UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

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|---|---|
| CANDIDATE NAME | |

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| CENTRE NUMBER | | | | | | CANDIDATE NUMBER | | | | | |

**ENVIRONMENTAL MANAGEMENT** **5014/12**

Paper 1 **May/June 2011**

**2 hours 15 minutes**

Candidates answer on the Question Paper.

Additional Materials: Ruler

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
All questions in Section A carry 10 marks.
Both questions in Section B carry 40 marks.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

| For Examiner's Use | |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| Total | |

This document consists of **23** printed pages and **1** blank page.

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## Section A

For Examiner's Use

**1** **(a)** Look at the photograph showing one use of solar power in a small settlement.

**(i)** What is the solar power in the photograph being used for?

.....[1]

**(ii)** Describe the power unit at the top of the post.

.....

.....[1]

**(iii)** Why do both units face in the same direction?

.....[1]

For Examiner's Use

**(iv)** What objections might people living here have raised if wind power had been used instead of solar power?

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.....[3]

**(b) (i)** State **one** disadvantage of solar power.

.....[1]

**(ii)** Explain the advantages of using solar power in rural areas of developing countries.

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.....[3]

For Examiner's Use

**2** **(a)** Explain how malaria spreads in a population.

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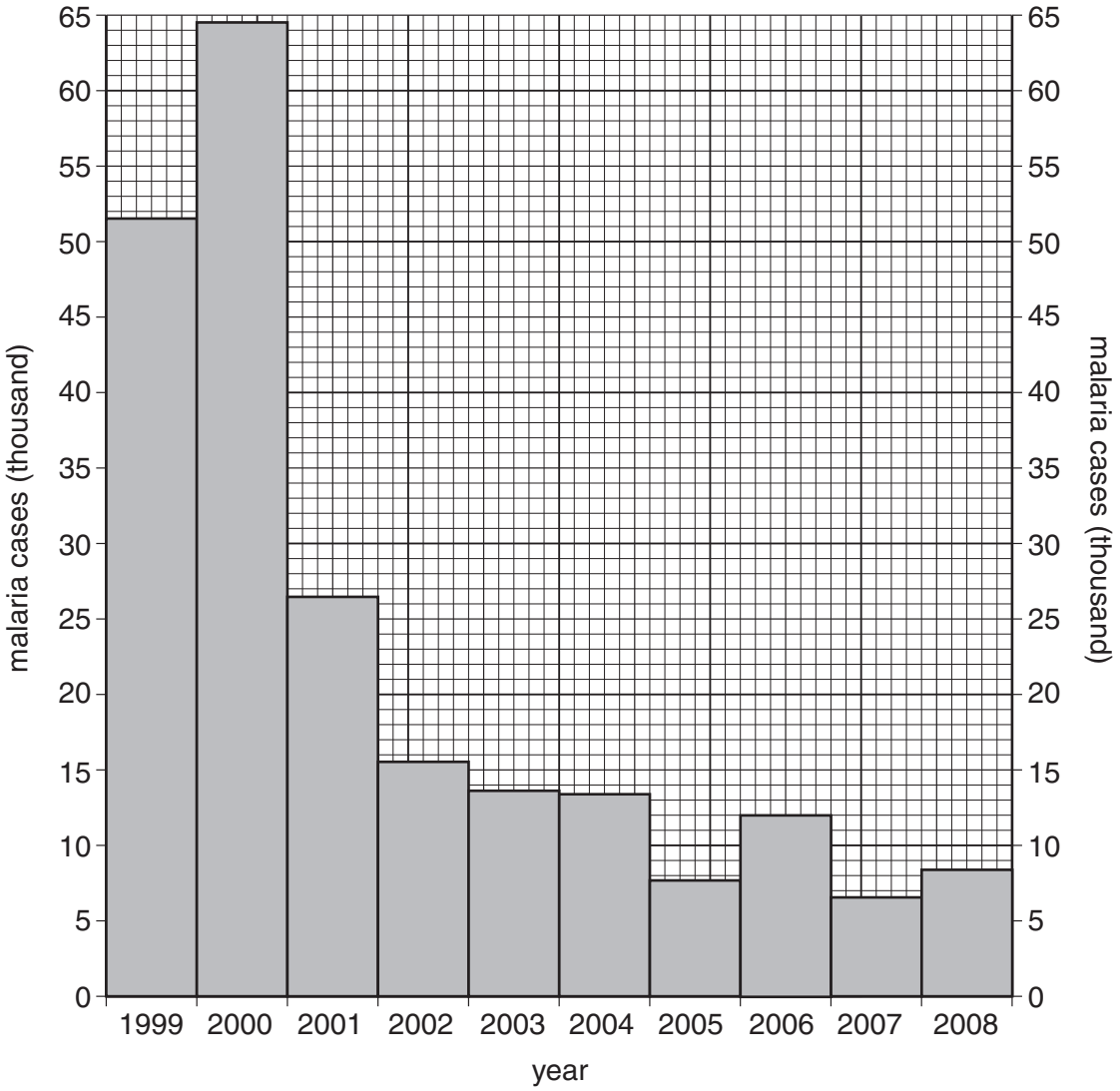
..... [4]

**(b)** The graph shows the number of cases of malaria in South Africa from 1999 to 2008.



For Examiner's Use

Describe how the number of cases of malaria in South Africa changed between 1999 and 2008.

