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# Markets - Spring 2023 - Quiz III

**Your Full Name:**
**Recitation Hours:**

**Instructions**

Please print out this quiz and write your answers on it. Make sure you staple it.

There are a total of 26 points. Each question is labeled with the number of points it is worth.

**Please write neatly (I insist!). Show all your work.**

Due date: May 8th, Monday at 5 PM. Place your quiz in Prof. Norris's mailbox.

**Q1. Ch 13. (13 points):** Suppose a monopolist faces demand $D = 6 - Q$ and $MR = 6 - 2Q$, and has costs $TC = 1 + 2Q$, and $MC = 2$. The monopolist is unable to price discriminate.

a. Derive the ATC. Is this a natural monopoly and why?. (2 points)

b. Draw the demand curve, MR, MC, ATC on a graph. Make sure to label the curves and axes clearly (2 points)

c. Calculate the value of the optimal $Q$ and $P$. Label this on the graph of the previous question (part b). (3 points)

d. Calculate the value of the profit at this point. Also label this on the graph (part b). (2 points)

e. The government's antitrust division determines this monopoly has too much market power. It has two options: break the monopoly into two smaller companies, or regulate it using a price ceiling. Which should it do and why?. (2 points)

f. The government has decided to enact the price ceiling. On the graph, label the price ceiling that maximizes consumer surplus. Indicate this consumer surplus on the graph (part b). (2 points)

**Q2. Ch 14. (5 points):** The USA and USSR were in a precarious state of interdependence during the Cold War. Each country had a huge advantage of having nukes while the other country didn't, thus incentivizing each to develop nukes, but everyone would be better off if no-one ever built nukes. The following pay-off matrix numerically describes this situation with hypothetical numbers (see Table 1 below).

| US / USSR | Build Nuke | Don't Build |
|---|---|---|
| Build Nuke | 50/50 | 0/100 |
| Don't Build | 80/0 | 20/20 |

Table 1: Predicted Percentage of Casualities

The value in each cell for each country is the predicted percentage of casualties their country will suffer under that outcome. Note that USSR suffers a worse fate in the case that the US has a nuke but they do not, because of John von Neumann's strategy of preventative war.

a. Suppose the USSR builds a nuke. What is the US's best response? (1 point)

b. Does there exist a dominant strategy for the US? (1 point)

c. Find the Nash equilibrium (1 point).

d. Find the joint best outcome. (1 point).

e. Is the Prisoner's Dilemma present here? Explain why. (1 point).

**Q3. Ch 15. (8 points):** One of your former peers starts up a firm after graduating NYUAD. However, he didn't take Markets so is unsure if he is behaving optimally. He's asked you for help. His firm faces monopolistic competition, has diminishing returns to its inputs and uses a fixed input. He produces a quantity such that his marginal cost and the maximum price that consumers are willing to pay for it are equalized, P=MC. He makes a positive profit.

a. Draw the Demand curve, MR, MC, and ATC reflecting this situation on a graph. Label the quantity, price and profit of the firm under his strategy. (3.5 points)

b. Is his strategy maximizing his profits? Explain how he would do so if not. Label the quantity, price and profit of the firm under the optimal strategy on your graph in part a. (2.5 points)

c. He asks you about what you predict might happen to his profits in the future. What do you expect will happen to profits in this industry as we go to long run and why? What is the key assumption of monopolistic competition that gives you your conclusion? (2 points)

**Additional space for answers if needed.**

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