Problem Set 4: Due Mar 2/3

Sample Midterm A
Section I: Key Terms—Police the Reading

1. What does Partha Dasgupta think Friedrich von Hayek deserved his Nobel Prize?

a) **he was the first economist to precisely identify and focus on the extraordinary utility of the market as a mechanism for widely and cheaply disseminating important and useful information about the state of the economy to producers and consumers;**
b) his _Road to Serfdom_ famously warned of the dangers of socialism;
c) his business-cycle theory was the first to precisely identify and focus on the dangers of overinvestment as the root cause of economic depressions;
d) he performed the first comprehensive analysis of natural monopoly and its costs and benefits;
e) none of the above.

2. What is another name for what FBAH call the "Equilibrium Principle?"

a) the "Low-Hanging Fruit Principle";
b) **the "No-Cash-Left-on-the-Table Principle";**
c) the "Sunk-Cost Principle;
d) the "Income Effect Principle";
e) none of the above.

3. What do FBAH mean when they refer to the "hurdle method of price discrimination"?
a) selling both inferior and normal goods;
b) monopolies that sell more than they should to maximize profits in order to discourage competition;
c) **the practice by which a seller offers a discount to all buyers who overcome some obstacle;**
d) investing in increased capacity to lower average fixed costs;
e) none of the above.
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4. What is a "positional arms race"?
a) a strategic game between two players where the first mover receives more utility than the second player;
b) what occurs when an increase in one person's performance reduces the expected reward of another's performance;
c) an agreement in which contestants attempt to limit mutually offsetting investments in performance enhancement;
d) **a series of mutually offsetting investments in performance enhancements that is stimulated by a positional externality;**
e) none of the above.

Section II: Key Terms—Police the Concepts

Explain each of the following in one sentence that convinces your GSI you understand the concept and how it has been used so far in lecture, section, and readings:

1. What is the "willingness to pay" of a consumer?

The price above which the consumer simply will not buy. The difference between WTP and the price a consumer pays is the benefit to the consumer of the existence of the market—the surplus they gain.

2. What is "producer surplus"?

Aggregate over all producers the surplus each gains from the market—the difference between the price they receive and their particular opportunity cost. That is producer surplus—the maximum amount that you could ever possibly induce producers as a group to pay in order to keep the market open.

3. What is a "first-mover advantage"?

A situation in which the first competitor to make decisions can thereby make it very clear that it is impossible for it to follow certain competitive strategies, if that knowledge affects the strategies that other competitors are then induced to follow in a way that advantage the first competitor.

4. What are "increasing returns to scale"?

A situation in which there is some degree of non-rivalry: in which the resources a producer uses to produce the first unit are not thereby used up, and are available in some degree to help produce the second unit. Thus it is less than twice as expensive to produce two units as one, less than ten times as expensive to produce a hundred units as ten, less than a hundred times as expensive to produce a hundred-thousand units as a thousand, and so forth. Any simulacrum of competitive equilibrium may be impossible to sustain in the presence of increasing returns to scale, and even if sustainable may well be grossly inefficient and wasteful.

Section III: Supply, Demand, and Surplus

Let's assume that we can treat all automobiles as more or less the same. Suppose demand for cars worldwide is P = $140 - 2Q, where P is the price of cars in thousands of dollars and Q is the number of cars sold each year in millions. Suppose that cars can be produced at constant returns to scale at a fully-amortized cost of P = $20, where P is the price of cars in thousands of dollars.

1.What is the equilibrium price of a newly-produced car?

$20 (thousand/car). The supply curve is perfectly responsive at a price of $20. what else could the equilibrium price be?

2. What is the equilibrium quantity?

60 million cars/year. The demand curve is P = $140 - 2Q. We know that the equilibrium price is $20. That price is associated with a demand of 60 (million/ year).

3. What is the producer surplus?

zero: this is a perfectly-competitive constant-returns-to-scale industry with no fixed factors of production. The price is the same thing as the (constant) opportunity cost.

4. What is the consumer surplus?

Since the maximum willingness-to-pay is $140 and the minimum willingness to pay among those who purchase is $20, the average willingness to pay is (unrealistically) $80 (thousand/car). Average surplus per consumer is average willingness to pay minus price. That is (unrealistically) $60 (thousand/car). At 60 million cars/year, multiplying the average surplus per car by the number of cars sold gives us $3.6 (trillion/year) of consumer surplus.

Section IV: Monopoly

1. What is a "natural monopoly"?

A situation in which non-rivalry—increasing returns to scale—are strong enough that two competing producers cannot both profitably survive in the market. Hence over time the market will tend to wind up with one dominant producer, and no other producer will have an incentive to enter the market and challenge it.

2. Why is it the case that the market system cannot deliver a sustainable competitive equilibrium in the case of a "natural monopoly".

In a competitive market, price is equal to (or near) opportunity cost. But in the case of natural monopoly the opportunity cost is less than the average cost. And so if the good sells for its competitive price no producers will make money. Hence producers will drop out and exit the market until the wedge between the price and opportunity cost is large enough that producers are at least covering their costs

3. What, in your view is likely to be the most attractive option for how the government should deal with cases of natural monopoly?

