Econ 001: Midterm 1
February 19, 2008
Answer Key

Instructions:
- **This is a 60-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.**
- **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.**
- The use of Programmable Calculators is in violation of Departmental rule. It is strictly forbidden!

The Midterm has 2 parts.
Part 1 consists of **8** multiple-choice questions. Please use the first page of a blue book to record your answers.
Part 2 consists of 2 short answer questions. Please use a separate blue book for each.

Part I: Multiple Choice Questions (4 points each/32 points total):

1. Suppose that you have won a free trip to Italy for spring break, and it includes all relevant expenses. You cannot resell the ticket. You have two other alternatives for spring break: i) you are willing to pay $700 to go to Florida, but it actually costs you $500, or ii) you can stay in Philadelphia for free and study, and reap a benefit of studying worth $100 to you. What is your Opportunity Cost of going to Italy?

   a. $700
   b. $500
   c. $300
   d. $200
   e. $100
   f. $-100

2. Suppose that Alice and Bob produce Yoyos and Zippers. Alice has the comparative advantage in Yoyo production; Bob has the comparative advantage in Zipper production. Each has a constant opportunity cost. If Alice and Bob each split their time between making Yoyo and Zipper, then:

    a. The joint economy PPF is bowed in.
    b. The joint economy is not producing efficiently.
    c. There are no prices at which Alice and Bob would have been willing to trade.
    d. There is no point of specialization on the joint PPF.

3. In the 1990s the United States had an absolute advantage over China in the production of both toys & software. It now still has an absolute advantage in software, but not in toys.

    If both countries can only produce toys and software, we should expect the data to show that:
    i.   In the 1990s the United State exported toys.
    ii.   The United States is now exporting software.

    a. both statements are true
    b. only i
    c. only ii
    d. neither

4. A change in the price of smoothies leads to a _____, which leads to a _____.

    a. change in quantity demanded; shift in the demand curve
    b. change in demand; shift in the demand curve
    c. change in quantity demanded; movement along the demand curve
    d. change in demand; movement along the demand curve

5. The price of smoothies increases by 10% and quantity demanded of smoothies falls by 10%. The demand for smoothies is

    a. elastic.
    b. unitarily elastic.
    c. perfectly elastic.
    d. inelastic.

6. Suppose that the inverse demand for A is given by: $P_A = 200 - 5Q_A + 0.001I + P_B$, where I is income and P_B is the price of B. The supply for A does not depend on the price of B. Which of the following statements is true?

    a. A is normal; A and B are complements
    b. A is normal; A and B are substitutes
    c. A is inferior; A and B are complements
    d. A is inferior; A and B are substitutes

7. Suppose that gin and tonic water are complements. If the government increases the tax on gin, then you would expect that:

    a. the price of tonic water increases, and the quantity bought increases
    b. the price of tonic water increases, and the quantity bought decreases
    c. the price of tonic water decreases, and the quantity bought increases
    d. the price of tonic water decreases, and the quantity bought decreases

8. With normal supply and demand curves, we should expect subsidies of corn to cause:
        i. increased production of corn
        ii. higher producer surplus
        iii. higher total welfare/surplus in the economy.

    a. All three statement are true
    b. Only i is true
    c. Only i & ii are true
    d. Only ii & iii are true
    e. Only i & iii are true
    f. None of the statements is true

Answers:
1. d
2. b
3. c
4. c
5. b
6. b
7. d
8. c

Part II: Short Answer Questions (34 points each/68 points total):

Please use a separate blue book for each question.
Explain answers carefully using graphs where appropriate. Your grade depends on your explanation as well as your answer: so show your work!

Q1.

Bob and Alita are on a quest to defeat the evil Lord Hexis. In order to defeat him, they will need to summon an army of both undead and nature creatures. Alita has the ability to summon 4 devils or 12 unicorns in one turn. Bob can only summon 1 devil, but he has a magic staff which allows him to summon 18 unicorns per turn.

The following table specifies how much Bob and Alita can summon per turn:

(summoning per turn)	Unicorns	Devils
Bob	18	1
Alita	12	4

  a. If Bob and Alita attack Hexis separately, **what will be their summoning possibilities frontier** (per turn)? Put unicorns on the horizontal axis.

Answers:
Two straight line PPFs. Bob (18, 0) (0,1) & Alita (12,0) (0,4).

Total Points: 6
   3 For each PPF: straight line 1 point, each point= 1 point

  b. **Who has the absolute advantage in producing unicorns? Devils?**
Answers:
Bob has an absolute advantage in Unicorns as he can produce more unicorns per turn.
Alita has an absolute advantage in Devils as she can produce more Devils per turn.

Total Points: 4
   2 each.
   Loose 1 point if get explanation wrong (e.g.,confuse with A.A.).

  c. If Bob and Alita attack Hexis together, they will have 3 turns to defeat him.
     Draw their joint summoning possibilities frontier with unicorns on the horizontal axis.

Answers:
We have a PPF with 1 kink (90, 0) (54,12) (0, 15)

Total Points: 8
   One kink: 2
   Each point:2
Loose 2 points if draw a PPF for 1 turn instead of 3.

