



Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE
NAME

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CENTRE
NUMBER

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ENVIRONMENTAL MANAGEMENT

5014/12

Paper 1

May/June 2014

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 an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

Answer **all** questions.

Electronic calculators may be used.

You may lose marks if you do not show your working or if you do not use appropriate units.

Write your answers in the spaces provided on the Question Paper.

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.

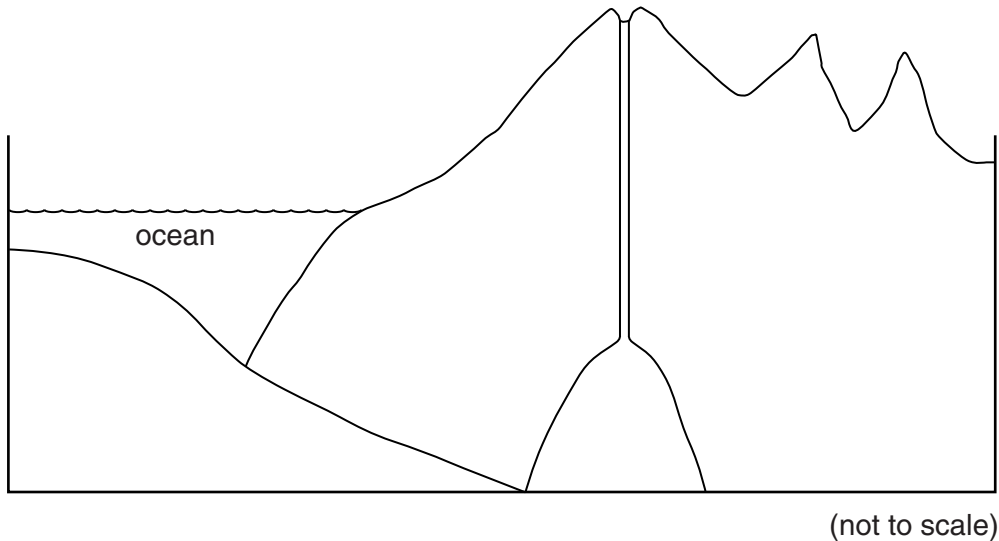
This document consists of **25** printed pages and **3** blank pages.



Section A

Answer **all** the questions.

- 1 (a) Look at the diagram of a plate boundary.



- (i) On the diagram label:

the oceanic plate
the magma reservoir
the crater of the volcano

[3]

- (ii) The diagram shows part of one of the layers of the Earth.

Circle which layer is shown.

crust inner core mantle outer core

[1]

- (iii) Name the type of plate boundary shown in the diagram.

.....[1]

- (iv) Explain how magma forms at this type of plate boundary.

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.....[2]

3

(b) Suggest three hazards of living on the slopes of volcanoes in areas such as the one in the diagram.

1

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2

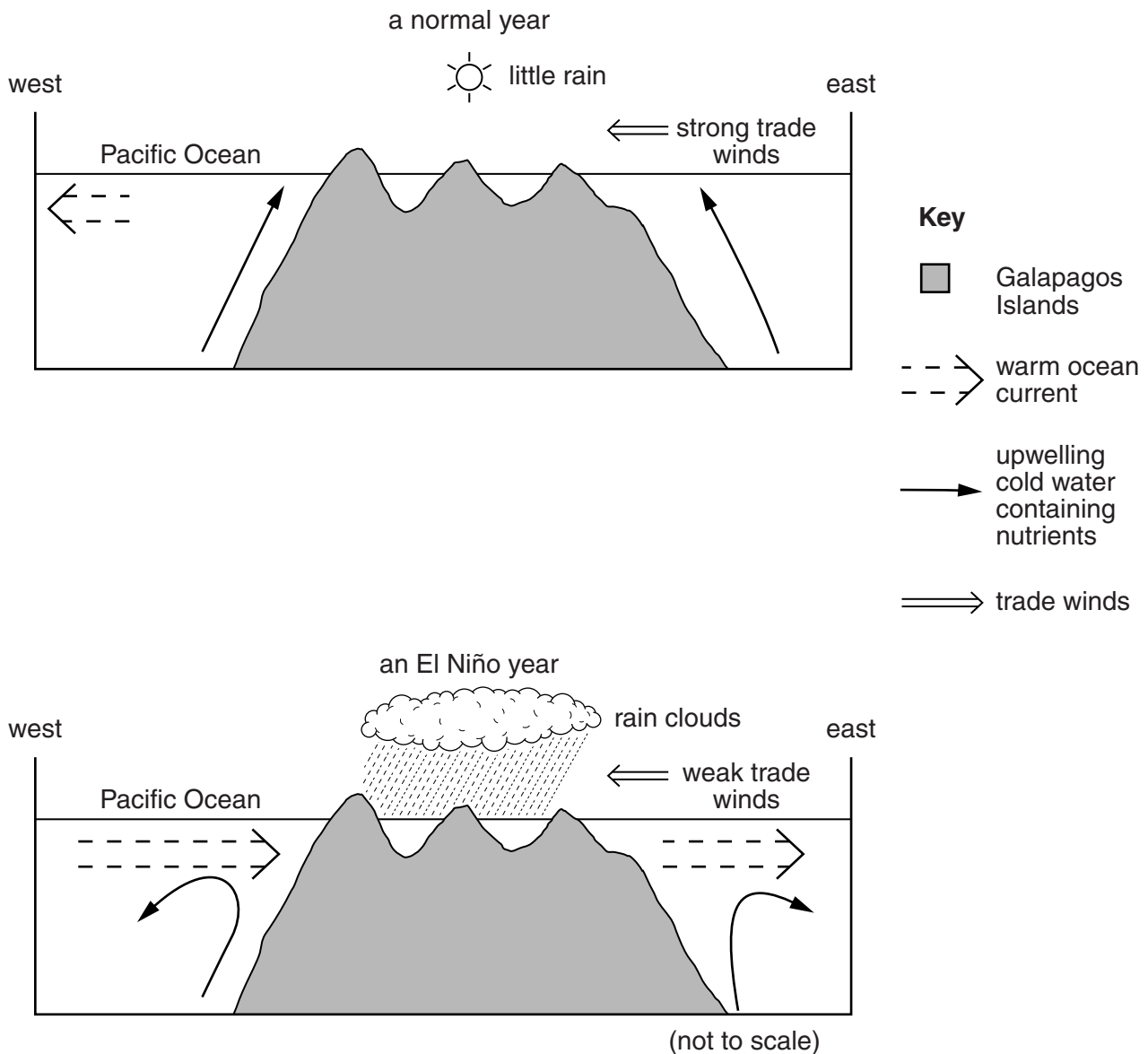
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.....[3]

