Econ 001: Midterm 2 (Dr. Stein) Answer Key
March 31, 2008

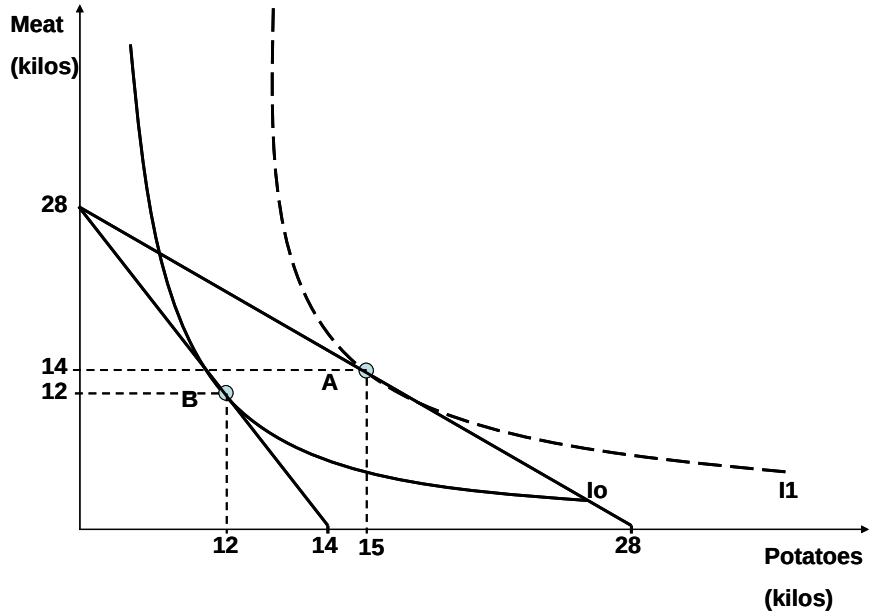
Instructions:

- **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 9 multiple-choice questions. Please write you answers in blue book 1.
Part 2 consists of 2 short answer questions. Please use a separate blue book for each answer.

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

1. The following graph shows Sacha's preferred consumption points A and B under two different budget lines. In both cases her income is $280.



Which of the following points will be on Sacha's potatoes demand curve:

a. (Q=12, P=12), (Q=15,P=14)
b. (Q=12, P=20), (Q=14,P=10)
c. (Q=14, P=28), (Q=28,P=24)
d. (Q=15, P=10), (Q=12,P=20)

2. Consider the graph above. Moving from A to B:

a. The substitution effect & income effect on potatoes are in the same direction and potatoes are an inferior good.
b. The substitution effect & income effect on potatoes are in the same direction and potatoes are a normal good.
c. The substitution effect & income effect on potatoes are in opposite direction and potatoes are an inferior good.
d. The substitution effect & income effect on potatoes are in opposite direction and potatoes are a normal good.

3. Consider the graph above. Between A and B, is Sacha's demand for potatoes:

a. Elastic
b. Unit-elastic
c. Inelastic
d. Perfectly inelastic

4. Paper4Me produces paper using both fixed and variable inputs. We know that at their production point the average variable cost is increasing. From this we also know that:

a. Marginal cost is above the average variable cost.
b. Marginal cost is above the average total cost.
c. Average total cost is increasing.
d. All of the above.

5. Suppose that the market for wheat is perfectly competitive and is in a long run equilibrium with a price of P and N firms producing q tons of wheat **each**. Imagine that the fixed costs of producing wheat decrease and let the new long run equilibrium prices, firms, and quantity per firm be P*,N*, and q*, respectively. Which of the following statements is true?

a. P*<P, N*>N, q*<q
b. P*<P, N*>N, q*>q
c. P*=P, N*>N, q*=q
d. P*=P, N*=N, q*=q

6. Which of the following is **true** for markets under perfect competition?

I. Firms that produce, choose quantity where MC=MR.
II. There is DWL.
III. The individual firm's demand is downward sloping.

a. Only I
b. Only II
c. Only III
d. I & II, but not III
e. I & III but not II
f. II & III but not I
g. I, II & III.

