Problem Set 4

(due at the beginning of class May 12, 1998 - note change from syllabus!)

I. Multiple Choice Questions

For each of the following questions, choose the best answer and explain clearly why you chose that answer over the other choices.

1. A perfectly competitive firm has hired 12 workers for $6 each. If labor is the only variable input, and the MRP of the 12th worker is $6, then we know that
   a) this firm must be making economic profits.
   b) this firm must be producing at the output level where P=MC.
   c) this firm cannot be producing at the output level where P=MC.
   d) this tells us nothing about profits or the level of output produced.

2. Nick is a policeman considering getting a law degree from the U. of Toronto. It will cost Nick $250,000 to go back to school, but as a lawyer he will make $25,000 more each year than he would as a policeman. If Nick is also a vampire who expects to live forever, then
   a) it is definitely not worth investing in a law school education no matter what
   b) it is definitely worth investing in a law school education no matter what
   c) it is only worth investing in a law school education if the interest rate is below 10%
   d) it is only worth investing in a law school education if the interest rate is above 10%

3. If the marginal cost of a product is less than its marginal utility, on efficiency grounds,
   a) we would want to leave production constant.
   b) we would want to increase its production.
   c) we would want to decrease its production.
   d) we cannot tell what to do without knowing the price.

4. Suppose that the Ferry Godmother is the monopoly provider of ferry service between two river towns, and that at the current level of service, demand for ferry rides is relatively inelastic. If the Ferry Godmother is charging $4 for a ride, and marginal cost is $3, then
   a) the Ferry Godmother is maximizing profit
   b) the Ferry Godmother should increase output and provide more rides
   c) the Ferry Godmother should decrease output and provide fewer rides
   d) the Ferry Godmother should decrease the price of a ride

5. A monopolist is profit maximizing and also is operating at minimum average total cost, thus
   a) economic profits must be positive
   b) economic profits must be negative
   c) economic profits must be zero
   d) not enough information to determine

6. A firm in a monopolistically competitive industry is in short run equilibrium with MR=$2 and ATC=$2. Assuming no change in costs, then when a long run equilibrium is established
   a) price will be equal to $2
   b) price will be greater than $2
   c) price will be less than $2
   d) cannot tell whether price will be equal to, greater than, or less than $2
**II. Short Answer Questions**

1. Suppose the following table gives all the information we have about a firm that is in short run equilibrium. This information is enough to fill in the rest of the table accurately.

<table>
<thead>
<tr>
<th>P</th>
<th>Q</th>
<th>Total Cost</th>
<th>Marginal Cost</th>
<th>Avg Total Cost</th>
<th>Marginal Revenue</th>
<th>Average Revenue</th>
<th>Economic Profits</th>
</tr>
</thead>
<tbody>
<tr>
<td>$20</td>
<td>90</td>
<td>$900</td>
<td>$10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Briefly explain how you used the given information to fill in the rest of the above table.

2. Suppose now that this same firm has moved to a long run equilibrium, and we again have only limited information, but it is enough to fill in the rest of the table accurately.

<table>
<thead>
<tr>
<th>P</th>
<th>Q</th>
<th>Total Cost</th>
<th>Marginal Cost</th>
<th>Avg Total Cost</th>
<th>Marginal Revenue</th>
<th>Average Revenue</th>
<th>Economic Profits</th>
</tr>
</thead>
<tbody>
<tr>
<td>$15</td>
<td>50</td>
<td>$750</td>
<td>$7.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a) Briefly explain how you used the given information to fill in the rest of the above table.

b) What type of market must this firm be operating in? Briefly explain how we know this.

**III. In-Depth Problem**

Suppose that the sugar industry is not competitive, but rather that the government requires a "license" to produce a ton of sugar. You can assume that the total number of licenses handed out is divided evenly across 100,000 previously competitive firms. The short run supply and demand curves for the industry and marginal cost curve for a representative firm are as shown.

<table>
<thead>
<tr>
<th>Sugar Industry</th>
<th>Representative Sugar Producer</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Graph" /></td>
<td><img src="image" alt="Graph" /></td>
</tr>
</tbody>
</table>

a) Suppose the government decides to operate the sugar industry like a monopoly. Add the appropriate MR curve for a monopoly to the industry diagram. To the firm diagram add the demand curve faced by the firm. How many sugar licenses will be given to each firm? Given this level of production, what is the marginal cost? What is the price? Briefly explain how you obtained your answers.

b) Referring to the graph, compare the consumer surplus, producer surplus and deadweight loss between this monopoly outcome, and the perfectly competitive outcome. Is society better off or worse off with this licensing program? Briefly explain how you obtained your answers.