

Second Practice Examination

1. (a) State the marginal conditions which must hold for the level of pollution control to be efficient.

(b) Ignoring any information problems, if policy makers wanted to assure an efficient allocation of control responsibility using an emission charge, how would the level of the charge be determined?

(c) Would a uniform charge (where every polluter faces the same rate) be efficient? Why or why not?

2. (a) State the marginal conditions which must hold for the cost-effective allocation of the responsibility for controlling a uniformly mixed pollutant.

(b) Considering any information problems, if policy makers wanted to assure a cost-effective allocation of control responsibility using an emission charge, how could the level of the charge be determined?

(c) Would a uniform charge (where everyone faces the same rate) be efficient? Why or why not?

3. Increasing block pricing is a policy approach that attempts to allocate access to scarce resources in an efficient way while limiting the amount of revenue derived. Discuss: (1) how the approach works, (2) how it has been used to solve environmental problems discussed in this part of the course and (3) why it improves upon the approach it replaced.

4. (a) In the typical economic model of a fishery would an increase in the price of fish generally result in a larger or a smaller catch? Why? Does your answer depend on whether the fishery is treated as private property or free-access common property? Why? (

(b) To protect an already overexploited fishery suppose the government is considering either limiting the length of the fishing season or instituting ITQ's. They want to know which is more efficient. Write a short policy brief to the decision-makers discussing the efficiency consequences of these choices on a free-access common property fishery and conclude with a recommendation.

5. Suppose 3 firms have marginal cost functions for controlling polluters of $MC_1 = \$1X_1$, $MC_2 = \$2X_2$ and $MC_3 = \$4X_3$, where X_i is the amount of emissions reduction by the i th firm. (Note: $MC_1 = \$1X_1$, means that for the first firm the first unit of emissions can be reduced for \$1, the second for \$2, the third for \$3 and so on.) Suppose further that each of the firms emits 10 units of emissions prior to any control (for a total of 30 for the three).

If the control authority wishes to reduce emissions by 14 units from these three firms, what per unit charge on emissions should it impose on each emitter to achieve the desired reduction cost/effectively? (For answering this question assume that the control authority knows all cost functions.)

How much revenue would be collected from each firm as a result of this charge?

6. One of the key determinants of deforestation involves factors that provide incentives to harvest trees at an earlier age.
 - (a) Developing countries typically have higher discount rates than industrialized countries. According to the standard economic model, what effect should this have on the optimal harvest age? Would a standing forest typically be cut sooner or later in a developing country? Why?
 - (b) The standard economic model of the harvester decision normally assumes that the real price of harvested timber is constant over time. If that constant price was higher for one forest than for another, otherwise identical forest, what effect would that higher price have on the optimal harvest age? Why?
7. Discuss briefly how the tradable permits approach to pollution control deals with any two of the three problems traditionally associated with the conventional approach to pollution control: (1) technological lock –in, (2) emission increases resulting from increases in the number of sources and (3) the incentive to reduce emissions below requirements. (10 points)
8. Explain what difference the magnitude of the discount rate makes in the quest for sustainable forestry. Your answer should touch on such aspects as the optimal age at harvest, the incentive to replant, and the desirability of various tree species. (10 points)

Concepts

14. For each of the following terms: (1) identify each term and (2) describe the role it plays either in intensifying or resolving one or more environmental problems discussed in this part of the course: (1) grandfathering, (2) double dividend, (3) microfinance, and (4) CAMPFIRE program