



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE
NAME

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ENVIRONMENTAL MANAGEMENT

0680/43

Alternative to Coursework

October/November 2014

1 hour 30 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.

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.

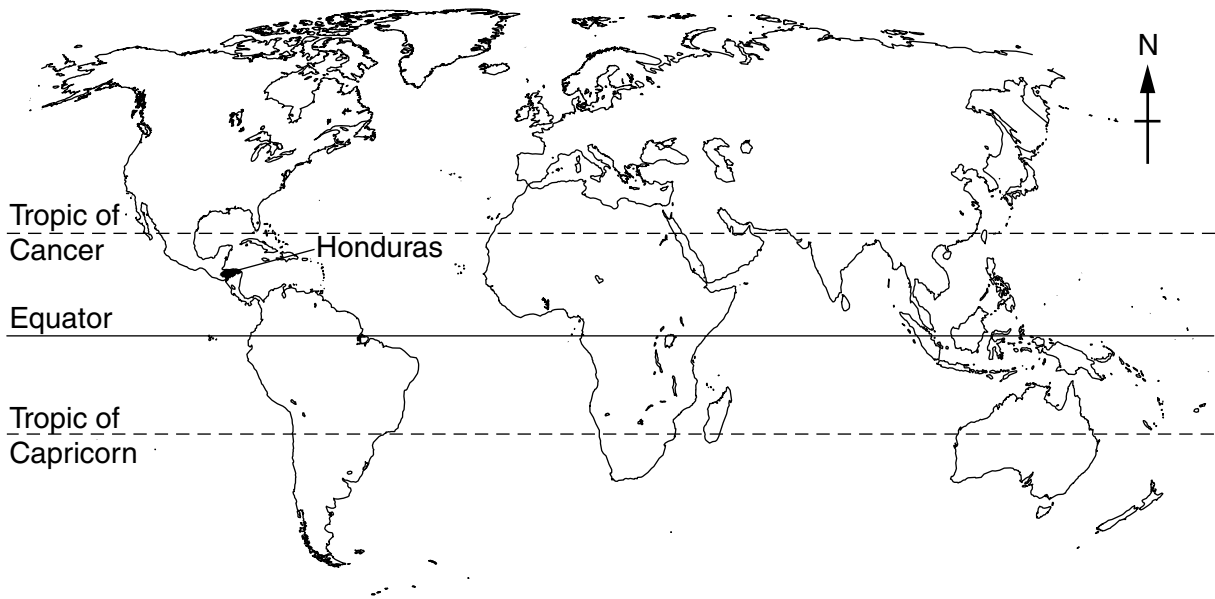
You may use the source data to draw diagrams and graphs or to do calculations to illustrate your answers.

At the end of the examination, fasten all your work securely together.

