CANDIDATE
NAME

CENTRE
NUMBER

CANDIDATE
NUMBER
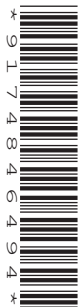
ENVIRONMENTAL MANAGEMENT

Paper 2

0680/23

May/June 2018

1 hour 45 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

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.

1 (a) The flow diagram shows part of the water cycle.

output	input

- interception storage
  - throughfall
- .... — overland flow
  - infiltration
- soil storage — through-flow
  - percolation
- .... — base flow
- river channel
  - run-off **output**

unimpeded fall

channel fall
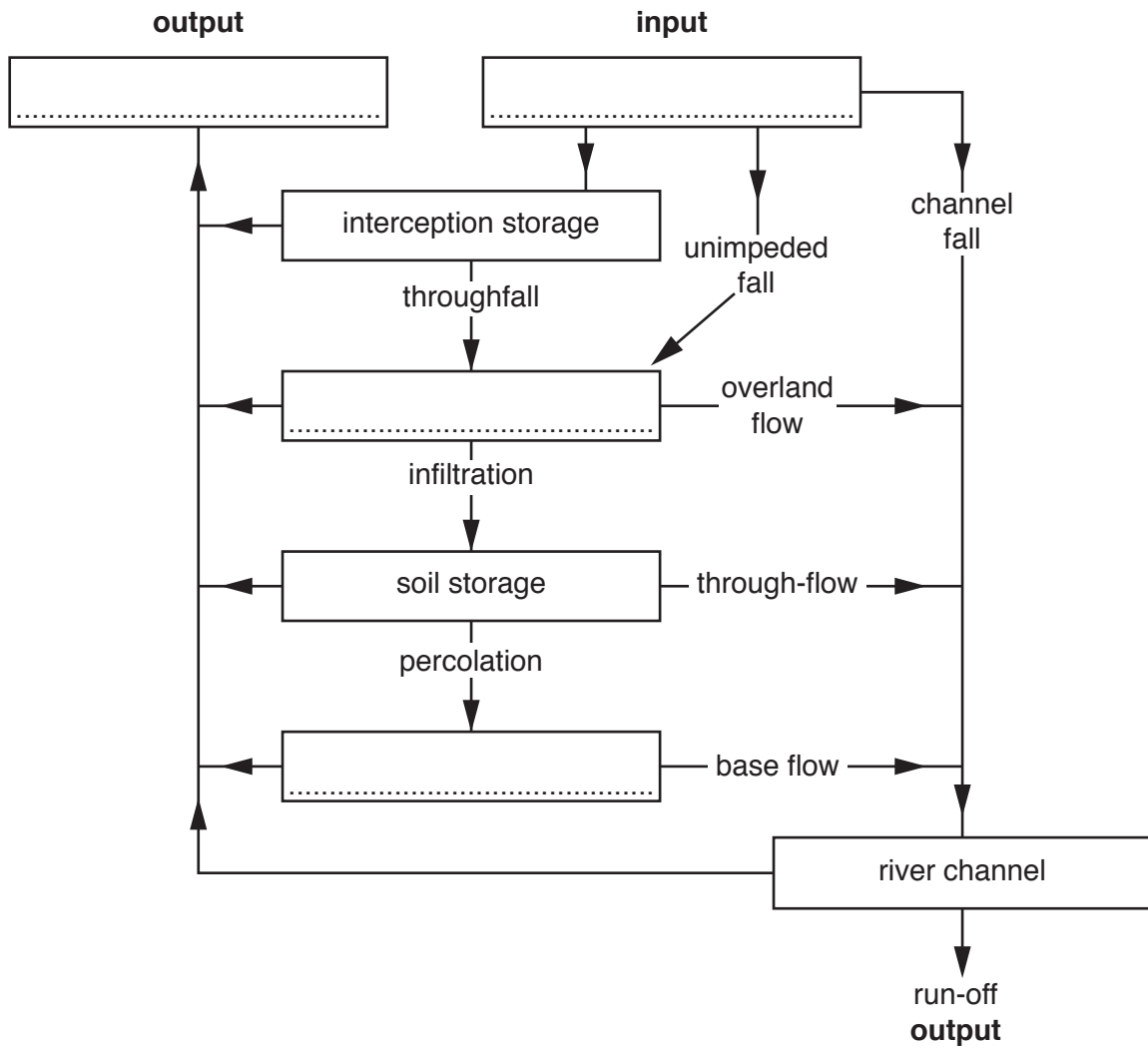
(i) Complete the flow diagram by labelling the four boxes. Use these terms:

evaporation   **groundwater storage**   **precipitation**   **surface storage**   [3]

(ii) State the meaning of the terms *interception* and *infiltration*.

interception ....

