

Final Exam
Spring 2005

VERSION A

Instructions

1. Write your SU ID NUMBER and the exam version letter above on your blue book. Please do NOT write your name.
2. Do not open this exam until you are told to do so.
3. Please turn off the ringer on your phone right now – before the exam begins.
4. Write on both sides of the bluebook pages.
5. SHOW ALL YOUR WORK. Numerical answers without supporting work will receive little or no credit.
6. Label all graphs, axes, curves, lines, points, etc., carefully.
7. Use economic reasoning.
8. Partial credit will be awarded for incomplete answers.
9. You have 120 minutes to work on the exam. There are 60 points possible; please budget your time accordingly.
10. Calculators may be used but may NOT be shared.
11. You may NOT use any of the following devices or technologies: cell phones, computers, personal digital assistants, or text messaging. Use of such devices or technologies on the exam will result in a failing grade.
12. This is a closed-book exam: you may NOT use any books or notes.
13. Please do your own work: collaboration of any kind on the exam is not allowed. Cheating will result, at a *minimum*, in a failing grade for the exam.

Part 1 (5 points)

Does a competitive market allocate an exhaustible resource like oil efficiently? Explain why or why not as thoroughly as you can.

Part 2 (25 points)

A state government is evaluating its options for reducing mercury pollution in a particular region. Mercury is currently uncontrolled and is being emitted by three sources, each of which is producing 100 units of mercury a year. Source 1's marginal abatement cost is given by $MC_1=10*Q_1$, where Q_1 is the amount of abatement it does. Source 2's marginal abatement cost is $MC_2=5*Q_2$, and source 3's marginal abatement cost is given by $MC_3=250$. The marginal benefits of abating mercury have been estimated to be $MB = 1000 - 5*Q_t$, where Q_t is the total amount of abatement.

- (a) Determine the efficient amount of abatement for each source.
- (b) Design an emissions tax policy that would lead to the efficient amount of abatement. Calculate the policy's total cost to each firm. Why might the firms prefer a less efficient command and control policy instead?
- (c) Design a tradable permit policy that would achieve the efficient amount of abatement while spreading the overall cost equally between the two firms. How many permits would you distribute to each firm? What would the price of a permit be in equilibrium?

Part 3 (15 points)

Suppose you've been asked to determine the recreational and scenic value of the Florida Everglades. No admission fee is charged. However, a researcher has interviewed a sample of the visitors and concluded that they come from 5 geographic zones. She has collected the following information, where "Travel Cost" is the round-trip transportation cost of visiting the area:

Zone	Travel Cost	Pop.	Initial Visitors
A	\$2	2,000	400
B	\$4	2,000	300
C	\$6	2,000	200
D	\$8	2,000	100
E	\$10	2,000	0

- (a) Using the travel cost method, calculate the number of people who would visit if an admission fee of \$2 were imposed.
- (b) It is also known that the total number of visits to the area (including people from all zones) is given by an equation of the form: $P = A - B*Q$, where P is the admission fee, Q is the number of visitors, and A and B are constants. Using this fact and the information above, calculate the value of the area.
- (c) Is the value from part (b) likely to overstate or understate the true value of the wilderness? What technique could you use to determine the extent of over or understatement? Please explain in detail.

EXAM CONTINUES ON THE NEXT PAGE.....

Part 4 (15 points)

The total amount of oil beneath the Arctic National Wildlife Refuge is very uncertain but some recent estimates put it at 10 billion barrels. Suppose the marginal cost of extracting the oil is \$30 per barrel, and that we are interested in allocating the 10 billion barrels between two periods. Period 1's demand for oil is given by $P_1 = 100 - 4*Q_1$. Period 2's demand, however, is expected to be significantly higher and is given by $P_2 = 150 - 4*Q_2$. The interest rate is 100 percent (the periods are a generation apart).

- (a) Find the efficient allocation of oil. What will the price, quantity, marginal social surplus and royalty be in each period?
- (b) Now suppose that before any oil is actually extracted, a team of researchers announces a breakthrough in the technology for producing synthetic fuel from coal. It is possible to make as much fuel as needed at a cost of \$90 per barrel, and the fuel is a perfect substitute for oil. Please calculate the new equilibrium and discuss how it compares to the one from part (a).