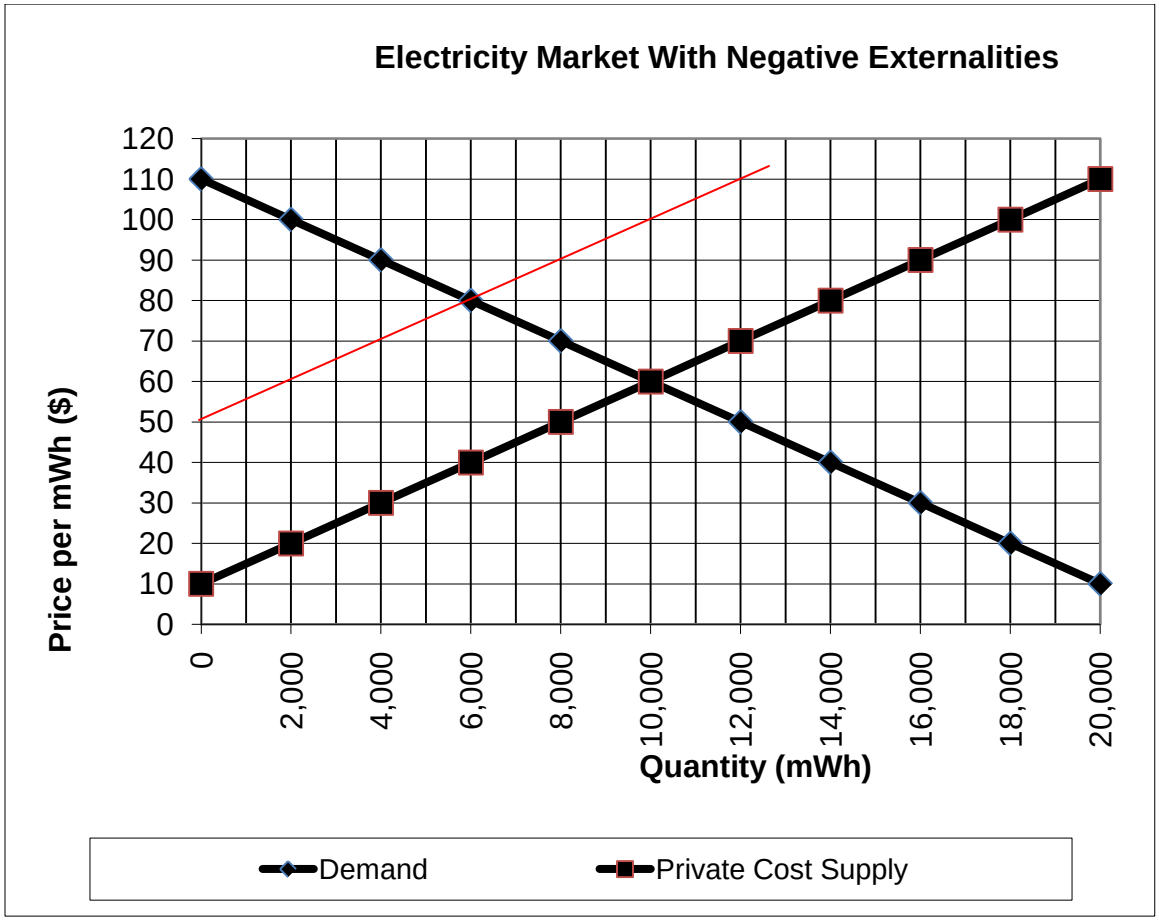
Economics 423 Exam 1, Professor Steven Hackett, Fall 2009

Name (1 point): ____Key____ Pick any 2 questions you do NOT want to answer and cross them out with a BIG X. Each of the remaining 33 questions below is worth 3 points.

Part 1: Only for students not participating in the 4th unit lab



1. a. Clearly draw a parallel social-cost supply curve in the diagram above, based on constant marginal external cost of $40.