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.....[3]

**(c)** In all malarial areas, the number of cases can vary from year to year. Suggest reasons why.

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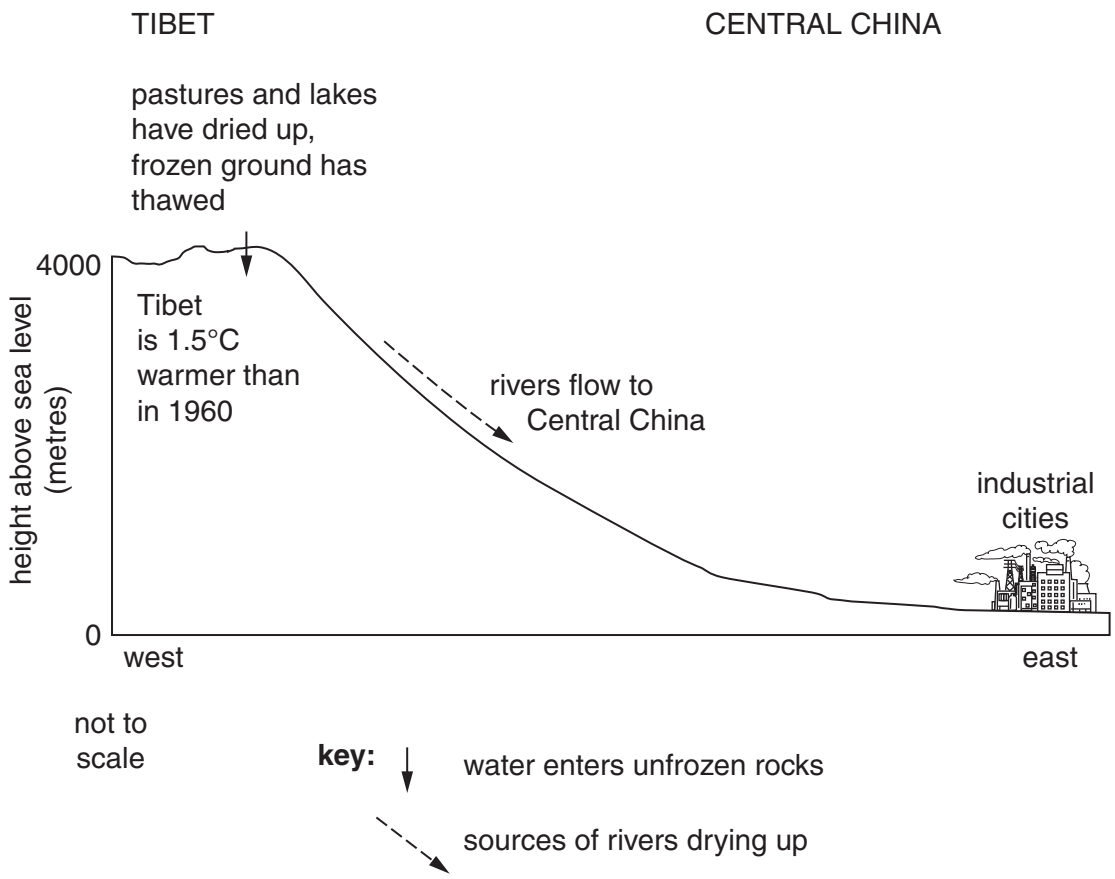
.....[3]

For Examiner's Use

**3** **(a)** Look at the sketch across part of China giving information about some problems in Tibet. Use it to answer the questions below.




**(i)** Explain how industries in Central China might contribute to rising carbon dioxide levels.

.....[1]

**(ii)** Explain how an increase of carbon dioxide in the atmosphere might lead to:

1 an increase in temperature;

.....

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.....[2]

2 a decline in pastoral farming in the semi-arid areas of Tibet.

