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Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

7731101867

ENVIRONMENTAL MANAGEMENT **0680/21**

Paper 2 **October/November 2014**

1 hour 45 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 **both** 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.

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 **16** printed pages.

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1 **(a)** Look at the five boxes. Inside each one is a description of a natural hazard.

A	**B**
magma coming from a cone shaped mountain	water covering the land for a short period of time

C	**D**
shaking of the ground surface for seconds or minutes	period of dry weather, lasting longer than normally expected

E
tropical storm, caused by very low air pressure

(i) State the letter of the box which matches the description of each natural hazard.

natural hazard	**letter**
cyclone	.....
drought	.....
earthquake	.....
flood	.....
volcanic eruption	.....

[2]

(ii) Name the natural hazards from the list above which are climatic hazards.

.....[1]

(iii) Are natural hazards short-term events, or long-term events, or both of these? Explain your choice of answer.

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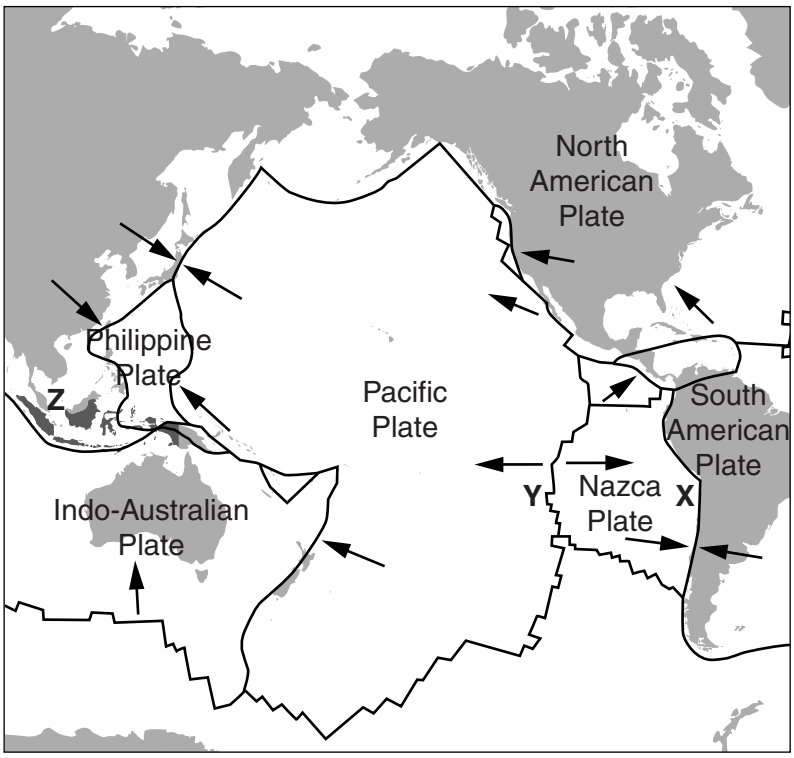
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(b) Look at the map, which shows plate boundaries.

Pacific Ocean: location of major plate boundaries



Key

direction of plate movement

plate boundaries

Z Indonesia

(i) Name the type of plate boundary shown at **X** and **Y**.

X .....

Y ..... [2]

(ii) Explain why the earthquake risk is greater for people living closer to plate boundaries than it is for those who live further away.

