Name: ______________________ (2 pts … Hey! … Now it adds to 100)

- Each problem is worth 2 points unless otherwise indicated.
- This exam ends promptly at 8:52. The late penalties for turning it in late are:
  1 minute late: - 3 points
  2 minutes late: - 6 points
  3 minutes late: - 9 points
  4 minutes late: not accepted

1. _____ Which of the following would be the best item to tax if one’s goal is to minimize deadweight loss? Assume that in each market, before any taxes, 1,000 units are sold for $20 each.
   a. Good A. $E_D = 0.95$. $E_S = 1.7$.
   b. Good B. $E_D = 1.0$. $E_S = 1.0$.
   c. Good C. $E_D = 1.05$. $E_S = 0.3$.
   d. More information is needed to answer this.

2. _____ Which of the following would be the best item to tax if one’s goal is to minimize deadweight loss? Assume that in each market, before any taxes, 1,000 units are sold for $20 each.
   a. Good A. $E_D = 0.3$. $E_S = 1.05$. $E_D = 1.7$. $E_S = 0.95$.
   b. Good B. $E_D = 1.0$. $E_S = 1.0$.
   c. Good C. $E_D = 1.7$. $E_S = 0.95$.
   d. More information is needed to answer this.

3. _____ In order to fund improved air cargo (ex. FedEx, DHL) security, the federal government levies a $6 per package tax on all air cargo packages. Sellers are legally responsible for sending these tax payments to the government. Assume that in the market for air cargo, $E_D = 1.6$ and $E_S = 0.8$. Who will bear the economic incidence of this new tax?
   a. Buyers will bear the entire incidence. The price they pay, after taxes, will increase by $6.
   b. Both sides will bear some incidence. However, buyers will bear more. The price buyers pay will rise, say by $4. The amount sellers receive (after taxes) will fall by less, say $2.
   c. The incidence will be split equally between buyers and sellers. Buyers will pay $3 more and sellers receive $3 less after the tax.
   d. Both sides will bear some incidence. However, sellers will bear more. The price sellers receive (after taxes) will fall, say by $4. The price buyers pay will rise by less, say $2.
   e. Sellers will bear the entire incidence. The price they receive (after taxes) will decrease by $6.
#’s 4 – 6: Below you have tax tables for three different countries. Use it to classify each country’s income tax system.

<table>
<thead>
<tr>
<th>Income</th>
<th>Country 1</th>
<th>Country 2</th>
<th>Country 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$20,000</td>
<td>$3,000</td>
<td>$2,000</td>
<td>$4,000</td>
</tr>
<tr>
<td>$40,000</td>
<td>$6,000</td>
<td>$6,000</td>
<td>$6,000</td>
</tr>
<tr>
<td>$60,000</td>
<td>$9,000</td>
<td>$10,000</td>
<td>$8,000</td>
</tr>
</tbody>
</table>

4. _____ What kind of income tax system does country 1 have?
   a. an orthogonal tax
   b. a pigouvian tax
   c. a progressive tax
   d. a regressive proportional tax
   e. a regressive tax
   f. a trans-income tax

5. _____ What kind of income tax system does country 2 have?
   a. an orthogonal tax
   b. a pigouvian tax
   c. a progressive tax
   d. a regressive tax
   e. a regressive tax
   f. a trans-income tax

6. _____ What kind of income tax system does country 3 have?
   a. an orthogonal tax
   b. a pigouvian tax
   c. a progressive tax
   d. a regressive tax
   e. a regressive tax
   f. a trans-income tax

7. _____ What type of tax did Henry George advocate?
   a. a tax on the value of land excluding the structures on that land
   b. a tax on the structures (ex. houses) sitting on land
   c. a tax on female labor income
   d. a tax on male labor income
   e. none of the above

8. _____ Henrietta says; “I’ve heard all the theory and arguments regarding taxes. I’ve come to the conclusion that, based on my goals, a “head tax” is the best tax for the United States.” Which of the following is most likely Henrietta’s main goal?
   a. promoting economic “efficiency”
   b. promoting horizontal equity
   c. promoting vertical equity
   d. following the benefits principle
   e. following the ability to pays principle

9. _____ Neither Laura nor Linda have kids. Laura earns $60,000 while Linda earns $30,000. However, both pay $5,000 in taxes. Which principle of taxation is most violated by this? Which principle of taxation does this most go against?
   a. the vertical equity principle
   b. the horizontal equity principle
   c. the efficiency principle
   d. the deadweight principle
   e. the benefits principle
   f. the ability to pay principle
10. Kyle and Kathy earn about $100,000, live together, own a house, but are unmarried. John and Julie are in the exact same situation ($100,000, live together, own a house, etc.) except they are legally married. However, under the U.S. tax system, John and Julie pay less in taxes. Which principle of taxation is most violated by this? Which principle of taxation does this most go against?
   a. the ability to pay principle
   b. the benefits principle
   c. the deadweight principle
   d. the efficiency principle
   e. the horizontal equity principle
   f. the vertical equity principle

