

LIBERAL STUDIES (ENVIRONMENTAL STUDIES) AS-LEVEL

8.30 am – 11.00 am (2½ hours)
This paper must be answered in English

1. This paper consists of **Section 1** and **Section 2**. Section 1 carries 75% of the module marks, and Section 2 carries 25%.
2. **Section 1** consists of three questions, *all* of which are to be answered. **Section 2** consists of four questions, of which candidates may attempt any *one*.
3. Each question carries 25 marks: 20 marks for content and 5 marks for effective communication.
4. Candidates are reminded that this subject emphasises the ability to present and support points of view in a clear, concise and logical manner, rather than the ability to recall facts.

Not to be taken away before the
end of the examination session

SECTION 1

Answer *all* the questions in this section.

1. Consider the following sources:

Source A:

With regard to the problem of deteriorating air quality in Hong Kong, three groups of people have put forward three different views:

- Health experts are advocating tightened air quality standards.
- Green groups are calling for policies that would increase energy saving and they are asking the government to give a higher priority to the use of clean transport such as railways.
- Industry representatives are asking for government assistance and subsidies for industry to reduce pollution through voluntary compliance.

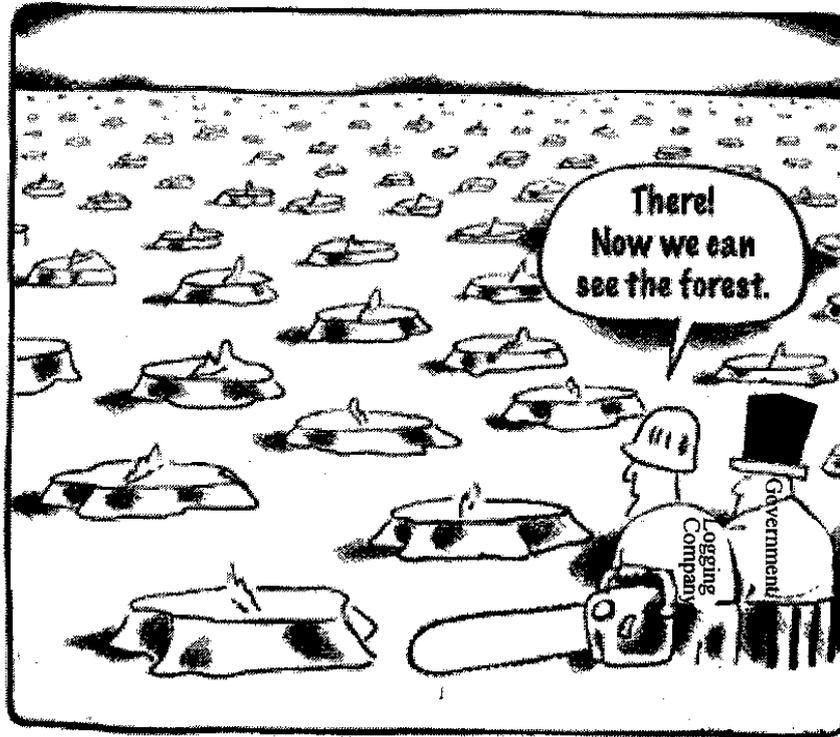
Source B:

At the moment, on days with high Air Pollution Index (API) figures, the government issues warnings to the public, but no other action is taken. It has been suggested that appropriate action should be taken during high API days, such as restricting traffic volume in congested urban areas through the charging of a fee on vehicles entering such areas.

- (a) Suggest why the three parties of people in Source A are proposing different policy approaches to solving the air pollution problem. How would their value positions affect their views? (12 marks)
- (b) Discuss whether or not the proposed measure mentioned in Source B can address the concerns of the green groups and industries in Hong Kong. (8 marks)

2. The following data relate to an important environmental issue:

Source A: Cartoon



Source B:

Some information about tropical rainforests and biodiversity:

- All tropical rainforests are located in developing countries.
- There are 5 to 8 million species of plants and animals in the world.
- The tropical rainforests cover 7% of the Earth's land surface but contain over 50% of the world's plant and animal species.
- At the global level, between 1 to 137 species are becoming extinct every day.

