

1) Econnie's marginal utility of a can of beer is 40 utils, her marginal utility of a cigarette is 20 utils, and her marginal utility of "all other goods," AOG, is 80 utils. A beer costs \$1, a cigarette costs \$.50 and the price index for AOG is \$2. Assuming for now that beer, cigarettes, and AOG are independent goods (neither substitutes nor complements), to maximize her utility, Econnie should:

- a) buy more beer, fewer cigarettes, and less AOG.
- b) buy more cigarettes, fewer cans of beer, and the same amount of AOG.
- c) continue to buy her utility-maximizing bundle of beer, cigarettes, and AOG.
- d) buy more of both beer and cigarettes and less AOG.
- e) none of the above.

2) Suppose, in the *initial conditions* of the preceding question, that it is determined that Econnie's smoking a cigarette results in \$.50 of negative externalities ("second-hand smoke") on those around her when she smokes. Ignore for simplicity any changes in the marginal utility of AOG when its quantity changes (AOG is "big," and changes very little). If Econnie is now charged the full social cost of a cigarette, how will her consumption bundle change from its initial level?

- a) she will buy the same amount of cigarettes, more beer, and less AOG.
- b) she will buy more of both beer and cigarettes and less AOG.
- c) she will buy the same amount of both beer and AOG and fewer cigarettes.
- d) she will not change her original bundle.
- e) none of the above.

3) Assuming the initial conditions of Question 2) (damage tax has just been put in place), suppose now that beer and cigarettes are complements. Compared to question 1), Econnie will now:

- a) buy the same amount of cigarettes, more beer, and less AOG.
- b) buy less of both beer and cigarettes and either more or the same AOG.
- c) buy more of both beer and AOG and fewer cigarettes.
- d) not change her original bundle.
- e) none of the above.

4) Which, if any, of the following statements was argued to be true in class?

- a) Imports harm domestic consumers by less than they help domestic producers.
- b) Exports help domestic consumers by more than they harm domestic producers.
- c) International trade increases wealth, hence results in higher environmental and labor standards.
- d) Imports harm workers producing those goods domestically, and that harm can often be larger, in dollar terms, than the domestic consumer benefits from lower prices.
- e) Only c) and d) are true.

- 5) Benefit-cost analysis of environmental projects was argued to have certain properties. Which answer is most accurate?
- A properly conducted B-C analysis with a positive NPV yields an efficient project, and efficient projects are always socially desirable.
 - A properly conducted B-C analysis always produces an equitable project, though on efficiency grounds it may be undesirable.
 - Discounting returns from environmental projects was argued to be faulty, inefficiently biasing decisions away from projects with large, but distant returns.
 - Discounting returns from environmental projects was argued to be efficient, though perhaps not always equitable.
 - Both b) and d) above are accurate.
- 6) Which of the following statements were argued in class to be true?
- At the economist's social optimum (when externalities are fully internalized), one would generally expect to have eliminated all environmental damages.
 - At the economist's optimal environmental quality, total benefits equal total costs of clean-up.
 - Environmental trade-offs (costs and benefits) are inevitable, hence should be considered, from the perspective of efficiency, in environmental policy decisions.
 - At the economist's optimal environmental quality, marginal benefits exceed marginal costs of clean-up by the maximum amount.
 - Both c) and d) are true.
- 7) Environmental policy, like any policy, involves both efficiency and equity. Which of the following are *correct* statements about these concepts?
- Efficient actions have benefits greater than costs while equitable actions have a distribution of benefits and costs among those affected that is viewed as fair.
 - Equity has to do with whether benefits are greater than costs while efficiency has to do with how those benefits and costs are distributed among people.
 - Policies that are inefficient are always socially desirable on equity grounds.
 - Engineers and economists use "efficiency" in the same way, as for example in energy efficiency ratings of heaters.
 - Statements a) and d) are correct.
- 8) In class discussion of endangered species, for example elephants, which of the following was seen as the single most important reason for their disappearance?
- the greed of mankind in consuming the elephants to the point of extinction.
 - ineffective property rights in elephants.
 - the ineffectiveness of existing policies in lowering the value of ivory, hence reducing poaching.
 - insufficient numbers of offspring and the large/older breeding size of elephants.
 - none of the above.

