I. An Introduction to NR Economics

B. To what extent does the finiteness of natural resources seriously limit long run growth?

1. Make sure you can define the following terms: production function, state of technical progress, technical efficiency, economic efficiency, isoquants, isocost curves, utility function, budget lines and indifference. Pick at least three of these terms and use them in a discussion of the markets ability or inability to partially offset the impacts of increased scarcity.

C. What is conservation?

2. Define conservation. Convince the reader that increased conservation is not always socially desirable.

3. Argue that Gifford Pinchot was not a conservationist. As part of your argument define conservationist.

Discounting and present value: an introduction.

4. Define, in words, the term present value. Why is the concept important to natural resource economists?

5. Consider the proposed development of a strip mine on land that is now wilderness. Conceptually, how would one determine on efficiency grounds whether it is better to have the strip mine or the wilderness area? What kinds of benefits and costs would be associated with the strip mine? What, if anything does this question have to do with non-market valuation? Which alternative is likely to be more efficient if the social rate of
discount is zero? Why?  

6. What is a discount rate? Discuss the role of the discount rate in determining whether a reallocation of resources between the near and distant future is or is not an act of conservation.

7. Define the term “personal rate of discount”. What is your personal rate of discount? What should one do if his or her personal rate of discount is greater than the market rate of interest?

8. At what rate do you think society should discount the future?

D. The history of the conservation movement.

3. First argue that a preservationist should not accept the argument that the benefits of preservation can be measured in the same units as the benefits of development. Then argue that a preservationist would be well advised to adopt this economic paradigm.

4. Why do you think that the management arm of the conservation movement (a current proponent of this philosophy is the U.S. Forest Service, etc.) has concentrated more on the production of produced goods and services from natural resources rather than the potential flow in services from in situ natural resources? Historically, was this a good policy for the Forest Service to adopt? Does it remain a good policy?

5. Discuss Aldo Leopold’s reasons for why we should conserve natural environments as laid out in his famous article “On the Land Ethic”. How would an economist justify Leopold’s view?

F. Macro models that include natural resources.

6. Write a brief essay that describes production, pollution, and recycling in a materials balance framework. Discuss the control and regulation of pollution within this framework.

7. Given the state of technical knowledge, can we hold production, consumption and recycling constant and reduce emissions? Can we reduce pollution? Explain. What are
the implications of your answer for environmental policy? As part of your answer, explain the difference between pollution and emissions.

8. What is the *Materials Balance Approach*, and what are its implications for environmental policy? Supplement your answer with a hypothetical example that show how ignoring materials balance can lead to bad environmental policy.

9. Assume a given state of technical knowledge. Discuss, in the Materials Balance Framework, the possibility of decreasing the production of waste products, while holding constant or increasing the output of market goods, either by: (1), using the same amounts of inputs but decreasing the production of waste products and increasing the production of market goods; or (2), holding the output of market goods constant but decreasing the amount of wastes produced by decreasing the amounts of inputs used.

10. Former Senator Gary Hart (remember him?) was once quoted to the effect that "we don't want to just move pollution around, we want to eliminate it." Discuss.

11. Write up a short essay for your upper-level undergraduate course in environmental economics that describes and critiques the Materials Balance Approach to pollution and its control.

12. Discuss pollution and recycling in a world with a fixed technology and a fixed level of output.

13. Discuss the following quote:

"In an economy which is closed (no imports or exports), and where there is no net accumulation of stocks, the amount of residuals inserted in to the natural environment must be approximately equal to the weight of basic fuels, food, and raw materials entering the processing and production system, plus oxygen taken from the atmosphere."
14. Assume that, everything else constant, pollution make us worse off. If it is possible to reduce pollution without decreasing the production of any goods or services or increasing the use of resources, what can be concluded about the current allocation of resources. Why?

For now (September 30, 1999) skip the questions on nonmarket valuation.

