

**ECON 275 – 70: ENVIRONMENTAL ECONOMICS – Take Home Final Exam
(40 points total)**

The following are the rules relating to the take-home exam.

1. The take-home exam must be returned by 11:59 pm on **Sunday, September 27, 2020**. Please upload your file in Canvas. A Microsoft Word file is preferred.
2. NO late exams will be accepted.
3. You may not discuss the exam in any way with anyone until the exam period is over.
4. It is preferable that the exam be typed in a font size of 12 point. Single or 1.5 spacing is fine. Please make it easily readable.
5. If you need to draw diagrams and prefer to do by hand, kindly take a picture of the diagram and copy and paste it into the submitted exam.
6. Any violation of the rules regarding consultation with others will be considered honor code violations. In addition, violation of rules regarding consultation or lateness will lead to assessment of penalties in grading (regardless of whether honor code action is taken). Please sign the Honor Statement and submit it along with your exam.

“I affirm that all work on this exam is my own and that my conduct regarding the exam is consistent with the highest standards of academic integrity.”

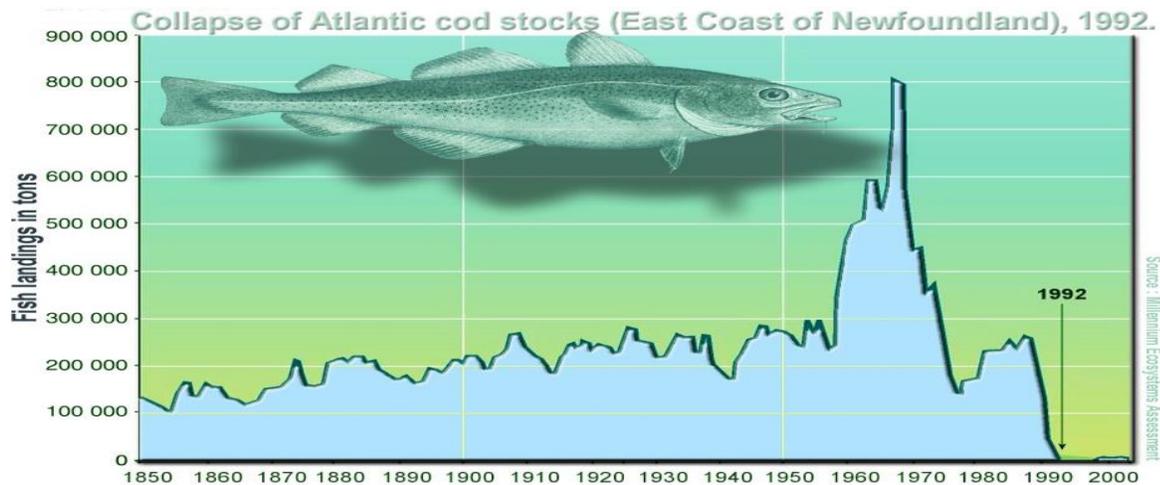
Name: _____

YOU MUST DO ALL PROBLEMS. PLEASE SHOW ALL WORK AND MAKE SURE TO READ EACH QUESTION CAREFULLY AND ANSWER EACH QUESTION FULLY.

1. **(9 points total)** You are appointed to be an advisor to the government of Qatar which is seeking to reduce the environmental impact of food production on the economy and society. Referring to the article *Environmental Impacts of Food Production* found on the link below and on the website, answer the following questions.

<https://ourworldindata.org/environmental-impacts-of-food>

- a. (2 points) What factors contribute most to the negative environmental impacts of food production? Be specific and explain.
 - b. (2 points) Does producing more food in Qatar reduce the environmental impacts? Explain in detail.
 - c. (4 points) You are now asked to write a letter of about **500 words** to the Qatar Ministry of Municipality and Environment discussing recommendations and policies Qatar can implement to achieve its goal of reducing the environmental impact of food production. Be specific and explain in detail.
2. **(6 points total)** On the next page is a diagram showing the number of fish landings of cod (number of fish caught) in an ocean area referred to as The Grand Banks. The Grand Banks has generally been considered one of the world's richest fishing grounds, supporting Atlantic cod, swordfish, haddock and capelin, as well as shellfish, seabirds and sea mammals.



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Based on this information, what economic concept can be used to describe what occurred between about 1950 and 1992? Research the issue, and, **in a minimum of 500 words**, explain the situation to someone who is not familiar with environmental economics.

3. **(6 points total)** The demand curve or marginal private benefit curve (MPB) for a product is given by $Q_D = 64 - 4P$. The supply curve or marginal private cost curve (MPC) is given by $Q_S = 4P$.
 - a. (2 points) Illustrate the demand curve and the supply curve on the same graph and find the equilibrium price and quantity. **SHOW YOUR WORK.**
 - b. (2 points) Find numerical values for the consumer surplus and the producer surplus and identify the areas of consumer surplus and producer surplus on your graph. **SHOW YOUR WORK.**

Now suppose it is determined that for each unit of the product produced there is a marginal external cost (MEC) of 8.

- c. (2 points) Calculate the new equilibrium quantity that is efficient if all costs are included. **SHOW YOUR WORK.**
4. **(5 points total)** The country of **DCM** is considering implementing a project that will install 100 windmills on a large piece of land close to a rapidly growing urban area. You have been requested to undertake a cost-benefit analysis to evaluate the feasibility of the project. Researching recent development in windmill projects, list what you perceive to be the:
 - a) (1 point) Private Costs of the project.
 - b) (1 point) Social Costs of the project.
 - c) (1 point) Private Benefits of the project.
 - d) (1 point) Social Benefits of the project.
 - e) (1 point) What type of uncertainty could exist for such a project? Explain.