- 9) A firm, competitive in both input and output markets, is currently hiring 100 identical workers each of whose marginal product is .1 ton/hour of a product selling for \$120/ton. This firm also buys 10 tons of materials, each ton of which has marginal product of .5 tons/hour. The hourly wage is \$12 and a ton of materials costs \$30. To maximize profit, this firm should:
- hire more labor and less materials.
 - hire less labor and more materials.
 - hire both in the amounts currently being hired.
 - hire less materials and the same amount of labor if labor's marginal product is not affected by the amount of materials hired.
 - hire more of both inputs.
- 10) In the preceding question, suppose that the half ton of materials that does *not* go into output, R, results in environmental damage of \$10 (i.e. a ton of residuals does \$20 of damage). Charging each firm \$20/ton for residuals emitted would result, in the short run, in which of the following, compared to any profit-maximizing changes already occurring in Question 9):
- less of both inputs being hired.
 - more of both inputs being hired.
 - more labor being hired and less materials being hired.
 - the same amount of labor being hired and less materials being hired.
 - either c) or d) are correct; cannot say without more information.
- 11) After the marginal damage tax of Question 10 is imposed on the firms in this industry, we would expect which long run result:
- same number of firms, but higher product price.
 - smaller number of firms, but higher product price.
 - smaller number of firms, but original \$120 product price.
 - larger number of firms at the higher equilibrium product price.
 - any of the above are possible.
- 12) The law of conservation of matter and energy implies that failure to properly price residuals from firms and households will result in:
- non-optimally dirty environments.
 - increases in residuals from firms that must be offset by reductions in residuals from households and vice versa, hence "conservation."
 - less than optimal amounts of residuals from both households and firms.
 - optimal levels of environmental quality that are "conserved," remaining the same regardless of residual price.
 - both c) and d) are true.

- 13) In class it was argued that air and water pollution, endangered species, rainforest destruction, the "freshman 10," cutting across the grass on C.U.'s campus, and so on are fundamentally similar. What is the feature that these problems have in common?
- a) mankind's greed is the common element.
 - b) lack of concern for the welfare of our fellow humans.
 - c) a missing market is the common element.
 - d) immoral behavior is the common element.
 - e) existing laws are being violated in each case.
- 14) A number of assertions were made in class about the impact of international trade on the concerns of students of environmental economics. Which of the following was asserted to be true of international trade?
- a) International trade increases wealth, but only for exporting nations.
 - b) International trade increases wealth, but only for importing nations.
 - c) International trade increases wealth, regardless of whether a nation imports or exports.
 - d) The wealthiest nations generate the most pollution because income and output must be identical due to the circular flow.
 - e) both c) and d) were argued to be true in class.
- 15) Which of the following discount (interest) rates, when employed in environmental decision-making, is *most* likely to result in acceptance of a given environmental policy?
- a) a high positive discount rate.
 - b) a medium positive discount rate.
 - c) a low positive discount rate.
 - d) a zero discount rate.
 - e) any of the above, depending on circumstances.
- 16) Coase, in the Theorem named after him, argued that, under certain circumstances:
- a) assignment of property rights does not matter on efficiency grounds—the efficient outcome will occur anyway.
 - b) assignment of property rights matters on efficiency grounds—the efficient outcome only occurs when the rights to environmental damage are assigned to the damaged party.
 - c) it will be very difficult to infer environmental damages, because of free-riding.
 - d) under certain perhaps restrictive assumptions, who is assigned the property rights in an environmental resource does not alter the equity of the outcome.
 - e) government taxation of pollution or creation of transferable emission rights will be necessary to achieve an efficient outcome.

