

Econ 001: Final Exam (Dr. Stein)  
December 12th, 2012

**Instructions:**

- **This is a 120-minute examination.**
- **Write all answers in the blue books provided. Show all work. Use diagrams where appropriate and label all diagrams carefully.**
- **Write your name and your Recitation Instructor's name in every blue book that you use.**
- **This exam is given under the rules of Penn's Honor system.**

My signature on the cover of bluebook #1 certifies that I have complied with the University of Pennsylvania's Code of Academic Integrity in completing this examination.

**PLEASE SIGN AND DATE BLUEBOOK #1**

- **All blue books, blank or filled, must be handed in at the end of this exam. No blue books may be taken from the room.**
- **Calculators are not allowed on this exam.**

**The Exam has 3 parts. You will need 3 blue books. One for each part.**

**Part I:**

**Multiple Choice Questions (Best 13 out of 14. 3 points each/39 points total).**

**Please write your answers in blue book 1.**

1. A recent opinion piece in the local paper defended the decision of the police department to purchase \$100,000 worth of expensive new police cars. The author argued that the police department recently raised \$120,000 by auctioning off property seized from drug runners (out of which they paid \$10,000 in salary to the police auctioneers). Since the property would just have moldered away in storage if they didn't sell it, the purchase costs the taxpayers nothing. What was the actual cost of the purchase to taxpayers?

- a. \$0
- b. \$20,000
- c. \$100,000
- d. \$110,000

2. Consider an industry with a standard upward sloping supply curve. Now imagine that technology has advanced, allowing the industry to produce goods much cheaper than before. In which case will the industry's total revenue decrease?

- a. Perfectly inelastic demand curve
- b. Unit elastic demand curve
- c. Perfectly elastic demand curve
- d. Since we do not know the shape of the supply curve, we cannot know how revenue will be affected.

3. The income elasticity of demand for haircuts in Atlantic City is 1.2. Last year, income increased by 10%. We can say that:

- a. Quantity demanded decreased more than 25%
- b. Quantity demanded decreased less than 25%
- c. Quantity demanded increased more than 25%
- d. Quantity demanded increased less than 25%
- e. We cannot know for sure because we don't know if haircuts are a normal or an inferior good.

4. Consider a monopoly charging the monopoly price. If the firm were to increase its price by a small amount, which of the following would certainly occur?

- I. Producer surplus would decrease.
  - II. Consumer surplus would decrease.
  - III. Total revenues would decrease.
- 
- a. II
  - b. I and II
  - c. I and III
  - d. II and III
  - e. I, II and III

5. Manufacturers of fishhooks, which are produced in a perfectly competitive market, use machinery and labor as inputs. The market starts off in a long run equilibrium. Then the price of machinery increases. We would expect:

- I. The price of fishhooks in the short run will remain the same.
- II. The price of fishhooks in the long run will increase.
- III. The quantity each firm produces in the short run will decrease.
- IV. The quantity each firm produces in the long run will decrease.

- a. I and II
- b. I, II and III
- c. I, II and IV
- d. I, II, III and IV
- e. III and IV
- f. I and IV
- g. II and III

6. Catherine is a freshman at UPenn. Her grandmother gave her \$200 to spend on recreation during the fall semester. Catherine chose to attend 5 concerts, which cost \$20 each and 10 movies, which cost \$10 each.

Over the winter break, the price of concerts climbed to \$30. Consequently, Catherine's grandmother decides to give her \$250 for the spring semester. In the spring semester, Catherine will be:

- a. Worse off than she was in the fall.
- b. Just as well off as in the fall.
- c. Better off than in the fall.
- d. Less stressed since ECON 001 is over.

7. Acme Thermal Underwear is a profit-maximizing monopolist serving Philadelphia. There is a large fixed cost but a constant marginal cost  $MC > 0$ . Government regulations say that the firm must abide by marginal cost pricing. Demand for thermal underwear is downward sloping as usual. The National Weather Service predicts an unusually mild winter for the city this year. What will happen to Acme's profits?

