

There are five questions on this examination. The first question is compulsory, and is worth 50% of the marks for this examination. Attempt answers to two of questions 2-5, each of which is worth 25% of the marks for this examination. Present your arguments clearly and concisely.

1. This question is compulsory, and requires short answers.
 - a. Briefly define the concept of sustainable development. **[5 marks]**
 - b. Briefly discuss the concept of appropriate technology. **[5 marks]**
 - c. What is the “triple bottom line”? **[5 marks]**
 - d. What are the core aspects of “Design for Environment”? **[5 marks]**
 - e. What is causing anthropogenic climate change? **[5 marks]**
 - f. From an environmental perspective, discuss the relative merits of coal, natural gas and nuclear power as fuels for electricity generation. **[10 marks]**
 - g. How do hybrid vehicles reduce the environmental impact of personal transportation compared to gasoline and diesel powered vehicles? **[10 marks]**
 - h. What are the major technical obstacles to be overcome before fuel cells can be widely used to power personal transportation? **[5 marks]**

2. Discuss the following statement from the World Bank:

“Without adequate protection of the environment, growth is undermined; but without growth it is not possible to support environmental protection.”

Your answer should consider the roles of technology, economics and government regulation in fostering sustainable development. **[25 marks]**

3. You work for a domestic pharmaceutical company that has recently been taken over by a foreign competitor that has a well-established corporate image as a “green”, environmentally friendly organization. Your first task after the takeover is to lead a team conducting a life cycle assessment comparing the environmental impact of one of your domestic factories and the original home factory overseas of your new corporate bosses. Discuss both how you might go about this assessment, and also the major areas of differing environmental impact that you might expect to identify. **[25 marks]**.

4. Discuss the following statement from CNN:

“As electricity rates soared for many Americans, the focus has turned to alternative power sources – wind energy among them. Supported by environmentalists and included in President Bush’s energy plan, wind power is proving to be a viable option.”

Your answer should consider the environmental and economic costs associated with the various renewable and non-renewable energy sources that are, or could be, used in the United States for electricity generation. **[25 marks]**

5. Discuss possible technological and policy changes that could be implemented to reduce the environmental impact of American society and economy, without negatively affecting its economic competitiveness. You should:

- a. Identify one or more areas of the US economy and society that do not use resources efficiently, in the sense of minimizing the environmental impact.
- b. Identify reasons for this, whether associated with inappropriate technology or regulation.
- c. Consider solutions to reduce the environmental impact of the U.S.A.