



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

CANDIDATE  
NAME

CENTRE  
NUMBER

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**ENVIRONMENTAL MANAGEMENT**

**5014/01**

Paper 1

**October/November 2009**

**2 hour 15 minutes**

Candidates answer on the Question Paper.

Additional Materials:     Ruler  
                                     Protractor

**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.

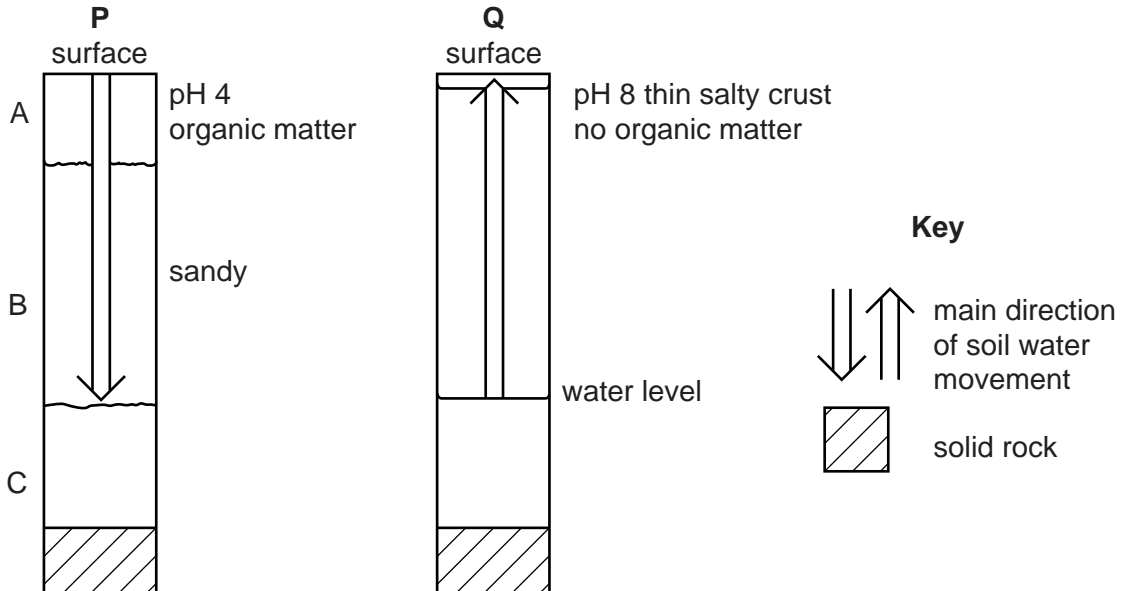
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6	
<b>Total</b>	

This document consists of **22** printed pages and **2** blank pages.



Section A

1 (a) Look at the soil diagrams, **P** and **Q**, showing soils from different parts of the world.



- (i) Which soil is the most acidic? ..... [1]
- (ii) On profile **Q** shade the part of the soil which has no air content. [1]
- (iii) Which soil is in an area with a desert climate? Explain your answer.

..... [1]

(b) Explain how human activity causes salination (salinization) of soils.

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..... [4]

(c) Why is soil **P** likely to cause problems for crop farmers?

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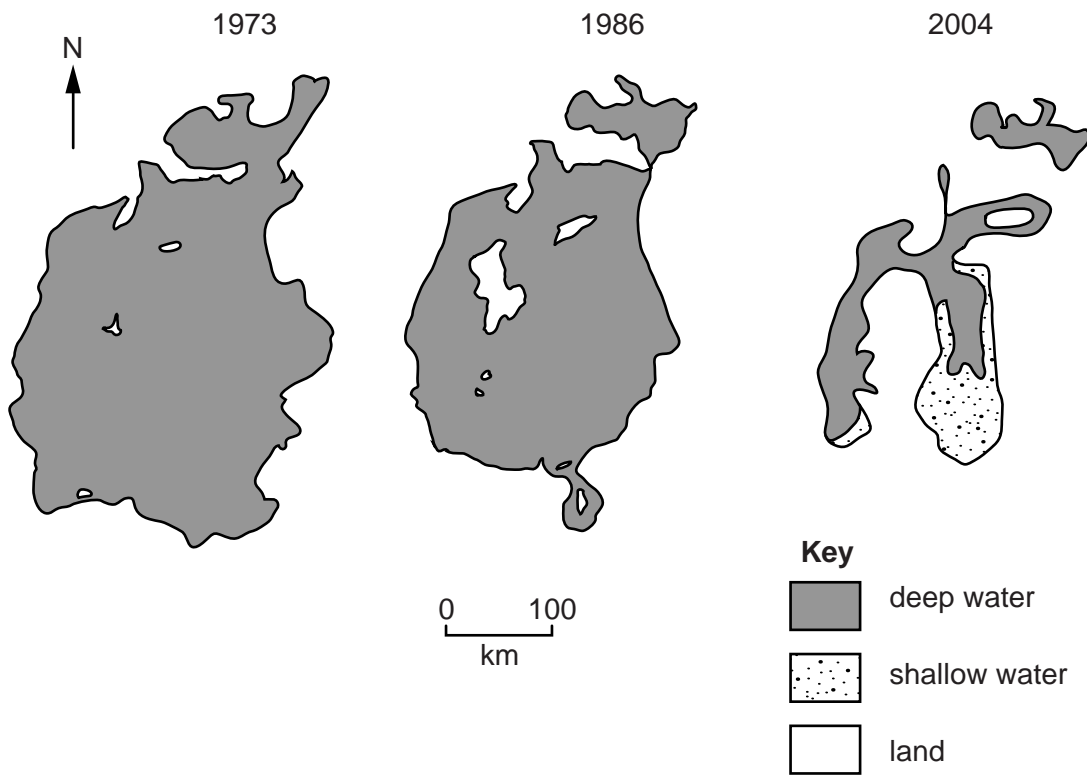
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..... [3]

