Exam 2  Section A

Code Name: ______________________

Section A: Answer all of the questions in this section. (3 pts each unless noted)

Answer problems 1 – 3 based on the following information. Assume there are 4 coal burning power plants producing a total of 20,000 tons of pollution before there is any government regulation. Economists have determined (correctly) that the socially optimal amount of pollution is 80% of the current level, i.e. 16,000 tons/year, or 4,000 tons less than the current level. The amount of pollution produced by each firm, before government intervention, is given below. The cost of reducing pollution is also given below for each firm.

<table>
<thead>
<tr>
<th>Firm</th>
<th>Amount of pollution produced before govt. intervention</th>
<th>Cost of reducing pollution (per ton, per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm S</td>
<td>6,000 tons/year</td>
<td>$100.00</td>
</tr>
<tr>
<td>Firm T</td>
<td>4,000 tons/year</td>
<td>$65.00</td>
</tr>
<tr>
<td>Firm U</td>
<td>4,000 tons/year</td>
<td>$60.00</td>
</tr>
<tr>
<td>Firm V</td>
<td>6,000 tons/year</td>
<td>$40.00</td>
</tr>
<tr>
<td>Total</td>
<td>20,000 tons/year</td>
<td></td>
</tr>
</tbody>
</table>

1.  From an efficiency standpoint, which of the following is true?
   a. Firm S should do all the pollution reduction. The other firms should continue to produce the same amount of pollution.
   b. Firms V should do all the pollution reduction. The other firms should continue to produce the same amount of pollution.
   c. Firm S and V should do all the pollution reduction. Firms T and U should continue to produce the same amount of pollution.
   d. All firms should reduce pollution by 1,000 tons.
   e. All firms should reduce pollution by 20%. Firms S and V reduce by 1,200 tons. Firms T and U reduce by 800 tons.

2. Assume that the government issues each firm, free of charge, tradable permits for 4,000 tons of pollution (for a market total of 16,000 tons). Which firm is most likely to be a net seller (i.e. sell more than it was issued) of permits?
   a. firm S
   b. firm T
   c. firm
   d. firm V
   e. None of the firms are likely to be a net buyer of permits.

3. Assume that the government issues each firm, free of charge, tradable permits for 4,000 tons of pollution (for a market total of 16,000 tons). Assume the market for pollution permits stays competitive (i.e. Firms do not use them as means to keep other firms from producing). Also, no one other than the four firms buys or sells permits. Which firm is most likely to be a net buyer (i.e. buy more than it was issued) of permits?
   a. firm S
   b. firm T
   c. firm
   d. firm V
   e. None of the firms are likely to be a net buyer of permits.

4. In class, we mentioned some markets in which tradable “pollution” permits have been tried. Which of the following is one of those markets?
   a. paper production in Canada
   b. halibut fishing in Canada
   c. gasoline production in Europe
   d. gasoline production in the United States
   e. cocoa production in (FRNC, i.e. rebel, controlled) Columbia
Henrik Ibsen’s play “Enemy of the People” involves a small Norwegian town in the 1880s. The town’s economy relies on tourists who come to visit its natural springs. A doctor discovers that the town’s many springs are being polluted, threatening people’s health and threatening the tourist industry.¹ It is suspected that tanneries (leather factories) are causing the pollution. Norway has a very well developed code of law and court system. Suggest a way to solve this problem in each of the cases below.

5. ______ Case 1. There are 51 tanneries and 64 health spas in the area each with a different owner. Good estimates of the amount of damage suffered by the spas, from various levels of pollution, exist. There is a cheap and easy way to measure the amount of pollution any given tannery emits. The tanneries are also very diverse (i.e. have a lot of differences) in the style of factory and the technology they use. Apply what was discussed in lecture and the text. **Which of the following solutions would probably be the most efficient and effective?**
   a. offer the spa a subsidy for every visitor they serve.
   b. little government intervention other than allowing people & companies to sue for damages in court.
   c. direct government regulation specifying the amount of leather produced and/or the technology used to produce it.
   d. direct government regulation closing the tannery down
   e. a tax on leather or the pollution emitted by tanneries
   f. a subsidy paid to the tanneries for every unit of leather they produce

6. ______ Case 2. There is only 1 tannery in the area. There are 2 health spas in the area each owned by one person. Technology exists to measure the amount of pollution being emitted by the tannery. Good estimates of the amount of damage suffered by the spa, from various levels of pollution, exist. Apply what was discussed in lecture and the text. **Which of the following solutions would probably be the most efficient and effective?**
   a. offer the spa a subsidy for every visitor they serve.
   b. little government intervention other than allowing people & companies to sue for damages in court.
   c. direct government regulation specifying the amount of leather produced and/or the technology used to produce it.
   d. direct government regulation closing the tannery down
   e. a leather boycott by the spa’s owners and employees
   f. spray painting cattle with indelible green paint so that it is more costly to produce leather

7. ______ Case 3. There are 51 tanneries and 64 health spas in the area each with a different owner. Good estimates of the amount of damage suffered by the spas, from various levels of pollution, exist. There is not, however, a cheap and easy way to measure the amount of pollution any given tannery emits, or even the amount of leather they produce. Apply what was discussed in lecture and the text. **Which of the following solutions would probably be the most efficient and effective?**
   a. offer the spa a subsidy for every visitor they serve.
   b. little government intervention other than allowing people & companies to sue for damages in court.
   c. direct government regulation specifying the amount of leather produced and/or the technology used to produce it.
   d. direct government regulation closing the tannery down
   e. a tax on leather or the pollution emitted by tanneries
   f. a subsidy paid to the tanneries for every unit of leather they produce