....

infiltration ....

....

[2]

(b) The graph shows the effect of a rain storm on the flow of a river.
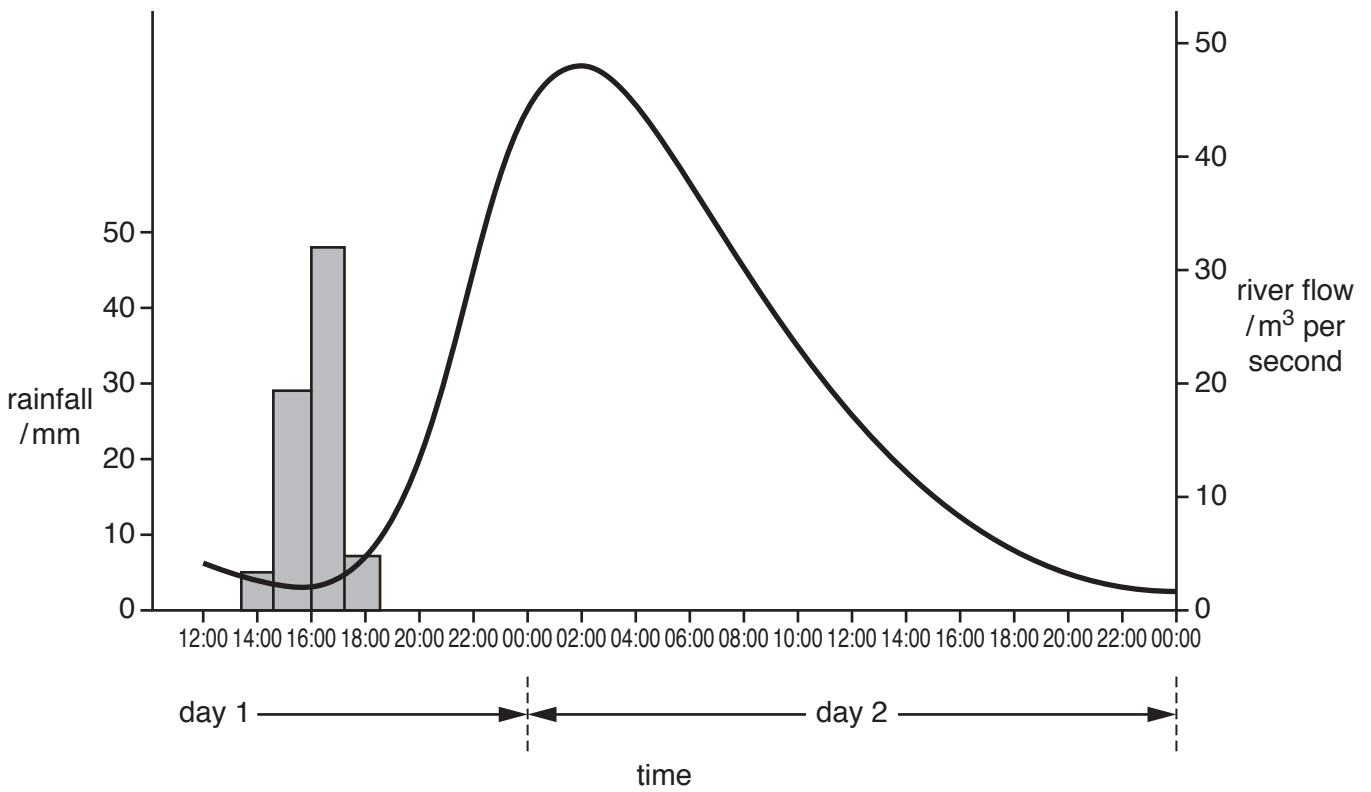
Key

rainfall

river flow

(i) State the highest rainfall and the day and time at which it occurred.

highest rainfall .... mm

day and time ....
[2]

(ii) State the highest river flow and the day and time at which it occurred.

highest river flow .... m^3 per second

day and time ....
[2]

(iii) Explain why there were several hours between the highest rainfall and the highest river flow. Use the flow diagram in **(a)** to help you.