2 (a) Look at the maps showing the size of the Aral Sea, an area of freshwater in Asia, in 1973, 1986 and 2004.



(i) Describe the changes which have taken place since 1973.

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.....

.....

..... [3]

(ii) Suggest possible reasons for the changes.

.....  
.....  
.....  
.....  
..... [3]

(b) (i) What is El Nino?

.....  
.....  
.....  
.....

(ii) Why does it alter rainfall amounts in Peru and other areas of the world?

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..... [4]

3 (a) (i) Name an instrument used to measure atmospheric pressure.

..... [1]

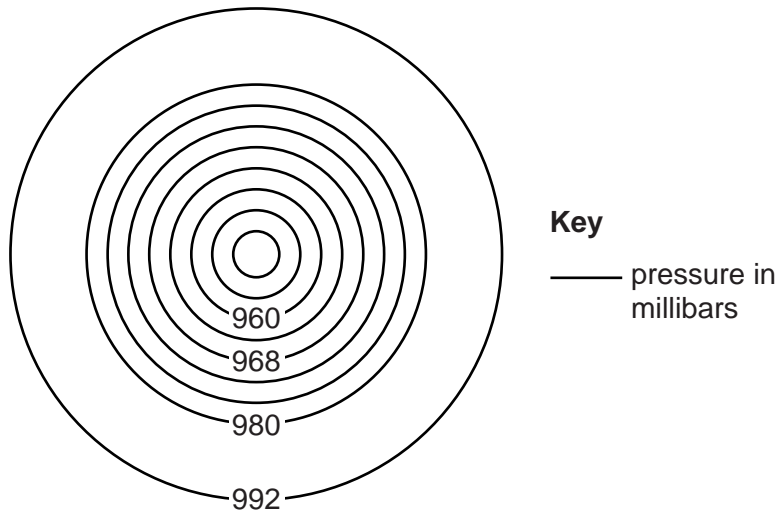
(ii) Read the description of part of an instrument which measures atmospheric pressure:

“It contains a collapsible metal box which is partly evacuated of air. When pressure rises, the top of the box bends in”.

Explain why a change in air pressure causes this change.

..... [1]

(b) (i) The diagram shows isobar lines in a pressure system known as a cyclone.



On the diagram, shade the area with the lowest pressure. [1]

(ii) Complete the diagram by drawing in the isobar lines between 980 and 992 mb. [1]

(iii) Does the diagram show that the winds will be weak or strong? Explain your answer.

.....  
..... [1]

(iv) What features of a cyclone cause damage?  
..... [2]

(v) Explain how improved weather forecasting can reduce the impact of a cyclone.  
.....  
.....  
.....  
.....  
..... [3]

4 (a) (i) Look at the photograph, which shows an oil refinery in an area of natural beauty.



State two features of the oil refinery which people could consider to be ugly.

.....  
..... [2]

(ii) For what **other** reasons could people object to the construction of an oil refinery at this location?

.....  
.....  
.....  
.....  
..... [3]

(b) Many tourists visit this area. Suggest one reason why they come.

.....  
..... [1]

(c) Suggest why the Government and Local Authorities allowed an oil refinery to be built in this coastal area, even though it is important for tourism.