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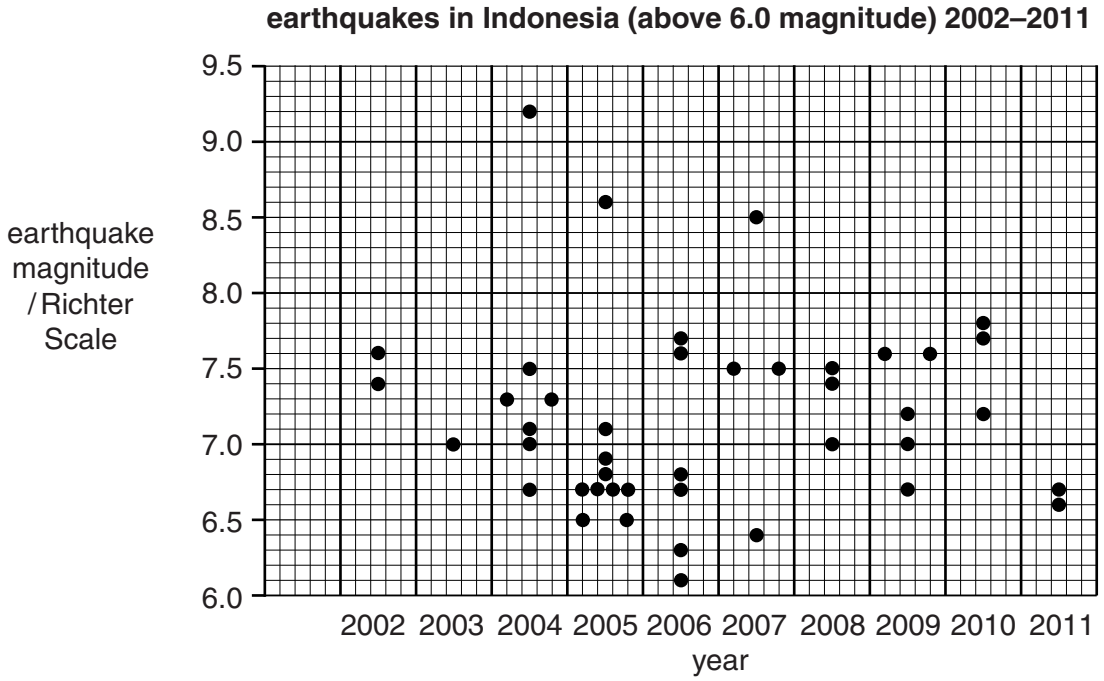
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(iii) Indonesia (marked **Z** on the map on page 3) has many earthquakes. It is an island country. Of its 18 000 islands, fewer than 1000 are permanently inhabited.

The graph below shows the strength of 43 strong earthquakes above magnitude 6.0 on the Richter Scale that occurred in Indonesia between 2002 and 2011.

Each dot shows an earthquake and its strength on the Richter Scale.



What was the magnitude of the strongest earthquake and when did it occur?

magnitude ..... year .....[1]

(iv) In which four-year period did earthquakes occur most frequently? State the evidence which supports your choice of years.

Four-year period .....

evidence .....

.....[3]

(v) What does the graph show about the risk of earthquakes occurring in Indonesia?

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.....[1]

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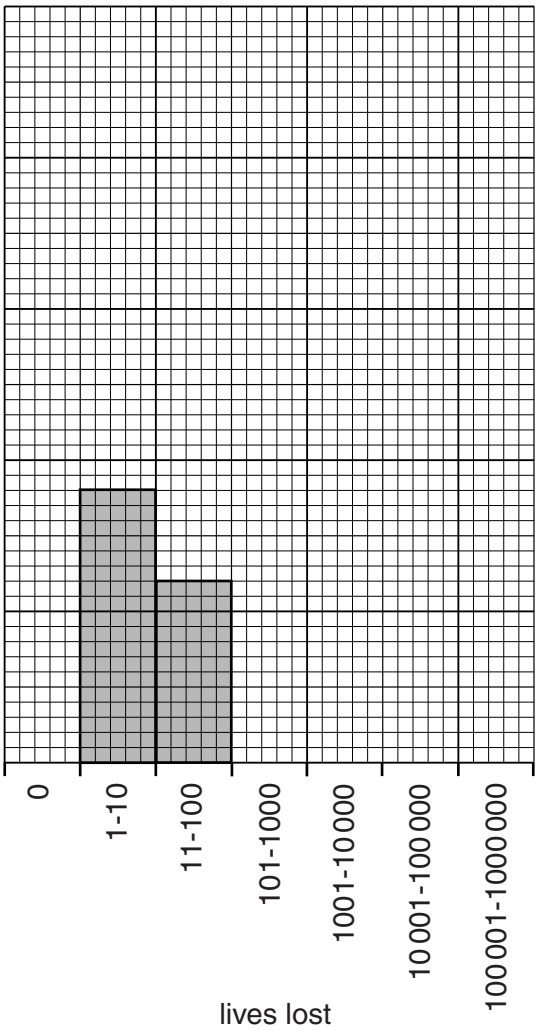
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(vi) The table is a summary of reported losses of life associated with the 43 earthquakes in Indonesia.