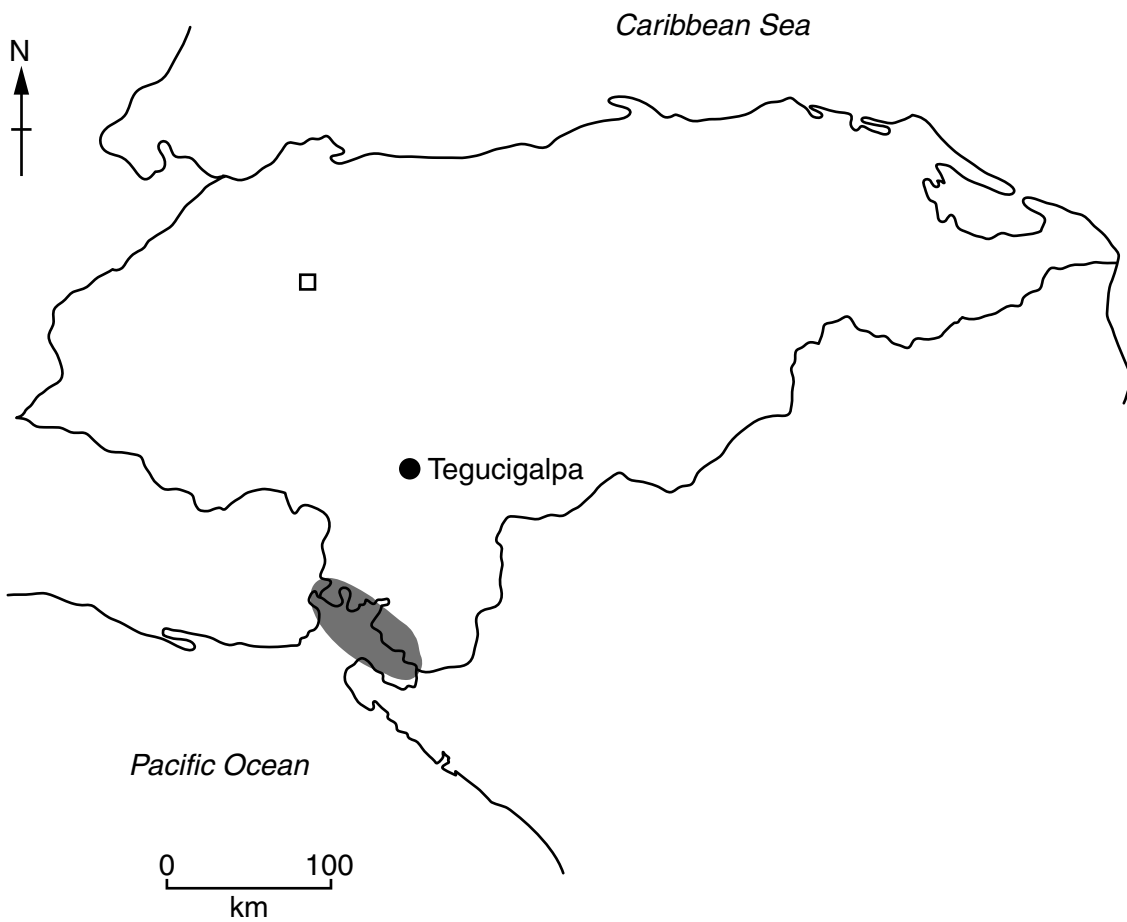
The number of marks is given in brackets [] at the end of each question or part question.

This document consists of **14** printed pages and **2** blank pages.

world map



map of Honduras



- Key**
- capital
 - antimony mine
 - shrimp farming area

Area of Honduras: 112 090 sq km

Population: 8 500 000

Children per woman: 2.9

Life expectancy: 71 yrs

Currency: lempiras (20 = 1 US\$)

Languages: Spanish, Amerindian languages

Climate: subtropical in lowlands, temperate in the mountains

Terrain: narrow coastal plains, mountains in the interior

Main exports: shrimps, clothing, coffee, car parts, cigars, bananas, antimony, palm oil and timber.

1 (a) The population of Honduras mainly work in the agricultural and fishing industries. However, there is still a high level of underemployment. The government is trying to encourage production of goods for export.

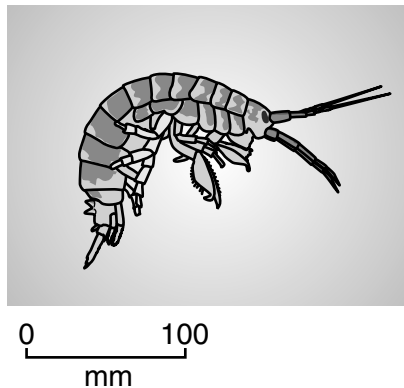
(i) Suggest what is meant by the term underemployment.

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

(ii) Describe how underemployment can cause problems for people living in Honduras.

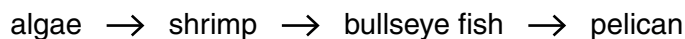
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.....[3]

(b) The diagram shows a shrimp.



Shrimp farming along the coast of Honduras has been developed to meet increasing world demand. At first, nearly all the shrimps in Honduras caught from the wild were exported. Large areas of mangrove swamps were cleared to make shallow ponds to grow shrimps in salty water. In order to meet world demand, 99% of shrimps in Honduras are now produced from larvae raised in nursery ponds. They are then released into the shallow ponds.

The natural food chain is shown below.



- (i) Suggest what changes may have occurred to the wild populations of bullseye fish and pelicans since shrimp farming began.

Give a reason for your answer.

bullseye fish

.....

pelican

.....[3]

- (ii) A scientist said, 'Cutting down the mangroves to allow shrimp farming in salty lagoons is not a sustainable activity'.

Suggest why the scientist said this.

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.....[3]

- (iii) Suggest how the growth of shrimp farming can be controlled to make it a sustainable activity.

.....