- a. Decrease
- b. Stay the same
- c. Increase
- d. We need more information about the elasticity of demand.

8. Suppose there is a natural monopoly with high fixed costs and a constant marginal cost of \$2. The firm also faces a demand curve:

$$MB = 20 - Q$$

And a marginal revenue curve:

$$MR = 20 - 2Q$$

If the firm's goal is maximize the quantity it sells, it should set a price of \_\_\_ and sell \_\_\_ units.

- a. \$20, 20
- b. \$11, 9
- c. \$10, 10
- d. \$0, 20

9. Suppose there is a natural monopoly with zero fixed costs and a constant marginal cost of \$2. The firm also faces a demand curve:

$$MB = 20 - Q$$

And a marginal revenue curve:

$$MR = 20 - 2Q$$

Under which of the following government policies would the firm provide the efficient level of output?

- I. If the government sets a price ceiling of \$2.
  - II. If the government forces the firm to use average-cost pricing.
  - III. If the government provides an \$18 per unit subsidy to the firm.
- a. I, II and III
  - b. I and II
  - c. I and III
  - d. I
  - e. II
  - f. III
  - g. None of them

10. Which of the following statements are true?

- I. Every Nash Equilibrium outcome is Pareto Efficient.
  - II. Every Pareto Efficient outcome is a Nash equilibrium outcome.
  - III. If a pair of strategies  $(S_1, S_2)$  is a Nash equilibrium, then Player 1 would strategy  $S_1$  regardless of the other player's behavior.
- a. I
  - b. II
  - c. I and III
  - d. II and III
  - e. All
  - f. None

11. Ebenezer derives no benefit from charitable contributions to others, even though he is very wealthy and could make Tiny Tim very happy at practically no cost to himself. One day he has a revelation: He wakes up and realizes that making other people happy makes him just as happy! Assume that the marginal cost and marginal social benefit of Ebenezer's charitable contributions are standard. Before his revelation, Ebenezer purchased \_\_\_ than the socially optimal level of charity, and after his revelation he purchased \_\_\_ the socially optimal level of charity.

- a. Less, more than
- b. More, less than
- c. Less, less than
- d. More, more than
- e. Less, exactly
- f. More, exactly

12. Isaac is currently indifferent between \$480 in hand and \$500 that will be awarded in 2 years. Complete the following sentences.

- I. If the interest rate increases, he will choose (A)\_\_\_\_\_.
  - II. If \$500 will be awarded in 1 year instead of 2 years, he will choose (B)\_\_\_\_\_.
- a. (A) \$480 in hand, (B) \$480 in hand
  - b. (A) \$500 in 2 years, (B) \$500 in 1 year
  - c. (A) \$480 in hand, (B) \$500 in 1 year
  - d. (A) \$500 in 2 years, (B) \$480 in hand
  - e. None of the above

**13.** Both M&M and Hershey are considering a new Winter Wonderland Candy line. The payoffs matrix both their simultaneous game is below. What is the Nash Equilibrium of his game?

		<b>M&amp;M</b>	
		<b>Regular Candy</b>	<b>Winter Wonderland Candy</b>
<b>Hershey</b>	<b>Regular Candy</b>	<b>M&amp;M: \$1250 Hershey: \$1250</b>	<b>M&amp;M: \$1400 Hershey: \$650</b>
	<b>Wonderland Candy</b>	<b>M&amp;M: \$650 Hershey: \$1100</b>	<b>M&amp;M: \$1000 Hershey: \$1000</b>

- Both companies will choose to introduce the new line of candy.
- Neither company will choose to introduce the new line of candy.
- Only M&M will introduce the candy, while Hershey will not.
- Only Hershey will introduce the candy, while M&M will not.
- There is no Nash Equilibrium to this game.

