Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

0608817213

ENVIRONMENTAL MANAGEMENT **0680/42**

Paper 4 **February/March 2017**

1 hour 30 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 **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.

Study the appropriate source materials before you start to write your answers.
Credit will be given for appropriate selection and use of data in your answers and for relevant interpretation of these data. Suggestions for data sources are given in some questions.
You may use the source data to draw diagrams and graphs or to do calculations to illustrate your answers.

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 **14** printed pages and **2** blank pages.

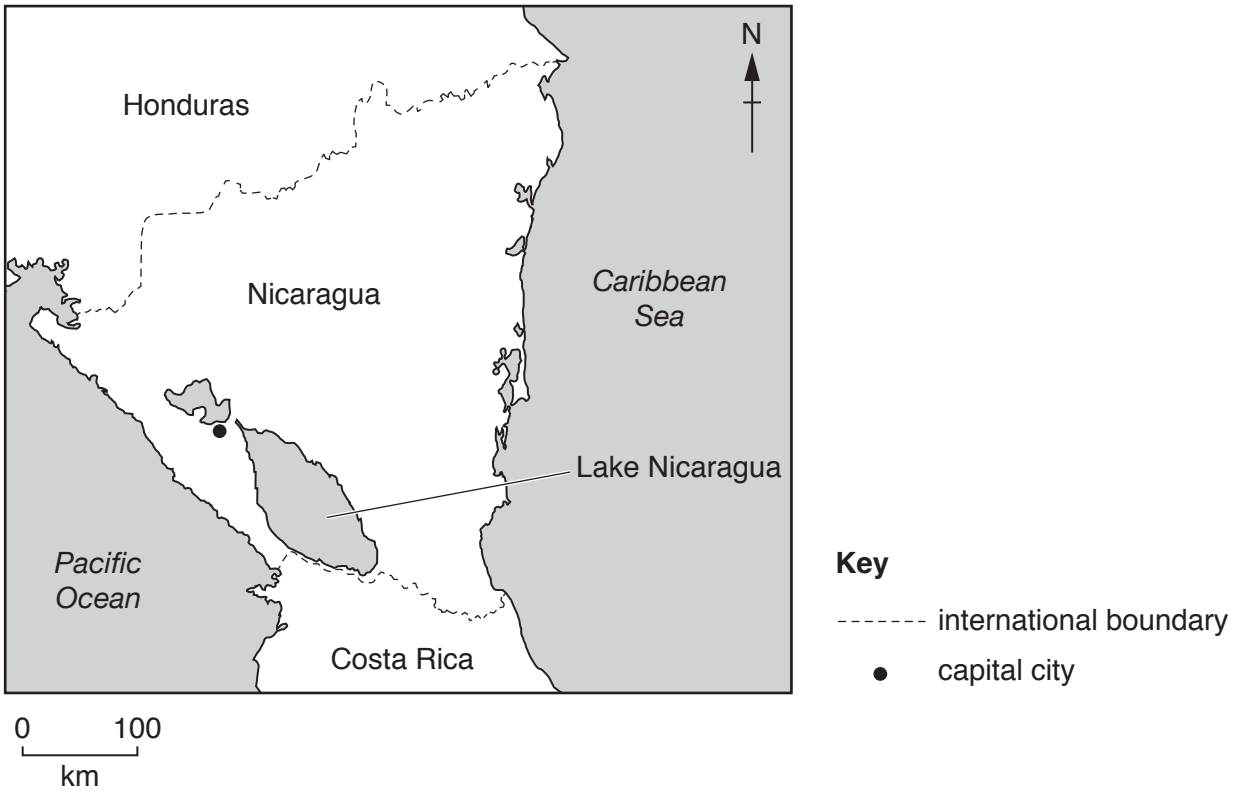
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CAMBRIDGE International Examinations

map of the world



map of Nicaragua



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area: 130 370 km^2

population: 6 million

children per woman: 1.99

life expectancy: 72

currency: Nicaraguan Cordoba 27.9 NIO = 1 USD

languages: Spanish, English, Miskito

climate: tropical, cooler in the highlands

terrain: central highlands, coastal plains

main exports: beef, car parts, coffee, cotton, gold, peanuts, shrimps, sugar, textiles

1 Nicaragua has the lowest population density of any Central American country. Tourism and agriculture are important to the economy. However, poverty remains widespread. The government plans to build a ship canal between the Pacific Ocean and the Caribbean Sea. It is expected to take many years to complete.