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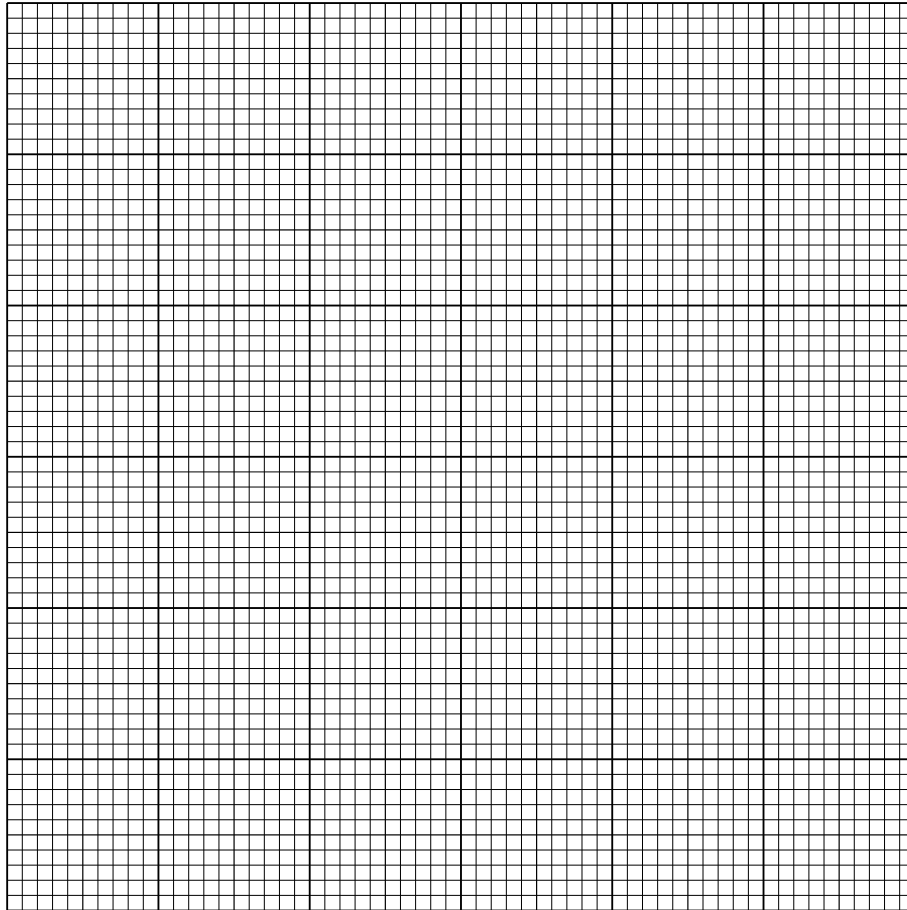
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.....[3]

- (c) (i) The scientist recorded the mass of shrimp harvest from six ponds, where a low density stocking method was used.

pond	A	B	C	D	E	F
mass of shrimp harvest /kg per ha	420	370	70	480	320	360

Plot the data as a graph on the grid below.



[4]

- (ii) Suggest a possible reason for the low yield from pond C.

.....
[1]

- (iii) The scientist decided to exclude the result from pond C. Calculate the average mass of shrimp harvest per hectare, excluding pond C.

Space for working.

..... [1]

- (iv) Suggest why the scientist decided not to include the result from pond C when calculating the average mass of shrimp harvest per hectare.

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

- (d) Some intensive shrimp farms use small ponds with very high stocking densities. They can produce 10 000 kg per ha. However, these small ponds must have air pumped into them and regular changes of water to remove shrimp waste. These shrimp are fed on high protein pellets. The production costs are 8 US\$/ha per harvest. The costs of the low density method is only 2 US\$/ha per harvest.

- (i) Explain why the shrimps need to be fed high protein pellets in these farms.

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

- (ii) Describe the possible risks and rewards of high density stocking methods for shrimp farmers.

risks

.....