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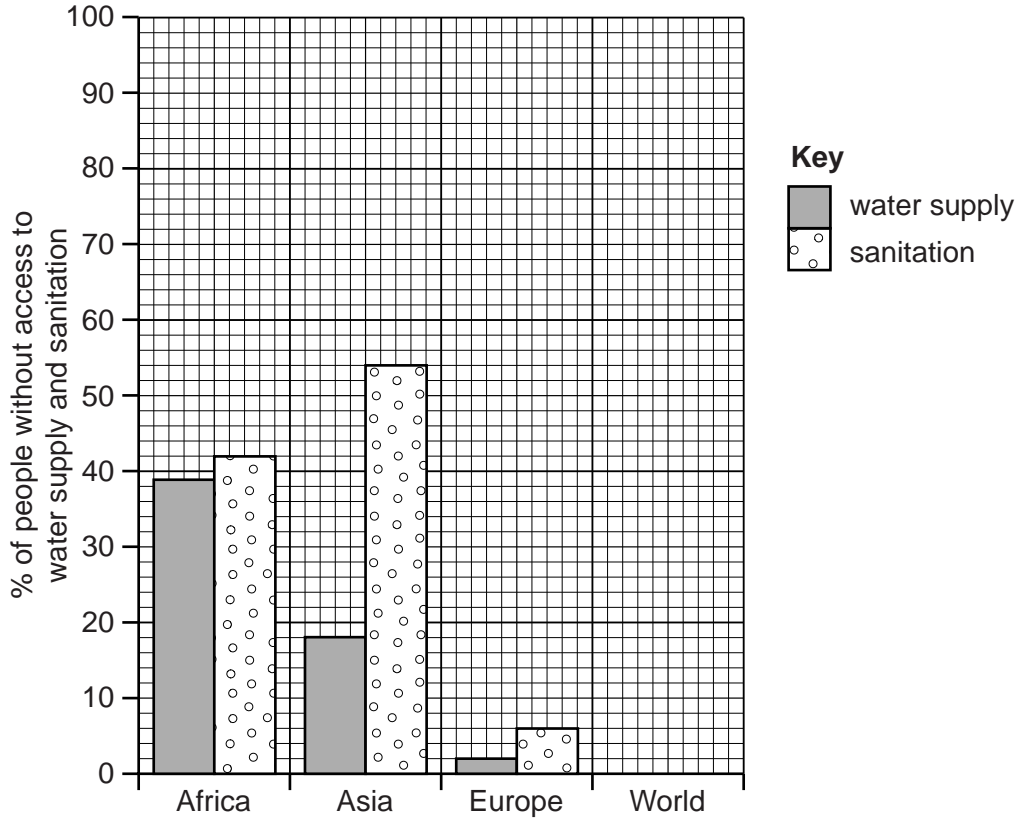
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Section B

- 5 (a) The graph shows percentages of people **without** access to water supply and sanitation in three continents.



- (i) Average percentages for the World  
 without water supply      18  
 without sanitation         40

Add the percentages for the World to the graph.

[2]

- (ii) Compare the percentages for the World with those for each continent.

Africa

.....  
 .....

Asia

.....  
 .....

Europe

.....  
 .....

[3]



(iii) State one reason why more people in the world have access to water supply than to sanitation.

.....  
.....  
..... [2]

(b) (i) If people do not have access to a piped water supply, from where do they obtain their drinking water? Name one source.

..... [1]

(ii) How safe, for drinking, is the water from this source? Explain your answer.

.....  
.....  
..... [2]

(c) One method for a country to increase supplies of clean water is desalination (extracting fresh water from sea water).

