

Student I.D. _____

Economics 527
Environmental Economics
Department of Economics
Spring 2003
2:30-3:25
Friday, Feb. 7, 2003
E. W. Nafziger
Waters 328
1st Multiple-choice exam

Fill out your answer card with a number 2 pencil, indicating student ID number and answers for the 12 multiple-choice questions. Note that the 12 multiple-choice questions count 36 points. Allocate your time carefully. Fill the circle completely for the letter that corresponds to the *best* answer.

1. Four of the following five are reasons why conventional microeconomic principles can not be used to study the allocation of environmental and natural resources. Circle the one answer of the following five that does not belong.
 - A. Economies do not use the market for allocating the environment and resources.
 - B. Environmental and natural resources are more likely to be public goods.
 - C. Many decisions involving the environment are irreversible.
 - D. Market failure is important in analyzing the environment.
 - E. Microeconomics is often static, neglecting implications of decisions for the future.

2. Sandra Postel is pessimistic about the earth's carrying capacity because of a list of several factors. Which of the following is a wrong list of Postel's factors?
 - A. Economic growth commands more resources, income inequality is growing, humans are destroying the resource base, and population is increasing.
 - B. Economic growth commands more resources, income inequality is growing, humans are destroying the resource base, and technological improvements are decelerating.
 - C. Economic growth commands more resources, income inequality is growing, population is increasing, and technological improvements are decelerating.
 - D. Economic growth commands more resources, humans are destroying the resource base, population is declining, and technological improvements are decelerating.
 - E. Income inequality is growing, humans are destroying the resource base, population is increasing, and technological improvements are decelerating.

3. For Robert Solow, sustainability is dependent on
 - A. centralized planning of natural resources.
 - B. deregulation of natural resource use.
 - C. every generation leaving all species of animals on earth undiminished.
 - D. maintaining the stock of coal and petroleum.
 - E. substitutability for natural resources.

4. In which way was Malthus's population theory wrong in explaining Western population growth?
 - A. He underestimated capital accumulation.
 - B. He underestimated increases in cultivated land.
 - C. He underestimated people reducing family size.
 - D. He underestimated technical progress.
 - E. All of the above statements are correct.

5. Which of the following is the view of Julian Simon?
 - A. An increased population increases technology and economic growth.
 - B. An increased population reduces economics of scale.
 - C. As natural resources diminish, growth is limited.
 - D. Humans use or destroy 25 percent of the earth's net primary productivity.
 - E. None of the above is true.

6. Georgescu-Roegen thinks that human species will leave a short life because of
 - A. a lack of labor inputs into the production process.
 - B. low entropy of the economic process.
 - C. our increased depletion of mineral deposits to produce luxuries.
 - D. None of the above is correct.

7. The Green Revolution's gain in Indonesia were limited because of
 - A. the adverse environmental side effects of pesticides.
 - B. biological control through natural predators.
 - C. the lack of irrigation water.
 - D. the use of multiculture planting.
 - E. None of the above is correct.

8. Which of the following is the view of Neo-Malthusians such as Lester Brown?
 - A. Foodgrain production per head did not grow in the West over the last two centuries.
 - B. Foodgrain production per head in the poorest countries is not likely to continue to grow.
 - C. The substitution of meat and more expensive foods for foodgrains means reduced production per head is not worrisome.
 - D. The world can expect unlimited technological change in agriculture in the future.
 - E. None of the above is the view of the neo-Malthusians.

9. Which of the following is true of population growth in the last half of the twentieth century?
- A. Population growth, 1950-2000, was faster than for any other 50-year period and population growth accelerated since 1970.
 - B. Population growth, 1950-2000, was faster than for any other 50-year period and population growth has remained about constant since 1970.
 - C. Population growth, 1950-2000, was faster than for any other 50-year period but population growth decelerated since 1970.
 - D. Population growth, 1950-2000, was slower than for any other 50-year period but population growth accelerated since 1970.
 - E. Population growth, 1950-2000, was slower than for any other 50-year period and population growth decelerated since 1970.
10. 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
11. 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 are true.
 - E. None of the above is true.
12. 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

