2021

AP CollegeBoard

AP® Microeconomics

Sample Student Responses and Scoring Commentary Set 2

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Free Response Question 2

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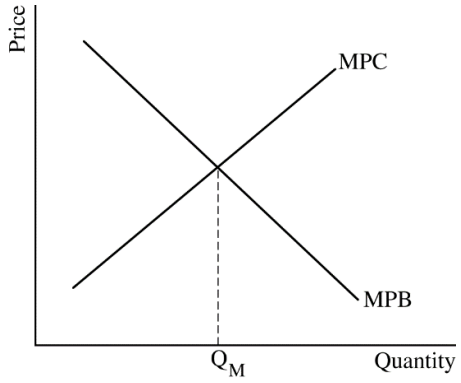
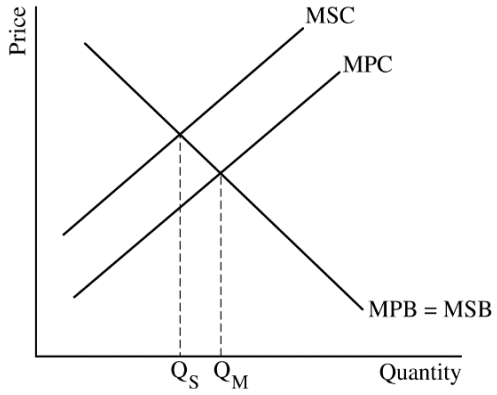
Question 2: Short — 5 points

(a) Draw a correctly labeled graph with an upward-sloping supply curve labeled MPC, a downward-sloping demand curve labeled MPB, and the market equilibrium quantity labeled Q_M. **1 point**



For the second point, the graph must include the MSC curve above the MPC curve at all output levels and must show the socially efficient quantity labeled Q_S. **1 point**



Total for part (a) 2 points

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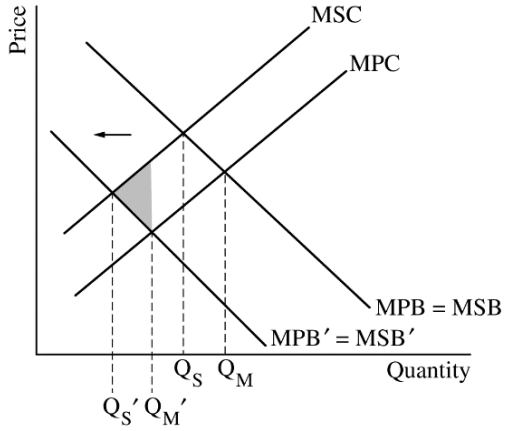
(b)	On your graph from part (a), show a leftward shift of the demand curve and shade completely the area of deadweight loss at the new market equilibrium.	**1 point**



(c) (i)	State that the per-unit tax would be equal to the marginal external cost (MSC − MPC).	**1 point**
(ii)	Explain that the lump-sum tax will not change the quantity produced because it does not affect the marginal cost.	**1 point**
	Total for part (c)	**2 points**
	Total for question 2	**5 points**

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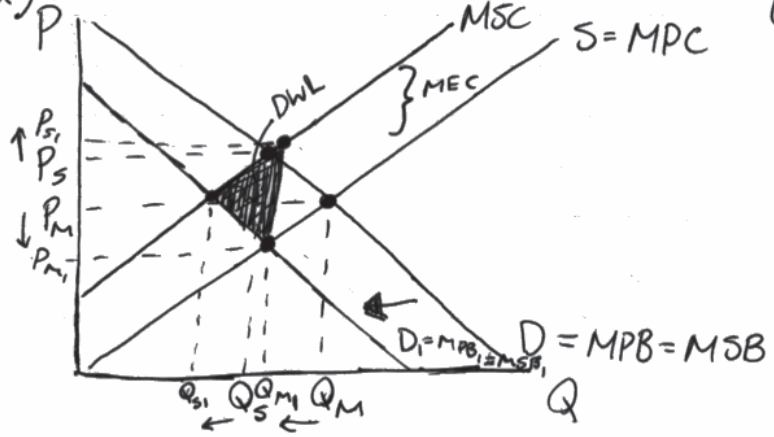
Q2 Sample A Page 1 of 1

