FINAL

Name ______________________________________________

Answers to Multiple Choice questions must be recorded on this page and this page must be inserted into your blue book at the end of the exam.

Answers to Multiple Choice questions recorded in blue books will not be graded. No exceptions.

Circle your answers below. If you are using a pen and wish to deselect a choice, please place an “X” through that choice.

1. a b c d
2. a b c d
3. a b c d
4. a b c d
5. a b c d
6. a b c d
7. a b c d
8. a b c d
9. a b c d
10. a b c d
11. a b c d
12. a b c d
13. a b c d
14. a b c d
15. a b c d
Multiple Choice questions (1 point each, 15 points total). Record answers on attached sheet. 
NOTE: Questions that begin with “(Select all that apply)” may have any number of answers! All other questions have exactly one answer.

1. How many people were killed as an immediate result of the Three-Mile Island Accident?
   a) None;  
   b) 10;  
   c) 31;  
   d) 121.

2. In the Massachusetts vs. the EPA Supreme Court case, the Court ruled that the EPA:
   a) does not have the authority to regulate carbon dioxide as a greenhouse gas;  
   b) does not have the authority to regulate carbon dioxide as a pollutant;  
   c) has the authority to regulate carbon dioxide as a pollutant, but does not do so;  
   d) has the authority to regulate carbon dioxide as a pollutant, and exercises this authority.

3. (Select all that apply) Which of the following are true?
   a) NG produces less GHG and particulate emissions per unit energy than oil;  
   b) NG is renewable;  
   c) NG has negligible contributions to smog and acid rain;  
   d) NG is easier to use in vehicles than gasoline.

4. (Select all that apply) Which of the following statements regarding photovoltaic solar cells (PV) and concentrated solar power (CSP) are true?
   a) PV requires direct sunlight, whereas CSP does not;  
   b) PV is more expensive than CSP per unit energy;  
   c) Energy storage is easier with PV than with CSP;  
   d) PV is currently used at Monterey Ridge Elementary in San Diego.

5. (Select all that apply) An artesian aquifer:
   a) is always confined;  
   b) requires a pumping well to recover water;  
   c) is always unconfined;  
   d) is, by definition, unpolluted and meets drinking water standards.

6. Arsenic in well water in Bangladesh is caused by pollution.
   a) True;  
   b) False.

7. (Select all that apply) Which of the following are anthropogenic causes of saltwater intrusion?
   a) Hurricanes;  
   b) Excessive pumping near the coast;  
   c) Dredging estuaries for shipping;  
   d) Excessive groundwater recharge.

More Multiple Choice questions on the back of this page.
8. Which list represents the current magnitude of GDP growth of these three countries, ranked from lowest to highest?
   a) US, India, China;  
   b) India, China, US;  
   c) China, India, US;  
   d) China, US, India.

9. (Select all that apply) Goals of China’s Five Year Plans, with the exception of the most recent one, have included:
   a) Increasing isolation from the rest of the world;  
   b) Expanding industry;  
   c) Improving environmental stewardship;  
   d) Enhancing socialism.

10. The largest sector of India’s GDP comes from:
    a) Agriculture;  
    b) Industry;  
    c) Services;  
    d) Oil exports.

11. Which of the following statements are true regarding buildings in temperate climates:
    a) Air conditioning is much more energy intensive than heating;  
    b) Heating is much more energy intensive than air conditioning;  
    c) Heating and air conditioning require about the same amount of energy;  
    d) Neither heating nor air conditioning require significant amounts of energy.

12. The Kyoto protocol limits the total amount of greenhouse gases emitted, while the Carbon Pie approach would limit the rate of emissions.
    a) True;  
    b) False.

13. (Select all that apply) Which of the following are documents directly associated with NEPA?
    a) Categorical Exclusion;  
    b) Endangered Species Act;  
    c) Environmental Assessment;  
    d) Environmental Impact Statement.

14. Which of the following countries is the world’s largest exporter of oil?
    a) U.S.;  
    b) Norway;  
    c) Saudi Arabia;  
    d) Iran.

15. (Select all that apply) Which of the following statements are true?
    a) Strip mining is required to recover heavy oil;  
    b) Heavy oil has higher heavy metal contamination levels than conventional oil;  
    c) Heavy oil requires less energy for refining than conventional oil;  
    d) Heavy oil has a higher sulfur content than conventional oil.
Short answer questions (2 points each, 30 points total): Be as concise as possible. You may answer the questions with lists or phrases, as appropriate; full sentences are not required.

1. Briefly explain how aerosols are thought to reduce the earth’s average temperature.
2. Is hydrogen an energy source or energy storage? Explain.
3. Define “externality” and give one example.
4. Explain the motivation behind “Design for the Environment.”
5. What is the Mauna Loa Record and why is it significant?
6. Give two significant criticisms of the King Hubbert Peak Oil theory as applied to the global oil supply.
7. Define “center timing.”
8. Besides an impermeable liner, list two characteristics of a modern landfill which are designed to prevent groundwater contamination.
9. Briefly describe the controversy related to the All-American Canal.
10. List four significant environmental impacts of desalination plants.
11. Besides a decrease in population growth rate, list two demographic impacts of China’s “One Child” policy.
12. What was the initial goal of CalCOFI and how has the goal evolved since then?
13. Explain how the management of U.S. ocean resources is complicated by the structure of the federal government.
14. List the two possible outcomes of an Environmental Assessment. If you use acronyms in your answer, define them.
15. List the top two categories of Food Bill expenditures and give one example of each.

Essay questions on the back of this page.
Essay Questions (55 points total): Your answers should be thorough, yet concise. Extraneous information not related to the question will not receive credit. Support your arguments with facts whenever possible; unsupported arguments will receive reduced credit. Remember: Quality over quantity!

1. (15 points) Due to increasing population, pollution of surface water, and the demands of industry and agriculture, many countries have begun to unsustainably deplete their groundwater resources.
   a) Explain why groundwater might be considered “common property” and how this might be responsible for its ultimate demise;
   b) The most obvious consequence of depleting groundwater resources is a lower water table in an unconfined aquifer or reduced pressure in a confined aquifer. Describe two other physical changes that might occur in an over-pumped aquifer;
   c) Using principles discussed in class, describe in detail the economic impact of one of the physical manifestations of groundwater depletion discussed in Part (b).

2. (20 points) Environmental legislation, environmental stewardship, and growth of the economy are interdependent concepts. Indeed, it is difficult to have a meaningful discussion about any one of these in isolation from the others.
   a) Discuss one piece of U.S. Federal environmental legislation and describe the intended impact of the legislation on the environment. You may use an existing or pending piece of legislation;
   b) Discuss the impact of the legislation described in part (a) on the economy in the short term. In particular, who are the economic winners and losers? Be specific;
   c) Discuss the impact of the legislation described in part (a) on the economy in the long term. In particular, who are the economic winners and losers? Be specific.

3. (20 points) Dongtan is an eco-city in the initial development stages near Shanghai, China. Upon completion in 2040, it is intended to house 500,000 residents in an urban setting. Every aspect of the city is designed from the ground up to be sustainable. For example, it will be self-sufficient in energy, water and food, and all transportation will have zero GHG emissions.
   a) Describe China’s motivation behind the enormous investment in the development of an eco-city like Dongtan. Be specific;
   b) Building Dongtan from the ground up allows planners to design infrastructure that would be impossible to retrofit in a modern metropolis. Give two examples from the Dongtan plan and describe how each would reduce the ecological footprint of the city;
   c) Discuss the implications if this eco-experiment is a failure;
   d) Discuss the implications if this eco-experiment is a success.