lives lost	number of earthquakes
0	22
1–10	9
11–100	6
101–1000	2
1001–10 000	3
10 001–100 000	0
100 001–1 000 000	1

Complete the bar graph to show the data in the table. One axis has been completed for you.

bar graph of lives lost in Indonesian earthquakes (2002–2011)



[3]

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(vii) Suggest reasons why some of these strong earthquakes caused little or no loss of life, while others caused large losses of life.

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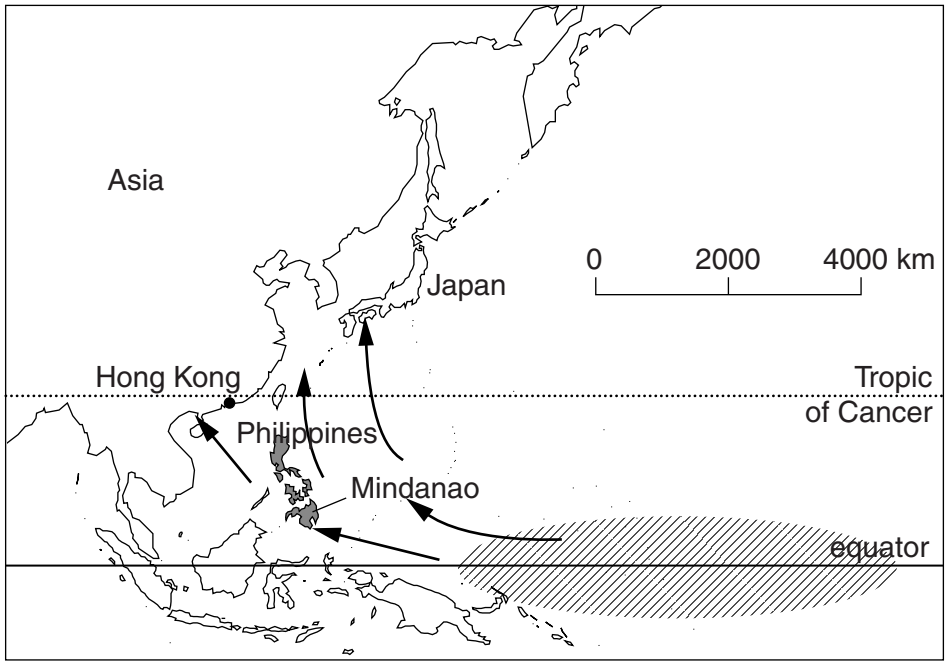
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(c) People living in the Philippines are at a great risk from cyclones. The country is hit by 20 or more cyclones each year.

Look at the map showing the location of the Philippines, and the source areas and tracks of the cyclones in that part of the Pacific Ocean.

formation and tracks of cyclones (typhoons) in part of the Pacific Ocean



Key

tracks of cyclones

source area of cyclones

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(i) Explain why many cyclones are formed every year in the source area shown on the map.

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.....[3]

(ii) Suggest why the greatest cyclone risk in the Philippines is during September and October.

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.....[1]

(iii) In most years, the Philippines is hit by more cyclones than other places in the Far East, such as Hong Kong and Japan. Using the map on page 6, suggest reasons for this.

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.....[2]

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(d) In December 2011 the full effects of a cyclone called Typhoon Washi were felt on the island of Mindanao. It is located in the south of the Philippines and south of the capital city, Manila.

