Intermediate Microeconomics
ECNS 301
Fall 2013

Exam #: 3
Version A

Tuesday December 10, 2013

Name: ___________________________________________________________

Instructions:
You must answer all of the following questions. Each question is worth the same amount. You have the class period to complete the exam.

Answer each question clearly and concisely. You must show your work to receive credit.

This exam is given under the rules of the Montana State University. By printing your name above you acknowledge the University’s Honor Code and agree to comply with the provisions of the Honor Code. You may not use notes or receive any assistance. There is to be no talking during the exam. You may use a calculator, but are never allowed to use device allowing you to take photographs or transmit over a network. No notes, no assistance, no talking, no cell phones, but you can use a calculator.

Clearly print your name above, in the space provided on the next page and in your blue book(s). You must turn in the exam and your blue book(s). There are two versions of the exam. Indicate your exam version on your blue book. It is your responsibility to make sure your version of the exam is different from the students next to you. If you have the same version as any of the students next to you, you will be asked to move.
True/False/Uncertain Plus Explanation

1. For each of the following, state whether it is true, false or uncertain and explain your answer. No points are given without explanation.

(a) In a simultaneous move game where both players prefer doing the opposite of what the opponent does, a Nash equilibrium does not exist.
(b) The telephone is an example of a product with network externalities.
(c) If a firm does not make an economic profit, it will shut down.
(d) Since there are no close substitutes for the monopoly’s product, the monopoly can charge any price it wishes.
(e) If each player has a dominant strategy, then those strategies make up a Nash equilibrium.

Short Answer/Numerical

2. The market supply and demand functions for a particular market are as follows.

\[ Q = 147 - 3p \]
\[ Q = 2p - 50 \]

The government is considering a per-unit tax of \( \tau \) to be levied on sellers.

(a) What are the equilibrium prices and quantity with the tax expressed as a function of \( \tau \)?
(b) What is the tax revenue collected as a function of \( \tau \)?
(c) What value of \( \tau \) maximizes tax revenue and how much tax revenue is generated?
(d) What is the lowest value of \( \tau \) that maximizes dead-weight loss and what is the dead-weight loss created?

3. There is one buyer and many sellers (a monopsony). The sellers will only sell one unit if their marginal cost is below the equilibrium price. The distribution of the buyer’s willingness to pay and the sellers’ marginal cost is as follows.

<table>
<thead>
<tr>
<th>Monopsonist’s Willingness to Pay</th>
<th>10</th>
<th>10</th>
<th>9</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>7</th>
<th>5</th>
<th>5</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sellers’ Marginal Cost</td>
<td>8</td>
<td>7</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

(a) Graph the demand curve.
(b) For each quantity on the demand curve, find the price the monopsonist would buy at and the consumer surplus.
(c) What is the equilibrium price and quantity?
(d) What is the equilibrium dead weight loss?
4. There are 80 consumers and each consumer has the following preferences for the goods \( x \) and \( y \)

\[
    u(x, y) = \min \left\{ 2x, \frac{1}{12}y \right\}
\]

and each consumer has an income level of \( m = 144 \). Firms produce good \( x \) with the following production technology.

\[
    x = L^{\frac{1}{3}}K^{\frac{2}{3}}
\]

\( K \) is the amount of capital used in production which has a rental rate of \( r = 12 \) and \( L \) is the amount of labor used in production with a wage rate of \( w = 3 \). Also, each firm that produces \( x \) must pay $384 for protection services. Firms product good \( y \) with the following production technology

\[
    y = L + 2K
\]

and firms that produce \( y \) do not have to pay for protection services.

(a) What are the market demand curves for goods \( x \) and \( y \)?

(b) What is a firm’s cost function for good \( x \)?

(c) What is a firm’s cost function for good \( y \)?

(d) If both markets are perfectly competitive, what are the market equilibrium prices and quantities?

(e) If both markets are perfectly competitive, how many firms product good \( x \)?