (a) because the response correctly identifies that the firm is experiencing economies of scale and correctly explains that LRATC is decreasing.

Part (b): 1 point

The response earned the point in part (b) because the response correctly identifies price and quantity.

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Question 3 (continued)

Part (c): 3 points

The response earned the point in part (c)(i) because the response correctly calculates total revenue and shows the work. The response earned the point in part (c)(ii) because the response correctly explains that the firm is producing at a price lower than ATC and earning a loss. The response earned the point in part (c)(iii) because the response correctly calculates the required subsidy and shows the work.

Sample: 3B
Score: 3

Part (a): 1 point

The response earned the point in part (a) because the response correctly identifies that the firm is experiencing economies of scale and correctly explains that LRATC is decreasing.

Part (b): 1 point

The response earned the point in part (b) because the response correctly identifies price and quantity.

Part (c): 3 points

The response earned the point in part (c)(i) because the response correctly calculates total revenue and shows the work. The response did not earn the point in part (c)(ii) because the response does not explain that the firm is earning negative economic profit. The response did not earn the point in part (c)(iii) because the response incorrectly calculates the required subsidy.

Sample: 3C
Score: 1

Part (a): 1 point

The response did not earn the point in part (a) because the response states that the firm is experiencing diseconomies of scale.

Part (b): 1 point

The response earned the point in part (b) because the response correctly identifies price and quantity.

Part (c): 3 points

The response did not earn the point in part (c)(i) because the response incorrectly calculates total revenue. The response did not earn the point in part (c)(ii) because the response does not explain

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Question 3 (continued)

that the firm is earning a loss. The response did not earn the point in part (c)(iii) because the response incorrectly calculates the required subsidy.

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