

Environmental Economics  
Economic 527  
Exam 1  
Friday, February 11, 2000  
10:30-11:25 a.m.  
E.W. Nafziger  
Waters 350

Fill out your answer card with a number 2 pencil, indicating student ID number, test version number, and answers for the 15 multiple-choice questions. Note that the 15 multiple choice questions count 45 points, the first essay (#16) counts 35 points, and the last essay (#17) counts 20 points. Allocate your time carefully.

1-15. Multiple choice (45 points, about 23 minutes) – fill the circle completely for the letter that corresponds to the best answer.

1. Environmental resources are

- a. the gross production value of the world's goods and services
- b. the maintenance of the productivity of natural, produced, and human assets to the next generation
- c. resources provided by nature that cannot be allocated unit by unit
- d. the total amount of solar energy converted into biochemical energy through plant photosynthesis

2. Which of the following are reasons why conventional microeconomic principles cannot be used to study the allocation of environmental and natural resources?

- a. conventional economics is static, generally neglecting future implications of investment decisions
- b. environmental and natural resources are often public goods, not subject to the exclusion principle
- c. many decisions about environmental and natural resources are irreversible
- d. all of the above
- e. none of the above

3. Sustainable development means maximizing

- a. economic growth
- b. income inequality
- c. the productivity of produced assets
- d. none of the above

4. Which of the following reduces the planet's carrying capacity?

- a. increased resources
- b. increased land erosion
- c. reduced inequality
- d. technological improvement

5. Which of the following did Malthus's analysis of population and food fail to envision?

- a. improved contraceptives
  - b. rapid technological change
  - c. both of the above
  - d. neither of the above
6. Which of the following factors contributed to the dramatic change in world population growth from 1900-50 to 1950-2000?
- a. a fall in both birth and death rates, but a faster decrease in birth rate than in death rate
  - b. a fall in both birth and death rates, but a faster decrease in death rate than in birth rate
  - c. an increase in birth rate and a fall in death rate
  - d. an increase in both birth and death rates, but a faster increase in birth rate
7. The demographic transition is
- a. the period between preindustrial and modern equality of crude birth and death rates
  - b. the period when both crude birth and death rates rise
  - c. the period when crude birth and death rates are equal
  - d. both *a* and *c* are correct
  - e. none of the above is correct
8. What, if any, is the statistical relationship between birth rate and GNP per capita?
- a. birth rates fall as GNP per capita increases
  - b. birth rates increase as GNP per capita increases, but at a slower rate than the increase in GNP per capita
  - c. birth rates increase as GNP per capita increases, but at a faster than the increase in GNP per capita
  - d. birth rates increase regardless of the movement in GNP per capita
9. Why would population continue to grow for several decades after a population reaches a replacement-level fertility?
- a. because of the high level of fertility
  - b. because of the high level of mortality
  - c. because of the old population
  - d. because of the young population
10. What are some of the costs of a high fertility rate and rapid population growth?
- a. diminishing returns to natural resources
  - b. increase in the ratio of dependent to working age population
  - c. rapid labor force growth
  - d. all of the above
  - e. none of the above
11. Which of the following is more likely to be associated with higher fertility rates?

- a. aspirations for upward social mobility
- b. higher educational rates
- c. higher female labor participation rate
- d. higher proportion of rural population
- e. more equal income distribution

12. According to Pimentel and Pimentel, an important adverse side effect of the Green Revolution is

- a. the harmful impact of pesticides
- b. the migration from urban to rural areas
- c. the reduced land concentration
- d. the reduced use of irrigation

13. According to the United Nations, the world's major environmental problems include:

- a. deforestation
- b. ozone depletion
- c. the quality of fresh water
- d. waste management
- e. all of the above

14. Which of the following is a major health consequence of environmental degradation, especially in developing countries?