[Total: 10]

- 2 (a) Look at the diagrams which show the seas around the Galapagos Islands in a normal year and in an El Niño year.



- (i) Use the diagrams to explain the causes of an El Niño event.

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.....[3]

- (ii) Suggest why El Niño years are better for most land-based animals in the Galapagos Islands.

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.....[4]

- (b) The diagram shows one food chain for the Galapagos Islands.

seaweed (algae) → marine iguana → Galapagos hawk

Seaweed needs nutrients.

Explain why thousands of marine iguana die during an El Niño event.

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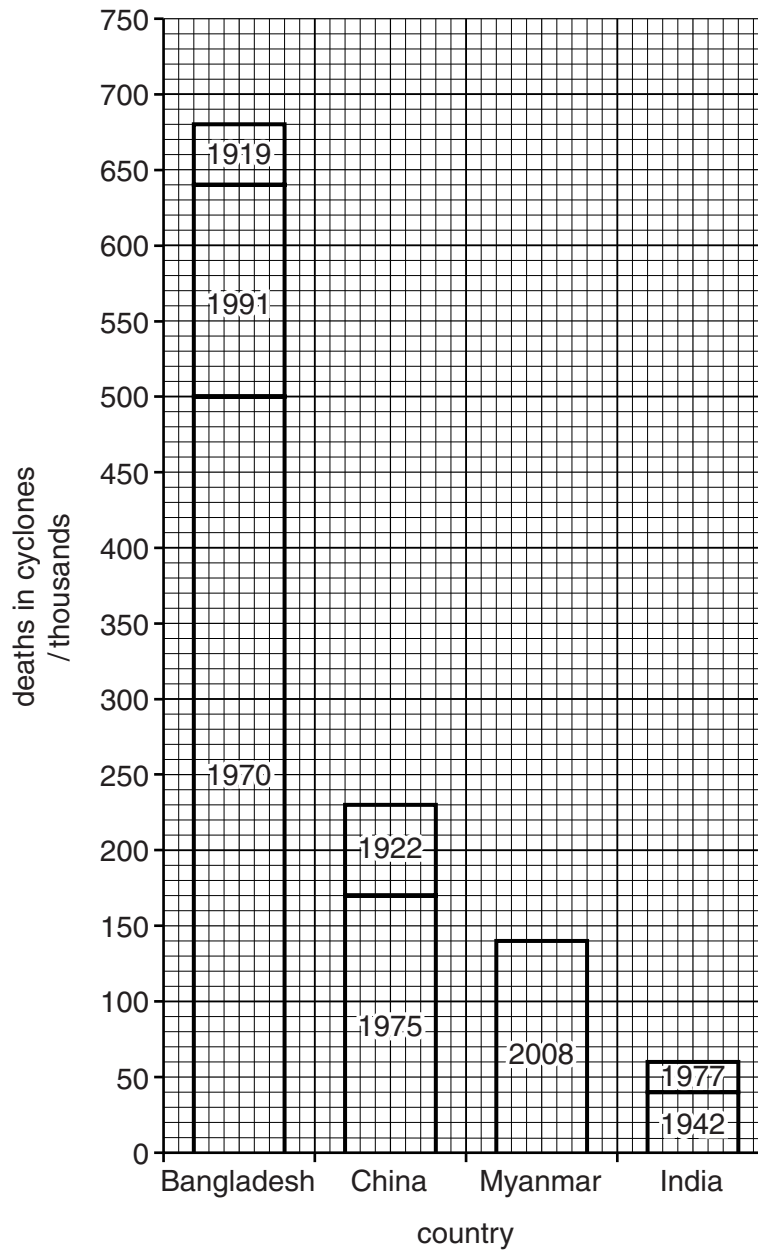
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[Total: 10]

- 3 (a) Look at the bar graph which shows the number of deaths in four countries caused by some cyclones between 1900 and 2010.