Key to 1st MC exam

1. A. 1. Four of the following five are reasons why conventional microeconomic principles can not be used to study the allocation of environmental and natural resources. Circle the one answer of the following five that does not belong. A. Economies do not use the market for allocating the environment and resources. 2. D. 2. Sandra Postel is pessimistic about the earth's carrying capacity because of a list of several factors. Which of the following is a wrong list of Postel's factors? D. Economic growth commands more resources, humans are destroying the resource base, population is declining, and technological improvements are decelerating. 3. E. 3. For Robert Solow, sustainability is dependent on E. substitutability for natural resources. 4. E. 4. In which way was Malthus's population theory wrong in explaining Western population growth? E. All of the above statements (He underestimated capital accumulation. He underestimated increases in cultivated land. He underestimated people reducing family size. He underestimated technical progress.) are correct. 5. A. Which of the following is the view of Julian Simon? A. an increased population increases technology and economic growth. 6. C. Georgescu-Roegen thinks that human species will leave a short life because of C. our increased depletion of mineral deposits to produce luxuries. 7. A. The Green Revolution's gain in Indonesia were limited because of A. the adverse environmental side effects of pesticides. 8. B. Which of the following is the view of Neo-Malthusians such as Lester Brown? B. Foodgrain production per head in the poorest countries is not likely to continue to grow. 9. C. Which of the following is true of population growth in the last half of the twentieth century? C. Population growth, 1950-2000, was faster than for any other 50-year period and population growth decelerated since 1970. 10. D. Why would population continue to grow for several decades after a population reaches a replacement-level fertility? D. because of the young population. 11. D. What are some of the costs of a high fertility rate and rapid population growth? D. all of the above (diminishing returns to natural resources, increase in the ratio of dependent to working age population, and rapid labor force growth) are true. 12. D. 12. According to the Bolivian poor *campesinas* seen in the video, their illiteracy initially gave rise to a lack of D. all of the above (knowledge, self respect, and understanding their own lives).

Student I.D. _____

Economics 527
Environmental Economics
Department of Economics
Spring 2003
2:30-3:25
Friday, March 7, 2003
E. W. Nafziger
Waters 328

Multiple-choice component of 1st exam

Fill out your answer card with a number 2 pencil, indicating student ID number and answers for the 16 multiple-choice questions. Note that the 16 multiple-choice questions count 48 points. Allocate your time carefully. Fill the circle completely for the letter that corresponds to the *best* answer.

1. Which of the following questions does James Boyce ask when analyzing the causes and consequences of environmental degradation?
 - a. Can we make anyone better off without making someone else worse off? Who reaps the benefits? Who bears the costs?
 - b. Can we make anyone better off without making someone else worse off? Who reaps the benefits? Why are the winners able to impose costs on the losers?
 - c. Can we make anyone better off without making someone else worse off? Who bears the costs? Why are the winners able to impose costs on the losers?
 - d. Who reaps the benefits? Who bears the costs? Why are the winners able to impose costs on the losers?
 - e. None of the above is correct.

2. Four of the following five are reasons why Boyce thinks that pollution and resource depletion are driven by the rich rather than the poor. Circle the one answer of the following five that does not belong.
 - a. The rich affect technological change more than the poor.
 - b. The rich are more able than the poor to impose environmental costs on others.
 - c. The rich discount the future more than the poor.
 - d. The rich have more investment in human capital than the poor.
 - e. The rich have more political power than the poor.

3. John Rawls supports inequalities as just if they result in
 - a. acceleration of economic growth.
 - b. an increase in gross national product.
 - c. compensating benefits for the rest of the population.
 - d. no one being better off while someone else is worse off.

4. A village owns a common forest. Which are the policies most likely to avoid degradation of the forest?
 - a. Institutions to limit the forest's use.
 - b. Opening the forest to village members.
 - c. Property and use rights for village members.
 - d. Both *a* and *b*.
 - e. Both *a* and *c*.

5. Which principle guides Kansas State University when KSU refrains from using a toll booth to restrict auto congestion during peak use around 12:20-12:30 p.m.?
 - a. biodiversity
 - b. high transactions costs
 - c. irreversibility of resource
 - d. subsidy of social benefits
 - e. None of the above is correct.

6. While more than one-third of Ghana was covered with natural forest in 1900, in 2003 only 5 percent of the country remains forested? What policies might have contributed to this deforestation? [You don't need to know what policies did contribute to deforestation but only what policies could have contributed to this deforestation.]
 - a. Ghana's forestry department spent too little on reforestation.
 - b. Logging and treecropping were unprofitable because Ghana's currency (cedi) was overvalued.
 - c. Poverty spurred rural families to increase the forest's use for fuelwood.
 - d. Property rights for using the forest are not clear.
 - e. All of the above are true.

7. 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

8. 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

9. In the video on Costa Rica, Juan Martinez-Alier argues that struggles to cope with environmental problems take place because
 - a. environmental organizations lack the competence to manage change.

- b. misguided government intervention increases the number of spillovers.
- c. state policy does not compel firms to internalize negative externalities.
- d. the state spends too much money on frivolous projects that have no effect on the environment.
- e. both **b** and **d** are true.

10. London's recent effort to reduce weekday congestion by automobiles within the eight square miles of the central London includes

- a. a daily congestion charge of £5.
- b. doubling the gasoline tax.
- c. making public transportation free.
- d. increasing annual auto license costs to £2000.
- e. All of the above are correct.