- a. biodiversity
- b. carbon sequestration
- c. lack of clean water
- d. winter kill

15. According to the Bolivian poor *campesinas* seen in the video, their illiteracy initially gave rise to a lack of

- a. knowledge
- b. self respect
- c. understanding their own lives
- d. all of the above
- e. none of the above

Answer key for multiple choice - 1c, 2d, 3d, 4b, 5c, 6b, 7a, 8a, 9d, 10d, 11d, 12a, 13e, 14c, 15d

16 (35 points, about 18 minutes). Lester Brown states: “As we look forward to the rest of the twenty-first century, it is clear that satisfying the projected needs of an ever larger world population with the economy we now have is simply not possible. The western economic model – the fossil-fuel-base, automobile-centered throwaway economy – that so dramatically raised living standards for part of humanity during this century is in trouble. Indeed the global economy cannot expand indefinitely.” Indicate either how mainstream economist Robert Solow *or* an optimist similar to Julian Simon would respond to Brown’s statement.

17 (20 points, about 10 minutes). Some economists argue that grinding poverty and impatience impel poor people to strive for immediate gain, forgetting long-term environmental sustainability. However, this need not be the case. Indicate what approaches society can take to spur poor people to behave responsibly toward the environment.

Environmental Economics  
Economics 527  
10:30-11:25 a.m.  
Waters Hall 350  
Friday, March 10, 2000  
Exam 2  
Version 1

Fill out your answer card with a number 2 pencil, indicating student ID number, test version number, and answers for the 15 multiple-choice questions. Also put your student ID number on both pages with essay questions, #16 and #17. Note that the 15 multiple choice questions count 45 points, the first essay (#16) counts 25 points, and the last essay (#17) counts 30 points. Allocate your time carefully.

1-15 Multiple-choice (45 points, about 23 minutes)- fill the circle completely for the letter that corresponds to the best answer.

1. According to mainstream economist Theodore Panayotou, pollution is excessive when
  - a. air and water are dirty.
  - b. firms are not forced to internalize all social costs.
  - c. government interferes in the firms' market.
  - d. pollution reduces the quality of air, fresh water, or ground water.
  - e. both **a** and **d** are true.
  
2. Which of the following does *not* describe the human capital (HK) approach to valuing life
  - a. HK calculates an individual's future production potential or the present discounted value of expected labor earnings
  - b. HK computes the medical cost of illness and the wages lost from illness and death
  - c. HK considers the value of the individual's market and non-market activities.
  - d. HK dates back to the 17<sup>th</sup> century
  - e. HK determines what society forgoes when it invests in life-saving programs.
  
3. Farmers in the Ogallala Aquifer of western Kansas, much of Nebraska, the Oklahoma panhandle, and northwestern Texas
  - a. face falling water tables
  - b. face a "tragedy of the commons" from unrestrained water pumping
  - c. use groundwater for irrigation
  - d. all of the above are correct
  - e. only **b** and **c** are correct
  
4. The video on the northern Indian hills area showed the problem of
  - a. domination of decisions by high castes
  - b. patriarchal domination of the village
  - c. rationing an open-access resource
  - d. all of the above
  - e. none of the above

5. Tenants on Thailand's farm land "mined" the soil, increasing soil erosion at a rapid rate because of
  - a. excessively individualized property rights
  - b. insecure use rights
  - c. overpricing of user rights
  - d. positive cost advantages or spillovers
  - e. under use of free goods
  
6. The city government of Kansas City wishes to minimize the social cost associated with factories' emission of suspended particulate matter. What decision making rule should the city government of Kansas City use?
  - a. Put into place polices to continue to reduce pollution emissions by one ton per year until the average reduction in the dollar cost of these emissions to humans, materials, buildings, animals, and ecosystems equals the average increase in abatement cost.
  - b. Put into place polices to continue to reduce pollution emissions by one ton per year until the marginal reduction in the dollar cost of these emissions to humans, materials, buildings, animals, and ecosystems equals the marginal increase in abatement cost.
  - c. Put into place polices to continue to reduce pollution emissions by one ton per year until the marginal reduction in the dollar cost of these emissions to humans, materials, buildings, animals, and ecosystems exceeds the marginal increase in abatement cost.
  - d. Put into place polices to continue to reduce pollution emissions by one ton per year until the marginal reduction in the dollar cost of these emissions to humans, materials, buildings, animals, and ecosystems is less than the marginal increase in abatement cost.
  - e. Put into place polices to continue to reduce pollution emissions by one ton per year until the total dollar cost of these emissions to humans, materials, buildings, animals, and ecosystems equals the total abatement cost.
  