(a) Use the information given to calculate the population density of Nicaragua.

Show your working.

..... people per km^2 [2]

(b) (i) Suggest why poverty remains widespread in Nicaragua.

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.....[2]

(ii) Suggest **two** reasons why the government wants the ship canal to be built.

.....

.....

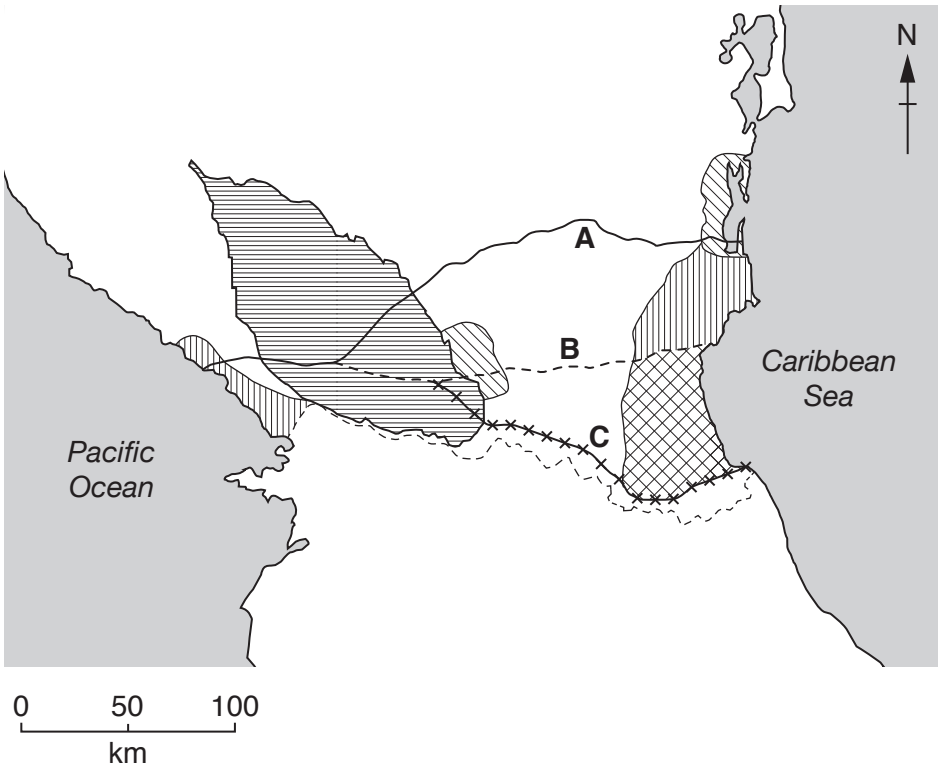
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[Turn over

(c) Several different routes for the ship canal have been proposed. The map shows possible routes for the canal. Route **B** is the shortest.



Key

- wetlands
- biosphere resource
- international boundary
- nature reserve
- Lake Nicaragua
- route **A**
- route **B**
- route **C**

(i) Use the map to measure the distance of route **A** and route **C**, starting at the Pacific Ocean and ending in the Caribbean Sea.

route **A** ..... km

route **C** ..... km

[2]

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(ii) Suggest which route, **A** or **C**, would have the largest environmental impact.

Explain your reasons.

route .....

reasons .....

.....

[1]

(d) A deep channel will have to be dug in the bed of Lake Nicaragua to allow the largest ships to cross the lake.

(i) Suggest how digging a deep channel could damage food webs in the lake.

.....

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.....[2]

(ii) Suggest what might happen to the water in the lake if large numbers of ships use the new canal.