- (a) Identify the issue illustrated in the cartoon in Source A. What is the nature of this issue? (8 marks)
- (b) With reference to Source B, discuss the importance of maintaining the tropical rainforests as major gene pools in the world. (12 marks)

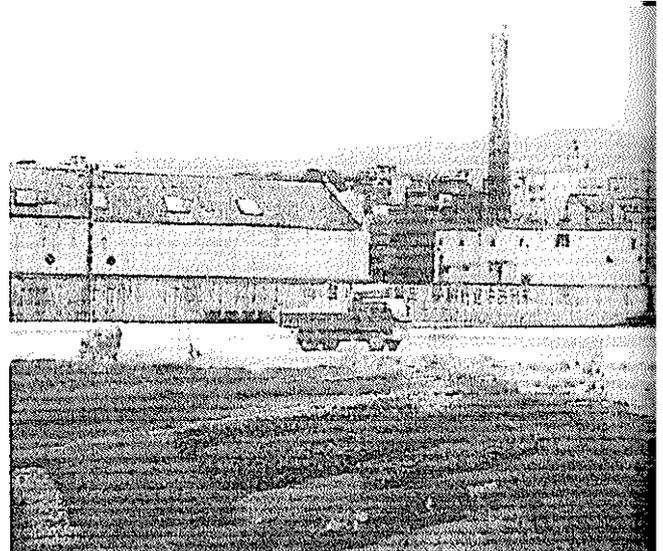
3. Consider the following information:

Source A:

The following photographs were taken at the same location in China:

Photograph A1

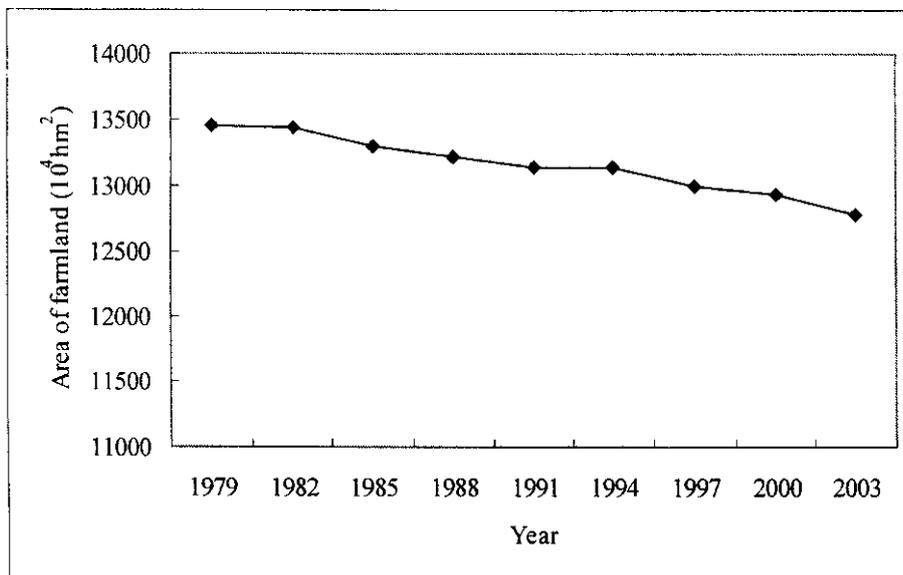
Photograph A2



Then

Now

Source B: Change in the area of farmland in China



- (a) Discuss the possible impact on the environment brought about by the changes suggested in the above information if such changes were to continue. What are the causes underlying these changes? (10 marks)
- (b) 'The equilibrium of an ecological system can be maintained only if economic development is stopped.' Discuss this statement in the light of the above information. (10 marks)

SECTION 2

Answer *one* question from this section.

4. Consider the following information on ozone layer depletion and acid rain:

- Ozone-depleting substances began being released on a large scale in the 1930s with the introduction of refrigeration technology. The emission of ozone-depleting substances increased steadily during the twentieth century. This caused a progressive thinning of the ozone layer in all areas of the globe, most notably over Antarctica. The thinning of the ozone layer has allowed an increased level of ultraviolet (UV) radiation to penetrate the atmosphere, with a significant adverse impact on human health and the environment.
- Decades of increased acidic input into the atmosphere has increased the environmental stress on forests and sensitive aquatic ecosystems. In some extreme cases, it has altered the composition of entire biological communities and eliminated some fish species from certain lakes and streams. In many other cases, the changes have led to a reduction in the diversity of organisms in some ecosystems.

- (a) In the light of the above information, which of these two issues do you think deserves to be given a higher priority in actions involving international cooperation? Justify your argument(s). (10 marks)
- (b) Propose some solutions for the environmental issue you have identified in (a). Explain whether or not developed and developing countries will encounter different obstacles in adopting these solutions. (10 marks)

5. The government has announced a strategy to solve the municipal solid waste problem in Hong Kong. The following is an abstract of the strategy:

The government is considering a comprehensive strategy which includes measures to reduce the generation of waste within households and workplaces and a number of waste treatment methods: (1) enlarging existing landfills; (2) providing centralized waste sorting and recovery facilities; and (3) building modern incinerators.

Landfilling has been the major waste disposal method in Hong Kong for the past two decades. It has been predicted that the existing landfills will reach their full capacity in the next 7 to 10 years and that enlarging these landfills can extend their life span. Through planning, engineering and environmental assessment, the feasibility of enlarging the landfill sites has been established in a preliminary way.