11. In the 1980’s, many advocated charging “user fees” to those who use certain government services. Further, these user fees should (approximately) equal the costs of providing the service. For example, instead of having low or free admission to national parks and monuments, an entrant would be charged (approximately) enough to cover the costs of providing the service. If it costs about $40 million per year to operate Yellowstone and there are 2 million visitors to the park, they should each pay a user fee of $20. Which principle best supports these user fees? i.e. Which principle do these user fees advance the most?
   a. the vertical equity principle
   b. the horizontal equity principle
   c. the efficiency principle
   d. the deadweight principle
   e. the benefits principle
   f. the ability to pay principle

12. (8 pts) Indicate (✓) whether each of the following is an example of a positive externality, a negative externality, or no externality. You should have only one check per row.

<table>
<thead>
<tr>
<th>Positive Externality</th>
<th>Negative Externality</th>
<th>No Externality</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>Julie pays to put termite bait stakes around their house. These stakes kill any termite colony within 75 feet of Julie’s yard. Jack, their neighbor, does not have termite stakes.¹</td>
</tr>
<tr>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>While Bob is away on vacation, Ted breaks into Bob’s house and steals his plasma screen TV.</td>
</tr>
<tr>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>Alan has been mowing Dawn’s lawn for 3 years. He used to charge $25. Now, without consulting Dawn, Alan raises his price to $30.</td>
</tr>
<tr>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>Cammie gives $250 to the Salvation Army, a charity. Because of this Duane gets to stay in a shelter for a week. Edward, another person, is glad to see Duane off the street.</td>
</tr>
</tbody>
</table>

13. The country of Macronesia uses a pigouvian tax to (attempt to) control phosphorous released by paper mills into lakes and streams. Assume the demand for paper increases greatly, but the government leaves the tax/unit unchanged. What is a likely result?
   a. Less legal pollution, but the $ price a firm pays for each ton of pollution is unchanged.
   b. The same amount of legal pollution, & the $ price a firm pays per ton of pollution increases.
   c. The same amount of legal pollution, & the $ price a firm pays per ton of pollution decreases.
   d. More legal pollution, but the $ price a firm pays for each ton of pollution is unchanged.

¹ Assume termites are not counted as part of society.
14. _____ The country of Macronesia issues tradable pollution permits for phosphorous released by paper mills into lakes and streams. Assume the demand for paper increases greatly, but the government leaves the number of permits unchanged. What is a likely result?
   a. Less legal pollution, but the market price of a pollution permit remains the same.
   b. The same amount of legal pollution, and the market price of a pollution permit decreases.
   c. The same amount of legal pollution, and the market price of a pollution permit increases.
   d. More legal pollution, but the market price of a pollution permit remains the same.

15. _____ Assume that a negative externality is generated when 1 unit of $X$ is produced. There is no way, yet known, to produce $X$ without generating the negative externality. Private markets, without government intervention, will likely:
   a. produce less $X$ than is socially optimal regardless of whether or not buyers and sellers are aware of the externality.
   b. produce the “socially optimal” amount of $X$ regardless of whether or not buyers and sellers are aware of the externality.
   c. produce more $X$ than is socially optimal regardless of whether or not buyers and sellers are aware of the externality.
   d. produce less than the socially if buyers and sellers are unaware of the externality, but produce the socially optimal amount if buyers and sellers are aware of the externality.
   e. produce more than the socially if buyers and sellers are unaware of the externality, but produce the socially optimal amount if buyers and sellers are aware of the externality.

16. _____ Assume that a positive externality is generated when 1 unit of $X$ is produced. There is no way, yet known, to produce $X$ without generating the positive externality. Private markets without government intervention will likely:
   a. produce less $X$ than is socially optimal regardless of whether or not buyers and sellers are aware of the externality.
   b. produce the “socially optimal” amount of $X$ regardless of whether or not buyers and sellers are aware of the externality.
   c. produce more $X$ than is socially optimal regardless of whether or not buyers and sellers are aware of the externality.
   d. produce less than the socially if buyers and sellers are unaware of the externality, but produce the socially optimal amount if buyers and sellers are aware of the externality.
   e. produce more than the socially if buyers and sellers are unaware of the externality, but produce the socially optimal amount if buyers and sellers are aware of the externality.