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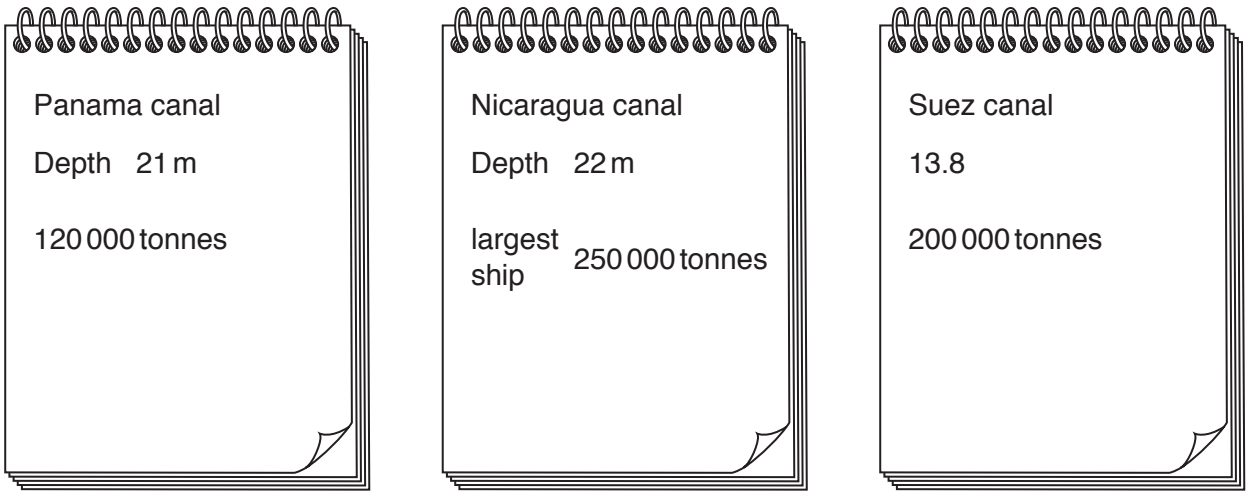
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(e) A student used the internet to find information about three ship canals. The student recorded the information on three pages of their notebook. The student has not recorded all the information clearly.



(i) Draw and complete a table to present this information clearly.

[3]

(ii) Suggest why the government of Nicaragua expects that the new canal will take many years to complete.

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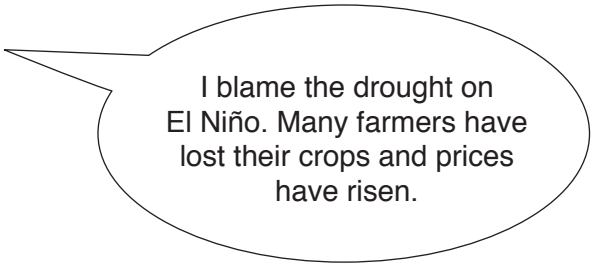
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2 In 2014, Nicaragua suffered its worst drought for 30 years.

A farmer said



(a) Describe the changes in the Pacific Ocean that occur in an El Niño event.

.....

.....

.....

.....

.....

.....[3]

(b) **(i)** In three months of 2014 the price of red beans increased from 602 USD per tonne to 1074 USD per tonne.

Calculate the percentage increase in the price of red beans.

Show your working.

.....% [2]

(ii) Suggest why the price of red beans increased so much in only three months.

.....

.....

.....

.....[2]

(iii) Suggest why red beans are a good source of food for humans.

.....[1]

(c) A student wanted to find out the time that red bean seedlings can survive in different volumes of water. The student first proposed two different methods.

method one: Place ten red bean seedlings into a dish. Add some water and record the time it takes for the seedlings to die.

method two: Place ten red bean seedlings into each of three dishes. Add 5 cm^3 of water to the first dish, 10 cm^3 to the second dish and 15 cm^3 to the third dish. Record the time it takes for the seedlings to die.

(i) Explain why method **two** is better than method **one**.

.....

.....

.....

.....[2]

(ii) Suggest **two** factors that the student should keep the same.

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.....[2]

(iii) Suggest **one** other change in red bean seedlings in response to different volumes of water that could be measured.