11. Theodore Panayotou has the following view concerning economic growth and the environment:

- a. Everyone should be charged for negative spillovers.
- b. Society should maximize GNP.
- c. Society should minimize environmental degradation
- d. The state should use subsidies to reduce environmental degradation.
- e. None of the above is correct.

12. What is Ronald Coase's view on the role of the market in environmental decisions?

- a. Establishing markets for land, air, and water is wrong.
- b. Markets produce efficient outcomes if property rights are defined clearly.
- c. Markets produce efficient outcomes with government taxes and subsidies.
- d. Transactions costs approach zero in environmental decisions.
- e. None of the above is correct.

13. What is Wes Jackson's view on the role of the market in environmental decisions?

- a. **An invisible hand leads to the betterment of all.**
- b. Establishing markets for land, air, and water is wrong.
- c. Markets produce efficient outcomes if property rights are defined clearly.
- d. Markets produce efficient outcomes with government taxes and subsidies.
- e. None of the above is correct.

14. Four of the following five are views that are held by Wes Jackson. Circle the one answer of the following five that does not belong.

- a. Farmers in Kansas should grow perennials in polyculture.
- b. Firms should internalize negative externalities.
- c. Humankind needs to adjust to the upcoming end of fossil fuel.
- d. Population growth is a major contributor to environmental degradation.
- e. Science should be evolutionary, dialectical, and holistic.

15. An example of an environmental public good, which is characterized by nonrivalry in consumption, is

- a. biodiversity
- b. lighthouses
- c. oceans
- d. All of the above are correct.
- e. None of the above is correct.

16. Which of the following discount (interest) rate is more likely to result in specie extinction?

- a. a high discount rate.
- b. a low discount rate.
- c. a negative discount rate.
- d. a zero discount rate.

Key MC 1st exam

1. D. Which of the following questions does James Boyce ask when analyzing the causes and consequences of environmental degradation? D. Who reaps the benefits? Who bears the costs? Why are the winners able to impose costs on the losers? 2. C. Four of the following five are reasons why Boyce thinks that pollution and resource depletion are driven by the rich rather than the poor. Circle the one answer of the following five that does not belong. c. The rich discount the future more than the poor. 3. C (or D). John Rawls supports inequalities as just if they result in c. compensating benefits for the rest of the population. I also gave credit for d. no one being better off while someone else is worse off. 4. E. A village owns a common forest. Which are the policies most likely to avoid degradation of the forest? e. Both *a* (Institutions to limit the forest's use) and *c* (Property and use rights for village members). 5. B. Which principle guides Kansas State University when KSU refrains from using a toll booth to restrict auto congestion during peak use around 12:20-12:30 p.m.? b. high transactions costs. 6. E. While more than one-third of Ghana was covered with natural forest in 1900, in 2003 only 5 percent of the country remains forested? What policies might have contributed to this deforestation? [You don't need to know what policies did contribute to deforestation but only what policies could have contributed to this deforestation.] e. All of the above (Ghana's forestry department spent too little on reforestation; logging and treecropping were unprofitable because Ghana's currency (cedi) was overvalued; poverty spurred rural families to increase the forest's use for fuelwood; and property rights for using the forest are not clear) are true. 7. D. The video on the northern Indian hills area showed the problem of d. all of the above (domination of decisions by high castes, patriarchal domination of the village, and rationing an open-access resource). 8. B. Tenants on Thailand's farm land "mined" the soil, increasing soil erosion at a rapid rate because of b. insecure use rights. 9. C. In the video on Costa Rica, Juan Martinez-Alier argues that struggles to cope with environmental problems take place because c. state policy does not compel firms to internalize negative externalities. 10. A. London's recent effort to reduce weekday congestion by automobiles within the eight square miles of the central London includes a. a congestion charge of £5. 11. A. Theodore Panayotou has the following view concerning economic growth and the environment: a. Everyone should be charged for negative spillovers. 12. B. What is Ronald Coase's view on the role of the market in environmental decisions? b. Markets produce efficient outcomes if property rights are defined clearly. 13. B. What is Wes Jackson's view on the role of the market in environmental decisions? b. Establishing markets for land, air, and water is wrong. 14. B. Four of the following five are views that are held by Wes Jackson. Circle the one answer of the following five that does not belong. b. "Firms should internalize negative externalities" does not belong. Wes Jackson believes the following: farmers in Kansas should grow perennials in polyculture; humankind needs to adjust to the upcoming end of fossil fuel; population growth is a major contributor to environmental degradation; and science should be evolutionary, dialectical, and holistic. 15. D. Fifteen. An example of an environmental public good, which is characterized by nonrivalry in consumption, is d. All of the above (biodiversity, lighthouses, and oceans) are correct. 16. A. Which of the following discount (interest) rate is more likely to result in specie extinction? a. a high discount rate.