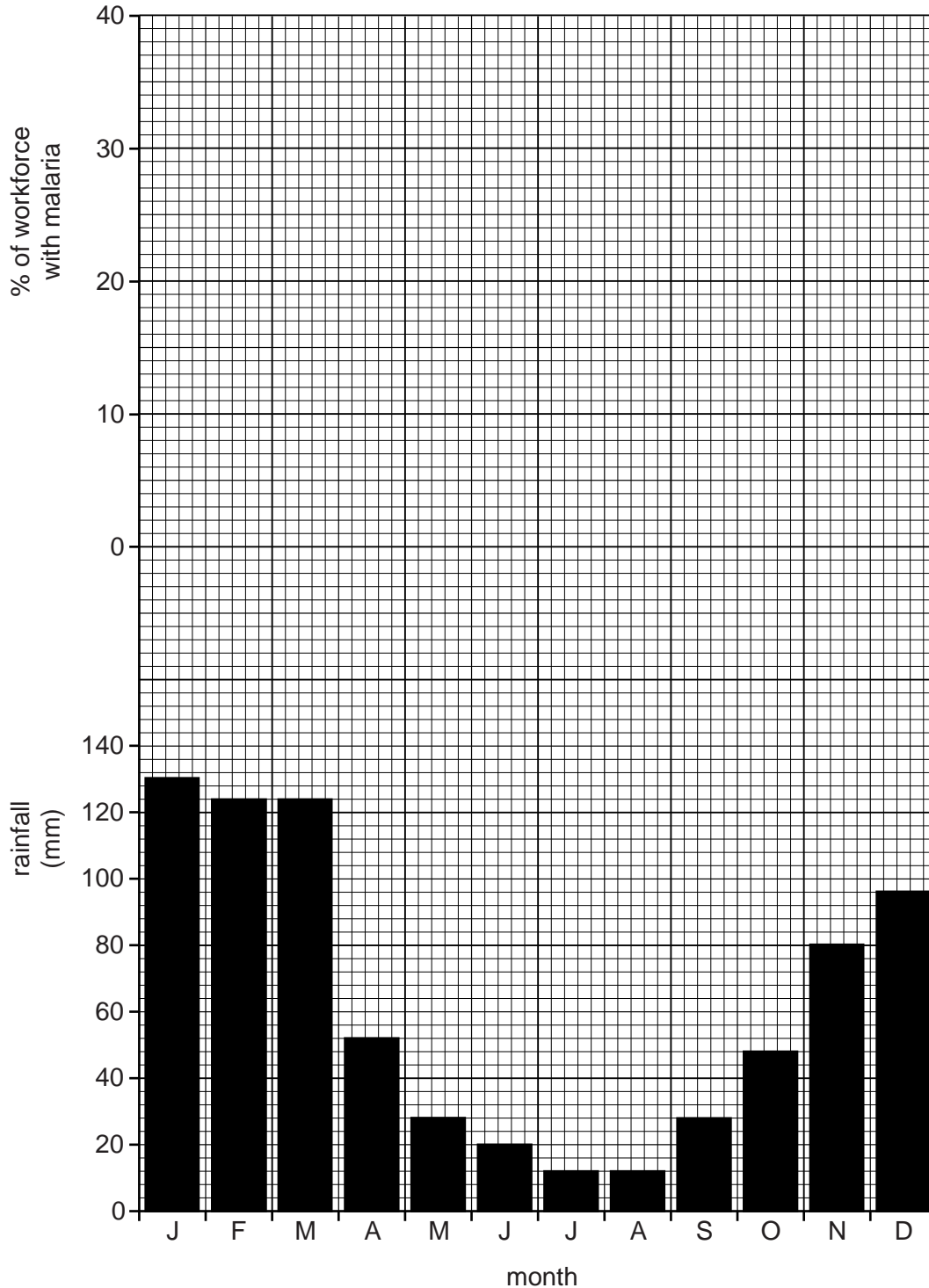
Why is desalination widely used in some Middle Eastern countries, especially Saudi Arabia, UAE and Kuwait, but rarely used elsewhere?

.....  
.....  
.....  
.....  
..... [3]

(d) Over three million people in the world die each year from water-related diseases. Malaria is the largest killer.

For  
Examiner's  
Use

(i) The graph shows rainfall for Maputo, the capital of Mozambique. It is located 25° south of the Equator in Africa.



The percentage of the workforce with malaria at a factory in Maputo varied during the year.

Percentage of workforce with malaria											
J	F	M	A	M	J	J	A	S	O	N	D
6	17	19	22	25	13	11	8	11	8	5	4

Draw a line graph above the rainfall graph to show these percentages for Maputo. [3]

(ii) When is the wet season in Maputo? [1]

(iii) At what time of year are there most cases of malaria among the workforce? [1]

(iv) How and why does the pattern of rainfall during the year affect the percentage of workers with malaria? Explain as fully as you can. [3]

(e) Information about malaria

Deaths per 100,000 people with malaria

	1900	1925	1950	1975	2000
In the world	200	170	50	20	25
In Africa	220	210	180	120	160