....

....

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....

....[3]

(iv) The river flowed through a village and a crop growing area. The river flooded when the flow reached $30\,m^3$ per second.

Suggest **three** economic impacts of the flood.

1 ....

....

2 ....

....

3 ....

....
[3]

(v) Suggest **two** ways in which the risk of flooding from the river could be reduced.

1 ....

....

2 ....

....
[2]

(vi) After the flood, water remained on the fields for several weeks.

Explain how this led to an outbreak of malaria in the village.

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....

....

....[3]

(c) The diagram compares climatic data and types of vegetation.
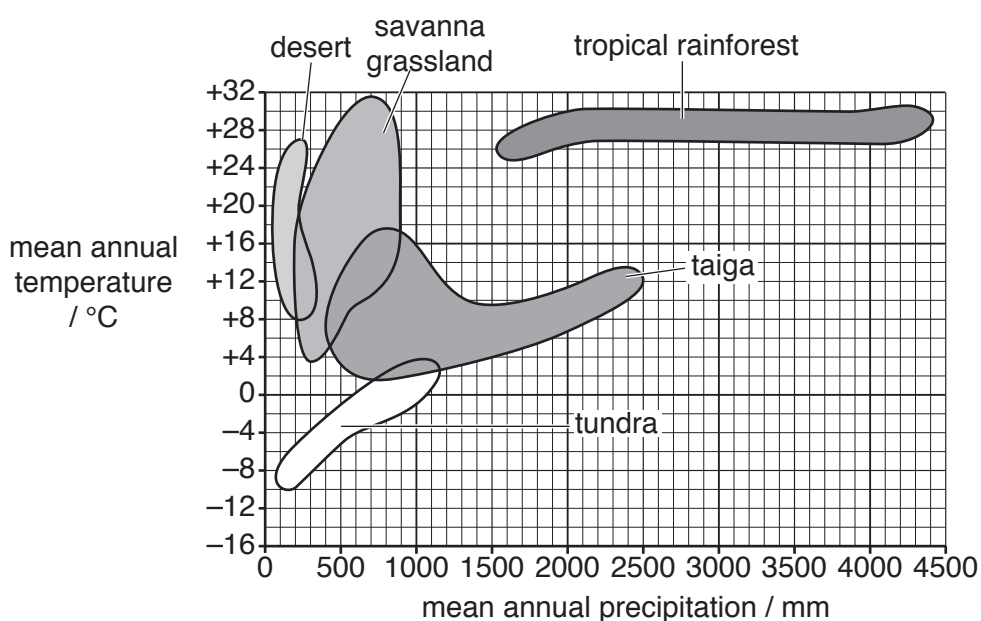
(i) State the type of vegetation that has a mean annual precipitation range of 400 to 2500 mm and a mean annual temperature range of +2 to +18 °C.

....[1]

(ii) State the mean annual precipitation range and mean annual temperature range for a desert.

mean annual precipitation range .... mm

mean annual temperature range .... °C

[1]

(iii) Using data from the diagram in (c), describe the climate in the tundra.

....

....

....

....

....

....[3]

(iv) Describe typical tundra vegetation.

....

....

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....

....

....[3]

(v) Savanna ecosystems are at risk. Describe strategies for conserving the biodiversity of the savanna.

....

....

....

....

....

....[3]

(d) (i) The table shows water use in a country.

water use	percentage	key
agriculture	69	
domestic	22	
industry	9	

Complete the key column of the table and the pie graph using the data in the table.
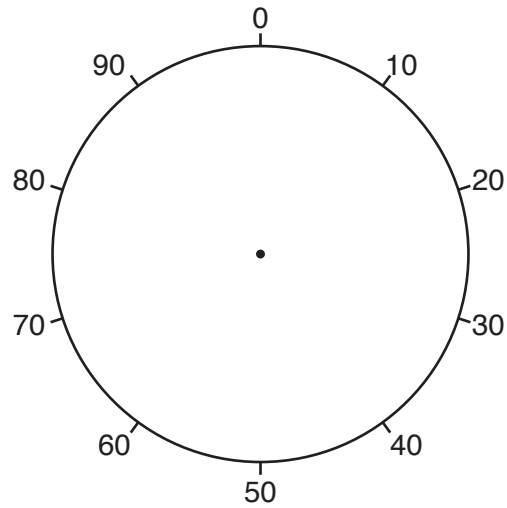
[2]

(ii) State the main use of water in agriculture.