Student I.D. _____

Economics 527

Environmental Economics

Department of Economics

Spring 2003

2:30-3:25

Friday, March 14, 2003

E. W. Nafziger

Waters 328

Essay component of 1st exam

1. Discuss what is meant by green taxes or green markets; illustrate an example of how to use green taxes or green markets to achieve greenhouse-gas abatement at least cost; and indicate the strengths and weaknesses of using your example of green taxes or green markets as opposed to other policies for reducing greenhouse-gas emissions.

2. Evaluate Wes Jackson's critique of the approach of mainstream economists (Theodore Panayotou and Robert Solow are examples of mainstream economists) to environmental and resource problems and policies.

Student I.D. _____

Economics 527
Environmental Economics
Department of Economics
Spring 2003
2:30-3:25
Wednesday, April 16, 2003
E. W. Nafziger
Waters 328
2nd One-Hour Examination

Fill out your answer card with a number 2 pencil with the best response among the options, indicating student ID number and answers for the 16 multiple-choice questions. Note that the 16 multiple-choice questions count 48 points, the first essay (#17) counts 27 points, and the last essay, 25 points.

Be sure to put your name and student ID number on the top of the page for both essay questions. Allocate your time carefully.

One. What is the relationship between suspended particulate matter (SPM) 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. SPM increases with increased GDP per capita from low-income to middle-income levels and increases with looser government restrictions from increased GDP per capita from middle-income levels to high income levels.
- b. SPM increases with increased GDP per capita from low-income to middle-income levels and falls with tighter government restrictions from increased GDP per capita from middle-income levels to high income levels.
- c. SPM falls with increased GDP per capita from low-income to middle-income levels and increases with looser government restrictions from increased GDP per capita from middle-income levels to high income levels.
- d. SPM falls with increased GDP per capita from low-income to middle-income levels and falls with looser government restrictions from increased GDP per capita from middle-income levels to high income levels.

Two. Scientists expect that global climate change during the 21st century will

- a. make Kansas's climate become more like Oregon's today.
- b. move wheat production further south in Canada.
- c. raise sea level.
- d. reduce temperatures in Kansas.
- e. reduce tropical cyclones in Bangladesh.

Three. 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.

Four. In Loma Alta, Ecuador, the community reduced deforestation by

- a. inviting ranchers to use land.
- b. preventing Panama hat production.
- c. preventing timber sales outside the community.
- d. All of the above are correct.
- e. None of the above is correct.

Five. In Ecuador the law established land-tenure rights for rural peasant communities. The example of Loma Alta indicates that the Loma Alta community

- a. can create institutions to reduce commercial use of open-access resources.
- b. cannot prevent degradation and destruction of open-access resources.
- c. cannot prevent the “tragedy of the commons” without individual ownership.
- d. cannot restrict excessive community commercial use of open-access resources.

Six. The value of the forests of Loma Alta included

- a. growing Panama hat fiber.
- b. increasing groundwater for neighboring areas.
- c. preventing soil erosion.
- d. providing habitat for wildlife.
- e. All of the above are correct.

Seven. The Ogallala Aquifer is

- a. blessed with improving water quality.
- b. blessed with rising water tables.
- c. located in Kansas, Nebraska, Oklahoma, and Texas.
- d. located in southern California.
- e. the source for surface water irrigation.

Eight. Economists can estimate the demand curve for visits to Yellowstone National Park by

- a. changes in visitors as the cost of admission is varied each month of the year.
- b. the cost of travel by visitors from various communities.
- c. the total number of visitors from various communities relative to their population.

d. Both **a** and **c** are correct.

e. Both **b** and **c** are correct.

Nine. The human capital approach to valuing life considers the discounted value of

a. future production potential.

b. medical costs of illness.

c. wages lost.

d. willingness to pay.

e. All of the above are correct.

Ten. A water shortage results from a price

a. corresponding to an excess demand for water.

b. corresponding to an excess supply of water.

c. higher than the equilibrium price.

d. lower than the equilibrium price.

e. Both **a** and **d** are correct

Eleven. The purpose of the Montreal Protocol, signed in 1987, was to reduce

a. greenhouse gases through cutting CFC production.

b. greenhouse gases through cutting CO₂ production.

c. ozone depletion through cutting CFC production.

d. ozone depletion through cutting CO₂ production.

e. None of the above is true.

Twelve. The purpose of the Kyoto Protocol, signed in 1992, was to reduce

a. greenhouse gases through cutting CFC production.

b. greenhouse gases through cutting CO₂ production.

c. ozone depletion through cutting CFC production.

d. ozone depletion through cutting CO₂ production.

e. None of the above is true.