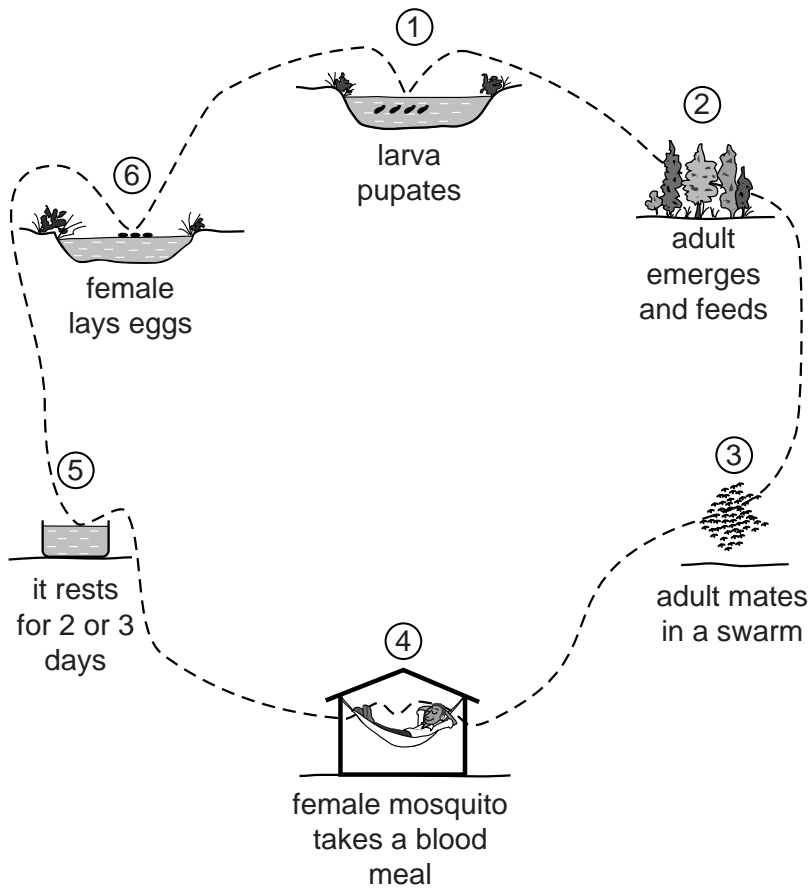
- \* 500 million cases a year world-wide
- \* 2–3 million people die from it every year
- \* At least 1 million deaths are in Africa
- \* Over 2 billion people (1 in 3 in the world) are at risk
- \* Most sufferers contract malaria two or three times a year

(i) Describe how the information shows that malaria is a more serious problem in Africa than in the rest of the world. [3]

(ii) Malaria is an important factor keeping people and countries in Africa poor. State two ways it does this.

.....  
.....  
.....  
..... [2]

(f) The diagram shows how the female mosquito spreads malaria.



(i) Why is malaria a water-bred disease?

.....  
..... [1]

(ii) Details about the two early methods of controlling malaria are given below.

**Method 1** – Use of cheap medicines, especially chloroquine

Problem: so widely used to treat tropical fevers that mosquitoes have developed resistance to it.

**Method 2** – Spraying the pesticide DDT on the breeding grounds; only small amounts needed to be used, yet it was highly effective in killing mosquitoes

Problem: its careless use killed many fish as well as beneficial insects and birds. It has such a bad name that many African governments are now afraid to use it.

For each method, name the stage in the diagram which it was trying to control.

Method 1 .....

Method 2 ..... [2]

(iii) For as long as they were effective, both methods were suitable for use in poor African countries. Explain why.

.....  
.....  
.....  
..... [2]

(iv) Methods for improved malaria control in Africa are available.

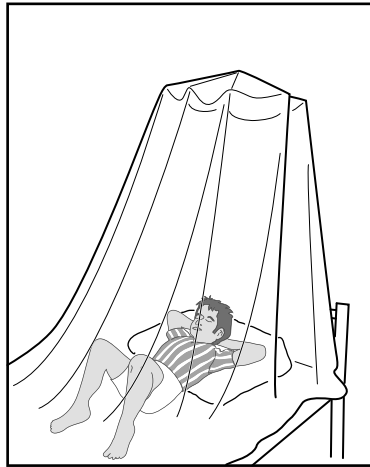
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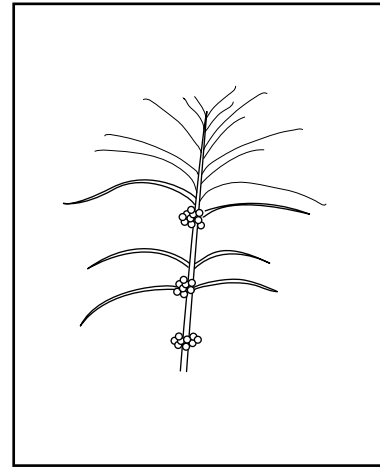
Spraying the inside and outside of huts with DDT.

B



Sleeping under mosquito nets treated with insecticide; these are re-treated with insecticide every six months.

C



Use the drug artemisia, made from a Chinese herb – it cures 90% of patients within 3 days at a cost of up to US\$10 per person; acting quickly reduces the chance of drug resistance developing. It is in short supply.

Describe how these methods are improvements upon the two early methods already named.