In order to defeat Hexis they will need at least 10 devils and 60 unicorns.

d. **Show this point on your graph from part III**.

Answers:
A point on a PPF required here

Total Points: 3

e. **Will Bob and Alita be able to defeat him? If yes, how many unicorns and devils will each hero summon? If no, explain why.**

Answers:
They will indeed be able to defeat Hexis. Note tha Alita can produce 10 devils in 2.5 turns. This leave her with ½ a turn for Unicorns, or 6 unicorns.
Bob can produce 3*18 or 54 unicorns
6+54=60 unicorns abd the defeat of Hexis!

Total Points: 7
Yes: 1
Alita: 10 devils & 6 unicorns: 3 points
Bob: 54 unicorns: 3 point

f. Bob and Alita are afraid that they may not be able to defeat Hexis on their own and so they ask for help from their barbarian friend, Dogwoggle. Dogwoggle is not good at summoning and can only summon 1 devil or 1 unicorn per turn. **Is it productively efficient for Bob, Alita and Dogwoggle to summon 60 unicorns and 10 devils**? **What assumption do we make in economics that does not seem to hold in this imaginative world?**

Answers:
It is not productively efficient for the three together to produce only 60 unicorns & 10 devils. We have shown in d that Alita and Bob can do this by themselves. With Dogwoggle they can produce even more.

In economics we assume that wants are unlimited so we always want to be producing efficiently or on the PPF. In this game the goal is to defeat Hexis and therefore wants are limited to this one goal.

Total Points:
Not productively efficient: 3

No unlimited wants: 3

Q2. Keep your answers short! You only need a sentence or two per section.

Due to the increased awareness to global warming (and pressure from Europe …), USA decides to launch a plan to reduce the emissions of carbon dioxide and is considering posing heavy carbon taxes on gasoline produced by petroleum companies.

a. Draw the gasoline market before the proposed tax. Assume that the supply and demand curves for gasoline are linear and that the demand is downward sloping and supply upward sloping. Show the equilibrium price (p*) and quantity (q*) before the tax.

Answers:
Regular graph.

Total Points: 4
Axis: 2 (1 each)
p* & q*: 2 (1 each)

b. Suppose now that the $1 tax per gallon is posed on petroleum companies. Show graphically how this will affect the price consumers pay, producers get and the equilibrium quantity.

Answers:
Shift up of supply by $1. Show new p** (bigger than p*) for consumer price and p**-t<p* for producer price. q**<q*.

Total Points: 8
Shift up of S by $1: 2
p**: 2 (need to specify that this is the price paid by the consumer *or* re-label the Y axis clearly to this effect).
p**-t :2 (need to specify that this is the price paid by the producer *or* re-label the Y axis clearly to this effect)
q**: 2

c. The petroleum industry is strongly against the tax and is trying to convince the president that such a tax is not effective in decreasing the emissions of carbon dioxide. During an urgent night call to the president, the head of the "USA Oil Federation" claims that <u>one of the assumptions</u> made in section a) does not hold, therefore "even tough the tax will reduce the profits of the petroleum industry, it will not change the quantity of oil (q*) sold in equilibrium".

State clearly the assumption the head of the federation refers to. What assumption should be made instead to support such an argument? What is the economic implication of your new assumption? **Show graphically**

Answers:
The USA Oil Federation must be claiming that the supply is completely inelastic. In this case the tax will not effect quantity sold, which implies that the price to the

consumer is as before. Therefore ps=p**-t=p*-t or the price to the producer has decreased by the full amount of the tax. Thus the full burden of the tax (or the tax incidence) falls on the producers.
Note that a completely inelastic demand will also keep quantity unchanged but in this case the price to the consumer will increase by the full amount of the tax and there will be no effect on the producer which contradicts the claim.

Total Points: 8
Understanding that supply is completely inelastic: 2
Showing graphically (need to shift D down): 2
Marking correctly the price to the producer: 2
Mentioning tax burden, incidence etc: 2 points

If answer by drawing the case of a completely inelastic demand curve: a max of 4 points.

It turns out that the assumptions you made in section a) <u>do hold</u>, but that the president has to cancel the tax because of relentless lobbying by the petroleum industry. The president has an alternative plan in mind – to set a price for oil which is higher than the equilibrium price p*.

   d. **Show graphically** the new equilibrium outcome (price and quantity).
Answers:
A graph similar to part a above with a price floor (p_) above p*. Quantity will be at the intersection of demand & (p_) which is less than q*.

Total Points: 6
Price floor marked correctly: 3
Quantity marked correctly: 3

   e. If the petroleum industry's objective it to maximize revenues from oil will they approve the new plan of the president? What does your answer depend on?
      Explain graphically
Answers:
The answer depends on elasticity of demand. If demand is inelastic revenues will increase and the oil industry will approve the plan. If demand is elastic revenues will decrease and the oil companies object.
A full answer must show the two possible outcomes graphically either in one graph with two demand curves or two separate graphs. Revenues before and after tax must be clearly marked to be able to compare the effect of the tax.

Total Points:8
Two distinct demand curves: an elastic and an inelastic one:2
Showing effect of increase in price on revenue in each case: 2
Explaining that therefore the companies will approve of the plan if and only if demand is inelastic:4