Question 1 Question 2 Question 3

○ ● ○

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

(a) (i)(ii)



(b)

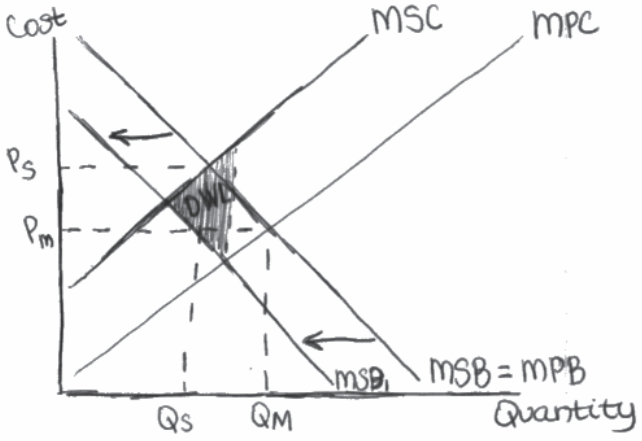
(c) (i) The per unit tax level should equal the marginal external cost to achieve the socially optimal quantity.

(c)(ii) A lump sum tax will not shift the marginal cost (supply) curve, and therefore will not impact the quantity ~~produced by~~ of copper produced in the short run, rather it will simply introduce an additional fixed cost on copper firms, increasing the average total cost, but not reducing the quantity of output to the socially optimal level.

Question 1 ○ Question 2 ● Question 3 ○

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

2a.)

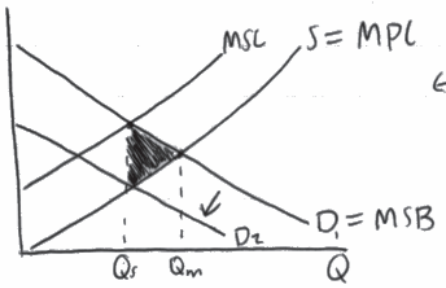


ci.) lump-sum subsidy

cii.) it would lower the price and increase the deadweight loss.

Question 1 ○ Question 2 ● Question 3 ○

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

a) 

← copper market

b) *shown on graph*

c) i: A per-unit tax at the high level would achieve the socially optimal quantity because it would force the production to decrease, resulting in less contamination of the river water.

ii: A lump-sum tax would not achieve the socially optimal quantity in the short run because after the producers paid the one time tax, they would resort back to their old production methods / quantities & continue to pollute the river water.

Question 2

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

Overview

The question assessed students' understanding of the negative production externalities, graphing marginal social costs and benefits, marginal private costs and benefits, how a change in demand would change the market deadweight loss, determining the size of a per-unit tax to correct for the externality, and evaluating the effect of a lump-sum tax. Students were expected to draw and label a graph for a market with a negative production externality and to show the market quantity compared to the socially optimal quantity. Additionally, students were expected to analyze a change in demand conditions to determine how it would affect deadweight loss in the market. Finally, students were also expected to calculate the level of the per-unit tax needed to correct for the externality and to explain why a lump-sum tax would not correct for the same externality.