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.....[2]

For Examiner's Use

**(b)** Using information from the diagram, suggest how central China may be affected by the changes in Tibet.

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..... [2]

**(c)** What difficulties does China face in cutting carbon dioxide emissions?

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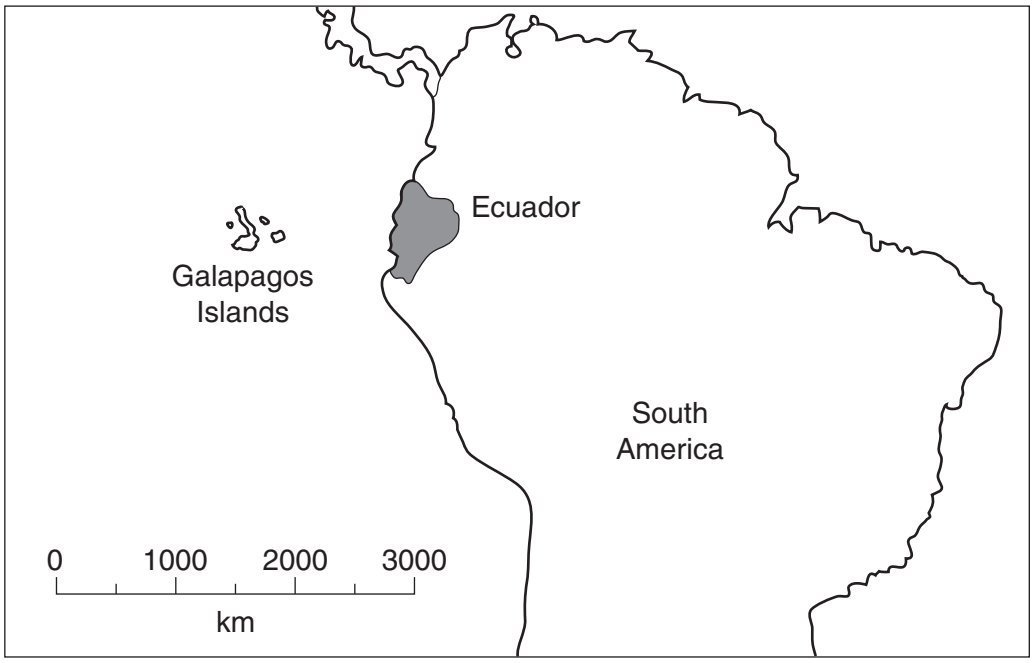
..... [3]

For Examiner's Use

**4** **(a)** The map shows the position of the Galapagos Islands, a National Park which is part of Ecuador, and some information about them.

> The Galapagos Islands have a tourist industry of great value to the economy of Ecuador. Birds and animals, such as great tortoises, not found anywhere else in the World, can be seen there. In 2007 the United Nations listed the National Park as one of its endangered sites.




**(i)** What is the approximate distance from the Galapagos Islands to the nearest point on the coast of Ecuador?

…… km [1]

**(ii)** Why are some of the birds and animals living in the Galapagos Islands found nowhere else in the world?

.....

..... [1]

For Examiner's Use

**(b)** The table gives information about recent changes in the population numbers on the Galapagos Islands.

| | |
|---|---|
| total population in 2000 | 15 000 |
| total population in 2010 | 30 000 |
| number of inhabitants in 2010 who were born in the Galapagos Islands | 4 500 |
| number of Galapagos inhabitants in 2010 who are migrants | |

**(i)** Calculate the number of migrants in the 2010 population and complete the table. [1]

**(ii)** Most migrants to the Galapagos Islands were from mainland Ecuador.
Suggest why people in developing countries, such as Ecuador, migrate from one part of the country to another.

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..... [3]

**(iii)** Describe how ecosystems of small islands, such as the Galapagos, might be damaged by large increases in population.

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..... [4]