The people living in the northern part of Mindanao were affected by the cyclone in the following ways:

- severe flooding everywhere, including the main city Cagayan de Oro
- flash floods and landslides swept houses into rivers and out to sea
- at least 1250 people died, most of them from drowning
- up to half a million people lost their homes

(i) In most cyclones, damage to property and loss of life are caused by the combined effects of very strong winds **and** heavy rainfall.

Which one of these two causes was more important in Typhoon Washi? Describe the evidence which supports your choice.

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.....[2]

(ii) Survivors of Typhoon Washi blamed the government and local authorities for not doing enough to protect Mindanao against the cyclone risk.

State why you would expect the authorities in the Philippines to be well prepared for cyclones.

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.....[1]

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(iii) Look at what different people in the Philippines said after Typhoon Washi.

A Local official in Cagayan de Oro

'The government in Manila did not give us advanced storm and flood warnings or money to build enough cyclone shelters.'

B Government official in Manila

'The government has a system to send storm warnings via mobile phone text messages. It was not used for this typhoon because wind strength was too weak to trigger the warnings.'

C National Disaster Management official in Manila

'City officials should never have allowed people to build their own shanty houses on sand banks in the Cagayan River.'

D Environmental group

'Cagayan de Oro was at high risk because it is between steep-sided, deforested mountains and the sea. No flood defences had been built because local officials claimed that typhoons were infrequent in northern Mindanao.'

Suggest whether physical factors, human factors or a combination of both were responsible for the great loss of life in Typhoon Washi?

Support your view with references to the comments made by the different people.

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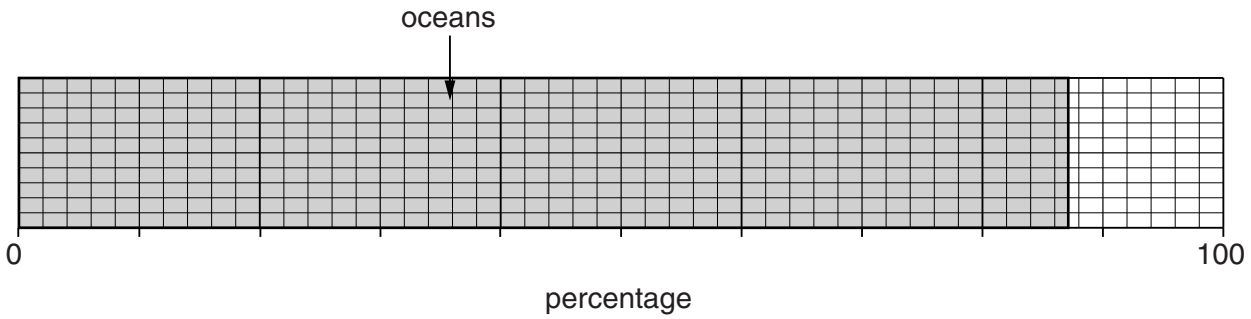
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2 **(a)** Look at the information about some of the Earth's water stores.

water stores	percentage
oceans	87
glaciers (snow and ice)	9
underground	3
lakes and rivers	1

(i) Complete the divided bar graph and key to show this information.

Earth's water stores



[2]

(ii) State one advantage and one disadvantage of using lakes and rivers and glaciers for water supply.

lakes and rivers

advantage .....

.....

disadvantage .....

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glaciers

advantage .....

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disadvantage .....

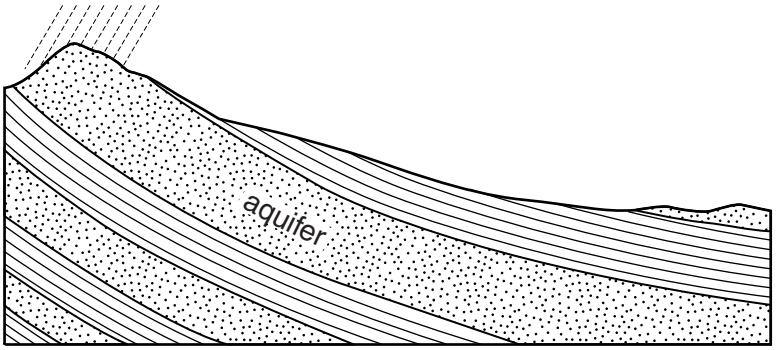
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(iii) The diagram shows an underground water store (aquifer).