- (i) Complete the graph by adding the cyclone in Bangladesh in 1912 that killed 40 000 people. [1]
- (ii) Compare the effect of these cyclones before and after 1950.

.....

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.....[2]

(b) State two characteristics of the weather of cyclones that cause loss of life.

1

2 [2]

(c) Explain why cyclones of the same strength kill very different numbers of people, using the following headings:

the type of land and its location

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human and economic reasons

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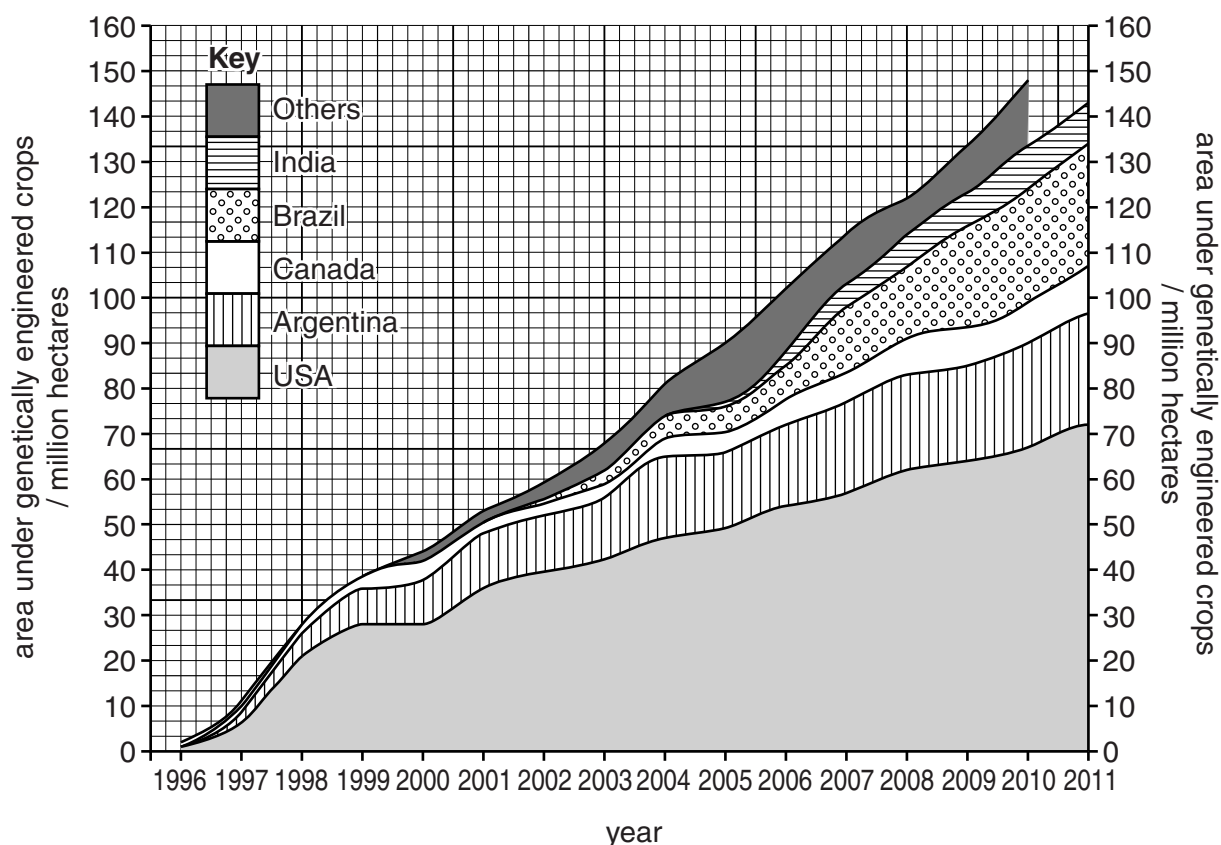
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[Total: 10]

- 4 (a) Look at the graph which shows the number of hectares used for genetically engineered crops between 1996 and 2011.



- (i) Complete the graph to show that the total area of land under genetically engineered crops in the world was 160 million hectares in 2011. [1]
- (ii) Approximately what proportion of the world's genetically engineered crops was grown in the USA in 2011? Circle the correct answer below. [1]
- 20% 35% 45% 65%
- (iii) In which year did Brazil start growing genetically engineered crops? [1]
-

- (b) (i) Some genetically engineered crops are resistant to insect pests.

Suggest two advantages of this.

- 1
-
- 2
-[2]

- (ii) Some genetically engineered crops have increased protein content.

Suggest **one** advantage of this.

