

Final Exam

Thursday, June 15, open note.

There are five questions on this examination. The first one is compulsory and is worth 50 points. Questions 2-5 are worth 25 points each, and you should answer two of them. Present your arguments clearly and concisely.

1. This question is compulsory. Provide short answers to the following:
 - a. Briefly define the concept of sustainable development. [5 points]
 - b. Briefly define infill development. [5 points]
 - c. Briefly define the “tragedy of the commons” and provide two examples. [10 points]
 - d. Name two possible environmental impacts of driving a car (using the life cycle assessment framework to think about environmental impact), and explain your choices briefly. [10 points]
 - e. Briefly explain the potential pitfalls in using economically-based cost-benefit analysis (and a discount rate) to evaluate environmental decisions. [10 points]
 - f. Describe two possible environmental concerns associated with agriculture. [10 points]
2. [25 points] On April 22, 2006, in honor of Earth Day, President Bush gave a speech in which he stated the following:

Today I saw cars and buses that run on hydrogen instead of gasoline, and that emit pure water instead of exhaust fumes. This nation does not have to choose between a strong economy and a clean environment; we can have both at the same time. And investing in new technologies like hydrogen will enable this economy to be strong, people to be able to afford fuel, this country's national security not dependent on parts of the world that are unstable. And technology will once again make this country the leader in the world, and that's what we're here to celebrate.

Write an essay in which you explain what technology the president referred to in his speech, what environmental advantages it might offer, and what technological advances are required to bring this to market (as an affordable fuel, as the president described).

3. [25 points] In the same Earth Day speech, the president also stated:

Finally, I want to talk a little bit about ethanol. I'm a big proponent of ethanol. I like the idea of America's farmers being able to grow fuel. I like the idea of people saying, my corn crop is up and, therefore, we're less dependent on oil from somewhere. And that's what we're beginning to do. We're beginning to change driving habits of the American people by changing the fuel mix in their cars. Any vehicle can use ethanol with a concentration of less than 10 percent. With minor modifications, cars and trucks can become what's called flex-fuel vehicles that run on a fuel blend called E-85, which is a mix of 85 percent ethanol and 15 percent gasoline.

Write an essay in which you explain the potential advantages and disadvantages of relying on E-85 or other biofuels to power American vehicles. Consider environmental, equity, and economic concerns. In your essay, be sure to address the full range of relevant issues, which may include air quality and global warming, as well as agricultural requirements.

4. [25 points] You have been appointed to a task force that aims to identify a "smart growth" plan to encourage environmentally sustainable urban development in the San Diego region over the next 20 years. Your task force has been asked to consider "everything" from water and land use, to zoning and building codes, to transportation. In an essay, explain the range of environmental issues that San Diego (and other southern Californian cities) face in the coming decades, and describe how you might use the "Design for Environment" and/or "Life Cycle Assessment" framework to help prioritize regional planning. What actions do you think are most important?
5. [25 points] The US Energy Policy Act of 2005 specifically allocates funds to support electricity generation through "clean coal" initiatives, through the construction of new nuclear power plants, and through subsidies of wind and solar energy. Compare these four technologies. What are the advantages and disadvantages of each of them? How do they impact the environment? How do their costs differ? Explain how you might allocate government money to best meet long-term electric needs over the next decade and over the next century.