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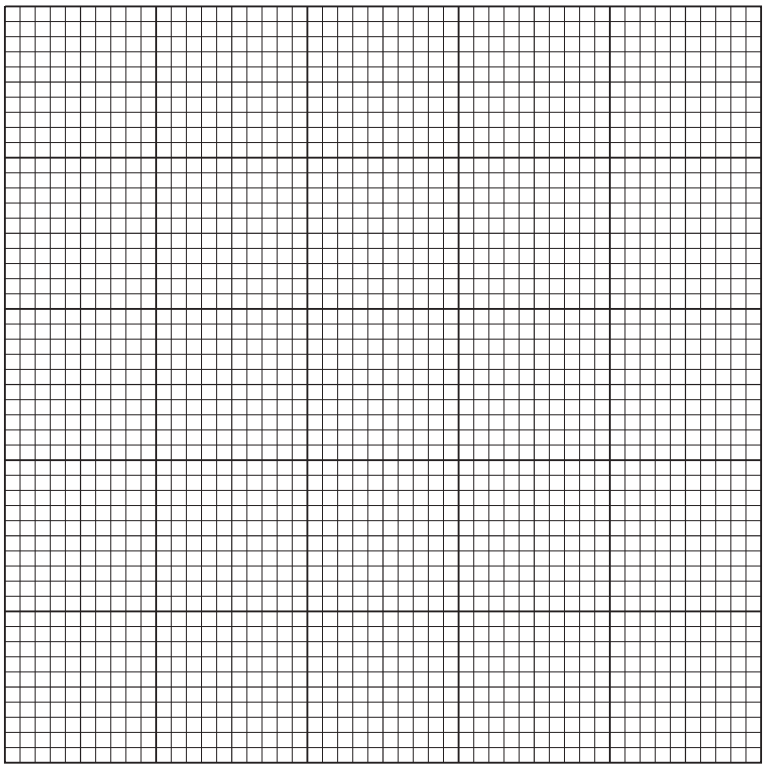
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(d) The student then carried out a different method. She placed ten red bean seedlings into each of five dishes. She then added different volumes of water to each dish. The results are shown in the table.

volume of water added /cm^3	time for all seedlings to die /days
3	2
6	3
9	4
12	5
15	5

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(i) Plot this information as a graph on the grid.



[4]

(ii) Describe the trends shown by the graph.

.....

.....[1]

(iii) The table shows rainfall data at a weather station located in an area used to grow red beans.

month	J	F	M	A	M	J	J	A	S	O	N	D
average rainfall /mm	15	5	20	45	226	240	211	241	325	280	159	42

In which month should farmers **not** plant red beans?

Using the information in the table, suggest a reason for your answer.

month .....

reason .....

.....

[2]

(iv) Red beans are legumes.

Explain why good crops of red beans can be grown without using fertilisers.

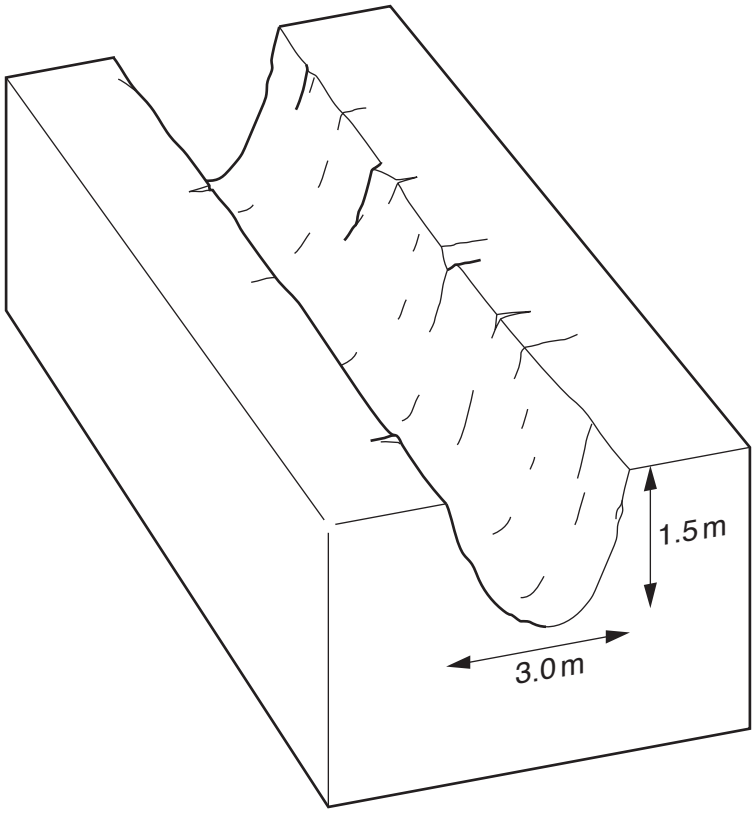
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(e) The diagram shows a field with gully erosion.