- 17) Which of the following is a true statement regarding benefit-cost analysis?
- a) Benefit-cost analysis attempts to aggregate the preferences of each individual weighting them as equally as is possible.
 - b) Of two mutually-exclusive projects, Project A has a B/C ratio of 2, while Project B has a B/C ratio of 1.5. On efficiency grounds, Project A must always be preferred to Project B.
 - c) Benefit-cost analysis can, on efficiency grounds, conclude that a project is inefficient, but that project could still be collectively viewed as making society better off.
 - d) Only a) and c) above are true.
 - e) Only b) and c) above are true.
- 18) Economists take environmental problems as being synonymous with:
- a) faulty preferences for environmental goods versus ordinary goods.
 - b) any environmental degradation.
 - c) the greed of mankind for goods involving pollution in their production externalities.
 - d) negative externalities.
 - e) both b) and d).
- 19) The novel argument that Graves discussed in class and in Chapter 8, regarding the valuation of public goods was that:
- a) We work to acquire the goods we desire, and if we are unable to individually increase some of those goods, we will under-generate income.
 - b) Dollars are philosophically inappropriate for use in benefit-cost analysis, since they are base, crass, and inhumane, hence irrelevant to human welfare.
 - c) The examination of the trade-offs between ordinary goods and environmental goods is appropriate in more situations than had been previously supposed.
 - d) All benefits of providing public goods, not just a subset of them, should be incorporated in environmental standards.
 - e) None of the above capture Graves' argument.
- 20) Which of the following is true about interest rates?
- a) The interest rate is the opportunity cost of current consumption in terms of foregone future consumption.
 - b) Increases in the number of productive investment opportunities would result in higher interest rates.
 - c) Increases in household saving rates would result in lower interest rates.
 - d) Only b) and c) are true.
 - e) All of a), b) and c) are true.
- 21) At a 5% interest rate, a dollar to be received in one year will be worth approximately what now?
- a) \$1.05
 - b) \$.95
 - c) \$1.10
 - d) \$.90
 - e) \$1.00 exactly.

22) Firm A has a marginal cost of cleanup of \$200/ton and pollutes 80 tons of SO₂. Firm B, the only other firm in the region, has marginal cleanup cost of \$400/ton and pollutes 100 tons. Each firm has been granted right to pollute 50% of last year's pollution. What will happen?

- a) At some price between \$200/ton and \$400/ton, Firm B will buy rights to pollute from Firm A and stop polluting.
- b) At some price between \$200/ton and \$400/ton, Firm B will buy rights to pollute from Firm A, but still must clean up 10 tons of pollution at a cost of \$400/ton.
- c) In this case there are no incentives to engage in trade and each firm will continue behaving as they have in prior years.
- d) Firm A will buy rights to pollute from Firm B at some price less than \$400/ton.
- e) Impossible to say with information given.

23) In Question 22's situation, suppose a tax of \$300/ton is imposed on polluters of SO₂ rather than the emission rights program described. But imagine now that there are many firms, each like Firm A and Firm B. Relative to what would have happened with the tradable emission rights, we would expect:

- a) more firms in long-run equilibrium, selling at a lower price than with salable emission rights.
- b) fewer firms in long-run equilibrium, selling at a higher price than with salable emission rights.
- c) fewer firms in long-run equilibrium, selling at the same price as with salable emission rights.
- d) the same number of firms in long-run equilibrium, selling at the same price in either regulatory setting.
- e) none of the above.

24) Which, if any, of the following is true about *externalities*?

- a) externalities are compensated spillovers leaving utility unchanged.
- b) externalities, without intervention, result in non-optimal levels of production and consumption.
- c) negative externalities result in under-production of the good in question.
- d) internalizing negative externalities fully eliminate environmental damages.
- e) both b) and d) are true.

25) The following projects are mutually exclusive, in that having any one precludes having the others. Given the information presented (PVC is "present value of costs" and NPV is "net present value"), which project would you prefer, on efficiency grounds?

- a) Project A PVC = \$1 million NPV = +\$690,000
- b) Project B PVC = \$3 million NPV = +\$300,000
- c) Project C PVC = \$4 million NPV = +\$400,000
- d) Project D PVC = \$10 million NPV = +\$691,000
- e) None of the projects should be pursued.