-
-[1]

- (iii) Give reasons why some people are concerned about the growth of genetically engineered crops.

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-
-
-[4]

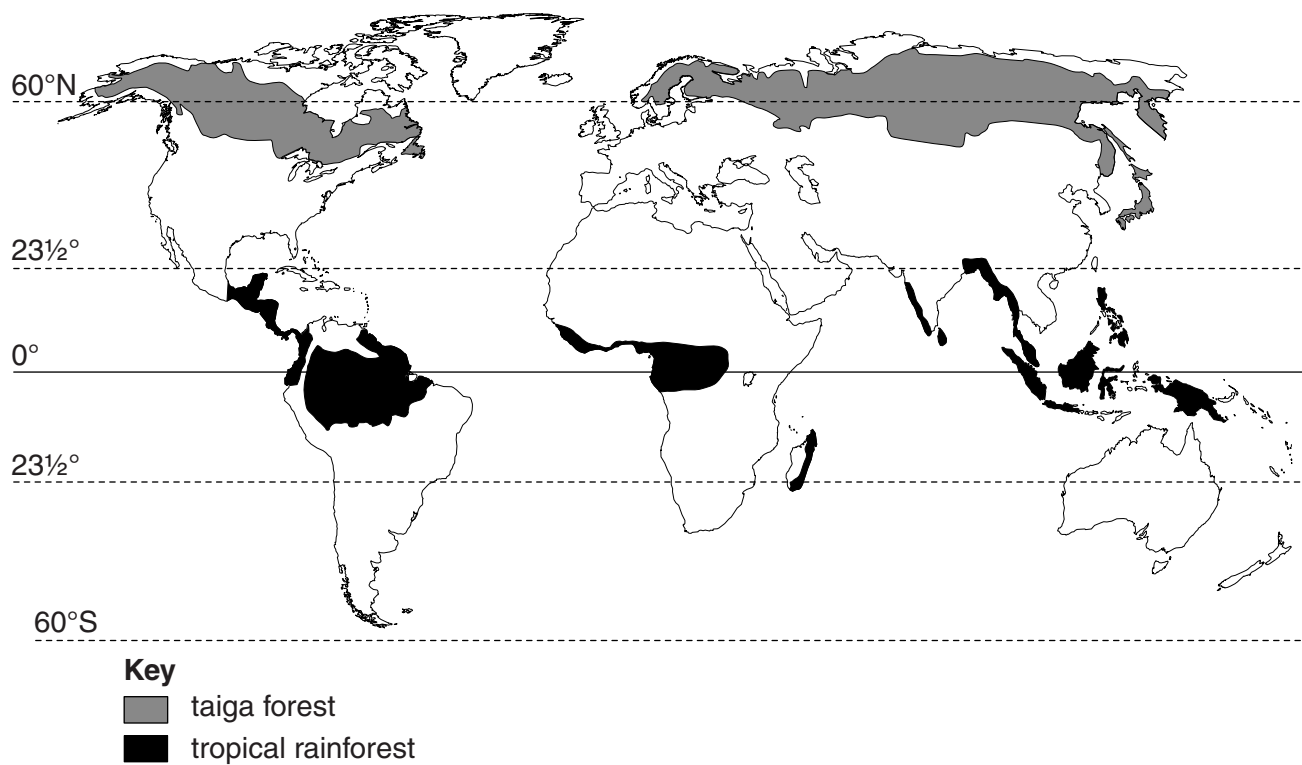
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Section B

Answer **both** questions.

- 5 (a) Look at the map showing the world distributions of two biomes, tropical rainforest and taiga forests.

location of tropical rainforest and taiga forest biomes



- (i) Describe where tropical rainforests are located.

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..... [2]

- (ii) Describe where taiga forests are located.

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..... [2]

- (iii) State the most important difference between the distribution of taiga forest and tropical rainforest.

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 [1]

- (b) Some of the characteristics of the vegetation in the two biomes are given in the table. Complete the table by filling in the empty boxes.

	tropical rainforests	taiga forest
A forest characteristics		
1 biodiversity	many species of tree in 50 hectares	two or three species of tree in 50 hectares
2 forest layers	4 or 5	
3 tree shape	1. tall and slim trunks, 2. branches and leaves mainly at the top	1. 2.
B leaf characteristic		
C example of named tree	mahogany	

[6]

(c) Look at the table showing a summary of the climates for tropical rainforests and taiga forests.

	temperature/°C		precipitation/mm		
	mean monthly temperature		mean annual total	wettest month	driest month
climate	highest	lowest			
equatorial for tropical rainforest	28	26	2000	270	150
cool temperate interior for taiga forest	14	−12	500	70	20

(i) Calculate the annual range of temperature in taiga forest.

Space for working.

..... °C [1]

(ii) Use the climate data to explain two differences in vegetation characteristics between tropical rainforest and taiga forest.

difference

explanation

.....

difference

explanation

..... [3]

- (iii) The table below shows the percentage of tropical rainforest and taiga forest cleared by people.

tropical rainforest
45% already cleared

taiga forest
less than 5% cleared

Suggest how the climates of the two biomes explain this difference.