7. When total revenue is less than variable costs, a firm in a perfectly competitive market will:

a) continue to operate as long as average revenue exceeds marginal cost.
b) continue to operate as long as average revenue exceeds average fixed cost.
c) shut down (i.e., not produce).
d) raise its price.

8. Many products we consume are differentiated (heterogeneous) and are produced in a market with many firms and free entry and exit. As a result we should expect to pay:

a) A price equal to the marginal cost of production.
b) A price equal to the average total cost of production.
c) Both a and b.
d) Neither a nor b.

9. Two tobacco firms, Philip Morris and Camel, are competing and have to make a decision about advertising. If one firm uses advertisements while the other doesn't, then it will gain market share. The firms have the following payoffs in millions of dollars:

		Philip Morris	
		Advertise	Don't Advertise
Camel	Advertise	Philip Morris:3 Camel:4	Philip Morris: 1 Camel: 10
	Don't Advertise	Philip Morris: 10 Camel: 2	Philip Morris: 6 Camel: 6

Which of the following statements is true?

a) The only Nash Equilibrium is for both firms to advertise.
b) Philip Morris will always choose to advertise, regardless of what Camel does.
c) If the government made advertisements for tobacco illegal, so that neither firm has the option of advertising anymore, then both firms will be better off.
d) All of the above are correct.

Answer Key
1. d
2. b
3. c
4. a
5. a
6. a
7. c
8. b
9. d

Part II: Short Answer Questions:

Please use a separate Blue Book to answer each of the 2 questions.

Q1. (34 points)

Jim Tucker is a truck owner from Illinois. He drives his own truck and is paid a given price per 100 miles. The rising cost of diesel fuel is of great concern to Jim. He says: "I cannot shift this cost to my customers, and yet it is hurting the bottom line. I am not sure it is worthwhile staying in this business anymore."
The following question asks you to use our economic model to analyze Jim's statement and to predict how the rising cost of diesel may affect both the trucking market and other markets.

a. Draw a graph of the typical cost curves that Jim Tucker faces.

Answer:
Typical MC, AVC & ATC expected here.

Points: 4
MC upward sloping: 1
Intersect AVC & ATC at minimums: 1
Right relationship between AVC & ATC:2
If omit AVC: 3 out of 4

b. Add to your graph a price (per hundred miles) that is consistent with the truck industry being in the long-run equilibrium. Explain why you chose the price you did.

Answer:
Add P=Min ATC.
At this price despite the fact that firms maximize profits and produce where MC=MR there are no economic profits P=ATC.

Points: 4
P=minATC:2
Explanation that links to zero profits:2

c. Explain why Diesel fuel is a variable cost in the trucking industry.

Answer:
The expenditure on diesel increases with transportation distance.
In other words: the more you drive the more diesel the truck will need the higher the cost.

Points: 4
Link between distance & cost: 4

d. How will the increase in diesel fuel affect the costs facing Jim Tucker? How will this affect his decision of how many miles of service to provide in the short run? Show graphically.

Answer:
The increase in the price of diesel will increase the MC, AVC & ATC.
At the going price Mr. Tucker will provide fewer miles of transportation.

Points: 8
Shift in MC curve: 2
Shifts in AVC & ATC: 1 each
Smaller q at given price: 2

e. If all truckers are affected similarly what will happen to the industry supply curve and to the market price?

Answer:
All MC shift so their sum shifts and we have a shift in of the industry supply curve.
Price will increase. Quantity supplied will decrease (though not specifically asked).

Points: 4
Shift in of S: 2
Increase in P: 2

f. What will be the long-run effect of the rising cost of diesel in the transportation industry? In particular, explain, what will happen to the price of transportation per hundred miles in the long run. What will happen to the number of trucking firms in operation? Show graphically and refer to your graph from part d as needed.

Answer:
In the long run the price of transportation will increase to the new MinATC, p'>p.
Note: Depending on the way the graph was drawn in part d the answer below may vary. *Consistency is the key to full credit.*
******Each firm produces less than before q'<q and the market quantity decreases as well Q'<Q. It is unclear what happens to the number of firms.******

Points: 6
P increase: 3
N: 3 as long as consistent w/ graph

g. What effect will these changes have on other markets? What should we expect will happen to prices of other goods sold if the increase in the price of diesel is sustained?