Thirteen. The largest total annual emitter of CO₂ is

a. India.

b. Japan.

c. Russia.

d. Saudi Arabia.

e. the United States.

Fourteen. What arguments would support the rich industrialized countries paying for Madagascar to preserve its

tropical rainforests?

- a. preservation of biodiversity.
- b. preservation of the Punjabi Aquifer.
- c. sequestration of carbon dioxide.
- d. Both **a** and **c** are correct.
- e. None of the above is correct.

Fifteen. Which of the following are weaknesses of the contingent valuation method?

- a. belief that answers are hypothetical.
- b. lack of respondent information.
- c. nonresponse bias.
- d. strategic bias.
- e. All of the above are correct.

Sixteen. The increase in CO₂ concentration in the last 50 years or so is a result of

- a. burning of fossil fuels.
- b. destruction of forests.
- c. groundwater depletion.
- d. Both **a** and **b** are correct.
- e. Both **a** and **c** are correct.

Student I.D. _____
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Essay question (27 points) – you can write on both the front and the back of this sheet.

17. How would Sichuan (China) provincial authorities decide whether to build a bridge across the Yangtze River in a major city, Chongqing. Discuss the economic principles involved, including in your discussion both environmental and non-environmental factors. You may make assumptions needed for your analysis.

Student I.D. _____
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Essay question (25 points) – you can write on both the front and the back of this sheet.

18. Use both a graph and words to explain the decision-making rule to use to minimize social cost where suspended particulate matter (SPM) in Kansas City, Missouri, is involved? Explain the various types of costs that are part of the curves you have drawn. Discuss.

Key: Answers to Exam 2, April 16, 2003

1. B. What is the relationship between environmental pollution 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.] b. SPM increases with increased GDP per capita from low-income to middle-income levels and falls with tighter government restrictions from increased GDP per capita from middle-income levels to high income levels. 2. C. Scientists expect that global climate change during the 21st century will c. raise sea level. 3. C. The least-cost method of abating greenhouse gases internationally is through c. tradeable emission permits. 4. C. In Loma Alta, Ecuador, the community reduced deforestation by c. preventing timber sales outside the community. 5. A. Five. In Ecuador the law established land-tenure rights for rural peasant communities. The example of Loma Alta indicates that the Loma Alta community a. can create institutions to reduce commercial use of open-access resources. 6. E. The value of the forests of Loma Alta included e. All of the above (growing Panama hat fiber, increasing groundwater for neighboring areas, preventing soil erosion, and providing habitat for wildlife) are correct. 7. C. The Ogallala Aquifer is c. located in Kansas, Nebraska, Oklahoma, and Texas. 8. E. Economists can estimate the demand curve for visits to Yellowstone National Park by e. Both b and c (the cost of travel by visitors from various communities, and the total number of visitors from various communities relative to their population) are correct. 9. E. The human capital approach to valuing life considers the discounted value of e. All of the above (future production potential, medical costs of illness, wages lost, and willingness to pay) are correct. 10. E. A water shortage results from a price e. Both a (corresponding to an excess demand for water) and d (lower than the equilibrium price) are correct. 11. C. The purpose of the Montreal Protocol, signed in 1987, was to reduce c. ozone depletion through cutting CFC production. 12. B. The purpose of the Kyoto Protocol, signed in 1992, was to reduce b. greenhouse gases through cutting CO₂ production. 13. E. The largest total annual emitter of CO₂ is e. the United States. 14. D. What arguments would support the rich industrialized countries paying for Madagascar to preserve its tropical rainforests? d. Both a and c (preservation of biodiversity, and sequestration of carbon dioxide) are correct. 15. E. Which of the following are weaknesses of the contingent valuation method? All of the above (belief that answers are hypothetical, lack of respondent information, nonresponse bias, and strategic bias) are correct. 16. D. The increase in CO₂ concentration in the last 50 years or so is a result of d. Both a and b (burning of fossil fuels and destruction of forests) are correct.

Student I.D. _____

Economics 527
Environmental Economics
Department of Economics
Spring 2003
2:30-3:25
Friday, May 2, 2003
E. W. Nafziger
Waters 328
2nd One-Hour Examination

Fill out your answer card with a number 2 pencil with the best response among the options, indicating student ID number and answers for the 13 multiple-choice questions. Note that the 13 multiple-choice questions count 39 points, and the essay (#14) counts 11 points.

Be sure to put your name and student ID number on the top of the page for both essay questions. Allocate your time carefully.

1. According to the video, Costa Rica has increased the total economic value of its forests through
 - a. barley production, botanical medicines, fruit production, and handicrafts.
 - b. barley production, botanical medicines, fruit production, and tourism.
 - c. barley production, botanical medicines, handicrafts, and tourism.
 - d. barley production, fruit production, handicrafts, and tourism.
 - e. botanical medicines, fruit production, handicrafts, and tourism.

