INSTRUCTIONS

• Please put your name on ALL pages.
• There are a total of 4 parts on this exam.
• There are 100 total points. You have 90 minutes to complete the exam. Plan your time accordingly.
• Read all questions carefully.
• No calculators or notes allowed.
• Write legibly and label any diagrams appropriately and thoroughly.
• This quiz is given under the terms of Penn’s Code of Academic Integrity.
Part 1: Multiple Choice (20 points, 2 points each)

Please circle the correct answer for each of the following questions:

1. Consider the market for burritos. When the price of tacos goes down, the equilibrium price of burritos decreases and the equilibrium quantity of burritos traded decreases. Which of the following statements is consistent with this outcome?
   a. Burritos and tacos are substitutes.
   b. The demand for burritos is increased.
   c. Burritos and tacos are complements.
   d. The supply of burritos is increased.

2. Consider the market for coffee. If the demand for coffee is ________, total revenues coffee manufacturers receive will ________ when the price of coffee increases.
   a. Unit Elastic; Decrease.
   b. Unit Elastic; Increase.
   c. Inelastic; Decrease.
   d. Elastic; Decrease.

3. If demand for a good is perfectly inelastic, which of the following statements is incorrect?
   a. Taxes will lead to efficient outcomes.
   b. Subsidies will cause zero dead-weight loss.
   c. Producer surplus is infinite.
   d. The burden of a tax falls entirely on the consumers.

4. Suppose that a government wants to add a tax to a market and also wishes for as much of the tax burden as possible to fall on producers. Which of the following would best accomplish that goal.
   a. A tax on buyers in a market with perfectly inelastic supply and downward sloping demand.
   b. A tax on buyers in a market with upward sloping supply and downward sloping demand.
   c. A tax on suppliers in a market with perfectly elastic supply and downward sloping demand.
   d. A tax on either buyers or suppliers in a market with perfectly inelastic demand and upward sloping supply.
5. The following table shows the total cost, total variable cost, and marginal cost of aluminum can production for 4 and 5 units. Based on the information below, what are the Total Fixed Costs for this firm?

<table>
<thead>
<tr>
<th>Quantity</th>
<th>TC</th>
<th>VC</th>
<th>MC</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td></td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>45</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

a. 0  
b. 8  
c. 25  
d. 31

6. Suppose that a perfectly competitive firm has decided to produce (in the short run) \( q = 10 \) units of a good when the price is 20 dollars. However, it has also decided to exit in the long run. Based on this, we can say that:

a. AVC at \( q = 10 \) must be greater than 20 dollars. 
b. ATC at \( q = 10 \) must be less than 20 dollars.  
c. The VC at \( q = 10 \) must be less than 200 dollars.  
d. The TC at \( q = 10 \) must be less than 200 dollars.

7. Consider a competitive firm with the following cost graph. If market demand is \( Q = 1000 - 10P \), how many firms are there in this market in the long run?

![Cost Graph](image)

a. 10  
b. 20  
c. 30  
d. 40
8. Consider the following graph. The market was originally monopolized. An anti-trust law suit was brought against the monopolist; and the market was opened to competition. In this transition, what is the change in Producer Surplus?

![Graph]

a. –C –D – E
b. –A – B +H
c. –C –D + H
d. E + H

9. The Public Broadcasting Service (PBS) is an American non-profit public broadcasting television service. Anyone with a television and an antenna (or cable) can get access to PBS network programming without paying a fee. More so, PBS can broadcast TV shows to every single household in the country. Which of the following statements about PBS TV show programming is true?

a. Without government intervention, the quantity of PBS TV shows provided will be above the efficient quantity.
b. Without government intervention, the quantity of PBS TV shows provided will be below the efficient quantity.
c. The PBS network situation is an example of “tragedy of the commons”, every US citizen will want to watch the TV shows, but no one will want to pay for them.
d. Every citizen in the US has an incentive to contribute money to finance PBS network’s production of TV shows.

10. Which of the following types of goods is generally overproduced or overused?

a. Common resource.
b. Good featuring a positive externality.
c. Output of a natural monopoly.
d. Public goods.
Part 2: True-False-Uncertain (10 points, 2 points each)

For each question, circle either True, False or Uncertain. You do not have to provide an explanation.

1. Firms in perfectly competitive markets earn zero profit in the long run, therefore the market cannot be efficient.

   True  False  Uncertain

2. In the market for yachts, a tax on consumers will lead to higher tax revenue for the government compared to a tax on producers, because consumers of yachts are usually wealthy people.

   True  False  Uncertain

3. In a market for an inferior good that has a downward sloping demand curve and an upward sloping supply curve, a recession (i.e. the country loses income and people’s wages decrease), leads to a decrease in the price of the good.

   True  False  Uncertain

4. In a market with negative externality, taxation will restore equity but will hurt efficiency.

   True  False  Uncertain

5. Consider a natural monopolist facing a downward sloping demand curve: Since the firm has sole access to a resource, the profit maximizing decision is P=MC.