....[1]

(iii) There are many competing demands for water.

Suggest how competing demands for water can be managed.

....

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....[6]

2 **(a)** The graph shows worldwide electricity generation from renewable sources from 1971 to 2011.
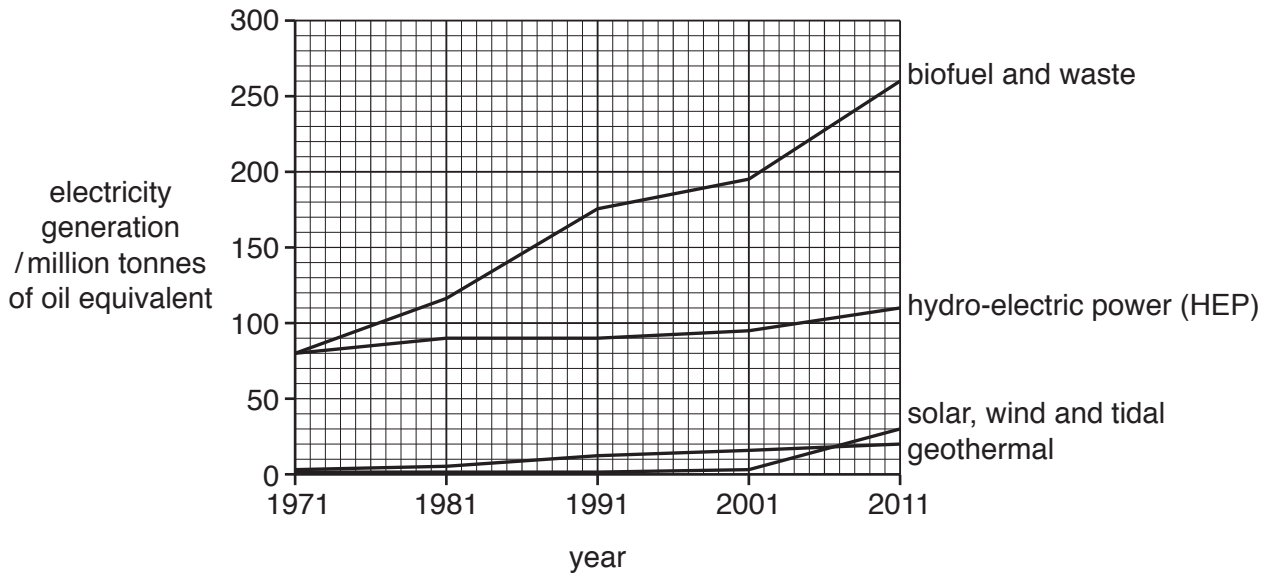
(i) State the renewable energy source that increased the most from 1971 to 2011.

....[1]

(ii) Calculate the increase in electricity generation for hydro-electric power (HEP) from 1971 to 2011.

.... million tonnes of oil equivalent [1]

(iii) Explain why there has been an increase in the use of renewable energy sources since 1971.

....

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....[3]

(iv) Suggest **two** reasons why geothermal energy generation is very low.

1 ....

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2 ....

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[2]

(b) Nuclear power is used to generate much more electricity than all the renewable sources. The percentage of electricity generated using nuclear power in some countries is shown on the graph.

