1. (30 pts.) Put an X on the T if the statement is true. Put an X on the F if the statement is false.

T  F  In the years since 1900, Federal government spending as a percentage of GDP grew the fastest in the 1960’s during President Johnson’s war on poverty.

T  F  The largest source of income for the federal government is personal income taxes.

T  F  Consumer welfare is maximized when the difference between the marginal benefit and the marginal cost of the last unit is maximized.

T  F  Normative economics is a scientific approach to analysis that establishes cause and effect relationships among economic variables.

T  F  The “theory of the second best” says that if there are two imperfections in a market, correcting for just one of the imperfections will not necessarily improve consumer well-being.

T  F  It is not necessary to correct for inframarginal externalities to achieve an efficient outcome.

T  F  If there is a benefit externality the firm will produce less than the socially optimal level of output.

T  F  A natural monopoly is a firm that has a monopoly because of its control over natural resources.

T  F  The First Fundamental Theorem of Welfare Economics says that as long as markets are competitive the efficient level of output will be produced even if the production of one of the goods creates a negative externality.

T  F  Assume a good is nonrival but excludable (such as a bridge with low levels of traffic). The most efficient method of financing the bridge would be to charge some sort of toll.

T  F  Transitivity is when the purchase of a public good by one person allows another person to enjoy the benefits of the good without paying.

T  F  Arrow’s Possibilities theorem concludes that it is impossible to find a voting rule that simultaneously meets all the criteria Arrow listed.

T  F  Rational ignorance is when voters choose not to gather information on a public policy issue because the expected benefits of gathering the information are less than the expected costs.

T  F  It is possible for logrolling to result in a level of output close to the optimum level because logrolling can give voters a way to express the intensity of their preferences.

T  F  Bureaucrats have an incentive to try to promote a level of spending above the optimal level.
2. (5 pts.) Define the term “marginal benefit.” Explain how the height of the demand curve represents marginal benefit.

3. (6 pts.) Explain why economists argue that pollution can be reduced at lower cost with a permit system than a “command and control” system.

4. (6 pts.) What is the Coase Theorem? Explain the main points of the Coase Theorem.

5. (6 pts.) Assume the following:
   MSB=MPB=12-Q
   MPC=2Q   MEC=Q

   A. What level of output will be produced with no correction for the externality?
   B. What is the optimal level of output?
   C. What is the deadweight loss if there is no correction for the externality?
6. (8 pts) What is a pure public good? Be sure to define the terms nonrival and nonexclusionary in your answer.

7. (5 pts.) Assume there are two consumers with the following marginal benefit curves for a public good:

\[
MB^A = 10 - Q \quad MB^B = 5 - Q
\]

If the MC of producing a unit of the good is $5, what is the optimal level of production?

8. (5 pts) What does it mean when we say a public good is congestible?

9. (5 pts.) Explain what is meant by the phrase “tragedy of the commons.”
10. (4 pts.) On the graph below, explain why the tax share $t'$ is not a Lindahl equilibrium.

```
Tax share of A

100%

Q'

B's desired quantity given the tax share

A's desired quantity given the tax share

0%

Public Good
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11. (10 pts.) The graph below shows the demand curves for street lights (a public good). Answer the following:
   a. If majority rule voting is used, how much output will the voters choose? Explain.
   b. Are the voters likely to choose the optimal level of output in this case? Explain.

```

Tax Price

Da

Db

Dc

Quantity
```
12. (6 pts.) Will a political equilibrium be achieved if majority rule voting is used to decide the size of the stadium, given the preferences of the voters shown below? Explain why or why not.

<table>
<thead>
<tr>
<th></th>
<th>5,000 seats</th>
<th>Net Benefit 30,000 seats</th>
<th>55,000 seats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voter A</td>
<td>110</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>Voter B</td>
<td>30</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>Voter C</td>
<td>60</td>
<td>20</td>
<td>80</td>
</tr>
</tbody>
</table>

1. (4 pts.) Answer EITHER A or B:
   a. Explain the difference between allocative efficiency and production efficiency.
   b. Does high school education fit the criteria of a pure public good? Explain why or why not.