The question stated that copper is produced in a perfectly competitive market; however, its production creates liquid waste that seeps into local rivers and causes human illness and crop failures downstream. This marginal external cost is constant at all quantities. In part (a) students were asked to draw a correctly labeled graph for the copper market labeling MSB, MPB, MSC, and MPC. Part (a)(i) and (a)(ii) asked students to show the market equilibrium quantity labeled Q_M and socially efficient quantity labeled Q_S, respectively. These parts of the question tested students' knowledge of a negative production externality while using a graph. This task included demonstrating knowledge of MSC being greater than MPC at all quantities while MSB and MPB were equal to each other. Students had to draw both the upward sloping MPC and MSC lines with MPC<MSC at all quantities. The marginal external cost was constant, so these two lines should have been parallel. Students were asked to show the market equilibrium at the intersection of the MPC and MPB curves as well as the socially efficient quantity at the intersection of MSC and MSB curves. There was no positive or negative externality of consumption, so the MPB and MSB were expected to be the same downward sloping line. These tasks required students to demonstrate the skill of correctly labeling the y-axis as price and showing Q_M and Q_S on the X axis with dotted lines from their respective equilibrium and socially optimal conditions.

Part (b) introduced a demand-side change and asked students to redraw the new demand curve to the left of the original (MPB, MSB) and shade the new deadweight loss. Specifically, this part of the question told students to assume that the demand for copper decreases. Students were then required to shade the area above the new demand curve, below the original MSC and between the new socially optimal quantity and the new market equilibrium quantity.

Part (c) asked students to consider a government imposed per-unit tax on the copper market. Students were asked what level of per-unit tax would achieve the socially optimal quantity and to explain why a lump-sum tax on producers would not achieve the socially optimal quantity. In part (c)(i) students needed to state that the level of per-unit tax needed to be equal to the marginal external cost of producing copper. In part (c)(ii) students needed to explain that a lump-sum tax would not achieve the socially optimal quantity because it would not change the marginal cost of producing copper.

Sample: 2A
Score: 5

Part (a): 2 points

- The response earned the first point in part (a) because the response shows a correctly labeled graph with a downward sloping MPB curve and an upward sloping MPC curve with Q_M at MPB=MPC.
- The response earned the second point in part (a) because the response shows MSC above MPC and labels Q_s at MSB=MSC.

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Question 2 (continued)

Part (b): 1 point

- The response earned the point in part (b) because the response shows a leftward shift of the demand curve (D_1 in the response) and shows the correct shading of DWL with the area above the new demand and below MSC between the quantities where D_1=MSC and D_1=MPC.

Part (c): 2 points

- The response earned the point for part (c)(i) because the response specifies the per-unit tax would be equal to the marginal external cost.
- The response earned the point for part (c)(ii) because the response explains that the quantity produced will not change because the lump-sum tax will not affect the marginal cost.

Sample: 2B
Score: 3

Part (a): 2 points

- The response earned the first point in part (a) because the response shows a correctly labeled graph with a downward sloping MPB curve and an upward sloping MPC curve with Q_M at MPB=MPC.
- The response earned the second point in part (a) because the response shows MSC above MPC and labels Q_s at MSB=MSC.

Part (b): 1 point

- The response earned the point in part (b) because the response shows a leftward shift of the demand curve (MSB_1 in the response) and shows the correct shading of DWL with the area above the new demand and below MSC between the quantities where MSB_1=MSC and MSB_1=MPC.

Part (c); 2 points

- The response did not earn the first point for part (c)(i) because the response does not specify that the per-unit tax would be equal to the marginal external cost.
- The response did not earn the point for part (c)(ii) because the response does not explain that the lump-sum tax will not affect marginal cost.

Sample: 2C
Score: 1

Part (a): 2 points

- The response did not earn the first point in part (a) because the response does not show a downward sloping MPB curve, with Q_M at MPB=MPC.
- The response earned the second point in part (a) because the response shows MSC above MPC and labels Q_s at MSB=MSC.

Part (b): 1 point

- The response did not earn the point in part (b) because the response does show a leftward shift of the demand curve (D_2 in the response) but does not show a correct shading of DWL with the area above the new demand and below MSC between the quantities where D2=MSC and D2=MPB.

Part (c): 2 points

- The response did not earn the point for part (c)(i) because the response does not specify that the per-unit tax would be equal to the marginal external cost.

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Question 2 (continued)

- The response did not earn the point for part (c)(ii) because the response does not explain that the lump-sum tax will not affect marginal cost.

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