2. Which of the following is a part of Costa Rica's policies to contribute to the reduction of global warming?
 - a. adopting industrial-country emission standards, clearing forest land, and sequestering carbon.
 - b. adopting industrial-country emission standards, clearing forest land, and replanting mangrove forest.
 - c. adopting industrial-country emission standards, sequestering carbon, and replanting mangrove forest.

 - d. clearing forest land, sequestering carbon, and replanting mangrove forest.
 - e. None of the above is correct.

3. Four of the following include at least one example of nature's "free services" consumed by the human economy. Which one of the following includes only examples of the destruction of nature's "free services" consumed by the human economy?

- a. destruction of the honeybee's ecosystem, forest fires in Indonesia, increasing buffer areas of native trees, and reducing the planet's number of plant species.
- b. destruction of the honeybee's ecosystem, forest fires in Indonesia, increasing buffer areas of native trees, and replacing a forest watershed with a plantation.
- c. destruction of the honeybee's ecosystem, forest fires in Indonesia, reducing the planet's number of plant species, and replacing a forest watershed with a plantation.
- d. destruction of the honeybee's ecosystem, increasing buffer areas of native trees, reducing the planet's number of plant species, and replacing a forest watershed with a plantation.
- e. forest fires in Indonesia, increasing buffer areas of native trees, reducing the planet's number of plant species, and replacing a forest watershed with a plantation.

4. According to David Norman, biotechnology, the application of biology to human use, includes

- a. ability to modify proteins by "protein engineering," moving DNA and genes from one organism to another, and plant and animal breeding.
- b. ability to modify proteins by "protein engineering," moving DNA and genes from one organism to another, and use of enzymes in food processing.
- c. ability to modify proteins by "protein engineering," plant and animal breeding, and use of enzymes in food processing.
- d. moving DNA and genes from one organism to another, plant and animal breeding, and use of enzymes in food processing.
- e. All of the above are correct.

5. Genetic engineering refers to

- a. in-vitro multiplication or regeneration of plant material in the laboratory.
- b. the fermentation processes for drink and food
- c. the insertion of specific "traits" artificially into other organisms.
- d. the use of identifying markers associated with specific characteristics.
- e. None of the above is correct.

6. Which of 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 are engaged in factory work.
- 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 are engaged in factory work.
- e. None of the above statements is correct.

7. Which of the following will increase the US's GNP?

- a. Cleaning up an oil spill.
- b. Cutting trees and selling timber.
- c. Medical costs resulting from air pollution.
- d. Shifting from bicycles to autos.
- e. All of the above are correct.

8. The Index of Sustainable Economic Welfare (ISEW) per capita for the United States

- a. fell for about two centuries, then rose from 1976 to 2002.
- b. fell for the two centuries through 2002.
- c. rose for about two centuries, then declined from 1976 to 1992.
- d. rose for the two centuries through 2002.

9. The Index of Sustainable Economic Welfare (ISEW) subtracts

- a. air pollution, water pollution, noise pollution, and depletion of nonrenewable resources from personal consumption.
- b. air pollution, water pollution, noise pollution, and services of government capital from personal consumption.
- c. air pollution, water pollution, depletion of nonrenewable resources, and services of government capital from personal consumption.
- d. air pollution, noise pollution, depletion of nonrenewable resources, and services of government capital from personal consumption.
- e. water pollution, noise pollution, depletion of nonrenewable resources, and services of government capital from personal consumption.

10. A failed or shadow state

- a. is a state defeated in war.
- b. is a state experiencing environmental degradation.
- c. is a state not recognized by any other state.
- d. provides a bureaucracy and protection for its population.
- e. provides only minimal public goods to the population.

11. Dutch disease refers to revenues from booming primary products that

- a. depreciate the home currency
- b. increase incentives to export other goods.
- c. increase import substitution.
- d. raise factor prices for other home goods.
- e. None of the above is correct.

12. De Soysa and other scholars studying war find

- a. the greater the mineral wealth per capita, the greater the incidence of conflict.
- b. the greater the manufacturing wealth per capita, the greater the incidence of conflict.
- c. the less the mineral wealth per capita, the greater the incidence of conflict.
- d. Both *b* and *c* are correct.
- e. None of the above is correct.

13. According to Renner, resource-based wars are unlike traditional wars in that with resources wars

- a. an objective is to maintain conditions conducive to resource looting.
- b. an objective is to permit activities that otherwise would be criminal.
- c. the bulk of violence is directed against civilians.
- d. the most important revenue source is the illicit sale of natural resources.
- e. All of the above are correct.

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Essay question (11 points) – you can write on both the front and the back of this sheet.

