ES135 Final Exam Review Questions

Chapter 1, Readings 1-2

1. What are some of the differences between traditional, or neoclassical, environmental economics and ecological economics?
2. How do traditional environmental economics and ecological economics define the value of the environment differently?
3. Are there ultimate limits to economic growth according to traditional environmental economics? According to ecological economics?
4. What are some of the issues emphasized by traditional environmental economics?
5. What are some of the issues emphasized by ecological economics?
6. What are the differences between the standard circular flow model and the broader circular flow model?
7. What are some of the differences between environmental microeconomics and environmental macroeconomics?

Chapter 2, Reading 3

1. What was the original Malthusian hypothesis? Was it correct?
2. What was the neo-Malthusian hypothesis of the 1960s and 1970s? Have these predictions proved accurate?
3. How has the debate between environmental optimists and pessimists changed in the last couple of decades? Why has the issue of equity become more relevant?
4. What is sustainable development?
5. What are the implications of sustainable development for population and natural resource issues?

Readings 4-7

1. Are “free” markets normally efficient in the case of environmental goods?
2. Do environmental economists always rely on market prices to make policy recommendations?
3. Do economists generally favor government intervention in the case of environmental goods?
4. Does environmental protection necessarily imply a decrease in GDP?
5. What is the “Great Green Tax Shift”? What are some of the problems preventing its implementation?
6. What do we mean when we say that sustainability is about inter-generational equity?
7. What do we mean when we say that sustainability is an act of investment?
8. What is the difference between inter-generational and intra-generational equity? Can these be compatible goals?
Chapter 3

1. What do we mean when we say that a demand curve is also a marginal benefits curve?
2. What is consumer surplus?
3. What do we mean when we say that a supply curve is also a marginal cost curve?
4. What is producer surplus?
5. What do we mean when we say that a market in equilibrium produces the maximum level of social benefits?
6. What is a deadweight loss? What would it look like in a graph?
7. What is a positive and negative externality?
8. Why isn’t a market efficient in the presence of externalities? How would you represent this in a graph?
9. Why isn’t the optimal level of pollution zero?
10. What do we mean by “internalizing” an externality?
11. How would you illustrate a tax on a negative externality in a graph?
12. Why would we provide a subsidy to producers who produce a good that generates a positive externality? How would you illustrate this in a graph?
13. Can a subsidy also be used in the case of a negative externality?
14. What is a Pigovian tax?
15. What is the Coase theorem?
16. How would you represent the Coase theorem in a graph showing the marginal benefits and marginal costs of pollution?
17. Does who holds the property rights in an application of the Coase theorem affect the ultimate level of pollution? Does the ownership of property rights affect the distributional implications?
18. What are some of the limitations of the Coase theorem in reality?

Chapter 4

1. What is a common property resource? What is an open access resource?
2. How would the total product (i.e., harvest) from an open access resource change with an increase in harvest effort?
3. How would the average revenue change with an increase in the harvest effort of an open access resource?
4. How do we determine how much harvest effort will be expended with an open access resource?
5. Why is the open access equilibrium inefficient?
6. What is the tragedy of the commons?
7. What criterion should be used with a common property resource to determine the socially efficient harvest level?
8. How could we achieve the socially efficient harvest level with a common property resource?
9. What is an individual transferable quota? How can we determine the price of an individual transferable quota?
10. What is a public good (i.e., what do we mean by nonexclusive and nonrival)?
11. Will the private market be able to supply public goods? Why or why not?
12. What is the free rider problem with respect to public goods?
13. How can the socially efficient level of public goods be provided?

Chapter 5

1. How can equilibrium price and quantity be solved given an equation for supply and demand?
2. How can one obtain a marginal net benefit curve given a supply and demand curve?
3. In the absence of any concern about the future, what point along a marginal net benefit curve maximizes welfare?
4. How can the efficient allocation of a nonrenewable resource be determined in a two time period model? Show this on a graph.
5. How can a future marginal net benefit curve be discounted?
6. How does changing the discount rate change the allocation of a nonrenewable resource across time periods?
7. What are user costs?
8. What is a resource depletion tax? Why does it increase economic efficiency?
9. How would we expect the price of a nonrenewable resource to change over time?
10. What is Hotelling’s Rule?

