2021

AP® Microeconomics

Free-Response Questions
Set 2

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MICROECONOMICS

SECTION II

Total Time—1 hour

Reading Period—10 minutes

Writing Period—50 minutes

3 Questions

Directions: You are advised to spend the first 10 minutes reading all of the questions and planning your answers. You will then have 50 minutes to answer all three of the following questions. You may begin writing your responses before the reading period is over. 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. 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. If the question prompts you to "Calculate," you must show how you arrived at your final answer. Use a pen with black or dark blue ink.

You may plan your answers in this orange booklet, but no credit will be given for anything written in this booklet. **You will only earn credit for what you write in the separate Free Response booklet.**

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1. NCHart is a corporation that has developed and patented a new drug to treat heart disease. There are no substitutes for this drug, giving NCHart a monopoly.

   (a) Draw a correctly labeled graph of NCHart making a positive economic profit, and show each of the following.

   (i) The profit-maximizing quantity, labeled Q_m
   (ii) The profit-maximizing price, labeled P_m

   (b) At Q_m from part (a)(i), is demand elastic, unit elastic, or inelastic? Explain using information from the graph.

   (c) Instead of maximizing profit, suppose NCHart considers providing the new drug to as many patients as possible as long as it can generate enough revenue to cover its total costs.

   (i) On your graph from part (a), show the quantity that is consistent with this goal, labeled Q_Z.
   (ii) At Q_Z from part (c)(i), is there a deadweight loss? Explain.

   (d) NCHart's patent expires next year, and a new firm, TXDrug, is considering whether to Enter this market or Stay Out. NCHart can either produce Q_m or Q_Z. The firms independently and simultaneously choose their actions. The first entry in the payoff matrix represents NCHart's payoff and the second entry represents TXDrug's payoff. Both firms have complete information. Use the payoff matrix below to answer the following questions.

		TXDrug: Stay Out	TXDrug: Enter
NCHart	Q_m	\$10, \$0	\$4, \$1
	Q_Z	\$0, \$0	–\$2, –\$1

   (i) Does TXDrug have a dominant strategy? Explain using strategies and payoffs from the payoff matrix.
   (ii) What is the best response for NCHart if TXDrug chooses to Stay Out?
   (iii) Identify the Nash equilibrium.

Begin your response to this question at the top of a new page in the separate Free Response booklet and fill in the appropriate circle at the top of each page to indicate the question number.

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2. Copper is produced in a perfectly competitive market with an upward-sloping supply curve and a downward-sloping demand curve. Assume the production of copper results in liquid waste, which seeps into local rivers. The contaminated river water causes human illnesses and crop failures downstream. The marginal external cost from producing copper is constant across all quantities of copper produced.

(a) Draw a correctly labeled graph of the copper market with the marginal social benefit (MSB), marginal private benefit (MPB), marginal social cost (MSC), and marginal private cost (MPC) curves, and show each of the following.

(i) The market equilibrium quantity, labeled Q_M
(ii) The socially efficient quantity, labeled Q_S

(b) Suppose the demand for copper decreases. On your graph in part (a), show the deadweight loss at the new market equilibrium, shaded completely.

(c) Suppose the government is considering levying a tax on copper.

(i) What per-unit tax level would achieve the socially optimal quantity?
(ii) Explain why a lump-sum tax on producers will not achieve the socially optimal quantity in the short run.

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3. The table below shows the total cost and total benefit of advertisements placed by AZY Foods, a firm in the retail food market.

Number of Advertisements	Total Cost ($)	Total Benefit ($)
1	300	1,200
2	500	2,200
3	800	3,000
4	1,300	3,600
5	2,100	4,000
6	3,000	4,200
7	4,100	4,200

(a) Calculate the total net benefit of placing three advertisements. Show your work.

(b) Calculate the marginal net benefit of the third advertisement. Show your work.

(c) What is the optimal number of advertisements placed by AZY Foods? Explain using marginal analysis.

(d) Suppose over the next year the marginal benefit that AZY Foods receives from each advertisement increases by $300. Identify the optimal number of advertisements.

(e) There are many firms in the retail food market. Each firm places its own firm-specific advertisements without considering the actions of its competitors. In what market structure is AZY Foods operating?

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STOP

END OF EXAM

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