14. Discuss the economic benefits of specie and/or genus diversity.

Key to 3rd exam:

1. E. According to the video, Costa Rica has increased the total economic value of its forests through e. botanical medicines, fruit production, handicrafts, and tourism. 2. C. Which of the following is a part of Costa Rica's policies to contribute to the reduction of global warming? c. adopting industrial-country emission standards, sequestering carbon, and replanting mangrove forest. 3. C. Which of the following does not include only examples of the destruction of nature's "free services" consumed by the human economy? c. destruction of the honeybee's ecosystem, forest fires in Indonesia, reducing the planet's number of plant species, and replacing a forest watershed with a plantation. 4. E. According to David Norman, biotechnology, the application of biology to human use, includes e. All of the above (a. ability to modify proteins by "protein engineering," moving DNA and genes from one organism to another, and plant and animal breeding; b. ability to modify proteins by "protein engineering," moving DNA and genes from one organism to another, and use of enzymes in food processing; c. ability to modify proteins by "protein engineering," plant and animal breeding, and use of enzymes in food processing; and d. moving DNA and genes from one organism to another, plant and animal breeding, and use of enzymes in food processing.) are correct. 5. C. Genetic engineering refers to c. the insertion of specific "traits" artificially into other organisms. 6. A. Which of 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. 7. E. Which of the following will increase the US's GNP? e. All of the above (Cleaning up an oil spill; Cutting trees and selling timber; Medical costs resulting from air pollution; and Shifting from bicycles to autos) are correct. 8. C. The Index of Sustainable Economic Welfare (ISEW) per capita for the United States c. rose for about two centuries, then declined from 1976 to 1992. 9. A. The Index of Sustainable Economic Welfare (ISEW) subtracts a. air pollution, water pollution, noise pollution, and depletion of nonrenewable resources from personal consumption. 10. E. A failed or shadow state e. provides only minimal public goods to the population. 11. D. Dutch disease refers to revenues from booming primary products that d. raise factor prices for other home goods. 12. A. De Soysa and other scholars studying war find a. the greater the mineral wealth per capita, the greater the incidence of conflict. 13. E. According to Renner, resource-based wars are unlike traditional wars in that with resources wars e. All of the above (an objective is to maintain conditions conducive to resource looting; an objective is to permit activities that otherwise would be criminal; the bulk of violence is directed against civilians; and the most important revenue source is the illicit sale of natural resources) are correct. (Renner, pp. 152-153.)

Student I.D. _____

Economics 527
Environmental Economics
Final Examination
Monday, May 12, 2003
4:10-6 p.m.
Waters 328
E. Wayne Nafziger

Fill out your answer card with a number 2 pencil, indicating student ID number and answers for the 16 multiple-choice questions. Choose the response that *best* answers the question. Note that the 16 multiple-choice questions count 48 points, the first essay (#17) counts 27 points, and the last essay, 25 points.

Be sure to put your name and student ID number on the top of the page for both essay questions. Allocate your time carefully.

1. Sustainable development refers to
 - a. maintaining the productivity of natural, produced, and human assets to the next generation.
 - b. maximizing the rate of growth of real gross domestic product per capita over the long run.
 - c. minimizing the inequality of income distribution over the long run.
 - d. minimizing the price of natural resources over the long run.
 - e. producing to the point where a firm's marginal cost equals a firm's marginal revenue.

2. Developing countries are more likely to face a "tragedy of the commons" when
 - a. institutions are highly developed.
 - b. land tenure is individualized.
 - c. property rights are poorly defined.
 - d. the population growth rate is zero.
 - e. None of the above is correct.

3. Which of the following reduces the planet's carrying capacity?
 - a. increased capital resources.
 - b. increased soil erosion.
 - c. reduced population growth.
 - d. specialized production of commodities.
 - e. technical progress.

4. Herman Daly advocates investing part of the profit from the exploitation of non-renewable resources in
 - a. agriculture.
 - b. new capital equipment.
 - c. non-renewable substitutes.
 - d. renewable substitutes.
 - e. None of the above is correct.

5. Daly's impossibility theorem contends that
 - a. humans are already using 75 percent of the earth's net primary productivity.
 - b. increases in population will stimulate economic growth.
 - c. non-renewable resources prevent the world attaining US consumption levels.
 - d. the stock of minerals is adequate for rapid economic growth.
 - e. None of the above is correct.

6. Critics criticize the study, *The Limits to Growth*, by scholars at MIT, for
 - a. assuming agricultural needs grow slower than technical progress.
 - b. assuming population growth is zero.
 - c. discussing population and resources by region.
 - d. putting no limits on technical progress.
 - e. using proven reserves for long-term projections.