(i) Complete the graph using the data in the table.
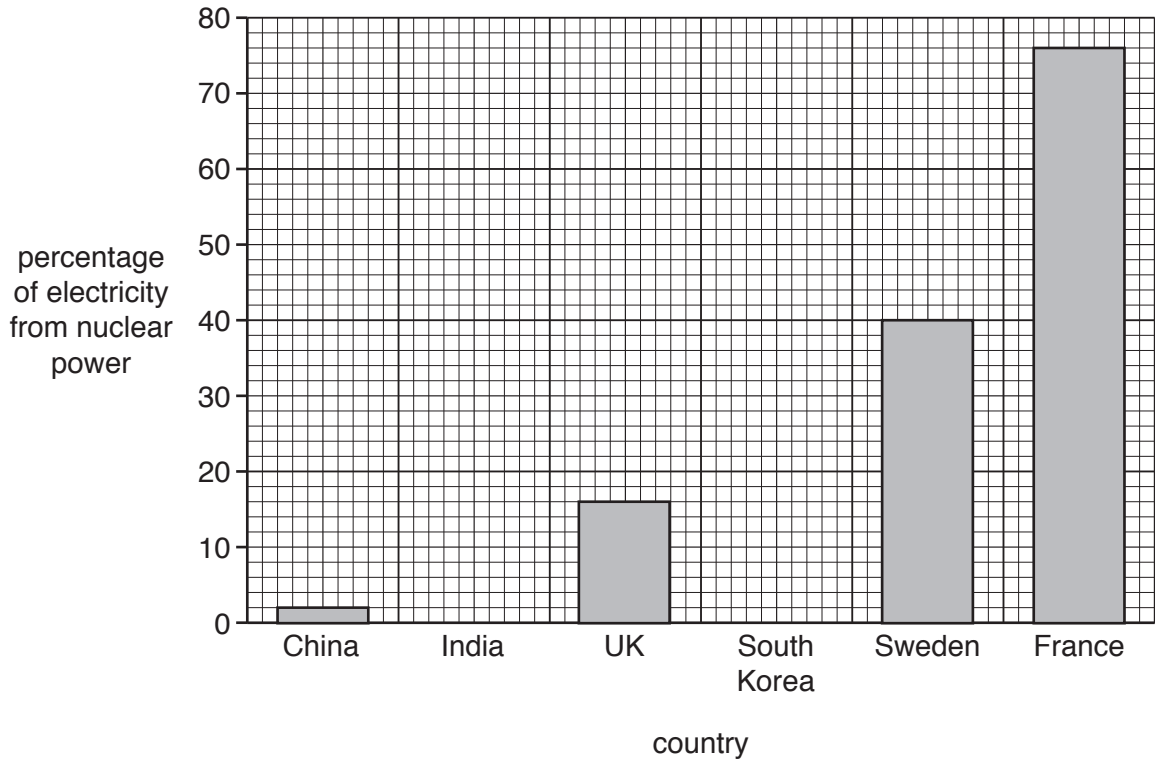
country

| country	percentage of electricity from nuclear power
India	4
South Korea	30

[1]

(ii) Calculate the percentage of electricity generated in France from sources **other** than nuclear.

.... % [1]

(iii) Suggest reasons why some countries generate a much larger percentage of their electricity from nuclear power than other countries.

....

....

....

....[2]

(iv) State **one** environmental reason for, and **one** environmental reason against, nuclear power.

for ....

....

against ....

....

[2]

(c) The map shows the location of ten major bauxite producing countries. Bauxite is the ore from which aluminium is obtained. The circles show the amount of bauxite mined in million tonnes per year.