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[3]

(g) Read the newspaper reports below.

For  
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Use

**A From South Africa**

**DDT can work**

In 1996 the South African government, under pressure from environmental groups both at home and abroad, abandoned the use of DDT. The number of cases of malaria jumped from around 10,000 per year to more than 60,000 by 2000.

When the government re-introduced DDT spraying in the middle of 2000, the results were dramatic. By the middle of 2001, the number of cases of malaria was cut in half, and deaths from it fell from 432 to 146.

**B From Kenya**

**Project to distribute free ITNs hailed as a great success**

In 2003 Kenya's Ministry of Health began the distribution of 13.5m ITNs (insecticide treated nets). The cost was kept low by government subsidies. Even so, 3.4m had to be given away free to the poorest, unable to afford even subsidised nets.

Partly funded by the WHO (World Health Organisation), this campaign was better supported by education than previous ones. In the past, nets that were given away free were re-sold, or used for fishing, or thrown away instead of being re-treated when the insecticide wore off.

Four years later, early results show that childhood deaths from malaria have fallen by almost 50%. Three hospitals along the malaria-prone coast reported a 57% drop in malaria admissions by 2006.

(i) Describe the evidence which shows that the improved malaria control methods can work.

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..... [2]

(ii) Suggest reasons why many African countries are slow to use these new methods.

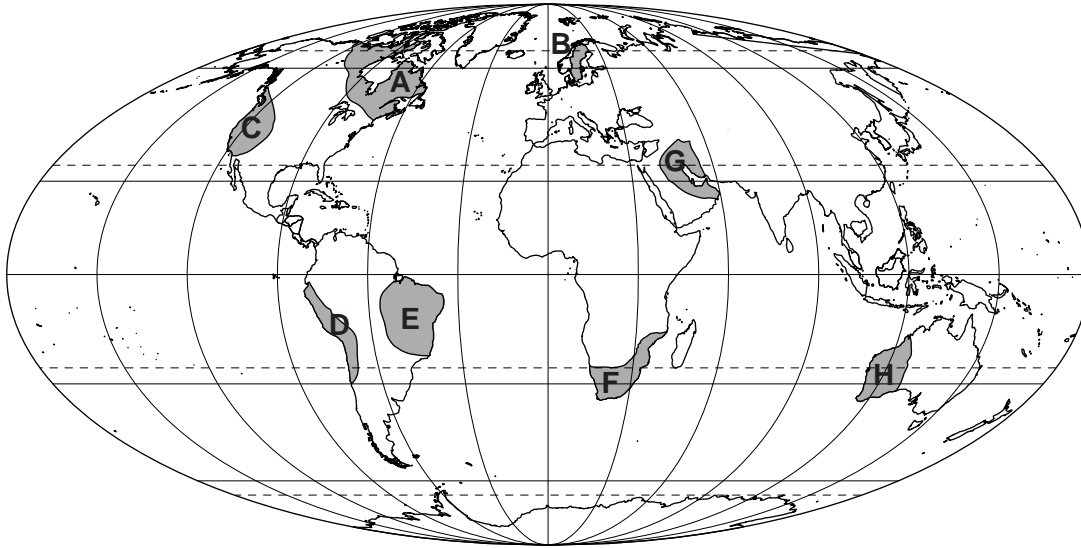
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[Total: 40 marks]

6 Some parts of the Earth's surface are mineral-rich.

For  
Examiner's  
Use

Some mineral-rich regions



**Key**  
 mineral-rich

(a) (i) Minerals from these regions include oil, copper, tin, diamonds, gold, iron-ore, nickel and uranium.

Name two of the regions shown on the map. From the list, name one mineral mined in the region.

Letter ..... Name of region ..... Mineral .....

Letter ..... Name of region ..... Mineral ..... [4]

(ii) Most of the minerals in the list have more than one use; sometimes their uses are very different. Elaborate on this statement by choosing one mineral and naming some of its uses.

.....  
 .....  
 .....  
 ..... [2]



(iii) Explain why some parts of the Earth's surface are mineral-rich while others are mineral-poor.