1.b. Total external cost in the "free market" equilibrium in the diagram above is $400,000.

2. If a Pigouvian tax were used to internalize negative externalities in the diagram above, the new "socially optimal" equilibrium price = $80 and the equil. quantity = 6,000.

3. Pigouvian taxes make markets more efficient, as measured by an increase in the true net gains from trade. By how much are the true net gains from trade larger in the "socially optimal" equilibrium relative to the "free market equilibrium"? $80,000

4. Now suppose that marginal external cost is a constant $60. In this case, the true net gains from trade in the "free market" equilibrium is $-100,000.

Part 2: <u>Only</u> for students participating in the 4th unit lab

Suppose that daily electricity demand is given by the equation P = 120 – 0.04Q
Private-cost electricity supply is given by the equation P = 20 + 0.01Q
Social-cost electricity supply is given by the equation P = 60 + 0.01Q
Q is in megawatt-hours. Marginal external cost is $40 per megawatt-hour.

1. Derive the numerical value for equilibrium price, quantity, and true net gains from trade in the "free market" equilibrium, assuming that firms can freely pollute without regulation or reputational consequences. Please show your work.

P = $40 Q = 2,000 True net gains from trade = $20,000

2. Derive the numerical value for equilibrium price, quantity, and true net gains from trade in the "socially optimal" equilibrium, assuming that a Pigouvian tax has fully internalized negative externalities, with tax funds used to offset damage costs. Please show your work.

P = $72 Q = 1,200 True net gains from trade = $36,000

3. Tax incidence refers to how the burden of a tax is shared among consumers and producers. Consumers share the burden of the Pigouvian tax by way of a higher price. What percentage of the Pigouvian tax in question 2 above is the consumers' burden, and what percentage is the producers' burden? Please show your work.

Consumer burden = 80% Producer burden = 20%

4. Suppose that a renewable source of electricity could supply the market at a price of $68 per megawatt-hour. This source would <u>not</u> be subject to the Pigouvian tax. If the polluting source of electricity is subject to the Pigouvian tax as in question 2 above, then electricity from which type of source will prevail in the market?

Renewable energy Polluting energy Cannot be determined (circle one)

Part 3: All students

5. Which of the following, if any, in the table below would usually cause equilibrium quantity to decrease and equilibrium price to increase in a competitive market? (circle any/all correct answers)

Inward shift in demand	Internalizing a positive externality
Internalizing a negative externality	Outward shift in supply

6. True/False (circle one): CEQA is a "fair competition" law that makes it illegal for new businesses to enter a local market if, by doing so, they would reduce the profits of existing firms.

7. True/False (circle one): In the absence of mandatory recycling or deposit-refund schemes, higher fees for garbage disposal, combined with free recycling drop-off, will tend to increase the supply of recycled commodities.

8. True/False (circle one): PG&E and the other investor-owned electric generating utilities supported the deregulation of California's electricity system in the mid-1990's, as they expected that wholesale prices would remain below fixed retail prices paid by their customers, thereby making electricity supply profitable.

9. True/False (circle one): During the summer of 2008, low demand for recycled commodities, combined with high diesel prices, improved the financial health of rural recycling centers, allowing them to expand their operations and to accept a wider range of low-value recyclable materials from households.

10. True/False (circle one): PG&E was able to "game" the California energy markets because the deregulation rules allowed the investor-owned utilities such as PG&E to sell electricity at high "spot market" prices in the power exchange to Enron and other energy brokers. Enron was in turn required to sell that electricity at low fixed retail prices to households and industrial consumers.

11. True/False (circle one): The first laws that gave states the right to regulate the hunting of wild game (e.g., deer, elk) essentially gave states the property rights of management and exclusion in regard to these game resources.

12. True/False (circle one): In well-functioning competitive markets for storable non-renewable resources with a fixed stock, steady-state demand, constant marginal extraction costs, and positive discount rates will cause resource prices to rise over time.