¹ Actually, the main theme of the play is not really pollution. Instead it is about self-interest vs public interest, hypocrisy, and mistaking the bandwagon, i.e. the latest fads in intellectual thought, for the leading edge of thought. It’s a cool play.
8. Friar Tuck ISD (FTISD) is a school district in Texas. It has 1,000 students. Property in FTISD is worth (i.e. accessed at) a total of $400,000,000. FTISD levies a 1.5% property tax to pay for its schools. i.e. FTISD collects \(0.015 \times \$400,000,000 = \$6,000,000\). Under the “Robin Hood” system, how much of this $6,000,000 is shared with poorer school districts?

a. None. FTISD is collecting \(\frac{\$6,000,000}{1,000} = \$6,000\) per student. This is below the level at which school districts start having to share their revenues.

b. $2,502,000. FTISD is collecting \(\frac{\$6,000,000}{1,000} = \$6,000\) per student. Given this, FTISD must share 41.7% of its tax revenues. \(\frac{\$6,000 - \$3,500}{\$6,000} = 0.417\). \(0.417 \times \$6,000,000 = 2,502,000\).

c. None. FTISD’s property tax base per student is \(\frac{\$400,000,000}{1,000} = \$400,000\) per student. This is below the level at which school districts start having to share their revenues.

d. $1,425,000. FTISD’s property tax base per student is \(\frac{\$400,000,000}{1,000} = \$400,000\) per student. Given this, FTISD must share 23.75% of its tax revenues. \(\frac{\$400,000 - \$305,000}{\$400,000} = 0.2375\). \(0.2375 \times \$600,000 = \$1,425,000\).

9. What is meant by the “Iron Triangle” as used in the text?

a. the three items which gave Pittsburgh more economic and political power than any other city in Pennsylvania: 1) iron ore, 2) coal, and 3) excellent transportation links

b. the three branch system of government used in the United States: 1) the Executive, 2) the legislature, and 3) the judiciary

c. the three layer system of government used in the United States: 1) the federal government, 2) state governments, and 3) local governments

d. the three levels of decision making in (legislative) representative democracy: 1) voters, 2) legislators, 3) legislative committees

e. the principal supporters of many government programs: 1) members of Congress who voted for it, 2) bureaucrats who administer it, and 3) special interests who benefit from it

10. Which of the following best describes Arrow’s Impossibility Theorem? “No democratic voting mechanism can be guaranteed to always:

a. always give each individual the same “voice” as long as real wealth (or real potential income) is not identical for every voter.”

b. always give each individual the same ‘voice’ as long as the level of information is not identical for every voter.”

c. enhance social welfare as long as there are barriers to entry and exit into the government’s area. ex. It is difficult to switch school districts. This is a barrier to entry and exit into a government’s area.”

d. 1) respond to changes in voters’ preferences, and 2) always produce ‘consistent results’. ex. If A is preferred to B, and B is preferred to C, consistency requires that A is preferred to C.”

e. be able to make a living catching arrows.”
11. Indicate (✓) the type of election by which members of the following legislatures get their jobs. You probably only want to check one cell per row.

<table>
<thead>
<tr>
<th>Legislature</th>
<th>Borda Count</th>
<th>Proportional</th>
<th>Chain Weighting</th>
<th>Winner Take All</th>
<th>Point Voting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Israeli Knesset</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK House of Commons</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S. House of Representatives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12. Where are education vouchers being tried?
   a. Greenlawn, New York
   b. Cleveland, Ohio
   c. Indianapolis, Indiana
   d. Calgary Canada
   e. Pittsburg, PA

13. Barbara Bureaucrat heads the Bureau of Highway Signs. The costs and social benefits of putting up highway signs is shown at right. Barbara behaves according the (Niskanen) theory, regarding bureaucrats, discussed in the book. How many highway signs will Barbara lobby for?

[Graphs of Total Costs and Benefits and Marginal Costs and Benefits]
Section B

(Same) Code Name: _______ I answered ____

Section B: Answer 1 of 2 of the questions in this section (either B.1 or B.2). 27 pts

B.1) Consider the accompanying graph (next page). On it, you are given marginal valuations of various amounts of a pure public good for all three individuals in a society. You are also given the marginal production costs. Assume the sellers’ side of the market is perfectly competitive.

a. Draw, precisely and accurately, the socially optimal demand curve.

b. Clearly indicate/label the socially optimal level of production. Label it $Q_{Soc}^*$.

c. How much would the private sector produce without any collective action on the part of buyers (ex. not govt.)? Clearly and thoroughly explain your answer.

B.2) Assume the following:

- Each parent’s (Pat) income = $40,000 (after taxes)
- Each parent has 1 child, Pat Jr., whom she/he must educate.
- Each child receive 1,000 “units” of public school at no added cost to their parent.
- Each parent is offered an education voucher of $5,000.
- Pat could send Pat Jr. to any number of private schools. Private schools cost $10/unit. These units are quality adjusted so that 1 unit of education is the same regardless of which school one goes to.
- By law, every child must receive at least 1,000 units of education.
- Public and private schools are mutually exclusive. For example, children cannot attend public schools and also attend private schools as a supplement.

a. Using budget line and indifference curve analysis, neatly and accurately illustrate 2 situations; one in which the person takes the voucher and one in which they don’t. Make sure you clearly and accurately label your curves, axes, and points.

b. Assuming parents and children have perfect information about school quality, do vouchers always enhance the utility of students and parents? Explain why or why not. Make sure you talk about both those who take the vouchers and those who do not.
B.1’s Accompanying Graph