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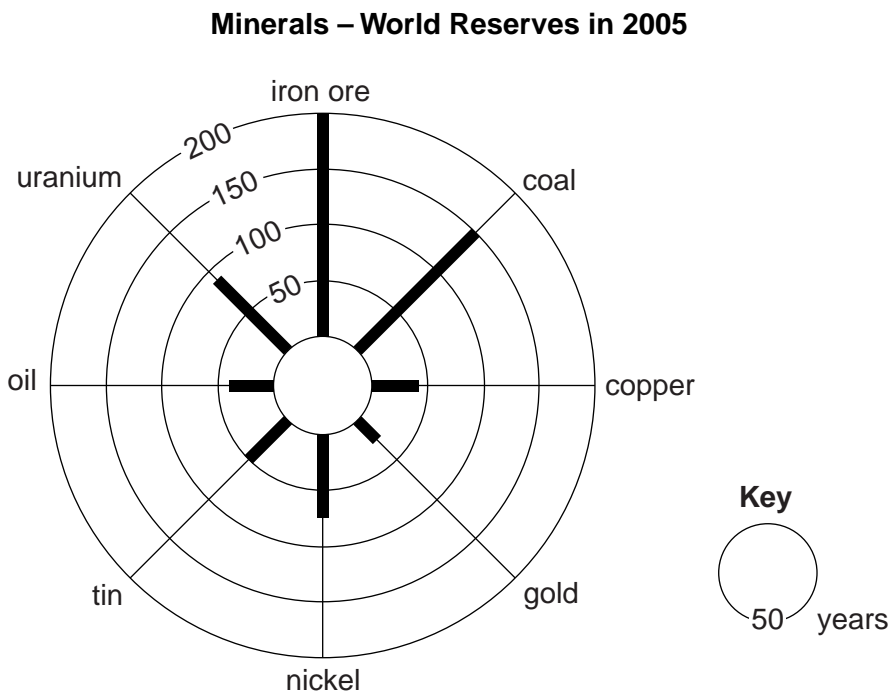
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..... [3]

(b) The diagram shows how long the known reserves of eight minerals are expected to last.



(i) How many years are reserves of nickel expected to last?

..... [1]

(ii) Explain why all these minerals will eventually run out.

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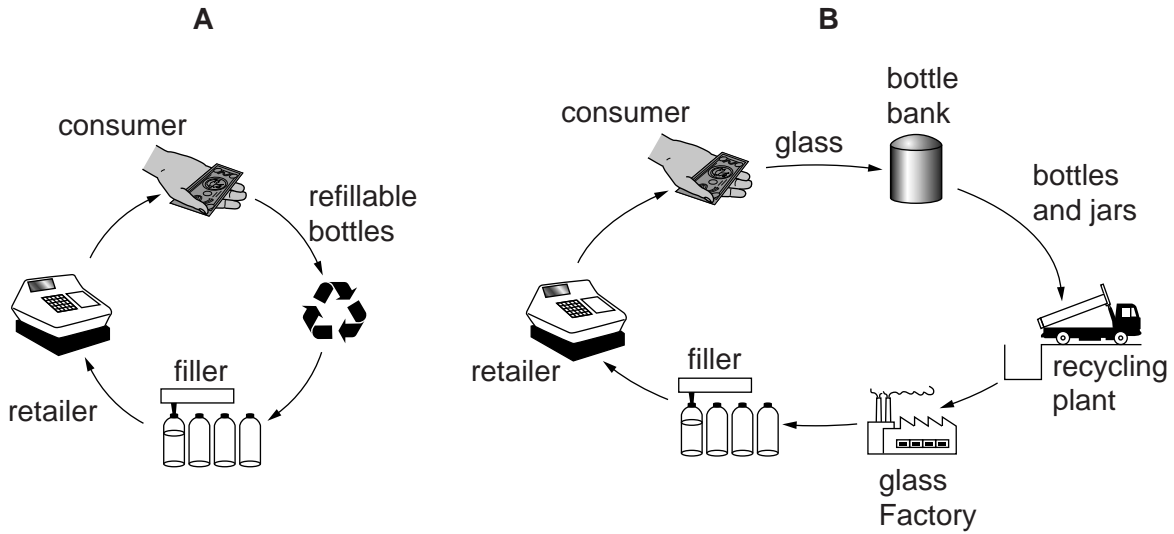
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..... [3]

(c) Two ways to extend the length of time before natural resources run out are shown in the flow diagrams below.



(i) Describe how each one increases the number of years before natural resources run out.

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(ii) Which one is better for the environment? Explain your choice.

.....