Interesting in what people say—anything reasonably intelligent-sounding and thoughtful gets full credit. Important points to hit are (a) that the problem cannot be solved because a competitive market is unsustainable, (b) that production ought to be pushed above the monopoly level, that (c) public ownership is a possibility, as is (d) rate regulation—imposing a price ceiling. And one has to worry about (e) government failure: might it be better to simply let the situation alone?

4. Why does this option strike you as more attractive than the other options you can think of?

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Section V: Externalities

1. Describe the advantages and disadvantages of using taxes and bounties to regulate negative externalities.

Major advantage: if you get the Pigovian tax (or bounty) right, you have fixed the externality. Major disadvantage: the government has to be able to calculate and then have the incentive to impose the right Pigovian solution. It's a contest between the magnitude of market failure on the one hand, and government calculation and incentivization failures on the other

2. Describe the advantages and disadvantages of allowing individuals to sue to regulate negative externalities.

Major advantage: if property rights are well-specified and bargaining costs are low, it fixes the externality without risking government calculation and incentivization failures. Major disadvantages: first, well-specifying property rights is a lot harder than it looks (recall the section exercise in which running express trains is unprofitable as any enterprise other than as a Coaseian law-enabled extortion racket); second, if bargaining costs are low… well, if bargaining costs are low, we can simply require consensus for everything and live in utopia, right?

Optional Additional Questions

1. What do FBAH mean by "variable factor of production"?

a) a factor of which the firm is uncertain about how much of it is variable;
b) resources available to a firm that are fixed in the short-run but can be varied over time via investment, capacity expansion, and depreciation;
c) a factor of production with a price that varies over time;
d) resources available to a firm that must be specified and ordered before the current level of demand is known;
e) none of the above.

2. What are the four kinds of market failure that Partha Dasgupta identifies in his *Economics: A Very Short Introduction*?
a) market-power, non-rivalry, macroeconomic, and distributional;
b) market-power, network, miscalculation, and macroeconomic;
c) non-rivalry, market-power, network, and miscalculation;
d) distributional, free-riding, market power, and macroeconomic;
e) none of the above.

5. What is "diminishing marginal utility"?

Whenever the willingness-to-pay of additional consumers declines as the number of consumers buying increases, or the willingness-to-pay of a single consumer for an additional unit declines as the number of units he or she buys increases.

6. What is "adverse selection"?

Whenever raising the price of a commodity leads those whom it is less costly to provide that commodity to to drop out of the market.

7. What is the "opportunity cost" of a producer?

The price below which the producer simply will not produce. The difference between OC and the price a producer receives is the benefit to the producer of the existence of the market—the surplus they gain.

8. What is an "equilibrium price"?

A price at which there is neither excess demand nor excess supply—at which the number of people who want to buy at that price is equal to the number of people who want to sell. A price at equilibrium will have no tendency to rise or fall.

9. In the 9 counties and more than 101 cities of Greater San Francisco there are 2.5 million households looking for housing. Apartments in San Francisco itself rent for the most. Apartments rent for proportionately less in less-central areas where living is less fun and less convenient. Let's imagine that every one of those 2.5 million households pays the SF market price. Suppose demand is P = $8 - 2 x Q (with Q in millions of apartments, and P rental cost in thousands of dollars/month). Suppose supply is P = $1.2 x Q (again with Q in millions of apartments, and P rental cost in thousands of dollars/month).

a) What is the equilibrium rental price of apartments?

$3 (thousand/bedroom/month, central-SF benchmark)

b) What is the equilibrium quantity?

2.5 (million apartments, one-bedroom benchmark)

c) What is the consumer surplus?

Average WtP is $5.5, average surplus per renter is $3, 2.5 units, $7.5 (billion/month) in consumer surplus

d) What is the producer surplus?

AOC is $1.5, average surplus per landlord is $1.5, 2.5 units, $3.75 (billion/month) in producer surplus

10. Suppose PowerCo is a power-plant operating company that runs coal-powered plants and has to decide how many power plants to run. The marginal revenue for power plants is given by MR= $10 - 2Q, where Q is the number of power plants operated and MR is measured in millions of dollars per year. The marginal cost of operating power plants is given by MC= $2, where MC is measured in millions of dollars per year. Each power plant imposes social costs through increased asthma in the nearby town of Breathville, with total social pollution costs= $4 x Q.

a) How many plants should Powerco run to maximize profit?

4 power plants

b) If the town can successfully sue Powerco as *parens patriae* to recover the social costs of operating power plants, how many power plants will Powerco operate?

2 power plants

c) What is an alternative policy by which the government could cause Powerco to run the socially optimal number of power plants?

This is subtle.

The socially-optimal number of power plants is not the number at which MR = MC + MEC (where MEC is the marginal externality cost).

The socially-optimal number is the number at which, along the demand curve, P = MC + MEC.

The demand curve is P = $10 - Q. $6 = $10 - Q = 4. By pure coincidence, the monopoly produces at the socially-optimal level: the effects of the market failure of monopoly which leads the firm to produce less than the societal optimum are fully offset by the effects of the market failure of externality which leads the firm to produce more than the societal optimum.