**14.** Please assume here are no externalities.

What is true in both:

A perfectly competitive labor market with a binding minimum wage (i.e., set above the equilibrium wage rate) and

A monopsonistic labor market at equilibrium

- There is unemployment.
- The amount of employment is efficient.
- At the quantity of labor hired, society's MB of labor exceeds society's MC of labor.
- At the quantity of labor hired, society's MB of labor is equal to society's MC of labor.
- At the quantity of labor hired, society's MB of labor is less than society's MC of labor.

**Answer Key:**

- 1. c
- 2.a
- 3.d
- 4.e
- 5.a
- 6.c
- 7.b
- 8.d
- 9.a
- 10.f
- 11.e
- 12.c
- 13.a
- 14.c

**This is still Part I. Please answer in blue book 1.**

**Q1. (11 points)**

In 1852, the US Army Corps of Engineers century decided to build levees, artificially constructed walls, to regulate water levels and prevent the flooding of New Orleans by the Mississippi River. In deciding to build the levees in installments (each installment increases the height of the levee, providing greater protection), they considered the total benefit of the four citizens of New Orleans:

Number of Installments	Charles Total benefit in \$	Andre Total benefit in \$	Nicholas Total benefit in \$	Maria Total benefit in \$
1	28	12	15	30
2	37	20	25	34
3	40	26	31	36
4	42	29	34	37

The cost of the first installment is \$50 and each subsequent one is \$20.

- a. What kind of good is a levee? Explain.
- b. How many installments should they build? What will the total cost of building them and what would be the total surplus generated?

Answer:

Number of Installments	Charles Marginal benefit in \$	Andre Marginal benefit in \$	Nicholas Marginal benefit in \$	Maria Marginal benefit in \$	Social Marginal benefit in \$
1	28	12	15	30	85
2	9	8	10	4	31
3	3	6	6	2	17
4	2	3	3	1	9

The government would like to tax the 4 citizens to pay for the construction of the levee. Each has a different income level. They are considering 2 schemes: the first tax system would divide the total cost of the levee equally and the second system would charge everyone a 1% of their income.

- c. What criteria should the government use to evaluate these two systems? Describe what kind of tax systems each one is, and how each would affect the (after tax) Gini coefficient.

**a. Answer:**

**Levee is a (pure) public good: it is non-excludable because you cannot prevent someone from getting the benefits from it; it is also non-rival since one additional citizen getting benefit from it doesn't imply any additional cost.**

**Points: 3**

**1 for each term.**

**b. Answer:**

**2 installments.**

**Total cost is  $50 + 20 = 70$ .**

**Total surplus is  $(85+31) - 70 = 46$ .**

**Points: 4**

**2 installments: 2 points (1 method, 1 answer)**

**TC=70: 1 point (full credit if method correct)**

**TS=46: 1 point (full credit if method correct)**

**c. Answer:**

**As both schemes allow the government to construct the efficient quantity of levees, the government should use the equity criteria to evaluate these two systems.**

**The first tax system is regressive so the Gini coefficient increases after the tax.**



**The second tax system is proportional so the Gini coefficient stays the same after the tax.**

**Points: 4**

**Efficiency and Equity: 1 (if mention either one)**

**1st is regressive the second proportional: 1**

**Gini increases in the first case: 1**

**Gini stays the same in the second: 1**

**Part II: Please answer in blue book 2.**

**Q2. (25 points)**

**Full credit depends on the ability of the TA to follow your work!**

Let us consider the market for tulips in the city of Philadelphia. Assume that the market is initially characterized by the following equations:

$$\text{Supply: } Q_S = 5P \quad (\text{or } P = Q_S / 5)$$

$$\text{Demand: } Q_D = 400 - 20P \quad (\text{or } P = 20 - Q_D / 20)$$

- a. What is equilibrium price and quantity in the tulip market? Is this outcome efficient? If so, indicate the size of total surplus. If not, indicate the size of any deadweight loss.