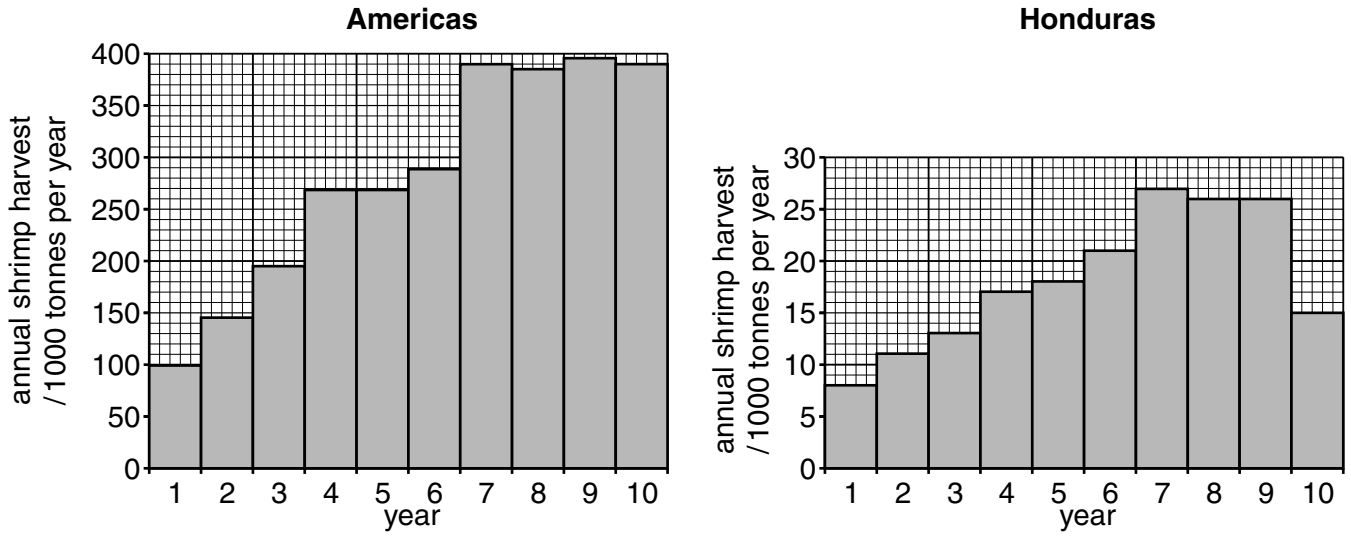
.....

rewards

.....

.....[3]

(e) The graph below shows the annual shrimp harvest in the Americas and Honduras over a ten year period.



(i) State which year had the highest shrimp harvest for:

Americas

Honduras [2]

(ii) Describe the pattern shown in the graph for:

Americas

.....

Honduras

..... [2]

[Total: 28]

2 (a) Antimony ore has been extracted from one shaft mine in Honduras for many years. The government has recently decided to give licenses for open pit (cast) and shaft mining of antimony and other ores. Some people are worried that new mining activity will cause problems.

(i) Describe the main differences between open pit (cast) and shaft mining.

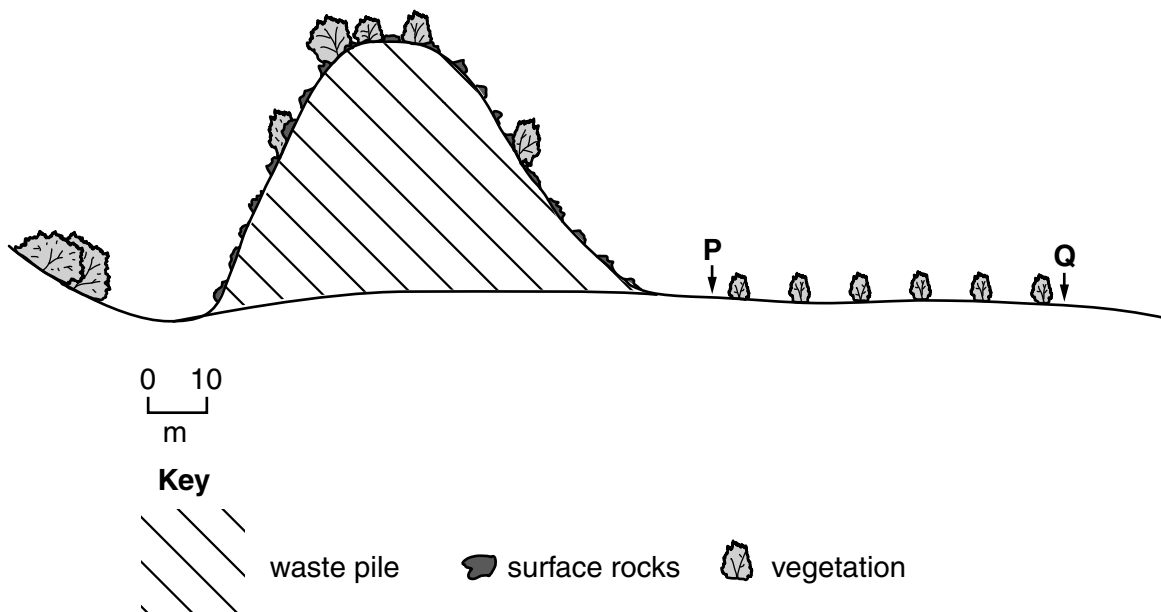
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(ii) Suggest why people living near the proposed open pit (cast) mines may be adversely affected by these mining developments.