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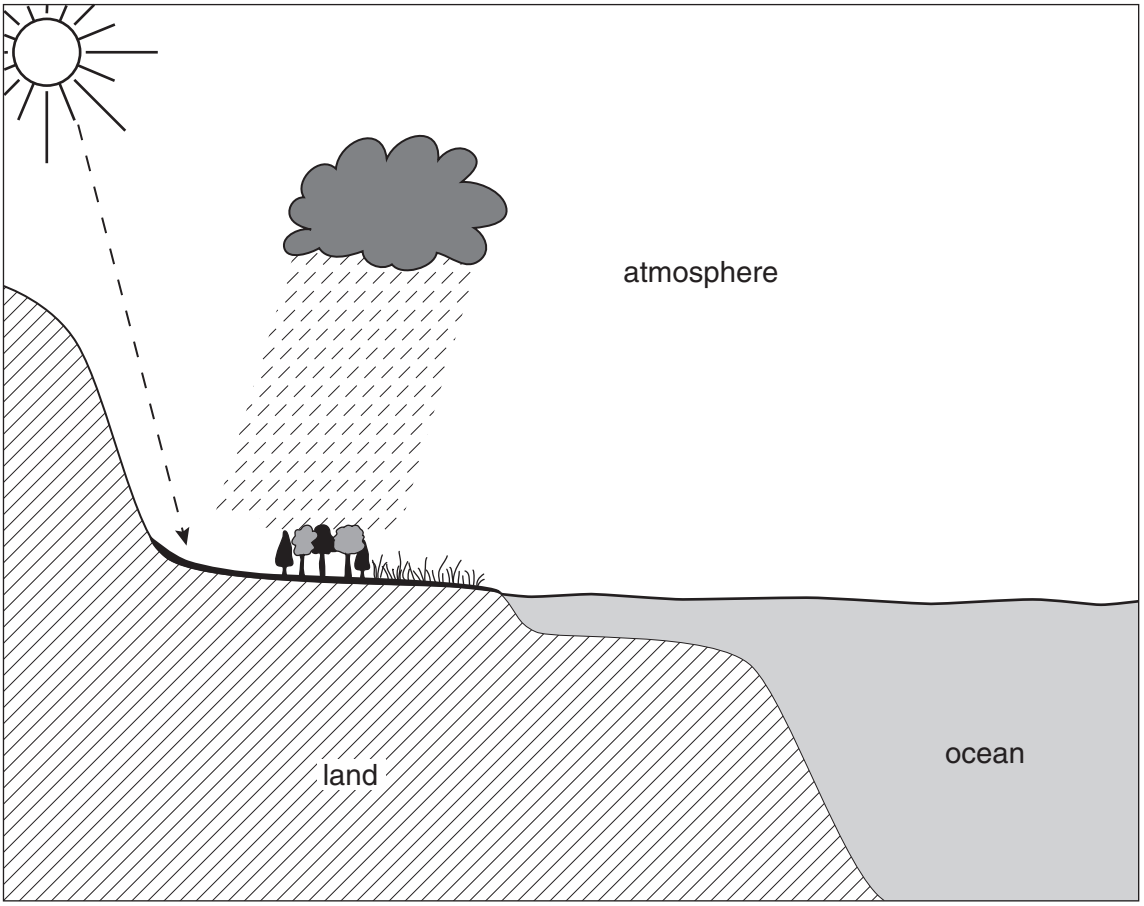
## Section B

For Examiner's Use

**5** **(a)** The Earth provides people with many useful natural resources – in the atmosphere, on the land surface, under the land surface and in the oceans.




Fill in the remaining boxes by naming two different examples of useful natural resources for people from the atmosphere, land surface and oceans.

| place | natural resources | |
|---|---|---|
| atmosphere | ..... | ..... |
| on the land surface | ..... | ..... |
| under the land surface | rocks | minerals |
| oceans | ..... | ..... |

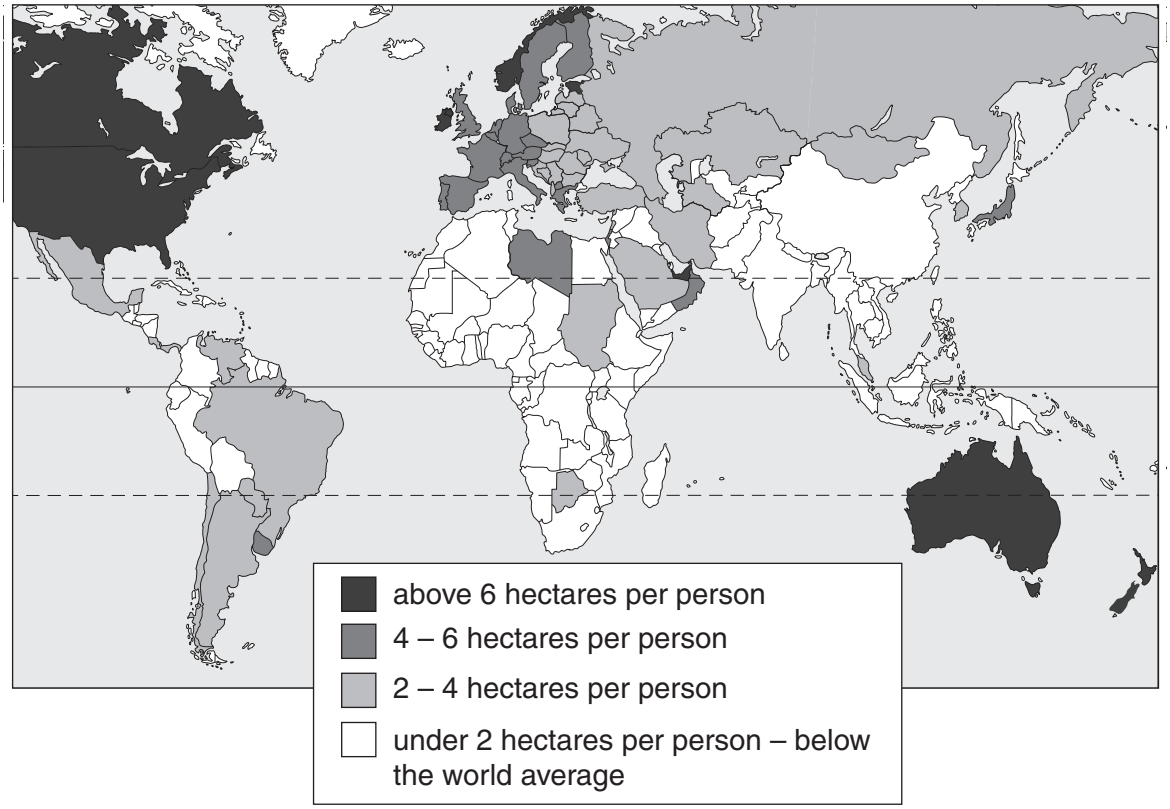
[3]