Key

bauxite mined per year / million tonnes

5 15 25 50
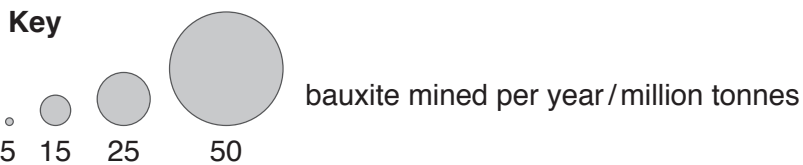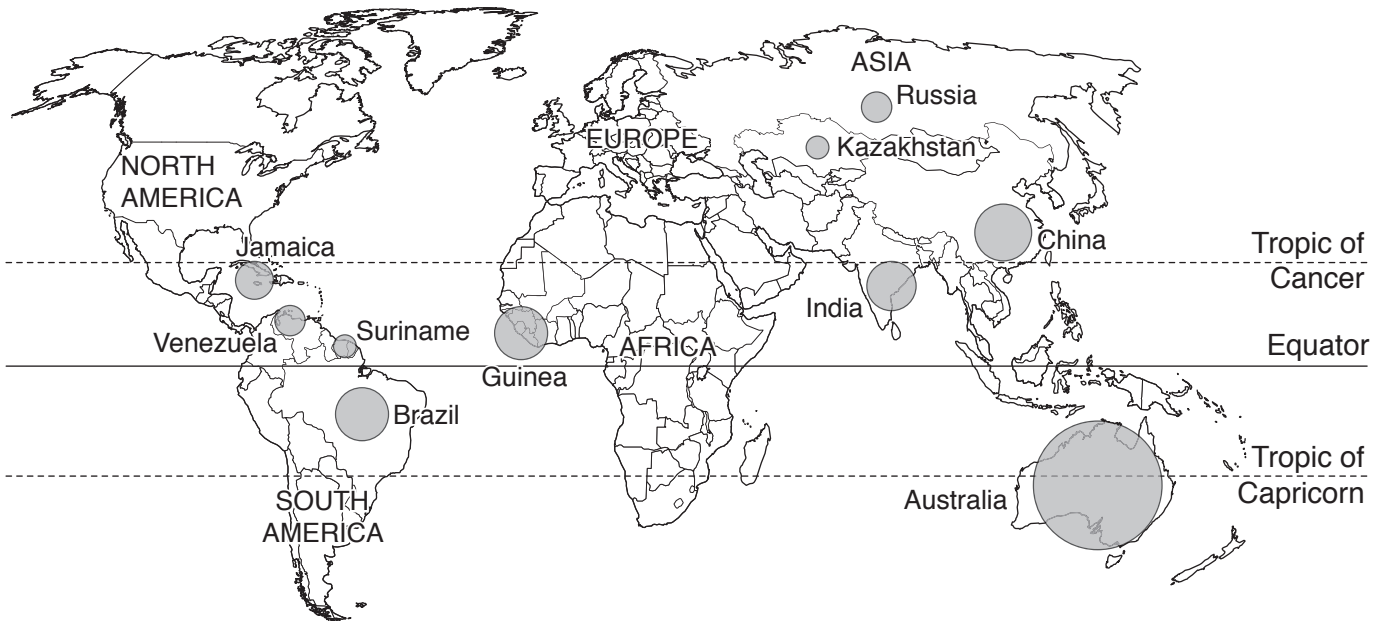
(i) State the country which produces the largest amount of bauxite per year.

....[1]

(ii) Describe the distribution of bauxite mining shown on the map.

....

....

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....[2]

(iii) Bauxite is mined using the open-pit (opencast) method.

Briefly describe this mining method.

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....[3]

(iv) Open-pit mining causes environmental problems.

Describe how these problems can be overcome.

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....[5]

(d) The table shows the top ten aluminium producing countries in 2015.

country	aluminium production /million tonnes
Australia	1.65
Bahrain	0.96
Canada	2.90
China	32.00
Iceland	0.82
India	2.35
Norway	1.32
Russia	3.50
United Arab Emirates (UAE)	2.30
USA	1.60

(i) Place the top five countries in rank order of aluminium production. The first one has been done for you.

rank	country
1	China
2	....
3	....
4	....
5	....

[2]

(ii) In 2015, the total world production of aluminium was 57.8 million tonnes.

Calculate the percentage of the world total produced in China. Circle the correct answer.

45%   50%   55%   60%   65%   [1]

(iii) Using the information in part **(c)** and part **(d)**, state how many of the ten major bauxite producing countries are also top ten aluminium producing countries.

....[1]

(e) Producing aluminium from bauxite requires a great deal of energy, so cheap energy is important for companies producing aluminium. Countries such as Canada and Norway have large amounts of cheap HEP available. Iceland has cheap geothermal energy. Some countries such as USA, Bahrain and UAE have cheap natural gas in large quantities. The other large producers of aluminium use cheap coal to generate electricity.

(i) Using the information in part **(d)** and **(e)**, state **one** country that uses electricity generated from coal to produce aluminium.

....[1]

(ii) State which aluminium producing countries use electricity generated from renewable resources.

....[1]

(iii) Explain why using large amounts of coal to generate electricity damages the environment.

....

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....

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....

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....[4]

Question 2(f) starts on page 16

(f) 'Recycling will solve the problems of depletion of resources and atmospheric pollution.'

How far do you agree with this statement? Give reasons for your answer.

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....[6]