Chapter 6, Reading 8

1. What is cost-benefit analysis?
2. In cost-benefit analyses of environmental regulations, can we normally estimate the costs or benefits with greater precision?
3. What is direct use value? What is indirect use value?
4. What are the three types of non-use values?
5. What are the three revealed preference valuation methods?
6. What is the defensive expenditures method? Why does it only provide a lower bound to true economic values?
7. What is the “jointness in production” problem?
8. Which environmental amenities can be valued using travel cost models?
9. How does one go about developing a travel cost model?
10. How can a travel cost model provide estimates of consumer surplus?
11. What are hedonic pricing models?
12. What are some of the limitations of revealed preference methods?
13. What is the difference between willingness to pay and willingness to accept?
14. What is contingent valuation?
15. How do WTP and WTA normally differ in contingent valuation research?
16. What are some of the ways to ask a contingent valuation question? What are some of the biases associated with contingent valuation?
17. What did the NOAA panel conclude regarding contingent valuation?
18. What are supply-side valuation methods? Why aren’t these methods considered true estimates of WTP?
19. What are some of the ways economists estimate the value of a statistical life?
20. How would one calculate a VSL?
21. Why do economists discount future costs and benefits?
22. How does one calculate a present value?
23. What are some of the problems associated with discounting?
24. What is the difference between risk and uncertainty?
25. How does one calculate an expected value?
26. What does risk aversion imply?
27. What are some of the limitations of CBA?

Chapter 7, Readings 9-10

1. What is natural capital?
2. What is net investment?
3. What is natural capital depreciation?
4. What are some ways to account for natural capital depreciation?
5. What are satellite accounts?
6. What is the principle of natural capital sustainability?
7. What is throughput?
8. What is the difference between a closed and open system?
9. Why is the issue of scale important in ecological economics?
10. What do we mean by “empty-world” and “full-world” economics?
11. What is the difference between weak and strong sustainability?
12. Why is ecological complexity important to ecological economists?
13. What is the precautionary principle?

Readings 22-24

1. About what percentage of GDP in the U.S. is spent on environmental protection?
2. How does spending on environmental protection in the U.S. compare to other countries?
3. Do the benefits of environmental protection in the U.S. appear to outweigh the costs?
4. About how many layoffs and plant closings are a result of environmental regulations?
5. What do we mean when we say that environmental protection results in “job shifting”?
6. Does environmental protection decrease U.S. economic growth?
7. How accurate are cost estimates of complying with environmental regulations?
8. Does the “free” market always tend to identify potential cost savings? How could government policies be used to encourage innovations?

Chapter 8, Readings 11-12

1. What are some of the criticisms and limitations of traditional national income
accounting measures?

2. What is the difference between Net National Product and Adjusted Net National Product?

3. What is the measure of genuine saving (S*) developed by the World Bank, and how is it calculated?

4. What are defensive expenditures? How are they included in traditional national income accounting?

5. What is the Genuine Progress Indicator (GPI, formerly known as Index of Sustainable Economic Welfare or ISEW)?

6. What are satellite accounts?

7. What is critical natural capital?

8. How do economists estimate future productivity losses, for example for soil erosion?

9. What is “true” income?

Chapter 10, Readings 13-14

1. What was the main prediction of Malthus’ Essay on the Principle of Population? Did it come true? Is his essay still relevant today?

2. How quickly did the global population grow during the 20th century? What is the current global population growth rate? How is it changing?

3. How will future population growth be distributed across different regions of the world?

4. Why is population momentum an important concept?

5. What is a population age profile?

6. What is the fertility rate? What is replacement level fertility?

7. What does the shape of a population age profile tell us about present and future population growth?

8. What is the demographic transition theory? What happens to birth rates, death rates, and population at each stage?

9. What is relevance of the demographic transition theory for current environmental and economic problems?

10. According to economic theory, what is the relationship between population growth and economic growth?

11. How can rapid population growth undermine economic growth?

12. What ecological principles apply to human population issues?

13. What is IPAT and what is its relevance for considering the future of the environment?

14. What types of population policies might be effective in the future?

Chapter 11

1. Has per-capita food production risen or fallen over the past 50 years?

2. Can agricultural land use continue to expand at current rates?

3. Why is per capita grain consumption in the U.S. so high?

4. What are some of the environmental impacts of agriculture?

5. How does the elasticity of supply affect food prices?
6. What is the difference between a supply-side and demand-side impact on prices?
7. What will be the most important factor in agricultural production growth in the future?
8. What is the relationship between fertilizer levels and yields? What are the environmental effects of increased fertilizer use?
9. What have been the trends in pesticide use in the U.S. in the past 40 years? What are some environmental implications of pesticide use?
10. What are some of the impacts of irrigation?
11. What proportion of the world’s water use goes to irrigation?
12. What policies might encourage sustainable agriculture?
Chapter 12