For Examiner's Use

**(b)** An environmental organisation has attempted to measure the ecological footprint of every country. The ecological footprint is the average amount of air, land, fresh water and sea resources used per person in each country, measured in hectares. World average is about 2 hectares per person.

Look at the world map showing the locations of countries with ecological footprints greater and lower than the world average.

**Ecological footprint of countries**




**(i)** Describe the location of countries with greater than average ecological footprints.

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For Examiner's Use

**(ii)** How is the distribution of countries with lower than average ecological footprints different from that of countries which are greater than average?

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.....[5]

**(iii)** On the world map, clearly mark and name any two countries with different ecological footprints, one above average and one below average. [2]

**(iv)** Give reasons for the different ecological footprints of these two countries.

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.....[4]

**(v)** A report in 2007 by another environmental organisation calculated that humans are using 30% more resources each year than the Earth can replace.

Why is this use unsustainable? Explain referring to examples of natural resources.

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.....[3]

For Examiner's Use

**(c)** World population growth is a major cause of the unsustainable use of natural resources.

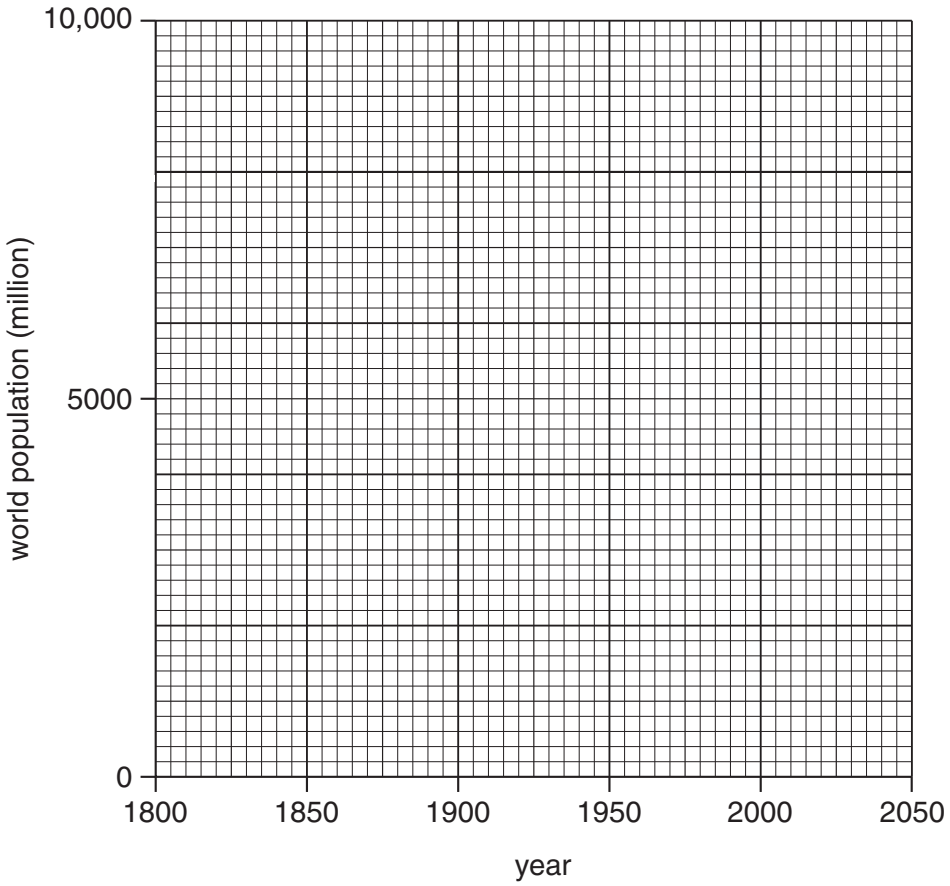
| year | total world population – actual and expected (million) |
|---|---|
| 1800 | 980 |
| 1850 | 1260 |
| 1900 | 1660 |
| 1950 | 2500 |
| 2000 | 6160 |
| 2050 | 9800 |

**(i)** By how many times is world population expected to have increased in the 250 years between 1800 and 2050?

.....[1]

**(ii)** Draw a line graph to show actual and expected world population numbers between 1800 and 2050.

**World population growth**




[3]

For Examiner's Use

**(iii)** How does the graph suggest that pressure on the Earth's natural resources will continue to increase?

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.....[2]

**(d)** Look at the population information for Nigeria, the country in Africa with most people.

| total population (million) | | birth and death rates in 2005 (per 1000) | | population structure in 2005 (%) | |
|---|---|---|---|---|---|
| 2005 | 127 | birth rate | 39 | under 15 | 44% |
| 2050 (expected) | 250 | death rate | 18 | over 60 | 5% |

**(i)** How many more people is Nigeria expected to have in 2050 compared with 2005?

.....[1]

**(ii)** Calculate the rate of natural increase per 1000 in Nigeria in 2005.

.....[1]

**(iii)** Describe how the population structure of Nigeria suggests that its population will continue to grow for many more years.