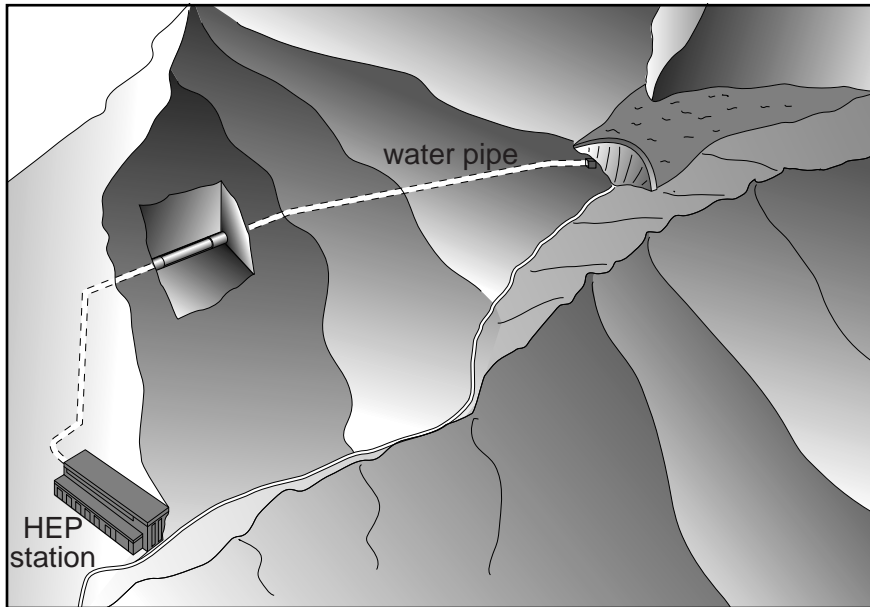
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- (d) Another way of extending the life of natural resources is to develop and use alternatives. Hydro-electric power (HEP) is an example of an alternative energy source.

For  
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Use

Hydro-electric power station in the Alps



- (i) Why is this a good location for generating hydro-electric power?

.....  
.....  
.....  
..... [2]

- (ii) Explain what people have done to enable energy to be generated here.

.....  
.....  
.....  
..... [3]

- (iii) In a location like this, the cost of making electricity from HEP is almost the same as that from oil. State two advantages of HEP over oil for generating electricity.

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..... [2]

(iv) Oil provides 40% of world energy, compared with only 6% from HEP. Why is the difference so great?

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..... [3]

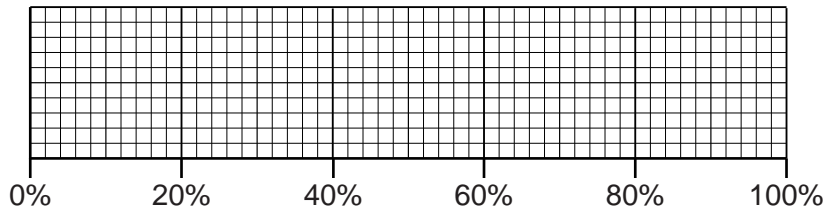
(e) Production of biofuels from crops such as sugar cane, palm oil and corn (maize) is increasing. The fuel from them can be used as alternatives to petrol and diesel in cars and trucks.

**Biofuel production in 2005**

(percentage of world total)

Brazil	41
USA	39
EU (European Union)	16
China	3
India	1

Complete a divided bar graph to show biofuel production in 2005.



[3]

(f) Some information about biofuel production in Brazil and the USA is given below.

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Use

	Brazil (from sugar cane)	USA (from corn)
Average cost of production of ethanol, compared with petrol (petrol = 1.0)	0.4	0.7
Fossil fuel input (transport and processing) needed for making ethanol (%)	11	70
Carbon dioxide reduction compared with oil (%)	90	20
Ethanol output from one hectare of land (equivalent litres of petrol)	3,000 – 6,000	1,500 – 3,000

(i) Which crop makes cheaper ethanol?

..... [1]

(ii) Give one reason why it is cheaper.

.....  
..... [1]

(iii) In which one of the two countries is the environmental impact from ethanol lower? Explain your choice.

.....  
.....  
.....  
.....  
..... [3]

(g)

**UN (United Nations) report on biofuels**

- \* They will cause severe environmental and social damage instead of saving the planet
- \* They will increase demand for land and water resources at a time when demand for food is rising
- \* Demand for palm oil has already led to rainforest clearances in South East Asia
- \* However, the report admits that biofuels will reduce greenhouse gas emissions

**Comment from the Government of Brazil**

- \* We have produced ethanol for more than 30 years; we developed the technology which makes us the world's most efficient producer
- \* 45% of our energy is from renewables, one of the highest percentages of any country in the world
- \* We are making a bigger contribution than most countries to reducing greenhouse gases
- \* Only 4% of our crop area is planted with crops for making ethanol
- \* It is on existing farm lands, not new land from rainforest clearances

**Targets for future use of biofuels**

- \* USA seven times increase by 2022
- \* EU to meet 10% of energy needs by 2020

Is it right for the USA, EU, Brazil and other countries to go ahead and increase the output of biofuels? Answer as fully as you can.

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..... [5]

[Total: 40 marks]



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