

Part I: Each is worth 2 points.

1. Command and control regulations:
 - a) are appropriate when the optimal level of pollution is at or near zero.
 - b) are useful economic tools for encouraging appropriate environmental action.
 - c) are appropriate when monitoring costs are low.
 - d) are clearly more equitable than incentive-based programs.

2. Marketable pollution permits require a slightly more complex system when there are geographic differences in pollution effects. One possible approach to designing a system of permits would be to:
 - a) use technology-based standards in conjunction with the permits.
 - b) auction off the permits one-by-one over time until all permits have been allocated.
 - c) simply give the permits away to polluters based on their historic emissions rate.
 - d) establish separate markets for each subregion.

3. Emission taxes are generally regarded as efficient since:
 - a) they raise the maximum amount of revenue possible for the IRS.
 - b) they encourage all pollution sources to completely eliminate their emissions.
 - c) they require environmental regulators to know the individual source marginal abatement cost functions.
 - d) they encourage all pollution sources to adjust their emissions so that the equimarginal principle is satisfied.

4. Emission taxes are more likely to be effective when applied to:
 - a) nonpoint sources of pollution
 - b) point sources of pollution.

5. The two defining features of command-and-control regulation are:
 - a) cost-effectiveness and flexible standards.
 - b) monitoring and compliance.
 - c) uniform standards and technology-based regulations.
 - d) pollution taxes and marketable permits.

Part II: Answer any THREE of the following four questions. Each is worth 8 points.

6. If the net benefits of a particular environmental program were found to be regressively distributed among different income groups, would this be sufficient grounds to oppose the program? Explain. (Be sure to explain what a regressive distribution means in your answer.)
7. Compare and contrast tradable discharge permits versus technology standards as a cost-effective tool in controlling pollution emissions.
8. “Efficiency implies cost-effectiveness, but cost-effectiveness does not imply efficiency.” Explain this statement.
9. Environmental protection programs are frequently designed to require all polluters to cut back emissions by a certain percentage. What are the perverse incentives built into this type of program?

Part III: You must answer the following question.

10. Suppose there are three firms emitting a uniformly mixed pollutant into an airshed, and new regulations require that emissions be reduced by one-half, thereby allowing each to emit only half of its past emissions. The table below describes the current emissions and marginal abatement costs for the three polluters.

Polluter	Current Emissions (tons per year)	Marginal Abatement Cost (\$ per ton)
Smellco	200	\$200
Gigantic	100	\$400
Stynk	300	\$600

- a) Suppose the EPA requires each firm to reduce its emissions by half. Compute the annual pollution abatement costs in this industry. Show your work. [4 points]
- b) Suppose the EPA issues tradable pollution permits to each firm equal to half of their current emissions. Who will sell their permits and how much will they then have to spend on abatement? Who will buy the permits and at what price? Compute the annual pollution abatement costs in this industry. Show your work. [6 points]