E. Non-Market Valuation: CVM and Travel-Cost

15. What is the contingent valuation method for valuing in situ natural resources?

16. What is the travel-cost method for valuing site-specific recreational activities? Briefly explain what it is and how it can be used to value recreational sites.

17. Consumer's surplus is typically measured in monetary units, but it could be measured in other units such as time working, or in terms of a particular commodity such as hazel nuts. If it was measured in units of time, consumer's surplus for an environmental commodity would be how much time one would be willing to work to have the environmental commodity available. The hazel nut consumer's surplus associated with having commodity x available at price p would be how many nuts one would be willing to give up to have commodity x available at price p. Would your expect individuals who, relative to other individuals, have a high consumer's surplus in terms of money to also have a high consumer's surplus measured in units of time, and would you expect individuals who, relative to other individuals, have a high consumer's surplus in terms of time to also have a high consumer's surplus measured in terms of money? Why? Discuss the implications of measuring consumer's surplus in terms of money.

18. What are use values and how do they differ from nonuse values? Why is the distinction important? As part of your answer argue define use value and nonuse value. Discuss some of the aspects and implications of including nonuse values in benefits/cost analysis for environmental policies.

19. Imagine a world where nonuse values are not considered in environmental policy. Ignoring transportation costs, where would toxic waste sites be located in such a world?
20. The famous economist Herkimer Snerd recently stated in a speech to the *Friends of Finance*, "If in money terms the gain to the gainers from an environmental policy is greater than the loss to the losers, the policy will make society better off and should be enacted." Is Herkimer correct? Discuss.

21. Argue that all the benefits from preserving the Cunningham property are capitalized into property values. Now argue that they are not all capitalized into property values.

22. You are at a party talking to Burt Backpacker, and he is arguing that backpacking trips are a costless activity. Argue in a way that Burt would comprehend that he is wrong and that you could use the costs he incurs to estimate how he values backpacking trips.

23. Write a short essay (one to three pages) that explains the contingent valuation method and argues that it is a good and defensible method for estimating environmental benefits and/or costs. Then give your essay to one of your classmate and have him or her write a brief retort that argues that the contingent valuation method is not a defensible method for estimating environmental benefits and/or costs.

24. Write the retort to someone else's question 16 essay.

25. Consider the designation of a new wilderness area in Colorado. Assume that the economics consulting firm of Snerd, Snerd, and Gomer has accurately determined the CV each hiker and backpacker would associate with designation and that the sum of all these individual CV's is $5 million. Snerd, Snerd, and Gomer included all the aspects of the change in their CV calculation for the hikers and backpackers. However, designation of this Wilderness Area will decrease the availability of water to grow Soy beans on the plains of Colorado. This reduction will cause the price of Tofu to rise by $1 a pound. Assume that before the change, four million pounds of Tofu was produced and sold. This price increase obviously makes Tofu consumers worse off. Note that hikers and backpackers are not in this group; i.e., they never consume Tofu. Convince me whether designating the Wilderness Area is a potential pareto improvement. What if the price increased by $1.50 rather than by $1?


27. Do you believe a typical American would pay $30 to avoid to avoid another oil spill in
Prince William Sound of the magnitude of the Exxon Valdez spill? Explain. If not, is the amount they would be willing-to-pay more or less? Why?

28. Why does industry have such a great interest in passive-use values?

29. Define the following terms and discuss their relevance to the Contingent Valuation Method: *embedding*, *free-rider bias*, and *starting point bias*. As part of your answer discuss how you might attempt to minimize the potential problems.

30. What is consumer’s surplus and why do we care about estimating the consumer’s surplus associated with different policies. As part of your answer, provide some examples.

31. What are choice experiments, and how are they used to value environmental commodities, As part of your answer, provide some examples.

32. Define the term Pareto Improvement. Define the term Potential Pareto Improvement. Discuss the advantages and disadvantages of each as a rule for whether a project/policy should be enacted