7. According to Marc Breslow, what are some of the reasons for market failure in the US energy market?
 - a. the federal government subsidizes fossil and nuclear fuel
 - b. the market erects barriers to conservation investment.
 - c. monopoly power in energy products blocks optimal purchases.
 - d. the price of fuels fail to reflect harm to the environment.
 - e. All of the above are correct.

8. What are the views of neo-Malthusians such as Lester Brown?
 - a. Grain production is expanding to marginal land.
 - b. Growth has increasingly stressed the ecosystem.
 - c. The population-food balance is threatened in the Third World.
 - d. Water scarcity limits the growth of grain output.
 - e. All of the above are correct.

9. Since 1968, the world's total fertility rate has
 - a. fallen by less than 5%.
 - b. fallen by more than 5%.
 - c. risen by less than 5%.
 - d. risen by more than 5%.
 - e. stayed the same.

10. Simon's view is that population growth
 - a. creates negative externalities
 - b. increases at a geometric rate
 - c. keeps income at subsistence
 - d. outstrips food growth
 - e. stimulates per capita growth

11. A steady state involves
 - a. an increase in inputs without technological progress.
 - b. growth resulting from population growth.
 - c. high rates of profit.
 - d. net new investment and technological progress.
 - e. no net new investment and no increase in output.

12. The costs of rapid population growth include
 - a. an increased dependency burden.
 - b. diminishing returns to land.
 - c. rapid labor force growth
 - d. All of the above are correct.
 - e. None of the above is correct.

13. The case for a zero discount rate is strongest when considering
 - a. an iron foundry.
 - b. automobile production.
 - c. education.
 - d. endangered species.
 - e. textile production.

14. What, if any, is the statistical relationship between birth rate and GNP per capita?
- Birth rates fall as GNP per capita increases.
 - Birth rates increase as GNP per capita increases, but at a slower rate than the increase in GNP per capita.
 - Birth rates increase as GNP per capita increases, but at a faster rate than the increase in GNP per capita.
 - Birth rates increase regardless of the movement in GNP per capita.
15. Daly and Cobb's Index of Sustainable Economic Welfare (ISEW) per capita
- adds environmental damage and resource depletion to gross product.
 - adds the import of goods and services from abroad to gross product.
 - subtracts environmental damage and resource depletion from gross product.
 - subtracts the gain of leisure time from gross product.
 - subtracts the services of government capital from gross product.
16. For Daly, the limiting factor in economic development is
- entrepreneurship.
 - human capital.
 - natural capital.
 - physical capital.

Student I.D. _____

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Essay question (27 points) – you can write on both the front and the back of this sheet.

17. How well does Malthusian population theory explain Western population growth? Discuss.

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Essay question (25 points) – you can write on both the front and the back of this sheet.

18. Discuss whether national policy makers can rely on green markets to attain sustainable development.

Key to final EE exam:

1. A. Sustainable development refers to a. maintaining the productivity of natural, produced, and human assets to the next generation. 2. C. Developing countries are more likely to face a “tragedy of the commons” when c. property rights are poorly defined. 3. B. Which of the following reduces the planet’s carrying capacity? b. increased soil erosion. 4. D. Herman Daly advocates investing part of the profit from the exploitation of non-renewable resources in d. renewable substitutes. 5. C. Daly’s impossibility theorem contends that c. non-renewable resources prevent the world attaining US consumption levels. 6. E. Critics criticize the study, *The Limits to Growth*, by scholars at MIT, for e. using proven reserves for long-term projections. 7. E. According to Marc Breslow, what are some of the reasons for market failure in the US energy market? e. All of the above (the federal government subsidizes fossil and nuclear fuel; the market erects barriers to conservation investment; monopoly power in energy products blocks optimal purchases; and the price of fuels fail to reflect harm to the environment) are correct. 8. E. What are the views of neo-Malthusians such as Lester Brown? e. All of the above (Grain production is expanding to marginal land; Growth has increasingly stressed the ecosystem; The population-food balance is threatened in the Third World; and Water scarcity limits the growth of grain output) are correct. 9. B. Since 1968, the world’s total fertility rate has b. fallen by more than 5%. 10. E. Simon’s view is that population growth e. stimulates per capita growth. 11. E. A steady state involves e. no net new investment and no increase in output. 12. D. The costs of rapid population growth include d. All of the above (an increased dependency burden, diminishing returns to land, and rapid labor force growth) are correct. 13. D. The case for a zero discount rate is strongest when considering d. endangered species. 14. A. What, if any, is the statistical relationship between birth rate and GNP per capita? a. Birth rates fall as GNP per capita increases. 15. C. Daly and Cobb’s Index of Sustainable Economic Welfare (ISEW) per capita c. subtracts environmental damage and resource depletion from gross product. 16. C. For Daly, the limiting factor in economic development is c. natural capital.