1. What is the difference between the physical supply and the economic supply of a non-renewable resource?
2. What are the three reasons that economic supplies of resources change over time?
3. How do we calculate expected resource lifetimes?
4. What is assumed with an exponential reserve index?
5. Why have predictions that non-renewable resources would be depleted failed to occur?
6. How do we measure resource rent?
7. What does Hotelling’s rule imply about the change in resource rents over time?
8. What is a choke price?
9. Do current price signals suggest that non-renewable resources are close to depletion?
10. How would internalized costs affect the price and consumption profiles of a non-renewable resource?
11. What is a backstop resource?
12. How does a manufacturer determine an optimal recycling rate?
13. How does the inclusion of environmental costs affect the optimal recycling rate?
14. What policies can be used to achieve the optimal level of recycling?
15. What are the trends in metal recycling rates in the U.S. over the past 40 years?

Chapter 13, Readings 15-16

1. What is the difference between economic and thermodynamic efficiency?
2. What is a net energy ratio?
3. How has global energy use grown in the past 50 years?
4. What source provides most of the world’s energy?
5. What is projected to happen with global energy demand in the future?
6. What is the Hubbert curve? Has it accurately predicted U.S. oil production?
7. Has global oil production followed a Hubbert curve?
8. When is global oil production expected to peak?
9. What has happened to photovoltaic energy prices and production over the past several decades?
10. What are some of the economic factors that maintain our dependence on fossil fuels?
11. How can low fossil fuel prices be viewed as a market failure?
12. What are some policies that could encourage a transition to renewable energy sources?

Chapter 14, Reading 17

1. What does sustainable management of a renewable resource require?
2. What is the maximum sustained yield of a renewable resource?
3. What are the shapes of the total revenue and total cost curves for a fishery?
4. What are the shapes of the marginal revenue, marginal cost, and average revenue
curves for a fishery?
5. What is the economic optimum yield level for a fishery?
6. What is the open-access equilibrium for a fishery?
7. What is rent dissipation?
8. How might the economic optimum yield level for a fishery be obtained?
9. What has happened to total world fish catch and per capita fish catch in the past 50 years?
10. What are some policies that could be instituted to encourage sustainable fishery management?

Chapter 15, Reading 18

1. Why is the interest rate important in determining whether a private owner will clear cut timber or practice sustainable forestry?
2. What is a mean annual increment?
3. Is cutting timber at the maximum mean annual increment economically optimal?
4. Is the economically optimal forestry management also ecologically optimal?
5. Why are property rights relevant to forestry policy?
6. What are some of the positive externalities associated with forests?
7. Why is full pricing relevant to forestry policy?
8. How has the global demand for wood and paper products changed over time?

Chapter 16

1. How do we determine the optimal level of pollution?
2. What are the two “command-and-control” approaches to pollution regulation?
3. What are the two “market-based” approaches to pollution regulation?
4. What are some of the advantages and disadvantages of technology-based approaches to pollution regulation?
5. How can we show using a supply-and-demand graph that taxes and subsidies (set at the same level) will result in the same level of pollution?
6. How can we use a supply-and-demand graph to show the overall costs of two firms to reduce their pollution levels?
7. How can we use a supply-and-demand graph to show how two firms will react with a system of tradable permits? How can we show that the tradable permits will reduce the costs of reducing pollution (as compared to a standard)?
8. Under what circumstance would a tax be preferable to a system of tradable permits?
9. Under what circumstance would a system of tradable permits be preferable to a tax?
10. What will happen with an increase in technology under a tax?
11. What will happen with an increase in technology under a system of tradable permits?
12. What are some of the advantages and disadvantages of using standards to regulate pollution?
13. What are some of the advantages and disadvantages of using taxes and subsidies to regulate pollution?
14. What are some of the advantages and disadvantages of using a system of tradable permits to regulate pollution?
15. What are “hotspots”?