7. What is the relationship between urban air quality and national GDP per capita? [Note that low income refers to most African economies; middle income to most Latin American economies; and high income to the United States and Western Europe.]
  - a. Urban air quality deteriorates with increased GDP per capita from low-income to middle-income levels and deteriorates with looser government restrictions from increased GDP per capita from middle-income levels to high-income levels.
  - b. Urban air quality deteriorates with increased GDP per capita from low-income to middle-income levels and improves with tighter government restrictions from increased GDP per capita from middle-income levels to high-income levels.
  - c. Urban air quality improves with increased GDP per capita from low-income to middle-income levels and deteriorates with looser government restrictions from increased GDP per capita from middle-income levels to high-income levels.
  - d. Urban air quality improves with increased GDP per capita from low-income to middle-income levels and improves with tighter government restrictions from increased GDP per capita from middle-income levels to high-income levels.

8. A water shortage results from a price
- corresponding to an excess demand for water
  - corresponding to an excess supply of water
  - equal to the equilibrium price
  - in excess of the equilibrium price
  - none of the above is correct
9. The Coase theorem asserts that
- environmental problems arise from state failure to eliminate market imperfections.
  - if property rights are defined clearly, markets will produce efficient outcomes.
  - transactions costs associated with environment problems are negligible.
  - all of the above are correct.
  - none of the above are correct.
10. In the video on Costa Rica, Juan Martinez-Alier argues that struggles to cope with environmental problems take place because
- environmental organizations lack the competence to manage change.
  - misguided government intervention increases the number of spillovers.
  - state policy does not compel firms to internalize negative externalities.
  - the state spends too much money on frivolous projects that have no effect on the environment.
  - both **b** and **d** are true.
11. Which of the following are *not* social costs to be added to the private cost of a gasoline-powered vehicles?
- carbon emissions
  - ozone pollution
  - resource depletion
  - traffic jams
  - none of the above
12. One way of using market forces to make the social costs of using an automobile equal to social benefits in highly-congested cities such as Singapore is
- making gasoline expensive by raising the tax
  - making public transportation free
  - requiring an expensive license to use an automobile
  - all of the above are correct
  - none of the above are correct

13. You can estimate a demand curve for the use of Yellowstone National Park

- a. by finding out the annual cost of maintaining the park
- b. by finding out the location of homes of visitors to the park
- c. by knowing the price charged for visitors to the park
- d. by observing how many visits visitors make at various prices
- e. none of the above is true

14. A survey of the citizens of Manhattan about how much they would be willing to pay in taxes to have a coronary unit in the city would indicate that saving a human life

- a. is of finite value
- b. is of infinite value
- c. is worth nothing
- d. none of the above is true

15. The principle which contributes to problems a city faces when it abolishes parking meters during the Christmas shopping rush is

- a. internalizing externalities
- b. irreversible consumption of goods
- c. reducing congestable goods
- d. reducing transactions costs
- e. the tragedy of the commons

*Answers to Exam 2, Version 1*

1/ B; 2/ C; 3/ D; 4/ D; 5/ B; 6/B; 7/B; 8/A; 9/B; 10/C; 11/ E; 12/ D; 13/ B; 14/ A; 15/ E

16. (25 points, about 12 minutes). Identify some of the market distortions and policy failures that contributed to the denuding of Nepal's forested hills by peasants.

17. (30 points, about 15 minutes). Examine an investment project that has environmental implications (but *not* a project we discussed in class February 28-March 3 and *not* a project similar to that in #16) to which you can apply benefit-cost analysis from society's perspective. You will be judged by the detail in which you describe the project and analyze its net benefits and the timing of them; and the importance of the investment decision (based on how you present the decision). While you are not asked to calculate numerically the net benefits, you need to explain verbally how you would calculate the net present value of the stream of net benefits. You should also explain the timing of benefits and costs and how time affects the value of various benefits and cost.