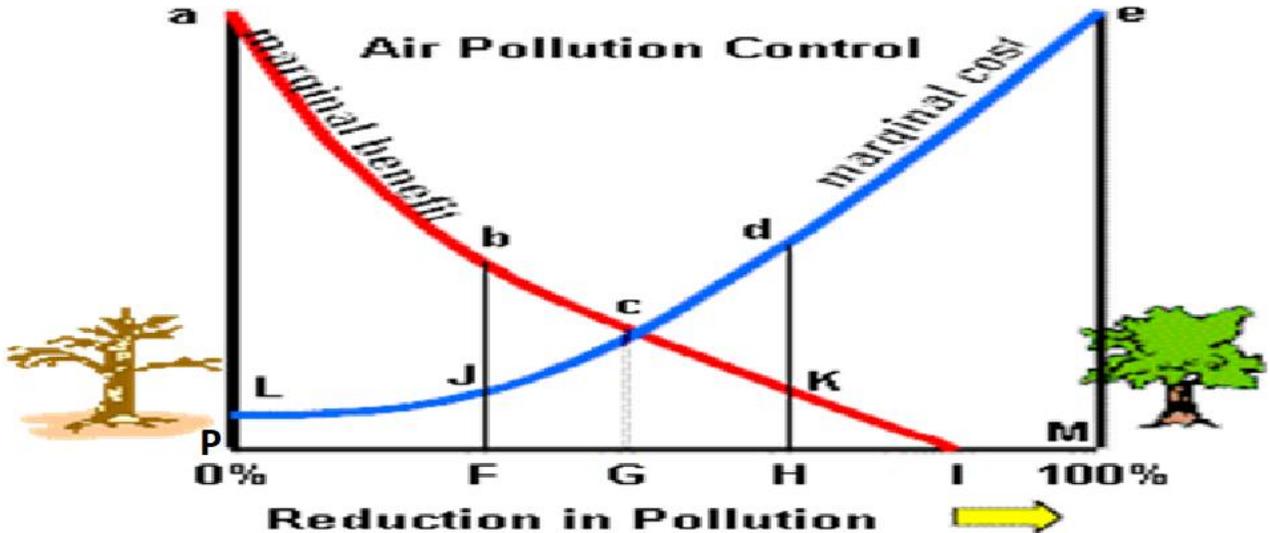
5. **(4 points total)** The country of **DCM** is also considering building a recreational area about an hour's drive from the urban area. You are assigned the task of developing a survey to estimate the values of a project using the **travel-cost method**. Develop eight (8) questions to be used in the survey to find out information that will help you estimate the benefits and costs of this project and list them below. For each question, also specify what economics cost of benefit you are trying to ascertain.
6. **(4 points total)** For each of the examples below, please answer the following:
- Does an externality exist? If so, classify the externality as positive/negative (or both).
 - If an externality exists, determine whether the Coase Theorem applies (i.e. is it possible to assign property rights and solve the problem?)
 - If it is possible for the Coase Theorem to solve this problem explain how.

Example 1 (2 points) – ABC Company builds a garbage recycling plant in a low-income area of the city.

Example 2 (2 points) - Your neighbors (whose apartment is right next door and has thin walls) are big fans of football and blast their television at all hours watching games.

7. **(3 points total)** Explain (in no more than a paragraph for each letter), why you agree or disagree with the following ideas:
- (1 point) All people have a right to use as many resources as they want.
 - (1 point) Other species exist to be used by humans
 - (1 point) Do you believe that we have any ethical obligations to maintain a livable world for future generations of (1) humans and (2) other species? Explain.
8. **(3 points total)** Refer to the diagram on the next page and fill in the blanks with letters with the correct answer to the questions in the given paragraphs.

On the left side of the diagram, there are no controls on pollution emissions and there is a 0% reduction in pollution. As we move toward the right along the horizontal axis, pollution is reduced through the application of environmental controls. Industrial emissions are entirely eliminated at 100%.



Fill-in the blanks using the letters (0.25 points each).

If there were no pollution controls, marginal benefit would be equal to 1. _____ and marginal benefit exceeds marginal cost by an amount equal to 2. _____. The optimal level of pollution control is indicated by the letter 3. _____. At **F** the marginal benefit from a percentile reduction in pollution is equal to 4. _____ and the marginal cost of a percentile reduction in pollution is equal to 5. _____. At this level of pollution the **net marginal benefit** would be equal to 6. _____.

Assume that currently environmental regulations require firms to reduce pollutants to the amount **F**. Suppose stringent new laws are now implemented and require that firms now cut back pollution from **F** to **G**. Were pollution to decrease from **F** to **G**, the **total benefit** from this reduction in pollution would be equal to area 7. _____ and the **total cost** of this reduction in pollution would be equal to area 8. _____.

Now assume that the government enacts even more stringent pollution controls that require firms to reduce pollution to **H**. Were pollution to decrease from **G** to **H**, the **total benefit** from this reduction in pollution would be equal to area 9. _____ and the **total cost** of this reduction in pollution would be equal to area 10. _____. The difference between total benefits and total costs is defined as the net change in total welfare and is equal to area 11. _____. If the government required 100% of pollution to be eliminated, the net cost would be equal to area 12. _____.