Readings 19-21

1. What is the goal of the Clean Air Act (1970)?
2. How are air quality standards set under the Clean Air Act?
3. What has happened to the level of the criteria pollutants in the U.S. since the passage of the Clean Air Act?
4. What are the two main limitations of the Clean Air Act?
5. What was the goal of the Clean Water Act (1972 and 1977)? Has this goal been met?
6. What is primary shortcoming of the Clean Water Act?
7. What is the purpose of CERCLA?
8. How is the clean-up of toxic waste sites funded under CERCLA if a responsible party cannot be identified?
9. What is the “strict, joint, and several liability” provision of CERCLA? Why is it so powerful and controversial?
10. How much progress has been made in moving NPL sites through the CERCLA process?
11. Why is the Endangered Species Act considered by many to be the most powerful environmental law in the world?
12. Can economic factors be relevant under the Endangered Species Act?
13. What is the ultimate goal of having a species listed under the ESA? How much success has been achieved in reaching this goal?
14. What was the main criticism of the EPA’s Draft Report on the Environment?

Readings 25-27

1. What is some of the evidence that the world is highly unequal from an economic and environmental perspective?
2. What are some of the implications of inequality for sustainable development?
3. What is some of the evidence that a large percentage of Americans consume above their means?
4. What is the relationship between income levels and happiness within a given society at a point in time?
5. What is the relationship between income levels and happiness levels over time (i.e., what happens to average happiness levels as income levels increase in a country)?
6. How does consumption change as people move from the global middle class to the global upper class?
7. What is positional consumption?
8. What is the problem with the “rat race”?
9. What is meant by a steady-state economy (SSE)?
10. What would the typical standard of living be in a steady-state economy?
11. Does the SSE imply a limitation to economic growth?
12. What are the four main characteristics of the SSE?
13. What is the distinction between growth and development in the SSE?

Chapter 18, Reading 28

1. What is the greenhouse effect? What causes it?
2. What are future predictions of global temperature increase?
3. What has been the trend in global carbon dioxide emissions since the Industrial Revolution?
4. What are the climate change implications of the “business as usual” scenario?
5. What are the results of cost-benefit analyses of global climate change? What are the potential problems with these analyses?
6. Why is the choice of a discount rate so important in a cost-benefit analysis of global climate change?
7. What are the possible impacts of global climate change on GDP?
8. What are the impacts of stabilizing carbon emissions on GDP?
9. What would be the effect of a carbon tax on the price of fossil fuels and alternative energy sources?
10. How could a system of tradable permits be used to reduce carbon emissions?
11. How would the price of a carbon permit be determined?
12. How would carbon reduction be allocated among various options if a carbon permit system were instituted?
13. How would the Kyoto protocol reduce carbon emissions? Why is the protocol meeting resistance?
14. What is the Clean Development Mechanism in the Kyoto protocol?
15. What are some additional policy tools that could be used to reduce carbon emissions?

Chapter 19, Readings 30 & 32

1. What does the theory of comparative advantage say about the gains from international trade?
2. How can we incorporate externalities into a graph showing the effects of international trade?
3. How can trade reduce environmental quality? How can trade improve environmental quality?
4. Under the GATT and the WTO, can countries generally limit imports to protect their environment?
5. What does Article XX of the GATT say about the ability of countries to restrict international trade?
6. What is the process and production methods (PPM) rule?
7. What is a “race to the bottom” and why can it occur as a result of international trade?
8. What is an Environmental Kuznets Curve (EKC)?
9. Is the EKC hypothesis supported by the available data?
10. What provisions does the North American Free Trade Agreement make for environmental protection?
11. How does the European Union handle issues of trade and environmental quality?
12. What are multilateral environmental agreements (MEA’s)? How are they related to WTO trading rules?
13. What strategies could be used at the national and international to reduce environmental damage associated with international trade?

Chapter 20, Reading 33

1. How is sustainable development defined?
2. What are the different implications of sustainable development for developed and developing countries?
3. What are the implications of sustainable development for agriculture, energy use, industry, and renewable resource systems?
4. How has funding for environmental programs by the World Bank changed in recent years?
5. What is the Global Environmental Facility?
6. What are some specific policy proposals for sustainable development, at the national and international levels?