Student I.D. \_\_\_\_\_

Environmental Economics  
Economics 527  
10:30-11:25 a.m.  
Waters Hall 348  
Monday, April 10, 2000  
Exam 3  
Version 2

Fill out your answer card with a number 2 pencil, indicating student ID number, test version number, and answers for the 15 multiple-choice questions. Also put your student ID number on both pages with essay questions, #i and #ii. Note that the first essay (#i) counts 25 points, the second essay (#ii) counts 30 points, and the 15 multiple choice questions count 45 points. Allocate your time carefully.

i. (25 points, about 12 minutes). Discuss the expectations of scientists and economists concerning the differential effect of global warming (or global climate change) in the 21<sup>st</sup> century on the economies of these two groups of countries: (1) developed countries (DCs) (the North) and (2) developing countries (LDCs) (the South).

ii (30 points, about 15 minutes). What is meant by a global public good? Give an example of a global public good that has environmental implications, and discuss possible policies for maintaining or increasing that global public good.

1-15. Multiple-choice (45 points, about 23 minutes). Fill the circle completely for the letter that corresponds to the best answer.

1. According to the video, Costa Rica has increased the total economic value of its forests through
  - a. botanical medicines.
  - b. fruit and handicraft production.
  - c. tourism.
  - d. all of the above are correct
  - e. none of the above is correct
  
2. Which of the following is not a part of Costa Rica's policies to contribute to the reduction in global warming?
  - a. adopting developed-country emission standards
  - b. carbon sequestration
  - c. clearing forest land
  - d. replanting mangrove forest
  - e. none of the above is the correct answer
  
3. In Loma Alta, Ecuador, researchers convinced local community members that deforestation had
  - a. increased soil erosion.
  - b. reduced cattle production .
  - c. reduced the water supply.
  - d. both *a* and *b* are correct.
  - e. both *a* and *c* are correct.
  
4. Carbon dioxide emissions from fossil fuels
  - a. comprise more than one-half of carbon dioxide in the air and water.
  - b. have increased substantially in the last 200 years.
  - c. have reduced the temperature of the earth in the last few decades.
  - d. all of the above are correct
  - e. both *a* and *b* are correct
  
5. According to Mahwish Aqeel,
  - a. a species subject to mass extinction can recover in a generation.
  - b. biodiversity is now at its lowest level since the Mesozoic era.
  - c. the exact number of species on earth is 10,000.
  - d. the mass extinction of species is at an unprecedented low level.
  - e. none of the answers above is correct
  
6. Which of the following group of countries now emits the majority of greenhouse gases?
  - a. China and India
  - b. Latin America

- c. tropical countries
- d. US, Canada, Europe, the former Soviet Union, and Japan
- e. none of the groups above emits a majority of greenhouse gases

7. According to economists, which of the following areas is expected to be most vulnerable to a continuation of global warming and related climate changes throughout the 21<sup>st</sup> century?

- a. Canada
- b. Europe
- c. Russia
- d. the South
- e. the US

8. Most scientists think that the major contributors to the increase in global atmospheric temperature in the last seventy years have been

- a. factories and forests.
- b. factories and pets.
- c. factories and vehicles.
- d. forests and pets.
- e. forests and vehicles.

9. Why do many economists advocate substituting a tax on fossil fuels for income taxes in the United States?

- a. the poor would pay a lower percentage of their income in taxes
- b. the tax would reduce incentives to degrade the environment
- c. the tax burden would shift toward those protecting the environment
- d. none of the answers above is true

10. What would happen to the market for petroleum, with the passage of a tax proportional to carbon emissions?

- a. price would decrease and quantity demanded would fall
- b. price would decrease and quantity demanded would rise
- c. price would increase and quantity demanded would fall
- d. price would increase and quantity demanded would rise
- e. price would not be affected

11. Which of the following is not an example of the destruction of nature's "free services" consumed by the human economy?
- a. destruction of the honeybee's ecosystem
  - b. forest fires in Indonesia and Malaysia
  - c. increasing buffer areas of native vegetation
  - d. reducing the planet's number of species
  - e. replacing a forest watershed with a plantation
12. A focus of Flavin's article, "Last Tango in Buenos Aires," is on
- a. negotiations concerning a global climate treaty.
  - b. reduction in carbon dioxide emissions.
  - c. the recent increasing surface temperatures.
  - d. all of the above is correct
  - e. none of the above is correct
13. According to Professor Dustin Becker, evaluating a forest according to its total economic value means including
- a. existence value, such as the preservation of songbirds.
  - b. indirect value, such as the contribution to watershed protection.
  - c. optional value, such as the potential from tourism.
  - d. all of the above are correct
  - e. none of the above is correct