13. True/False (circle one): In well-functioning competitive markets for non-renewable resources with a fixed total stock, steady-state demand, constant marginal extraction costs, and positive discount rates, the quantity of the resource sold each year will rise over time.

14. True/False (circle one): If there are five (mutually exclusive) policy options for managing a parcel of National Park land, then the opportunity cost of the preferred option is the value of the next best option.

15. True/False (circle one): Suppose that there is a recreational trail connecting various towns and tourism amenities, but there is a gap in the town of Arnold, in the middle of the trail. If Arnold

uses town funds to complete the trail, then it will create positive externalities for trail users who do not live in Arnold. Thus there is an argument for subsidizing such trails.

16. True/False (circle one): Suppose that a public policy option provides a Pareto improvement over the status quo. Then we know that that policy option generates the largest net social utility, but may make some people worse off relative to the status quo.

17. True/False (circle one): Internalizing negative externalities with a tax raises the price of the polluting good. If the good is a necessity, then the tax will be regressive (having a larger adverse impact on the poor). Tax credits or rebates for low-income households can make the tax less regressive.

18. True/False (circle one): Suppose that forestland provides positive externalities in the form of carbon dioxide sequestration, and that new law provides forestland owners with a subsidy for keeping the land in forests and for managing the forest to sequester carbon dioxide. Economics suggests that the result of this law will be a decline in the per-acre price of private land retained in forest (rather than, say, developed) due to reduced market demand.

Part 4: All students. Clearly write the letter for the word or phrase (on the left) beside the description (on the right) that matches it. Each word or phrase has at most one uniquely correct match.

Word or Phrase	Description
A. Recyclable natural resources	19. _E_ Corn-based ethanol subsidies cause this because the commodities are substitutes in production for some farmers.
B. State (government) property	20. _P_ Among various alternatives, the policy option that is utilitarian-ethical generates this.
C. Common property	21. _L_ This is a key reason for the law of diminishing marginal returns.
D. Compensate those made worse off	22. _D_ In order for a policy option that is Kaldor-Hicks efficient to also provide a Pareto improvement over the status quo, those made better off must do this.
E. Higher wheat prices	23. _B_ The property rights regime that describes the ownership of Redwood National Park.
F. Legal standing to sue	24. _N_ Requires a portion of the electricity sold by utilities like PG&E to derive from qualified renewable sources.
G. Equilibrium quantity is too small	25. _F_ In the *Mineral King* decision the US Supreme Court ruled for the first time that swimmers or hikers have this tool to protect the ocean or National Forests that they do not own.
H. Pigouvian tax	26. _M_ This US law is consistent with John Locke's concept of the origin of private property.
I. Reduced square footage of proposed new space	27. _G_ This occurs in markets suffering from unresolved positive externalities because demand is based on private benefits rather than social benefits.
J. Pareto efficient	28. _A_ These often have secondary markets where previously used resource competes with "virgin" resource.
K. Hydrolysis	29. _T_ This shows the relationship between price and quantity demanded on a diagram.
L. Congestion of the fixed input	30. _R_ Hotelling's rule is satisfied when this is equal in all time periods.
M. Homestead Act	31. _C_ This property rights regime describes the ownership of Swiss alpine meadows.
N. Renewable portfolio standard	32. _O_ This US law granted the federal government the property right of management to a resource formerly under the status of *res nullius*.
O. Clean Air Act	33. _I_ Possible mitigation under CEQA for blight induced by excessive new commercial development. (also took V)
P. Largest possible net social utility	34. _U_ Policy tool that can force farmers or timberland owners to limit development and provide positive externalities without compensation.
Q. Categorical imperative	35. _H_ A policy that internalizes negative externalities.
R. PV Marginal profit	
S. High discount rates	
T. Demand curve	
U. Zoning	
V. Conservation easement	