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.....[2]

**(iv)** More widespread use of family planning would help to reduce the high rates of population growth in Nigeria and many other countries in Africa, Asia and Central America.
Explain why some countries have been slow to manage their population growth.

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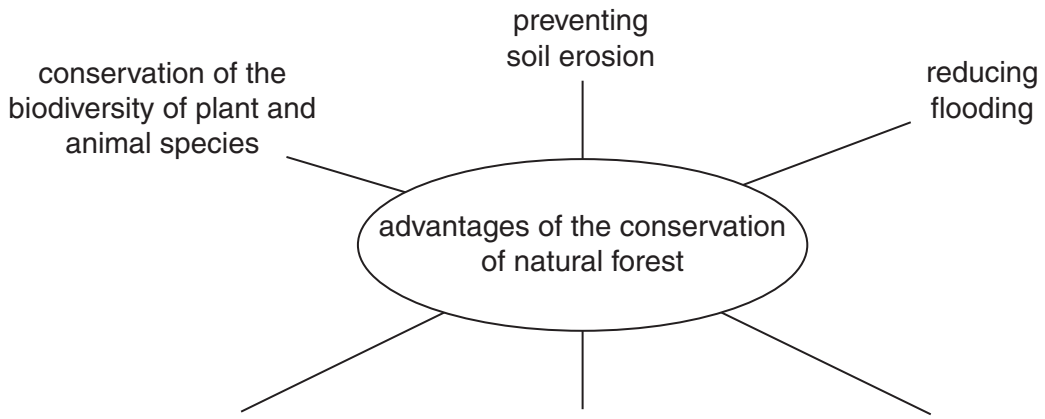
.....[4]

For Examiner's Use

**(e)** Some people say that a new type of economics is needed – one that puts a money value on the services that natural ecosystems provide free for humans.
Look at some of the advantages for humans of conserving natural forests.

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**(i)** Complete the spider diagram by adding three more advantages for humans. [3]

**(ii)** Explain why conservation of biodiversity of plant and animal species is important to humans now and in the future.

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.....[3]

**(iii)** Why are people continuing to destroy and clear natural forests despite all these advantages?

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.....[3]

[Total: 40 marks]