14. According to Ochapa Onazi, major environmental issues in Nigeria are
- devastation to farm lands and river systems from oil exploration.
  - desertification from the Sahara desert.
  - soil erosion.
  - all of the above are true
  - only a and c are correct
15. Scientists expect that global climate change during the 21<sup>st</sup> century will
- make Kansas's climate become more like North Dakota's today.
  - raise sea level.
  - reduce polar temperatures.
  - reduce tropical cyclones in Bangladesh.

Answers to questions to exam 3 are:

1. D; 2 C; 3. E; 4. B; 5. B; 6. D; 7. D; 8. C; 9. B; 10. C; 11. C; 12. D; 13. D; 14. D; 15. B

Student I.D. \_\_\_\_\_

Environmental Economics  
Economics 527  
11:50-1:40  
Waters Hall 348  
Wednesday, May 10, 2000  
Exam 4 (Final Exam)  
Version 1

Fill out your answer card with a number 2 pencil, indicating student ID number, test version number, and answers for the 25 multiple-choice questions. Allocate your time carefully. Fill the circle completely for the letter that corresponds to the best answer.

1. Biotechnology is the application of
- biology to human use during the period before 1950
  - biology to human use during the period since 1950
  - both **a** and **b** are correct
  - none of the above is correct
2. Genetic engineering refers to
- in-vitro multiplication or regeneration of plant material in the laboratory
  - the insertion of specific "traits" artificially into other organisms
  - the use of identifying markers associated with specific characteristics
  - all of the above are correct
  - only **a** and **c** are correct

3. The following is true about chronic hunger in the world:
  - a. About 1 billion people suffer from chronic hunger and most of these people are engaged in farm work
  - b. About 1 billion people suffer from chronic hunger and most of these people live in urban areas
  - c. About 3 billion people suffer from chronic hunger and most of these people are engaged in farm work
  - d. About 3 billion people suffer from chronic hunger and most of these people live in urban areas
  - e. None of the above statements is correct
4. A major argument for the use of biotechnology is
  - a. in genetic engineering, which increases biodiversity
  - b. in low-income countries, where the benefits are most likely to exceed risks
  - c. in tissue culture, where the risks are small
  - d. Both a and c are correct
  - e. Both b and c are correct
5. Daly and Cobb's Index of Sustainable Economic Welfare (ISEW) per capita for the United States
  - a. fell for about two centuries, then rose from 1976 to 1992
  - b. fell for the two centuries through 1992
  - c. rose for about two centuries, then declined from 1976 to 1992
  - d. rose for the two centuries through 1992
6. Daly and Cobb's Index of Sustainable Economic Welfare (ISEW) per capita
  - a. adds environmental damage and resource depletion to gross product
  - b. adds the import of goods and services from abroad to gross product
  - c. subtracts environmental damage and resource depletion from gross product
  - d. subtracts the gain of leisure time from gross product
  - e. subtracts the services of government capital from gross product
7. For Daly, the limiting factor in economic development is
  - a. entrepreneurship
  - b. human skills
  - c. natural capital
  - d. physical capital
8. In the video on "GNP and the Index for Sustainable Economic Welfare (ISEW)," Martin Evers, a critical student,
  - a. indicated a better numerical measure of the quality of life
  - b. indicated that environmental jobs are the fastest growing job category in the US