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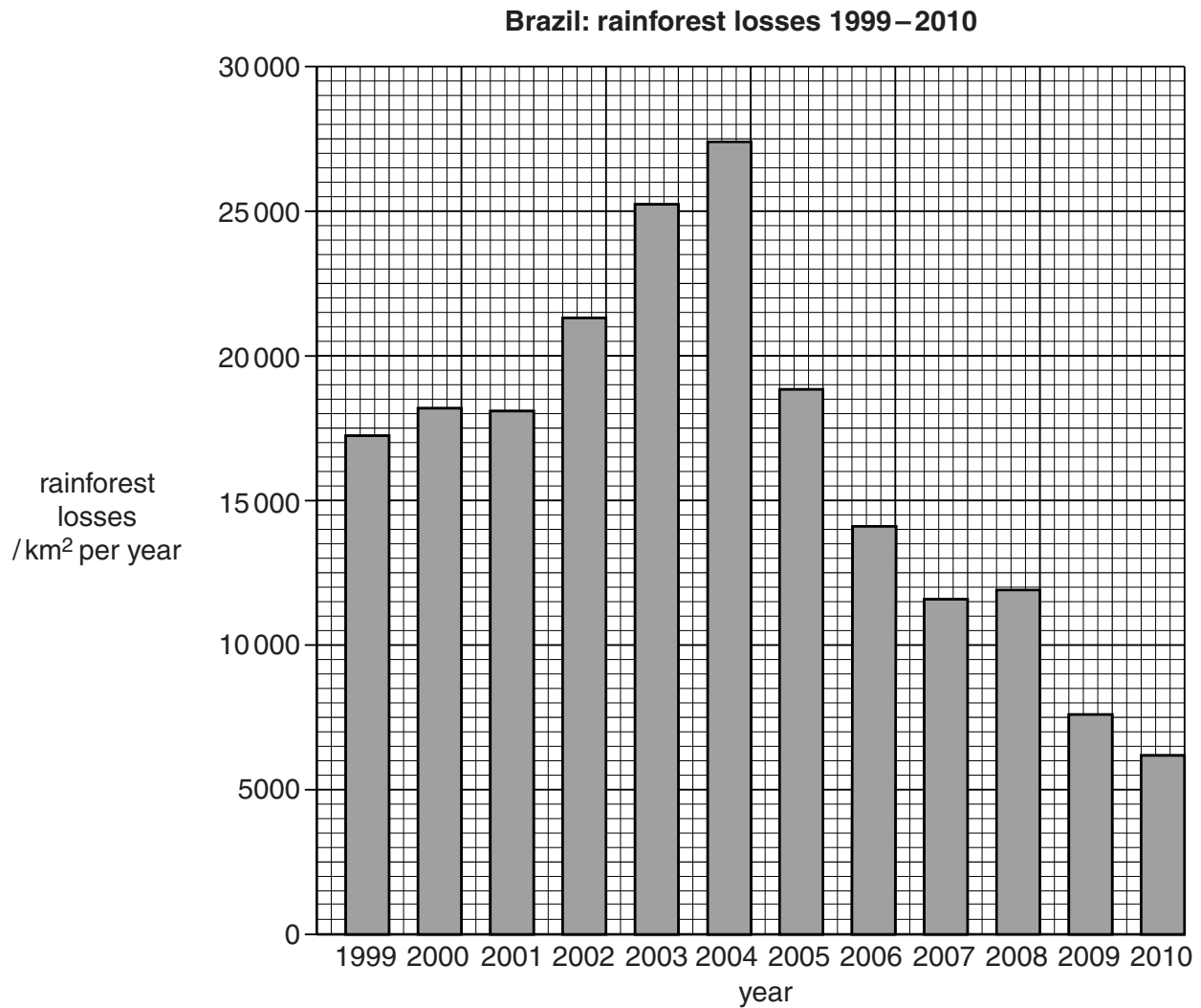
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(d) Environmental groups are concerned about tropical rainforest losses in Brazil.

Look at the bar graph showing estimates of forest clearances from 1999 to 2010.



- (i) Describe the trends shown by the graph on page 14.

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- (ii) Discuss the extent to which the graph shows that the environmental groups should be concerned about the clearance of the tropical rainforest in Brazil.