17. _____ Which of the following is true of litigation (i.e. lawsuits)?
   a. Litigation is likely to be effective as a correction for negative externalities only if the government is one of the parties suing.
   b. Litigation is likely to be more effective as a correction for negative externalities when there are few parties and any damages are easy to identify and measure.
   c. Litigation is likely to be more effective as a correction for negative externalities when there are many parties and any damages are hard to identify and measure.
   d. Litigation is by nature, a negative externality. It cannot correct for other negative externalities.
18. The graph at right depicts the private supply and demand curve for good X. Assume that the consumption of 1 unit of good X generates $15 in external benefits. What is the socially optimal level of production?

19. Which of the following would best correct for the externality in # 18 above? Which would move the market closest to the socially optimal.
   a. a $30 subsidy per unit
   b. a $15 subsidy per unit
   c. a $15 tax per unit
   d. a $30 tax per unit
   e. no government intervention (it’s a benefit already)

20. The country of Icthyistan is having problems with paper mills putting too much phosphorous into lake MorteDuFish. Recently two technologies, satellite spectral imagery and fractal water sampling have made it very cheap and easy to measure the amount of phosphorous a paper mill emits. About 10 paper mills surround the lake. 100’s of fishers and 10’s of 1,000’s of recreational users (vacationers) use the lake. Estimates of the damage the average fisher and recreational user suffers from pollution are available. Which option is likely the best way to deal with the pollution?
   a. Do nothing other than let any harmed parties bring lawsuits against those who harm them.
   b. Use direct government regulation, namely specifying the amount of paper each mill produces and the technology it uses.
   c. Issue tradable pollution permits. Make sure the amount equals the desired level of pollution.

21. Which of the following would be the best item to tax if one’s goal is to maximize social welfare as measured in this class? Assume that in each market, before any taxes, 1,000 units are sold for $20 each.
   a. Good A. $D = 1.05. $S = 0.95. $15 of external costs are generated for each unit sold.
   b. Good B. $D = 1.0. $S = 1.0. No external costs or external benefits are generated.
   c. Good C. $D = 0.95. $S = 1.05. $15 of external benefits are generated for each unit sold.
   d. More information is needed to answer this.
#’s 22 and 23: Assume the government of Pollutistan has decided to use tradable pollution permits to control emissions of S0₂ (sulfur dioxide) from power plants. There are 4 power plants in Pollutistan. The amount of S0₂ each emitted, prior to the use of tradable pollution permits, is given below. Their costs of abatement (reducing the amount of S0₂ they pollute) and the number of permits each firm gets are also given.

<table>
<thead>
<tr>
<th>Firm W</th>
<th>Firm X</th>
<th>Firm Y</th>
<th>Firm Z</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amt Emitted Before Permits</td>
<td>20 tons/day</td>
<td>40 tons/day</td>
<td>40 tons/day</td>
<td>20 tons/day</td>
</tr>
<tr>
<td>Cost of Abatement</td>
<td>$50/ton</td>
<td>$40/ton</td>
<td>$30/ton</td>
<td>$20/ton</td>
</tr>
<tr>
<td>Polln Permits Issued</td>
<td>15 tons/day</td>
<td>30 tons/day</td>
<td>30 tons/day</td>
<td>15 tons/day</td>
</tr>
</tbody>
</table>

22. (8 pts) Indicate (✓) what each firm will likely do with its permits. Assume all firms are out to maximize profits. Assume firms do not hoard permits to keep others out of the market. Assume these 4 firms are the only potential buyers and seller. You should have 1 check per row.

<table>
<thead>
<tr>
<th>Firm</th>
<th>Sell Permits</th>
<th>Use Only what it was Issued</th>
<th>Buy Permits</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

23. _____ What is a likely price be for the tradable pollution permits?
   a. $20/ton   b. $30/ton   c. $50/ton
   d. $40/ton   e. $1,000/ton

24. _____ It’s 1985 and John Lovett has decided to buy a ’74 Monte Carlo, repair it, and sell it? The amount he bought and sold everything for is shown at right. What was his level of economic profit?
   a. $1,000   b. $450
   c. $350   d. $100 $200
   e. less than $100 $200 but definitely greater than $0. Economic profits are always positive.
   f. some number less than $100 $200

25. _____ Which of the following best defines the short-run as used in microeconomics?
   a. The time period in which a firm is a price taker (no control over price).
   b. The time period in which variable costs exists.
   c. The time period in which some factors of production (inputs) are fixed.
   d. The time period in which a firm is a price maker (can raise price & still keep some customers).
26.  _____ It’s 2040 and you’ve just retired. You buy a restaurant up in Estes Park, Colorado. Which of the following is an example of a fixed costs?
   a. Gino Gambino, the local Mafia boss, has “asked” you to charge at least $20 per entrée so as not to undercut his business. You agree.
   b. Each day you order eggs. The number you order varies depending on your need. However, you always have, and always will, pay $0.50 per dozen.
   c. You’ve hired a famous and have agreed to pay her a salary of $55,000/year for two years. The market price of chefs of her caliber varies. You might be able to get another one for anything from $40,000 to $65,000.