No need for graphs here.

Answer:
As transportation costs are an input in the production of other goods and services we should expect the rising cost of transportation to increase the price of other goods too.

Points: 4
Correct link to increase in price in the economy as a whole.

Note on parts d through f: we realize that students may have answered parts of this question in a different order. Credit depends on logical progression from start to finish.
Full credit means you have to explain that supply in the industry shifts in due to increase in MC for all firms (each firm's MC shifts in and so does the aggregate of them) and due to exit.
Your TAs were pretty generous in grading this question. In any re grades requests we will consider the whole question and not a point by point allocation- so please think before your submit a request.

Q2. (34 points)

U- Kenn is a university facing the following demand curve P= 20,000 – Q, where P is the tuition per year and Q is the number of students attending.

The demand curve implies a marginal revenue curve of MR=20,000-2Q.

U-Kenn has large fixed cost, but their marginal cost per student is zero.

a. If U-Kenn was a for-profit university, how many students would it admit? What would be the tuition per student?

Answer:
Profit maximizing implies producing where MC=MR or 0=20,000-2Q.
So Q=10,000 and P=20,000-10,000=10,000 per student.

Points: 6
MR=MC: 2
Q=10,000: 2 (1 answer, 1 explanation)
P=10,000: 2 (1 answer, 1 explanation)

b. Now suppose U-Kenn is a not for profit institution. Its mission statement states that its goal is to maximize tuition revenue. If that is indeed the case, how would your answer to part a change?

Answer:
The answer would stay the same MR=zero is the point where revenues are maximized. A graphical explanation is possible and appreciated.

Points: 4
2 for answer 2 for explanation.

c. U-Kenn is considering a new mission statement. The proposal is make the goal "providing a efficient amount of education". In this case:
   - How many students would U-Kenn admit?
   - What would be the tuition charged?
   - Can U-Kenn achieve this goal? Explain why or why not.

Answer:
For efficiency we want MC=MB. As MC=zero this mean admitting all students with a MB>= zero or admitting all interested students Q=20,000. This implies charging tuition of zero.
U-Kenn cannot achieve this goal. Although there MC is zero they have "large fixed cost" which would not be covered without tuition and the university would shut down. This is a case of a natural monopoly.

Points:

Definition of efficiency/explanation: 2
Q=20,000: 2
P=zero: 2
Profits<zero, shut down:4

Students who argue that FC are sunk and therefore should be disregarded should get full credit.

d. U-Kenn new president suggests that the university can achieve this goal, by providing financial aid packages that would be given as grants (i.e., a lower up front price). The grants will very per student. The provost is surprised and asks: "how can giving grants benefit our bottom line?" Explain how this is possible. Assume the University can perfectly distinguish between each student's willingness to pay. In particular,:
   - What should the highest tuition be?
   - What should the lowest net tuition be (i.e., the tuition, minus the financial aid package)?
   - How much is the university spending on financial aid?
   - What are the university's total revenues, net of financial aid, in this case?

Answer:
The university should set the net tuition at each student's willingness to pay. The highest tuition should be 20,000 and the lowest net tuition zero. The university spends 20,000*20,000/2 on financial aid.
Its revenues, net of this financial aid, is also 20,000*20,000/2.

Points: 8
Phigh=20,000: 2
Plow=zero : 2
Finacial aid: 2
Total Rev: 2

e. Use the criteria of efficiency & equity to evaluate your answers in parts a and d.

Answer:
This outcome is efficient as all students with MB>=zero are getting education. As for equity: it seems totally unfair that the poor are paying less just because otherwise they can't afford it. They should remain poor forever.
Sorry, I meant to write it seems perfectly fair that the poor should pay less, after all education is an important way of leveling the playing field of success.
Bottom line: we are looking for a link between the outcome and your sense of what is fair.

Points: 6
It is efficient: 3
Argument on equity: 3