Key to rocks

 .....

 .....

Add labels to the diagram and key to show why an underground water store is present here. [3]

(iv) Suggest problems with extracting water from an underground water store. Suggest solutions to these problems.

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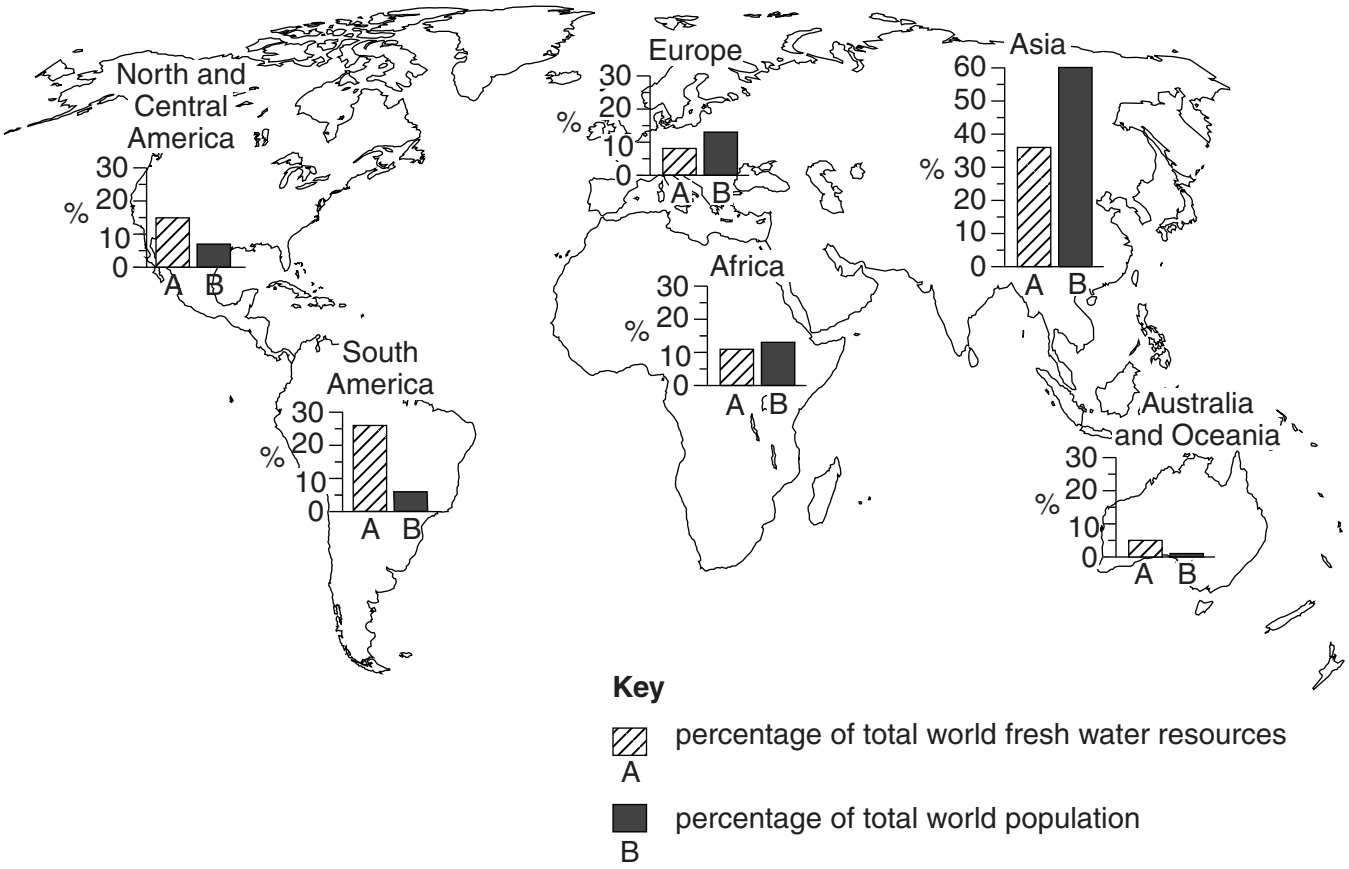
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(b) Look at the world map showing percentage of total world fresh water resources compared with percentage of total world population, for the six inhabited continents.