(i) Many fields are damaged by a type of soil erosion called gully erosion. Suggest how this type of erosion occurs.

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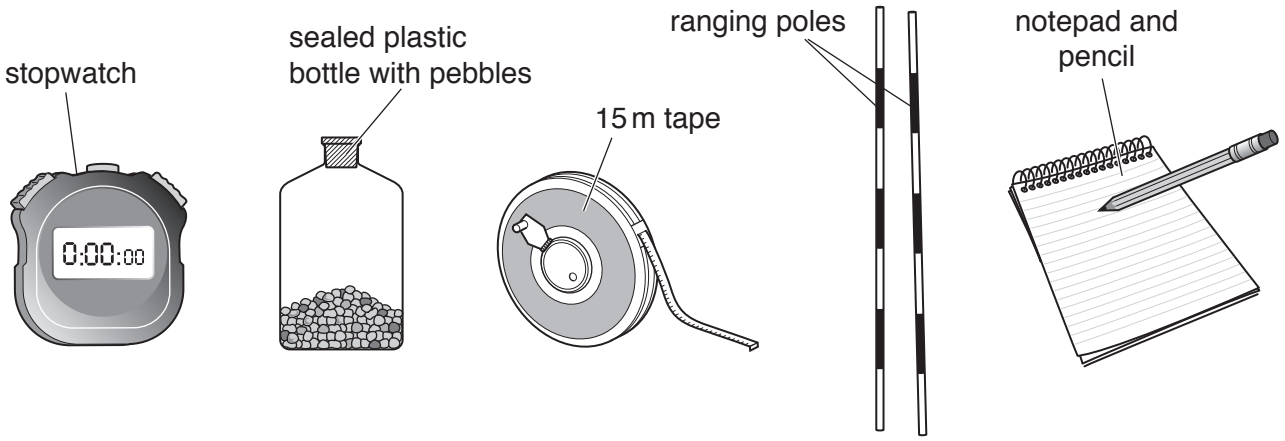
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(ii) Using the equipment shown in the diagram, describe how you could measure the flow rate of water in a channel.



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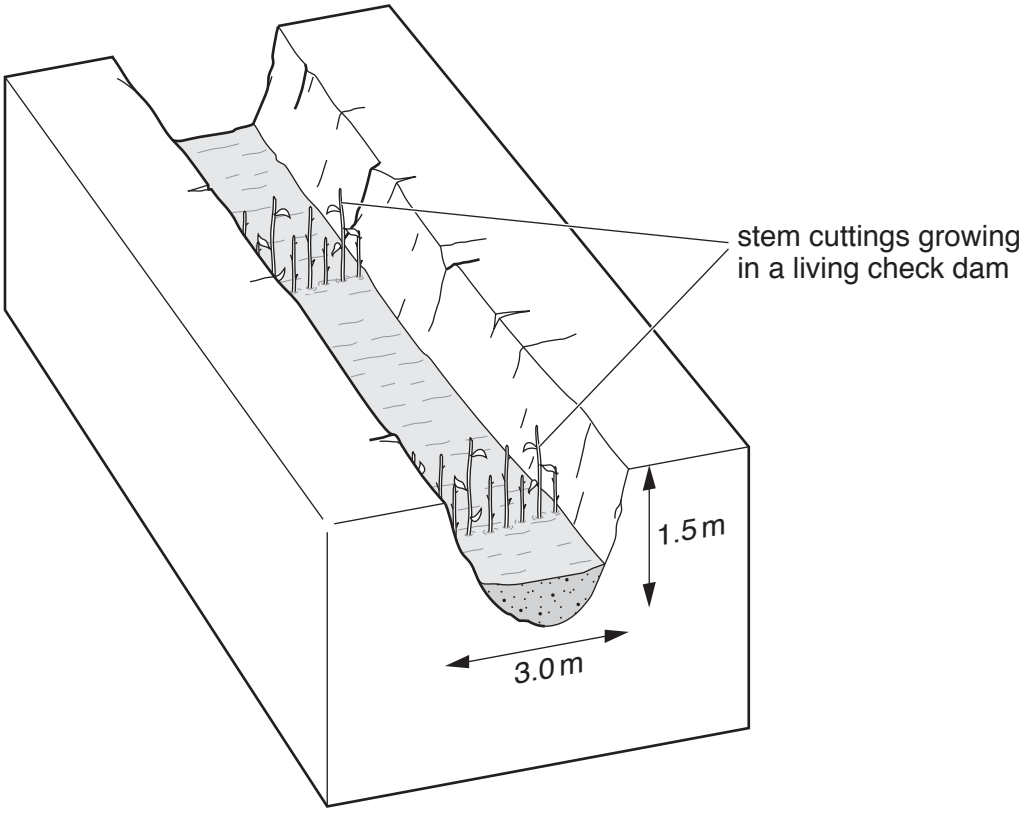
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(iii) To prevent further soil erosion some farmers have made living check dams by planting stem cuttings at regular intervals along the gulley.