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For Examiner's Use

**6** **(a)** Rocks and minerals have many uses for people. Here is a list of nine useful rocks and minerals.

bauxite coal diamonds iron ore lead

limestone oil (petroleum) phosphates uranium

**(i)** From the list, choose the rock or mineral for each of the uses named below.

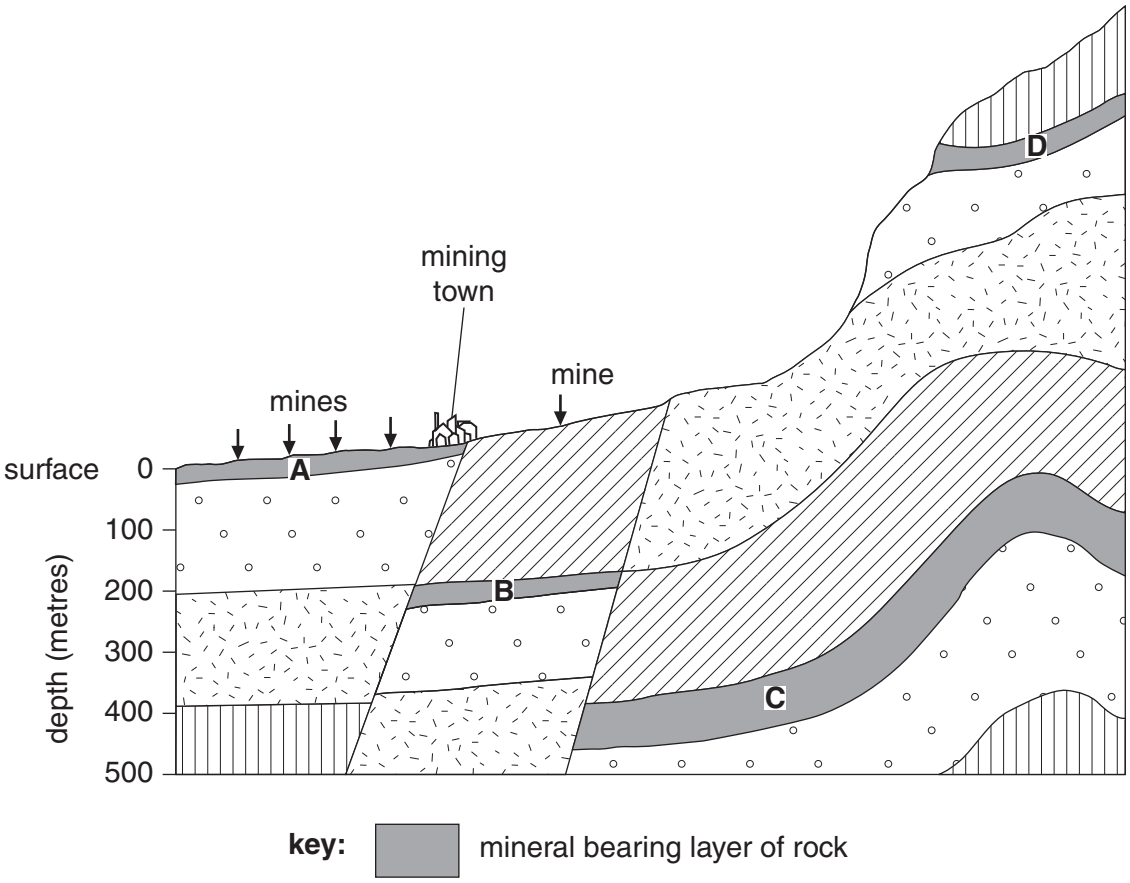
| **use** | **rock / mineral** |
|---|---|
| concrete and cement | ..... |
| plastics and synthetic fibres | ..... |
| steel girders | ..... |
| nuclear power | ..... [2] |

**(ii)** Choose any two of the other five rocks and minerals in the list, which were not used in answering part **(i)**. Give a use for each of them.

| **rock / mineral** | **use** |
|---|---|
| 1 ..... | ..... |
| | ..... |
| 2 ..... | ..... |
| | ..... [2] |

For Examiner's Use

**(b)** Look at the diagram which shows rock formations in a mining area.




**(i)** Name the type of mining used to take minerals out of rock layer **A**.

.....[1]

**(ii)** Describe the methods of mining used to take minerals out of rock layer **B**.

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.....[3]

For Examiner's Use

**(iii)** Explain why four mines are being used to take the minerals out of rock layer **A**, compared with only one for rock layer **B**.

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.....[3]

**(iv)** All mining causes environmental problems. Would you expect the environmental problems to be greater from mining rock layer **A** or **B**? Explain your answer.

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.....[2]

**(v)** When mining finishes at **A** and **B**, the mining company will need to look at rock layers **C** and **D**. Describe how the problems for mining layers **C** and **D** are likely to be greater than they were for **A** and **B**.

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.....[3]

**(vi)** Which rock layer would you expect them to mine first, **C** or **D**? Explain your answer.

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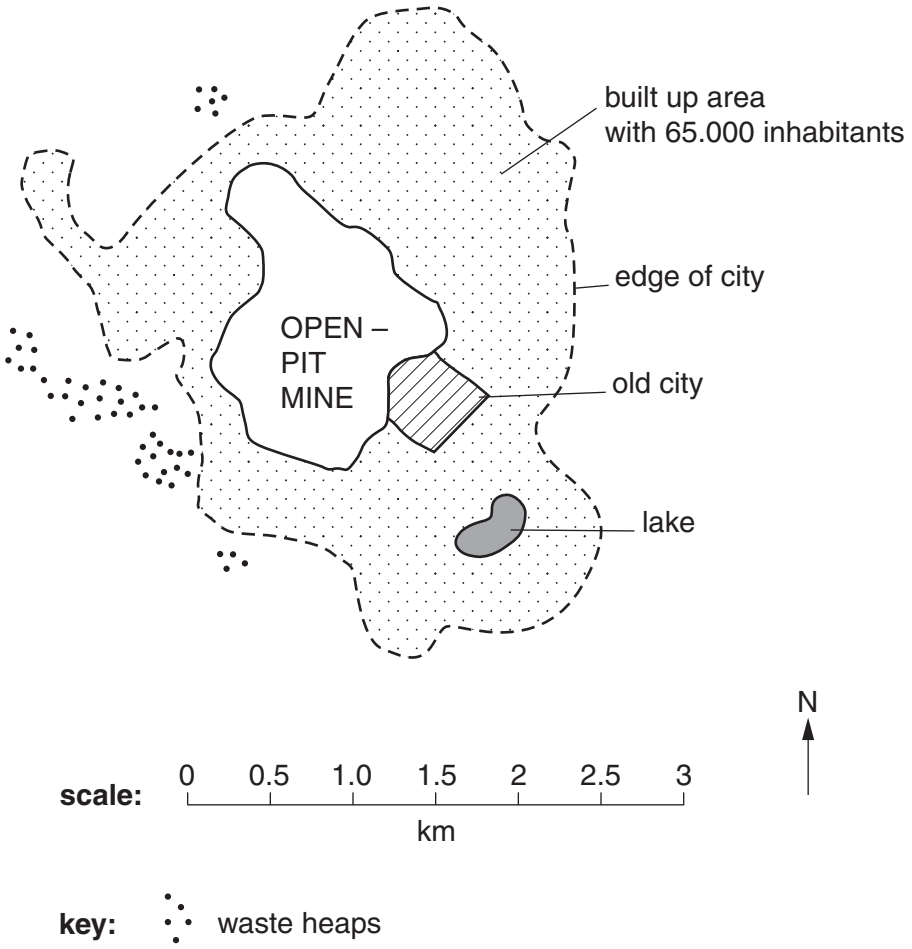
.....[2]