27. (8 pts) Indicate (✓) whether each of the following curves represents a realistic short-run marginal cost curve. **You should have 4 ✓’s, one per curve.**

<table>
<thead>
<tr>
<th>Realistic MC Curve</th>
<th>Not a Realistic MC Curve</th>
<th>The Curve</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓</td>
<td>$</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>q</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>$</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>q</td>
</tr>
</tbody>
</table>

28.  _____ Which of the following best illustrates the principle of “diminishing marginal product” (also know as “diminishing marginal returns”)?
   a. Brenna has company which makes boxes. She triples the size of her factory, office space, etc. However, she finds that in the new, larger factory management is more bureaucratic and is easier for workers to slack off and get away with it. Efficiency falls.
   b. TufGuard makes bullet proof vests in a 24,000 ft² factory. TufGuard doubles its workforce to meet increased demand. However, its output per worker declines because there simply aren’t enough machines and factory space for all the new workers.
   c. Amanda has a lawn care company. He has 3 regular workers. If things get busy, he turns to a fourth worker, Dan. Dan, however, is much less competent than the other 3. As a result, Dan does not make production increase as much as the other 3 did.
   d. all of the above

29. Green Thumb Lawn Care, Inc. hires George. This brings their total number of employees to 6. George is paid $90 per day. Because of George, output increases from 15 to 20 lawns mowed per day. Each lawn mowing is sold for $20. **What is the Marginal Product of Labor for George?** Make sure you include your units.
30. _____ Which of the following best explains what happens to marginal product (of labor) as output increases in the short-run?
   a. Marginal product may at first decrease. However, it will always eventually increase.
   b. Marginal product may at first increase. However, it will always eventually decrease.
   c. It depends on the size of the firm. Large firms always have increasing marginal product. Small firms always have decreasing marginal product.
   d. It depends on the size of the firm. Large firms always have decreasing marginal product. Small firms always have increasing marginal product.

31. (12 pts) Fill in the table

<table>
<thead>
<tr>
<th>Tons of Output per week</th>
<th>TVC</th>
<th>TFC</th>
<th>TC</th>
<th>AVC</th>
<th>AFC</th>
<th>ATC</th>
<th>MC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$1,200</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>$2,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>$2,600</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>$3,600</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

32. _____ For which time period are these costs?
   a. The long-run
   b. the intermediate-run
   c. the short-run
   d. Indeterminate. Information on the nature of the firm’s inputs is needed.

33. __________________________ Over which range, if any, is marginal product (of labor) increasing? (examples “none”, “0 to 2 units”, “1 to 2 units”, “3 units and up”, etc.)

34. __________________________ Over which range, if any, is marginal product (of labor) declining? (examples “none”, “0 to 2 units”, “1 to 2 units”, “3 units and up”, etc.)

35. _____ In which market have tradable “externality” permits been tried?
   a. halibut fishing off the coast of British Columbia
   b. tuna fishing off the coast of Japan
   c. chicken farming around the Chesapeake Bay
   d. pesticides, used by commercial farms, in the United States
   e. pesticides, used by commercial farms, in the European Union
Essay/Problems  (Answer each of these on the attached paper.)

8. Think of a market for which there is a negative externality.
   a. Explain why and how the negative externality is generated.
   b. Graphically, show how much the market would produce without any government intervention. Make sure you explain your graph.
   c. Graphically, show what the “socially optimal” level of production is. Explain why this is the socially optimal level
   d. Discuss one method, from the lecture and/or the text, of getting the market to the socially optimal. Discuss the strengths and weaknesses, i.e. the real world practicality or costs) of this method.
   e. Discuss a second method, from the lecture and/or the text, of getting the market to the socially optimal. Discuss the strengths and weaknesses, i.e. the real world practicality or costs) of this method.

9. Imagine a tax system in which everyone pays $9,000 regardless.
   a. Analyze the tax from the point of view of efficiency (as we defined in this class). A graph will help greatly, but is not absolutely necessary.
   b. Analyze the tax from an equity point of view. In particular, how does it meet (or fail to meet) the “horizontal equity” and the “vertical equity” criteria.
   c. Use(some of) the terms from questions 1 – 4. What type of tax system is this?
1. _____ Stuff:
   a. stuff
   b. stuff
   c. stuff
   d. stuff
   e. stuff

X. _____ Stuff:
   a. stuff
   b. stuff
   c. stuff
   d. stuff
   e. stuff

X. _____ Stuff:
   a. stuff
   b. stuff
   c. stuff
   d. stuff
   e. stuff