Mayor Michael Nutter, a fan of fine flowers, decides to examine the market for tulips. He concludes that the sale of tulips has the pleasant side-effect of beautifying his city – he argues that there is a positive externality present in the tulip market. Let us assume that Mayor Nutter is correct, and that the size of this externality is a constant \$5 per tulip.

- b. Under the Mayor's assumption, is the tulip market producing the efficient quantity? If not, what is the socially efficient quantity of tulips that should be cultivated? How large is any deadweight loss?

- c. Dissatisfied with the free-market outcome in the realm of tulips, Mayor Nutter decides that government involvement is needed – he wants to subsidize the production of tulips. If the goal is to achieve efficiency, how large should the subsidy be?
- d. Assume that Mayor Nutter’s subsidy is implemented. Under these conditions, find the new quantity, the new price(s), the size of any government income or expenditure, Total surplus and any deadweight loss.
- e. Soon after the new tulip policies are implemented, Ms. Jain, an eccentric recluse, writes a letter to Mayor Nutter. She reveals that she is actually the only buyer of tulips in the city of Philadelphia, and that she always buys 80 tulips, regardless of price. If her statement is correct, what does this imply about the efficiency of the tulip market **before** government intervention? What does it imply about the efficiency of the tulip market **after** the government intervention mentioned in part d? (Note: the initially specified Demand function may be ignored for the purposes of this question.)

**a. Answer:**

**P = 16; Q = 80. Outcome is efficient. TS = 800.**

**Points: 4**

**1 each.**

**Note: 2 out of 4 in case of arithmetic errors.**

**b. Answer:**

**No, the tulip market is not producing the efficient quantity.**

**The social efficient quantity should be where  $SMB=SMC$  or  $25-Q/20=Q/5 \rightarrow$**

**$Q^{eff} = 100$ . The DWL is 50.**

**Points: 6**

**Shifting either SMC or SMB in the right direction: 1**

**Set up of equation: 1**

**$Q^{eff}=100$ : 2**

**DWL=50: 2 (1 if graphically correct)**

**Note: 4 out of 6 if students shifted demand out by 5 instead of up by 5 but did everything else correctly..**

**c. Answer:**

**The subsidy should be \$5 per tulip.**

**Points: 3**

**\$5: 1**

**Per unit: 2**

**d. Answer:**

We know that  $Q = 100$ , so we can plug into demand to get  $P_d = 15$  and into supply to get  $P_s = 20$ ;

Government Expenditure =  $5 \cdot 100 = 500$ ;

Positive Externality (not asked for, but needed below):  $5 \cdot 100 = 500$

CS = 250;

PS = 1,000;

TS = CS+PS+Ext-GE=1,250.

No DWL.

Points: 9

Q=100: 1

$P_d$  &  $P_s$ : 1 each

C.S., P.S. & GE= 1 each (1/2 point each if done graphically and correct)

DWL=zero: 1

T.S.=2 (1 if graphically correct)

Note: 7 out of 9 if the logic was correct and the errors were only arithmetic.

e. Answer:

Demand in this case is perfectly inelastic. The tulip market is efficient both before and after the government intervention.

Points: 3

Efficient before the subsidy: 1 Efficient even after the subsidy: 2

**Part III: Please answer in blue book 3.**

**Q3. (25 points)**

On Thursday, November 29<sup>th</sup>, a federal bankruptcy judge gave final approval to Hostess Brands' plans to wind itself down and sell off its famous brands that include such American icons as Twinkies, Ho Hos, Sno Balls, Ring Dings and Wonder Bread.

According to Gregory Rayburn, the company's chief executive, what sent the company into bankruptcy was the refusal of one of its largest unions, the Bakery, Confectionery, Tobacco Workers and Grain Millers International Union, to accept far-reaching concessions and the subsequent strike that the union began on Nov. 9, crippling the company's bakeries.