For Examiner's Use

**(c)** Cerro de Pasco is a mining town in the Andes of Peru. At a height of 4,380 metres above sea level, mining is the only reason for the existence of the town. Silver, lead and zinc have been mined here for over 400 years from a large open pit mine in the centre of town. The town clings to the edges of the 380 metre deep pit, as the map below shows. The mine produces 60,000 tonnes of lead and 150,000 tonnes of zinc a year and reserves are plentiful. The streets of poor houses, with their corrugated iron roofs black with mining dust, suddenly stop at the edge of the pit. Houses near the edge of the pit show many cracks.

**Cerro de Pasco**




**(i)** Look at the map and its scale. Describe how it shows the large size of the mine.

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..... [2]

For Examiner's Use

**(ii)** Describe the location of the mine.

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.....[2]

**(iii)** Suggest a reason for the large number of cracks reported in the houses near the edge of the pit.

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.....[1]

**(iv)** Where does the waste from the mine go?

.....[1]

**(v)** A health report in 2007 showed that over 90% of children and 80% of women of child-bearing age had high blood levels of toxic substances like lead. Diseases of lungs and heart were found to be common in older residents.
Explain how the mining here can cause great health problems like these for the inhabitants of Cerro de Pasco.

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.....[4]

For Examiner's Use

**(d)** The mining company wants to increase the size of the open pit to mine in the area under the old city. This will involve the destruction of the main church, historical buildings and many houses.

There are two plans.

**Plan 1** The big move

- Build a new town for 70,000 people 35 km away, along the main road
- Cost estimates range from US$500 million to US$3500 billion; who will pay?
- Expected time for doing this 10–15 years

**Plan 2** Local resettlement by the mining company

- Build a new church, public buildings and houses not far from the mine
- Cost estimates are US$5-10 million
- Expected time for doing this 2–3 years

**Views of residents**

**A**
Growth of the mine should be stopped until there is a fair plan for everyone to live in a healthy place.

**B**
The mining company is only interested in short-term profits, not sustainable development.

**C**
The mine gives people work, but the price in terms of bad health and poor living conditions is high.

**(i)** What are the advantages of Plan **1** compared with Plan **2**?

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For Examiner's Use

**(ii)** How likely is it that Plan **1** will ever be put into effect? Explain your view.

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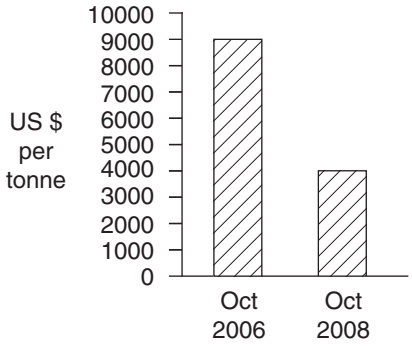
.....[5]

**(e)** Some countries depend upon mineral exports for most of their income. One example is Zambia, a poor landlocked country in Africa.

| **Zambia – the country** | **Zambia – minerals** | **World copper price** |
|---|---|---|
| population: 11 million<br>income per head: US$750<br>birth rate: 42 per 1000 | Africa's largest copper producer<br>exports: copper 85% of total<br>platinum 10% of total<br>1 in 10 paid jobs in mining | – the London Metal Exchange<br>  |



**(i)** How big was the difference in the copper price between October 2006 and 2008?

.....[1]

**(ii)** A market stall holder in Chingola, the main town in Zambia's copper belt, said 'Everyone in town gets worried when copper prices fall in London'.

Describe the likely effects of the big drop in copper price between 2006 and 2008 on local people living in Zambia's copper belt.

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.....[4]

For Examiner's Use

**(iii)** The main cause of the drop in world copper price was the recession in developed world countries. Why would a producer of copper (used in electrical wiring) and platinum (used in catalytic converters), located more than 12,000 km away like Zambia, be so badly affected?

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..... [2]

[Total: 40 marks]

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