

以下四題（每題 25 分）請詳讀題目後，說明 (1) 是題目之主要意義（占 15 分）及 (2) 題目於資源管理之意涵（占 10 分）。
(資料來源：Tom Tietenberg (2006), *Environmental Natural Resource Economics* (seventh edition), Pearson International Inc.)

(一)

Is the economy on a collision course with the environment? Or has the process of reconciliation begun? One group, led most notably by Bjørn Lomborg, Director of Demark's Environmental Assessment-Institute, concludes that societies have resourcefully confronted environmental problems in the past and that environmentalist concerns to the contrary are excessively alarmist. As he states in his book *The Skeptical Environmentalist*:

The fact is, as we have seen, that this civilization over the last 400 years has brought us fantastic and continued progress. . . . And we ought to face the facts—that on the whole we have no reason to expect that this progress will not continue.

On the other end of the spectrum are the researchers at the Worldwatch Institute, who believe that current development paths and the attendant strain they place on the environment are unsustainable. As reported in *State of the World 2004*:

This rising consumption in the U.S., other rich nations, and many developing ones is more than the planet can bear. Forests, wetlands, and other natural places are shrinking to make way for people and their homes, farms, malls, and factories. Despite the existence of alternative sources, more than 90 percent of paper still comes from trees—eating up about one fifth of the total wood harvest worldwide. An estimated 75 percent of global fish stocks are now fished at or beyond their sustainable limit. And even though technology allows for greater fuel efficiency than ever before, cars and other forms of transportation account for nearly 30 percent of world energy use and 95 percent of global oil consumption.

These views not only interpret the available historical evidence differently, but they also imply very different strategies for the future.

Sources: Bjørn Lomborg. *The Skeptical Environmentalist: Measuring the Real State of the World* (Cambridge, UK: Cambridge University Press, 2001). The Worldwatch Institute. *The State of the World 2004* (New York: W.W. Norton & Co., 2004).

(背面仍有題目,請繼續作答)

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How many resources should be allocated to the prevention of groundwater contamination? In part that depends on how serious a risk is posed by the contamination. How much damage would be caused? One way to obtain a lower-bound estimate on the damage caused is to discover how much people are willing to spend to defend themselves against the threat.

In late 1987 trichloroethylene (TCE) was detected in one of the town wells in Perkasié, a town in southeastern Pennsylvania. Concentrations of the chemical were 7 times the EPA's safety standard. Since no temporary solution was available to reduce concentrations to safe levels, the county required the town to notify customers of the contamination.

Once notified, consumers took 1 or more of the following actions: (1) they purchased more bottled water; (2) they started using bottled water; (3) they installed home water treatment systems; (4) they hauled water from alternative sources; and (5) they boiled water. Through a survey, analysts were able to discover the extent of each of these actions and combine that information with their associated costs.

The results indicated that residents spent between \$61,313.29 and \$131,334.06 over the 88-week period of the contamination. They further indicated that families with young children were more likely to take averting actions and, among those families who took averting actions, to spend more on those actions than childless families.

Source: Charles W. Abdalla, et al. "Valuing Environmental Quality Changes Using Averting Expenditures: An Application to Groundwater Contamination," *Land Economics* Vol. 68, No. 2 (1992): 163-169.

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According to the United Nations, about 40% of the world's population lives in areas with moderate-to-high water stress. ("Moderate stress" is defined in the U.N. Assessment of Freshwater Resources as "human consumption of more than 20 percent of all accessible renewable freshwater resources," whereas "severe stress" denotes consumption greater than 40 percent.) By 2025 it is estimated that about two-thirds of the world's population—about 5.5 billion people—will live in areas facing such water stress.

This stress is not uniformly distributed around the globe. For example, in the United States, China, and India, groundwater is being consumed faster than it is being replenished and groundwater levels are steadily falling. Some rivers, such as the Colorado in the western United States and the Yellow in China, often run dry before they reach the sea.

According to U.N. data, Africa and Asia suffer the most from the lack of water supply and sanitation in urban areas. Up to 50% of Africa's urban residents and 75% of Asians lack adequate access to a water supply.

The availability of potable water is further limited by human activities that contaminate the finite supplies. According to the United Nations, 90% of sewage and 70% of industrial wastes in developing countries are discharged without treatment.

Some arid areas have compensated for their lack of water by importing it via aqueducts from more richly endowed regions. In addition to promoting political conflict (regions from which the water is obtained may resist supplying it), the aqueducts may be geologically vulnerable. In California, for example, many of the aqueducts cross or lie on known earthquake-prone fault lines (Reisner, 2003).

本試題是否可以使用計算機：☐可使用，☒不可使用（請命題老師勾選）

考試日期：0301・節次：2

(四)

Over the last decade or so, the community of scholars dealing with the role of the economy and the environment has settled into two camps: ecological economics (<http://www.ecoeco.org/>) and environmental economics (<http://www.aere.org/>). Although they share many similarities, ecological economics is consciously more methodologically pluralist, while environmental economics is based solidly on the standard paradigm of neoclassical economics. While neoclassical economics emphasizes maximizing human welfare and using economic incentives to modify destructive human behavior, ecological economics uses a variety of methodologies, including neoclassical economics, depending upon the purpose of the investigation.

While some observers see the two approaches as competitive (presenting an "either-or" choice), others, including the author of this text, see them as complementary. Complementarity, of course, does not mean full acceptance. Significant differences exist not only between these two fields, but also within them over such topics as the valuation of environmental resources, the impact of trade on the environment, and the appropriate means for evaluating policy strategies for long-duration problems such as climate change. These differences arise not only over methodologies, but also over the values that are brought to bear on the analysis.