This question asks you to analyze this claim as well as the Union's response using our model for the demand and supply of labor.

- a. Start by drawing a graph of a downward demand and an upward supply of labor. Explain what assumptions are needed for downward sloping demand and an upward sloping supply. Assume this graph represents demand and supply in 2005.
- b. Suppose that in 2005, the equilibrium wage was \$16 an hour and that 6,500 bakers were employed. Mark these data on your graph.

Recently, Hostess Bread Company wanted to lower bakers' wages by 8%

- c. What type of change in demand for Hostess baked goods would be consistent with a decrease in the equilibrium wages? Explain graphically.
- d. What would happen to employment and unemployment if the union agreed to this demand? Show graphically.
- e. What would happen to employment and unemployment if the union refused this demand and insisted on keeping wages at \$16? Show graphically.
- f. The Bakers Union maintained that Hostess's top management had done little to modernize the company's aging bakeries or its sugary product offerings (despite the nation being increasingly health conscious). Explain *graphically* how each of these changes would have affected the demand for labor. Explain your assumptions carefully. Would either of these changes possibly lead Hostess to still be prepared to hire 6,500 bakers at \$16?

**a. Answer:**

**For the demand of labor to be downward sloping we need to assume a decreasing marginal productivity of labor.**

**For the supply of labor to be upward sloping, the substitution effect of higher wages must be greater than income effect of wages on leisure, which is a normal good. (If leisure is inferior supply is upward sloping too, but that is a strange assumption)**

**Points: 3**

**Basic graph: 1**

**Decreasing marginal productivity of labor: 1**

**Substitution effect > income effect: 1**

**b. Answer:**

**W = \$16 and L = 6,500 where supply and demand meet.**

**Points: 2**

**1 Each**

**c. Answer:**

**A decrease in the demand for Hostess baked goods would be consistent with a decrease in wages. The demand for Baked Goods falls, price falls and the demand for labor rotates in, with equilibrium employment and wages lower.**

**Points: 6**

**Understanding that we have 2 markets: 1**

**Shift in of baked goods: 1**

**Drop in their price: 1**

**Rotation of demand of labor: 2 (1 for shift out, 1 for rotation)**

**Lower equilibrium wages: 1**

**d. Answer:**

**If the union agreed to the decrease in wage, the employment would decrease from 6,500 to L' (the intersection of the new demand for labor and the original supply curve).**

**The unemployment would be zero since  $L' = L_d = L_s$**

**Points: 2**

**1 each**

**e. Answer:**

**If the union refused to the decrease in wage and insisted to keep it at 16\$, the employment would further decrease from L' to L'\_d (w=16). The unemployment would be greater than zero and equal to the difference between 6,500 and L'\_d(w=16).**

**Points: 2**

**1 each.**

**f. Answer:**

**The first claim is that the firm could increase labor productivity through the use of new capital. This assumes that labor and capital are complementary inputs so that more capital increase marginal productivity of labor.**

**The second claim is about changing the product itself, which presumably would increase demand for the good and hence it's marginal revenue.**

**Points: 9**

**Understanding that the first claim is about capital investment: 2**

**Relating to increased labor productivity: 1**

**Assuming complements: 1**

**Relating to wages and employment consistently: 1**

**Understanding that the second claim is about the output market: 2**

**Connection to shift in labor: 1**

**Relating to wages and employment consistently: 1**

**Note; the points given so far add up to 24 out of 25. The last point is given, at the discretion of the grader, for using clear graphs.**

**You are done! Have a great winter break!**

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Fun quote of the day:

“These products will surely live on in one form or the other — because these brands are about as indestructible as Hostess’s baked goods are,” said Jeffrey A. Sonnenfeld, senior associate dean for executive programs at the Yale School of Management. (NYTIMES, Nov 29<sup>th</sup>, 2012)