- c. indicated that scholars know how the economy and environment interact
  - d. objected to measuring welfare in economic terms
9. In the video, Daly advocated investing part of the profit from the exploitation of non-renewable resources in
- a. mining
  - b. new capital equipment
  - c. non-renewable substitutes
  - d. renewable substitutes
10. The business people (for example, from Volkswagen and ABB), in the video, “Greenbucks: The Challenge of Sustainable Development,” advocated cleaner technology, “green cotton,” and recyclable cars, through
- a. growing realization of the earth’s limits
  - b. investing in alternative energy
  - c. taxes so businesses pay for negative externalities
  - d. both **a** and **b**
  - e. both **b** and **c**
11. Daly’s impossibility theorem contends that
- a. humans are already using almost 100 percent of the earth’s net primary productivity
  - b. increases in population will stimulate future economic growth
  - c. non-renewable resources prevent the world attaining US consumption levels
  - d. the stock of mineral deposits is adequate for rapid economic growth
12. A major limit on the likelihood of attaining multilateral (international) agreements on implementing solutions to global warming and ozone depletion is
- a. free riding by nations
  - b. lack of enforcement
  - c. poverty in poor countries
  - d. none of the above is correct
  - e. both **a** and **b** are correct
13. The least-cost method of abating greenhouse gases internationally is through
- a. limiting emissions to 1990 levels
  - b. stabilizing average temperatures at 1990 levels
  - c. tradeable emission permits
  - d. data are lacking to choose between these three alternatives
14. Critics criticize the study, *The Limits to Growth*, by scholars at MIT,
- a. for assuming industrial and agricultural needs grow faster than technical progress
  - b. for assuming population growth is zero
  - c. for using proven reserves for long-term projections
  - d. both **a** and **b** are correct

- e. both **a** and **c** are correct
15. Which of the following will increase the US's GNP?
- a. Cleaning up an oil spill
  - b. Purifying water
  - c. Shifting from bicycles to autos
  - d. All of the above are correct
  - e. None of the above is correct
16. Which of the following scholars contends that "Nature is our standard."
- a. Ronald Coase
  - b. Martin Feldstein
  - c. Wes Jackson
  - d. Theodore Panayotou
  - e. Robert Solow
17. Which of the following scholars believes that if society defines property rights clearly, then markets will produce efficient outcomes such that people will pay for negative externalities they impose on others.
- a. Lester Brown
  - b. Ronald Coase
  - c. Herman Daly
  - d. Sandra Postel
  - e. Robert Solow
18. Which of the following scholars stated the following: "Ultimately environmental damage can be traced to distorted markets and policy failures."
- a. Ronald Coase
  - b. Herman Daly
  - c. Wes Jackson
  - d. Theodore Panayotou
  - e. Sandra Postel
19. Which of the following is **not** a part of the views of Wes Jackson?
- a. Belief in a biocentric approach
  - b. Ownership rights must be well defined
  - c. Science needs to be holistic
  - d. Self-interest is harmful
  - e. Small communities are the ideal
20. Erin Brockovich's view of environmental policy is that
- a. society should regulate and enforce regulations to reduce pollution
  - b. the state should subsidize expensive energy

- c. the state should tax producers to pay full social cost
- d. both b and c are correct
- e. none of the above is correct

21. The views of the majority of Kansas State University economists are closest to those of

- a. Herman Daly
- b. Wes Jackson
- c. Denice Meadows
- d. Sandra Postel
- e. Robert Solow

22. According to Heather Harrison and her group, in the last century, the sea level has
- fallen  $\frac{1}{4}$  to 1 inch
  - fallen 5 to 8 inches
  - risen  $\frac{1}{4}$  to 1 inch
  - risen 5 to 8 inches
  - stayed constant
23. In the video, “Greenbucks: The Challenge of Sustainable Development,” Daly’s reference to “the emperor wearing no clothes” refers to
- biologists’ failure to consider benefit-cost analysis
  - economists’ failure to consider environmental factors
  - environmental organizations’ failure to be realistic
  - politicians’ failure to establish green markets
  - polluters’ failure to stop polluting
24. According to Panayotou, the way to prevent endangering species uneconomically is to
- equate their price and scarcity
  - prevent economic growth
  - provide open access to the species
  - subsidize the use of the species
  - none of the above is correct
25. Which of the following policies does Panayotou support?
- Cease subsidizing use of a scarce resource
  - Define user rights to a resource
  - Firms must internalize spillovers
  - Prevent open access to common resources
  - All of the above are correct

Answers to final exam:

1. C; 2. B; 3. A; 4. E; 5. C; 6. C; 7. C; 8. D; 9. D; 10. D; 11. C; 12. E; 13. C; 14. E; 15. D; 16. C; 17. B; 18. D; 19. B; 20. A; 21. E; 22. D; 23. B; 24. A; 25. E