water availability by continent



(i) Continents in which there is great population pressure on available water resources are said to suffer from 'water stress'.

Name a continent that has a high water stress and a continent that has a low water stress.
State values from the map to support your answer.

high .....

.....

low .....

.....

[3]

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(ii) Look at what the map shows about Europe and Africa:

- both have the same percentages of total world population (13%)
- water resources in Europe are lower than in Africa
- water stress in many African countries is much greater than in most European countries

Suggest both physical and human reasons why water stress is generally greater in Africa than in Europe.

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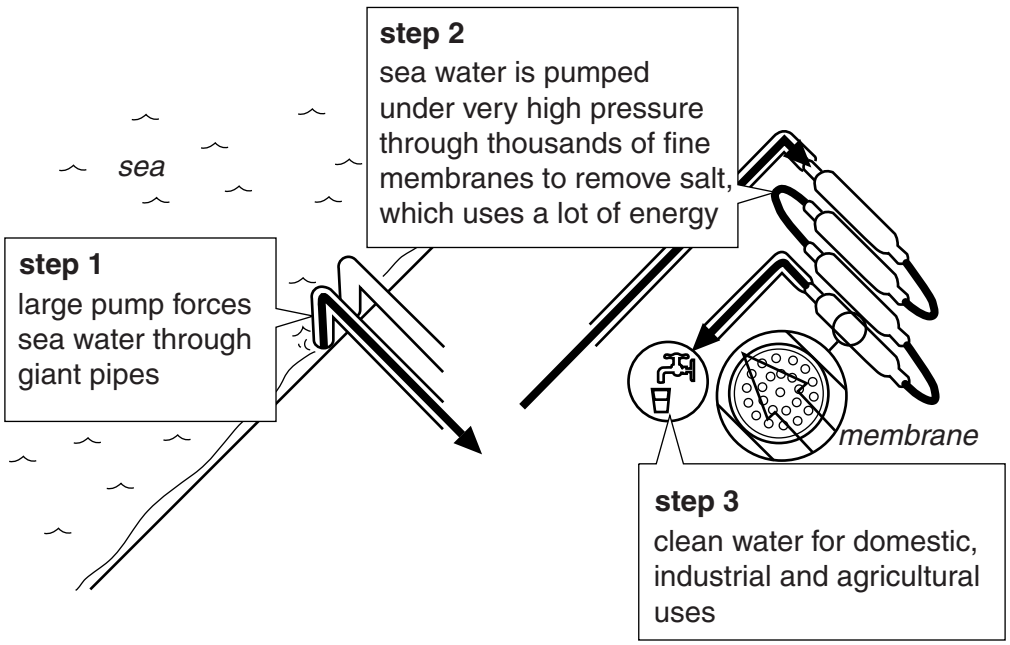
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(c) One way for water-poor countries to increase their supplies of clean water for domestic, industrial and agricultural use is desalination.
Look at the diagram showing how sea water is desalinated to give clean water using a process called reverse osmosis.

the desalination process



(i) Using the diagram, describe how salt is removed from sea water to make the clean water for human use.

