ESCUELA SUPERIOR POLITECNICA DEL LITORAL

Economía Ambiental
Midterm Exam
Second Term 2016

Directions: Put your name clearly on the test. Answer all questions. Your score will be calculated out of 100 points. You have two hours to complete the exam.

1.) (10 points) Gaspar has a steel factory that spills waste into the Sovany River that Peter uses for his kayaking tour business. Gaspar gets benefits from producing steel, while Peter's kayaking business is hurt by the resulting spilled waste. Gaspar personally gets \$8 per pound of steel made. Let *x* be the socially optimal pounds of steel produced and let *y* be Gaspar's privately optimal pounds of steel produced. His abatement cost function is defined by the following equation:

$$C(y - x) = 5(y - x)$$

If there is damage to the Sovany River from the production of steel, Peter's profits are reduced by the following damage function:

$$D(x) = 6x^2 + 9$$

What is the socially optimal number of pounds of steel that Gaspar should produce?

2.) (10 points) Consider that flower and honey production are related. That is, the amount of honey produced is a function of the amount of flowers produced. Let P^F be defined as the price of flowers, P^H is the price of honey, $f = F(l^F)$ is the production function for flowers as a function of labor l^F, $h=H(l^H, f)$ is the production function for honey where l^h is the labor devoted to honey production. The following equation defines the socially optimal equilibrium condition:

$$P^F F'(l^F) + P^H \left(\frac{\partial H(l^H, F(l^F))}{\partial l^F} \right) = P^H \frac{\partial H(l^H, f)}{\partial l^H}$$

Describe the meaning of this equation. (Hint: What does the left side represent? What does the right side represent?) Is this labor relationship a positive or negative externality if $P^H \left(\frac{\partial H(l^H, F(l^F))}{\partial l^F} \right)$ is positive?

3.) (10 points) Marie is a regulator in charge of a tradable permit system on CO_2 emissions. She has decided that the best way to distribute the permits is by auctioning them to the potential polluters. Do you agree with Marie's decision? Why or why not? (A good answer should have at least two reasons why you agree or disagree.)

4.) (10 points) Consider a firm that owns a gold reserve and is considering whether to extract gold now and put the money in the bank or to extract in the next period. Given that $\frac{P_{t+1}}{P_t} > 1 + r$ where r is the discount rate, when should the firm extract the gold? Why?

5.) (10 points) Give the stock equations for an *assimilative pollutant* and a *cumulative pollutant.*

6.) (10 points) Give three instances of when the Coase Theorem might fail.

7.) (10 points) Explain why a subsidy could lead to increased total pollution.

8.) (10 points) Explain how Random Penalty Mechanism works as an incentive to reduce pollution.

9.) (10 points) Imagine that you are a regulator in charge of reducing pollution from the burning of fossil fuels in the industrial sector in Ecuador (that is, reducing pollution from factories). What economic incentives would you choose to reduce pollution? Why do you feel that your chosen method is the most appropriate for Ecuador's industrial sector?

10.) (10 points) A *common property resource* is...

      a.) A resource that is owned and used exclusively by one person.

      b.) A resource owned by a collective body with some means of excluding others.

      c.) A resource with no ownership and can be used by anyone.

      d.) None of the above