A survey of some farmers that have had these living check dams for three years was carried out. The questions asked are shown in the table.

question	percentage yes	percentage no
Has your crop yield increased?	75	25
Has your soil fertility increased?	63	37
Have you experienced less flooding?	58	42

Suggest **one** more question the farmers could have been asked about the impact of living check dams.

.....

.....[1]

(iv) Explain why many farmers experienced less flooding after planting living check dams.

.....

.....

.....

.....[2]

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3 **(a)** There have been shortages of electricity in Nicaragua in recent years. Records of wind speed from weather stations were compared to find locations to build wind turbines.

(i) Name an instrument used to measure wind speed.

.....[1]

(ii) The wind speed data for one site in the north of the country is shown in the table.

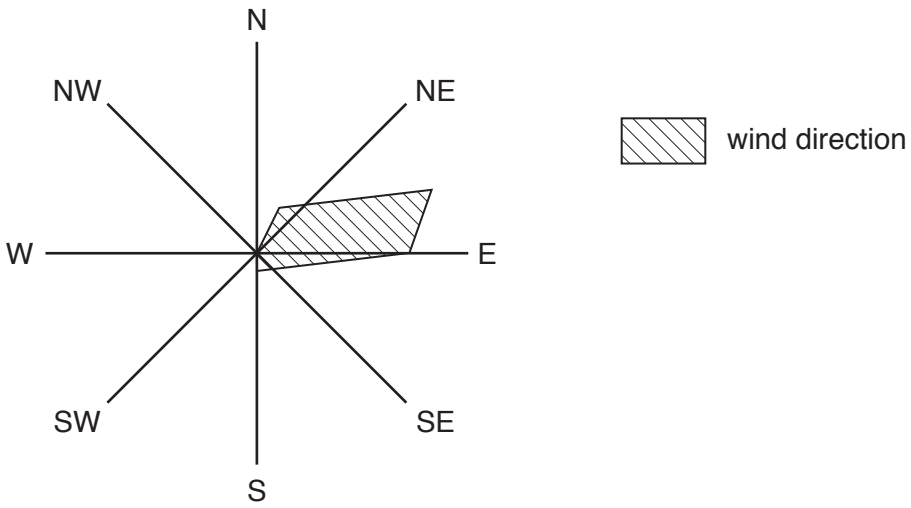
month	J	F	M	A	M	J	J	A	S	O	N	D
average wind speed /km per hr	17	17	17	15	13	11	13	11	11	11	11	11

Use this information to complete the table below.

	wind speed /km per hr
highest	.....
lowest	.....
range	.....

[2]

(iii) The wind direction for this weather station was recorded for one year and is shown in the diagram.



Suggest how this information confirms that this location is suitable for building wind turbines.

.....

.....

.....[2]

(b) (i) Suggest **two** advantages of using wind turbines to generate electricity.

.....

.....

.....

.....[2]

(ii) Explain why the government of Nicaragua wants to make sure there are no shortages of electricity in the future.

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.....[3]

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