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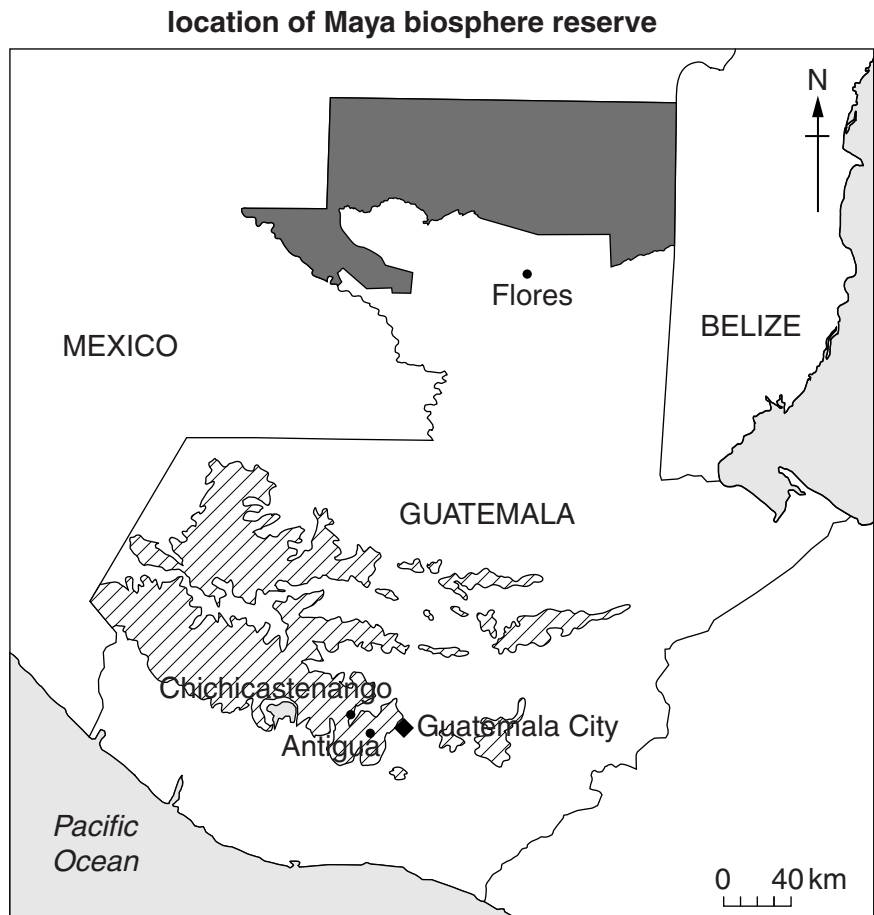
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- (e) One strategy for tropical rainforest conservation is to create a biosphere reserve. One example is the Maya biosphere reserve in Guatemala. It was created in 1990 to protect the largest remaining area of tropical rainforest in Central America. Map A shows its location and map B shows the zones within it.

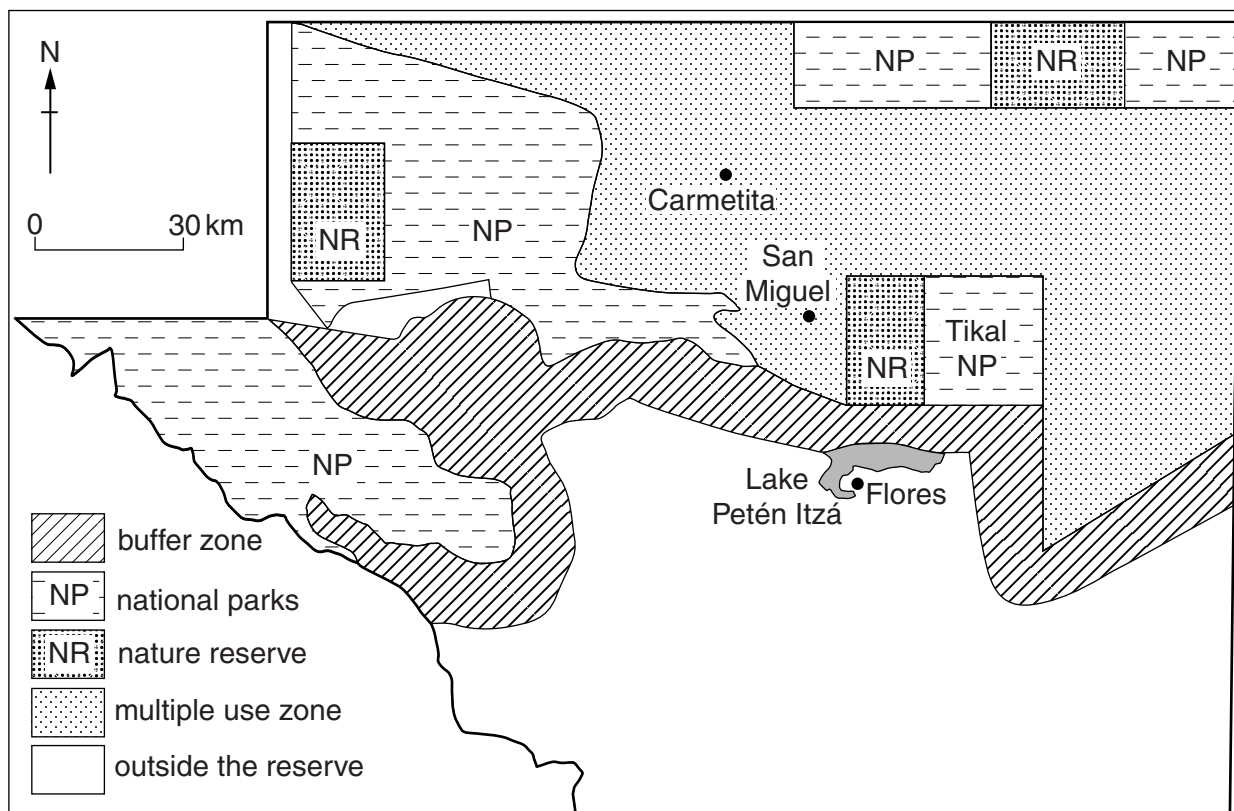
map A

**Key**

- Maya biosphere reserve
- mountain region
- capital city
- other main cities and towns

map B

zones inside the Maya biosphere reserve



(i) Name the **two** land uses where conservation of the rainforest will be greatest.