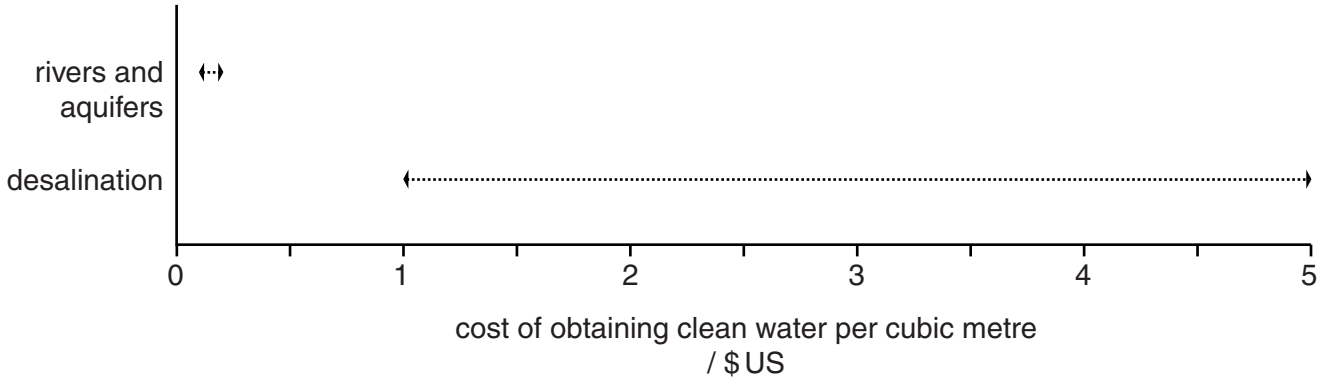
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(ii) The diagram shows the costs of obtaining clean water by desalination compared with obtaining water from rivers or aquifers.

cost of obtaining clean water from different sources



Key

range of costs

Suggest why there is a range of costs for desalination rather than just one cost.

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(iii) At present, desalination supplies less than 0.5% of human water supplies.
How does the diagram above, which shows the cost of obtaining clean water, help to explain this?

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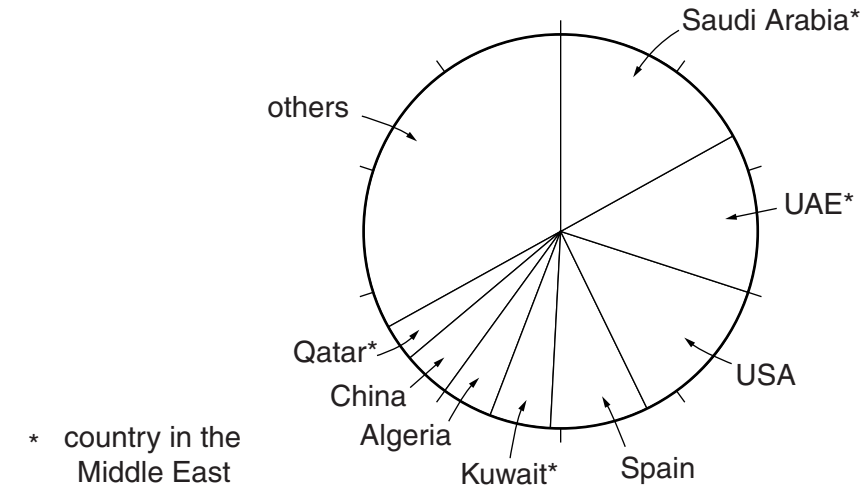
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(iv) Look at the pie graph showing the top eight countries that used desalination in 2008.

desalination in 2008: percentages of world total



What percentage of desalination water comes from countries in the Middle East? Circle one answer.

17% **30%** **38%** **48%**

[1]

(v) Suggest why four of the top eight countries that used desalination in 2008 are in the Middle East.

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(vi) How likely is it that desalination will increase in importance as a water supply for human needs in future years? Explain your opinion.

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(d) Agriculture accounts for about two-thirds of world water consumption.

(i) Describe how farmers can make more efficient use of water when irrigating their crops.

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(ii) State some of the environmental issues that result from inefficient use of water by farmers.

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