   True  False  Uncertain
Part 3: Short-Answer Questions (15 points)

For each question, use a maximum of 3 sentences. (Most of these can be answered with one sentence).

1. (6 points) For each of the following pairs of goods, circle the good that has a higher price elasticity of demand. Please explain your reasoning.

   (a) Computers (generally) vs. Apple MacBook Pro laptops.

   (b) Retail gasoline in the short-run vs. Retail gasoline in the long-run.

2. (5 points) The demand curve for Yoga Classes is given by \( P_Y = 150 - 2Q_Y - 0.5P_M \), where \( P_Y \) is the price of a yoga class, \( P_M \) is the price of a mat, and \( Q_Y \) is the quantity of yoga classes. Are yoga classes and mats substitutes or complements? Explain.

   (Here, we do not want you to write whether you think they are complements or substitutes in real life. You have to verify your conjecture with the information that you are given.)
3. (4 points) Consider the following diagrams.

Here you’re asked to interpret the shaded areas:

Area A represents:

Area B represents:
Part 4: Problems (55 points)

1. PPF Question (13 points)

England and Portugal can both produce cloth and wine. Suppose that one worker in one year can produce the following:

<table>
<thead>
<tr>
<th></th>
<th>England</th>
<th>Portugal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloth</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Wine</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

a) (3 points) Separately graph England’s individual PPF and Portugal’s individual PPF (per worker, per year) with cloth on the horizontal axis.

b) (3 points) Which country has the comparative advantage in the production of which good? How do you know?
c) (3 points) Graph the joint PPF of the two countries if they decide to work together.

d) (4 points) If the countries produce 2 units of cloth jointly, how much wine will they jointly produce if they are producing efficiently?
2. Demand, Supply, Equilibrium Question (14 points)

Consider the market for yoga classes. The demand and supply for yoga classes are given by the following:

Demand : \( P_Y = 140 - 2Q_Y \)
Supply : \( P_Y = 12Q_Y \)

Where \( P_Y \) is the price of a yoga class, \( Q_Y \) is the quantity of yoga classes.

a) (3 points) Graph the supply and demand functions. Make sure to label the axes, intercepts, and slopes.

b) (3 points) Compute the equilibrium price and quantity of yoga classes. Clearly mark and label this point on your graph.
c) (3 points) Compute the Consumer Surplus, Producer Surplus and Total Surplus at the equilibrium price and quantity. Clearly mark Consumer Surplus and Producer Surplus on your graph.

d) (5 points) Now suppose that in an effort to promote healthy lifestyles, the government chooses to impose a price ceiling on yoga classes at $96. Compute the new Consumer Surplus, Producer Surplus and Total Surplus given the price ceiling. What can you say about the efficiency of the new quantity of yoga classes traded? Explain.
3. Cost Curves and Perfect Competition Question (16 points)

(This question asks you what happens to cost curves generally. Use general notations to indicate costs, price and quantity and label all axes in graphs. Please don’t make numbers up, even if they’re consistent with your story.)

Suppose that the market for Blu-ray players can be treated as perfectly competitive.

a) (3 points) Imagine that this market is in long-run equilibrium. Using firm-level cost graphs, show the equilibrium price and the quantity produced by a Blu-ray manufacturer. Make sure you plot ATC, AVC, and MC. What are the profits of each firm in the long-run?

b) (3 points) Assume that a technological advance reduces the fixed cost of producing Blu-ray players. Explain what happens to the profits of a Blu-ray manufacturer in the short-run.
c) (3 points) Use the demand-and-supply diagram for the whole industry to show what happens to the equilibrium price of Blu-rays as a result of the change in part b) as the industry adjusts to the long-run. What happens to the number of firms in this industry?

d) (3 points) Do individual firms benefit from the technological advance in the short-run? Do they benefit in the long-run? Explain.

e) (4 points) Explain what happens to the consumer surplus in the short-run as a result of the technological advance. Explain what happens to the consumer surplus in the long-run.
4. Externality, Corrective Tax Question (12 points)

The loud music coming from the sorority next to your dorm is a negative externality that can be directly quantified. The accompanying table shows the marginal social benefit and the marginal social cost per decibel (dB, a measure of volume) of music.

<table>
<thead>
<tr>
<th>Volume of music</th>
<th>Marginal Social Benefit</th>
<th>Marginal Private Cost</th>
<th>Marginal Social Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>91</td>
<td>10</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>92</td>
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<td>3</td>
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<td>93</td>
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</tr>
<tr>
<td>97</td>
<td>4</td>
<td>8</td>
<td>14</td>
</tr>
</tbody>
</table>

a) (3 points) What is the socially optimal level of music?

b) (3 points) Only the members of the sorority benefit from the music. What’s the volume they choose?
c) (3 points) The College imposes a tax of $2 on the sorority. What is the decibel level the sorority now chooses?

d) (3 points) Is the tax of $2/decibel enough to correct for the negative externality? Explain.