..... [1]

(ii) How does this give protection to the rainforest?

.....
 [1]

(iii) Describe where the buffer zone is located **and** suggest its purpose.

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 [2]

- (iv) People living in the multiple use zone are encouraged to follow new economic activities, such as the sustainable harvesting of forest products rather than slash and burn subsistence farming.

A Fair Trade group has been organised to buy and export products.

Explain how **and** why these new economic activities can increase the chances of remaining areas of forest being conserved by the local people.

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..... [3]

- (v) Tikal, with its Mayan pyramids, attracts 200 000 visitors a year many of them from overseas.

Suggest what can be done to try to ensure that local people can share in some of the economic benefits from tourism.

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..... [3]

- (vi) Government figures show that the Maya biosphere reserve has lost 21% of its forest cover since being declared a protected zone in 1990. Some losses are due to illegal activities, such as production of drugs and forest clearance for airstrips to export the drugs.

Suggest why the government find it difficult to protect the forest from clearance.

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..... [2]

- (vii) Many biosphere reserves are located in countries where average incomes are low, such as Guatemala.

To what extent is the strategy of creating biosphere reserves likely to be successful? Explain your answer.

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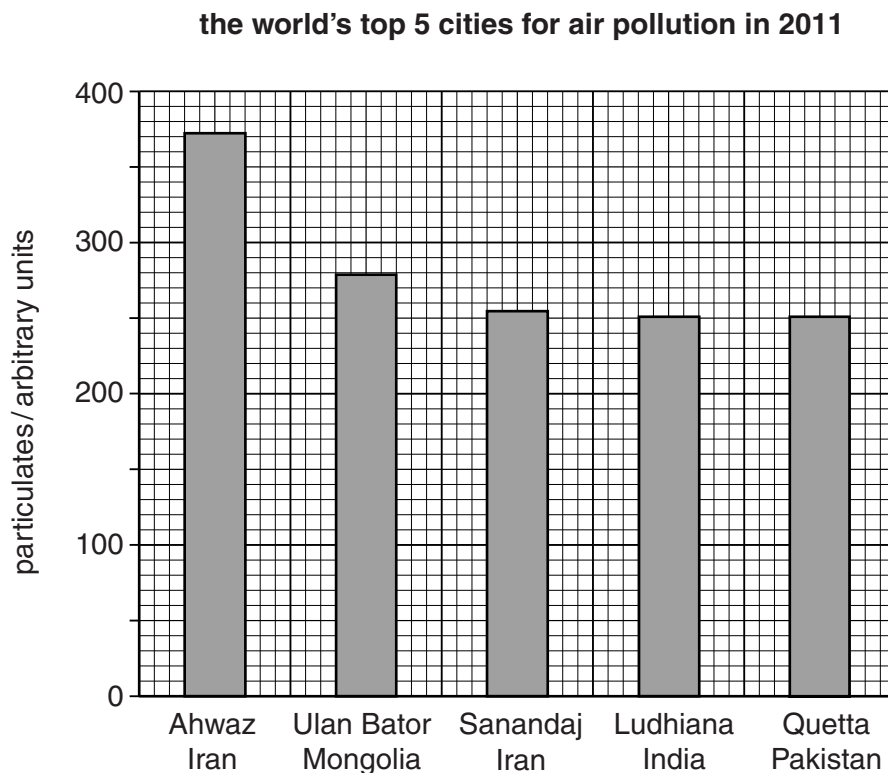
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[Total: 40]

- 6 (a) The bar graph shows the results of a survey in 2011, which identified the five cities with the world's highest urban air pollution. It was based on the measurement of particulates (such as smoke particles) in the atmosphere.



- (i) The World Health Organisation (WHO) recommends 20 arbitrary units as a safe limit for particulates.

On the graph above, draw a line to show this safe limit.

[1]

- (ii) Approximately how many times higher were the particulates in Quetta than the WHO safe limit?

Circle one answer.

5 times

9 times

12 times

18 times

[1]

- (iii) Describe how high levels of air pollution can affect economic activity in a city.

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..... [3]

- (iv) One of the reasons for the high levels of air pollution in these cities is the burning of fuel oil, firewood and dried dung.

Suggest reasons why it is difficult to reduce the amount of particulates going into the atmosphere in cities such as these.