- 26) The existence of “scarcity” implies that
- a) environmental goods, unlike ordinary goods, have no opportunity costs.
 - b) poverty will always exist.
 - c) more environmental goods can be produced only by giving up other goods.
 - d) All of the above are true.
 - e) only b) and c) are true.
- 27) If the demand and supply curves accurately represent the social marginal benefit and the marginal social cost of production for a private good
- a) the equilibrium price and quantity exchanged will be efficient, but not necessarily equitable.
 - b) the equilibrium price and quantity exchanged will be equitable, but not necessarily efficient.
 - c) producing more than the equilibrium quantity can make society collectively better off, since there will still be positive marginal benefits at the equilibrium quantity.
 - d) All of the above are true.
 - e) only a) and c) are true.
- 28) A perfectly functioning market will result in an equilibrium price and quantity that
- a) maximizes consumer surplus in the long run when supply curves are flat.
 - b) maximizes producer surplus in the long run when supply curves are flat.
 - c) maximizes producer surplus in the long run when demand curves are flat.
 - d) maximizes the sum of consumer and producer surplus in the short run.
 - e) both a) and d) are true.
- 29) The goal of the economist is to have environmental goods produced by a society at levels that
- a) are politically popular.
 - b) are set where marginal benefits to society exceed marginal costs to society by the largest amount..
 - c) steadily decrease over time.
 - d) are sustainable.
 - e) none of the above.
- 30) *Pure Public goods* are goods that:
- a) are provided by government, as for example a school lunch.
 - b) have properties that result in over-provision by private markets.
 - c) have the properties of being non-rivalrous and non-excludable.
 - d) have the properties of being both rivalrous and excludable.
 - e) Both b) and c) are required to accurately describe pure public goods.
- 31) Which of the following are true?
- a) Because of the (unpriced) scarcity value of fish, there is too much fishing from each boat.
 - b) Because of the (unpriced) scarcity value of fish, there are too many fishing boats.
 - c) Because of the (unpriced) scarcity value of fish, fishing is less profitable than it would otherwise be in the short run.
 - d) Because of the (unpriced) scarcity value of fish, non-optimally low fishing rates occur.
 - e) Only a) and b) are true.

- 32) Economists take environmental problems as being synonymous with:
- a) faulty preferences for environmental goods versus ordinary goods.
 - b) non-sustainability.
 - c) the greed of mankind for goods involving pollution in their production externalities.
 - d) negative externalities.
 - e) both c) and d).
- 33) At a 10% interest rate, a dollar received in two years will be worth approximately what now?
- a) \$1.21
 - b) \$.91
 - c) \$1.10
 - d) \$.83
 - e) \$1.00 exactly.
- 34) At a 10% interest rate, a dollar now will be worth approximately what in two years?
- a) \$1.21
 - b) \$.91
 - c) \$1.10
 - d) \$.83
 - e) \$1.00 exactly.
- 35) Which, if any, of the following is true about *externalities*?
- a) externalities are uncompensated spillovers.
 - b) externalities, without intervention, result in optimal levels of production.
 - c) negative externalities result in under-production of the good in question.
 - d) internalizing negative externalities will eliminate all remaining environmental damage.
 - e) only a) and d) above are true.
- 36) We are trying to rank, in efficiency, two environmental projects:
- a) The one that pays back its cost most quickly should always be ranked highest.
 - b) The one with present benefits most in excess of present costs should be ranked highest.
 - c) Cost and benefits should not be considered in ranking environmental projects, unlike ordinary projects.
 - d) The one with the highest benefit/cost ratio should be ranked highest.
 - e) Both b) and d) will always rank projects identically.
- 37) Consumer surplus is:
- a) the area under the supply curve.
 - b) the area above the supply curve but below equilibrium price.
 - c) the area under the demand curve.
 - d) the area under the demand curve but above the equilibrium price.
 - e) both b) and d).
- 38) The equilibrium price and quantity in a perfect supply and demand world results in:
- a) the maximum sum of producer and consumer surplus.
 - b) the maximum difference between consumer surplus and producer surplus.
 - c) the maximum difference between producer surplus and consumer surplus.
 - d) the maximum producer surplus in the long-run when supply curves are vertical.
 - e) none of the above.

39) If a market is in both short-run equilibrium and in long-run equilibrium (normal rate of return on investment in the industry is being earned), the short run situation can be characterized as:

- a) Producer surplus will equal total variable costs.
- b) Producer surplus will equal total costs.
- c) Producer surplus will equal total fixed costs.
- d) Total revenue will equal total costs.
- e) Both c) and d).

40) In Box 5 of the 5-Box Diagram, the equity impact of environmental policy in the United States was argued to be:

- a) progressive, with the poor receiving a disproportionately large amount of the benefits.
- b) progressive, with the poor paying a disproportionately small amount of the costs.
- c) regressive, with the poor receiving a disproportionately small amount of the benefits.
- d) regressive, with the poor paying a disproportionately large amount of the costs.
- e) both c) and d).