Centralized waste sorting and recovery facilities are highly mechanized. They can extract recyclable materials such as metals and glass. The remaining biodegradable substances can be further processed and turned into compost. Experience in Europe suggests that 50–60% of the waste still needs to be disposed of at landfills.

Incineration is a well-proven technology adopted by many developed countries in Europe and Asia. Incineration can reduce the volume and hazardous properties of waste. Modern incinerators adopt advanced techniques which can eliminate most pollutants and meet stringent international emission standards.

- (a) Considering the situation in Hong Kong, of the three waste treatment methods described in the above source, which one do you think should be timetabled first in an implementation plan of the government? Justify your answer. (12 marks)
- (b) With reference to any **one** of these three waste treatment methods, what do you consider to be the potential social and political problems of providing suitable sites for the facilities required by this method in Hong Kong? Explain your answer. (8 marks)

6. Consider the following information:

Research has shown that biofuels can replace petroleum as an energy source. Bio-energy is a kind of energy stored in organisms in the form of chemical energy that is initially transformed from solar energy through photosynthesis. Fuels extracted from plants or vegetable oils, such as ethanol and biodiesel, are called biofuels and are kinds of efficient and clean neo-fuels. When these kinds of fuels are used as substitutes for fossil fuels, greenhouse gas emissions can be reduced by 50% to 60%. A new source of renewable energy for future generations can be opened up.

In recent years the Brazilian government has been actively promoting the use of ethanol as a fuel, producing 13 million tons of ethanol annually at half the price of petroleum. The rate of using ethanol as a substitute for petroleum is close to 50%. In Brazil, ethanol has already taken up a 20% share of the transport fuel market. Of the 20 million automobiles currently in use in that country, about one-third have been converted into 'hybrid-fuel cars', in which the proportion of ethanol in petroleum can go as high as 25%. Moreover, some new models of cars can run on 100% ethanol.

However, some people think that the attempt to use biofuels to solve the problem of increasing greenhouse gas emissions is not really progressive, because it enables people to continue to drive cars and maintain an unsustainable lifestyle. They also suggest that when this problem is analysed from a wider perspective, one might discover that the use of biofuels will not reduce greenhouse gas emissions. Furthermore, they maintain that Europe's plan to increase its current level of biofuel consumption will put pressure on developing countries to convert natural forests and woodland into farmland. At the end of the day, the most effective method to bring about a permanent reduction of greenhouse gases is to reduce the volume of traffic.

- (a) To what extent are biofuels environmentally friendly? (10 marks)
- (b) Discuss how difficult it would be for Hong Kong to develop and promote biofuels to replace petroleum as car fuel. (10 marks)

7. Consider the following information:

Source A:

Annual Fishing Ban and Resources in the Oceans

Hong Kong fishermen found that not only did the South China Sea annual fishing ban fail to achieve its objectives, the fish catch even dropped to a new low level. The reason was that more and more mainland fishing boats used illegal and extremely destructive fishing methods, leading to a drastic drop in the volume of marine products in the South China Sea. Hong Kong fishermen also discovered that some boats were continuing to catch fish when the annual fishing ban was in effect, depriving the marine ecological system of the opportunity to regenerate itself.

The chief of the South China Sea Region Fishery Bureau indicated that, in the years since its implementation, the annual two-month fishing ban in the South China Sea had been highly effective. He said that the annual fishing ban had enabled 45% of the fish species to breed well because their breeding and growing seasons were minimally affected by fishing activities. This benefited both the marine resources and the fishermen. However, a Legislative Councilor remarked that the annual fishing ban did negatively affect the livelihoods of Hong Kong fishermen to a certain degree despite its positive impact on fish resources.

Source B:

The Publication of a Live Reef Food Fish Guide

A spokesman for a green group mentioned the following:

- Hong Kong imports large amounts of seafood caught from wild populations and it is the global trading center for live reef fish.
- Local citizens' habit of consuming seafood has a profound impact on marine resources.
- The group suggested the publication of the *Live Reef Food Fish Guide*, the contents of which would include the names of live coral reef fish found on the Hong Kong market, their adult sizes, their recorded maximum sizes, source regions (whether living in the wild or under cultivation), and their habitats (such as coral reefs, river mouths, or muddy and sandy seabeds).

- (a) In the light of Source A, discuss whether or not there is a tension between conserving resources in the oceans and sustaining fishermen's livelihoods. (10 marks)
- (b) In the light of Source B, discuss whether resources in the oceans can be effectively conserved by publishing information such as the *Live Reef Food Fish Guide*. (10 marks)

END OF PAPER

Sources of materials used in this paper will be acknowledged in the *Examination Report and Question Papers* published by the Hong Kong Examinations and Assessment Authority at a later stage.