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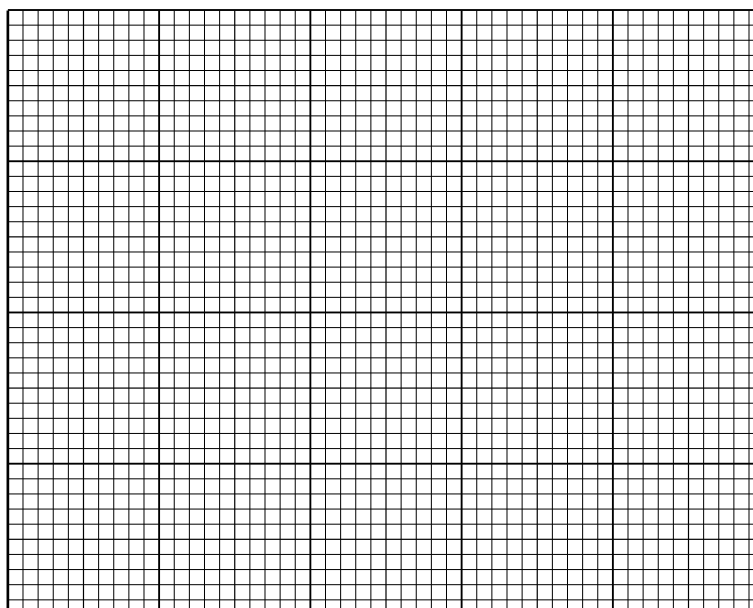
..... [3]

- (b) (i) Particulate amounts in four of the world's cities are given in the table.

city	country	particulates /arbitrary units
Beijing	China	121
Mexico City	Mexico	30
Los Angeles	USA	25
New York	USA	21

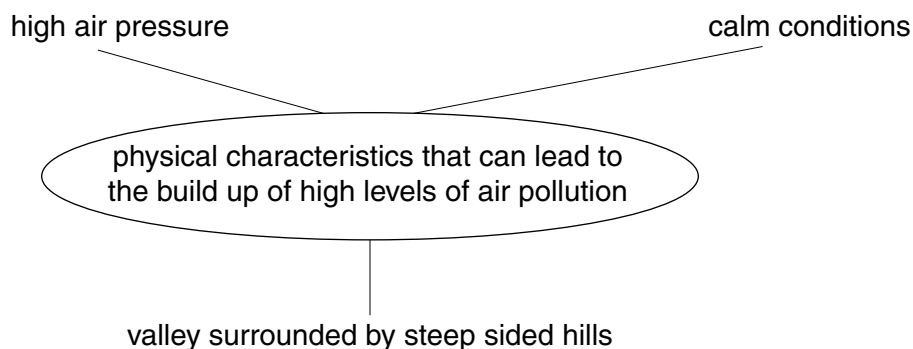
On the grid below, draw a bar graph of particulate amounts in Beijing, Mexico City, Los Angeles and New York.

air pollution in four of the world's cities



[3]

- (ii) There are certain physical characteristics which increase the chances of high levels of air pollution in cities. Three of these are named in the spider diagram.



Explain how these physical characteristics can lead to the build up of high levels of air pollution.

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- (iii) Describe strategies that can be used to improve the air quality in cities.

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- (iv) Explain the problems that governments have in implementing strategies to reduce air pollution in cities.

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- (c) Read the newspaper report about an air pollution accident in Bhopal, India in December 1984.

Disaster in Bhopal

A gas leak from a pesticide factory has killed more than 25 000 people. A large cloud of poisonous gas covered the shanty towns around the factory. The health of about 250 000 people living further away is thought to be at risk. People in Bhopal had little idea about the dangers of living next to a factory producing toxic chemicals.

The accident was caused by design faults in the factory's safety systems and by poor maintenance.

In the United States of America, factories making such toxic chemicals must be located at least 80 kilometres away from the nearest settlement.

- (i) State two ways in which the factory's managers could have reduced the risk of a gas leak from this factory in Bhopal.

1

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2

..... [2]

- (ii) Suggest why there was a greater loss of life in India, a developing country, than there would have been if the accident had happened in the United States of America, a developed country.

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..... [3]

- (d) Read this newspaper report written in 2009.

25 years later; the effects of the disaster are still being felt by the people of Bhopal

More than 25 000 people have died and at least 500 000 have serious health problems, such as cancer, anaemia, infertility and birth defects. Large areas around the factory have been labelled a 'global toxic hot-spot', unfit for any kind of use.

The factory site remains closed and abandoned, with thousands of tonnes of toxic wastes stored there. In the monsoon season, the rains wash these chemicals into the groundwater, contaminating local wells. These contain mercury concentrations thousands of times higher than WHO (World Health Organisation) recommended limits. An estimated 90 per cent of local people have to use this well water. They complain that not enough water is being piped in by the authorities.

- (i) Describe and explain the long-term effects of the Bhopal disaster.

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..... [4]

- (ii) Give **three** reasons why people could still be suffering from the effects of this disaster in another 25 years time.

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..... [3]

- (e) Human activities damage environments in many ways, such as the impact of mineral exploitation.

Discuss what measures could be taken to restore such damaged environments.

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..... [6]

[Total: 40]

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