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.....[4]

(b) Antimony is a toxic metal. Most of the antimony is extracted from the ore that is removed from the existing shaft mine. Many piles of mining waste are left behind. These waste piles release antimony into the groundwater after it has rained. Antimony accumulates in plants and reduces their growth.

(i) A student carried out a survey to investigate plant growth near one waste pile. The survey was carried out between points **P** and **Q**, shown on the cross section diagram below.



Draw an **X** on the diagram to show where you would expect the most antimony to be found after it has rained. [1]

(ii) The results of the survey are shown in the table.

	P						Q
distance from P /m	0	10	20	30	40	50	60
height of tallest plant/cm	3	4	6	6	8	12	12
bare ground /%	90	85	75	70	60	50	55

Describe the pattern of results for:

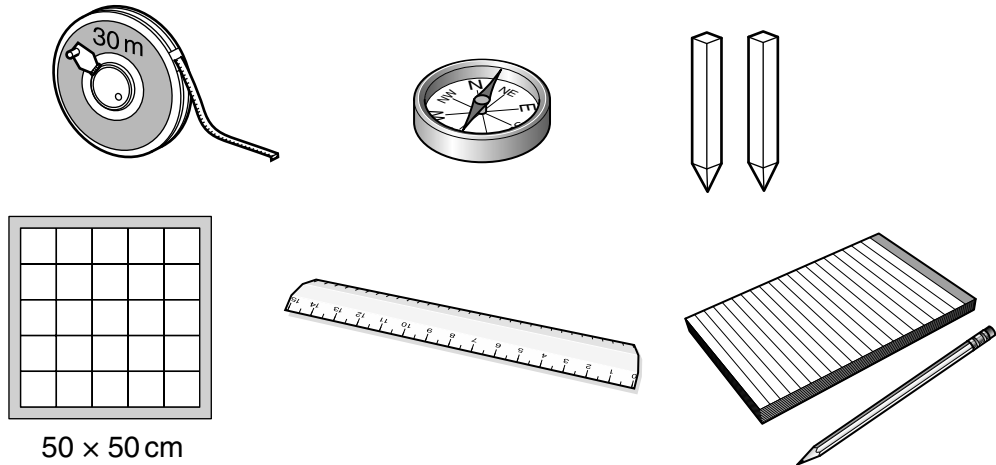
bare ground

.....

height of tallest plant

.....[3]

(iii) The student used the equipment shown below, to carry out the survey between points **P** and **Q**.



Using the equipment shown, describe a method the student could have used to carry out the survey between points **P** and **Q**.

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.....[4]

(iv) State **one** other measurement the student could have recorded from the plants.
.....[1]

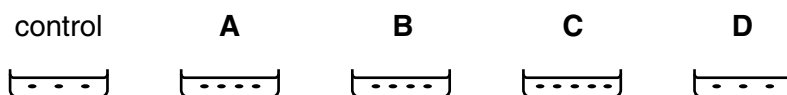
(v) Suggest **one** way the student could have improved the survey.
.....

.....[1]

(c) People living near these waste piles were worried that their drinking water was contaminated with antimony. The student wanted to find out if a plant species could be used to detect antimony in water samples. The student decided to use mung beans for the following reasons:

- seeds germinate quickly
- seedlings are fast growing
- the length of roots can be easily measured

The student used the method shown below.



Key

• mung bean

The control dish contained bottled water. The other dishes contained water collected from locations between points **P** and **Q**.

The roots of the mung beans were measured after 7 days. The results are shown in the table.

water sample	average length of root/mm
control	50
A	43
B	10
C	27
D	14

(i) Complete the table below to show the most likely order of antimony contamination.

The first box has been completed for you.

least contaminated \longrightarrow most contaminated

control
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[2]

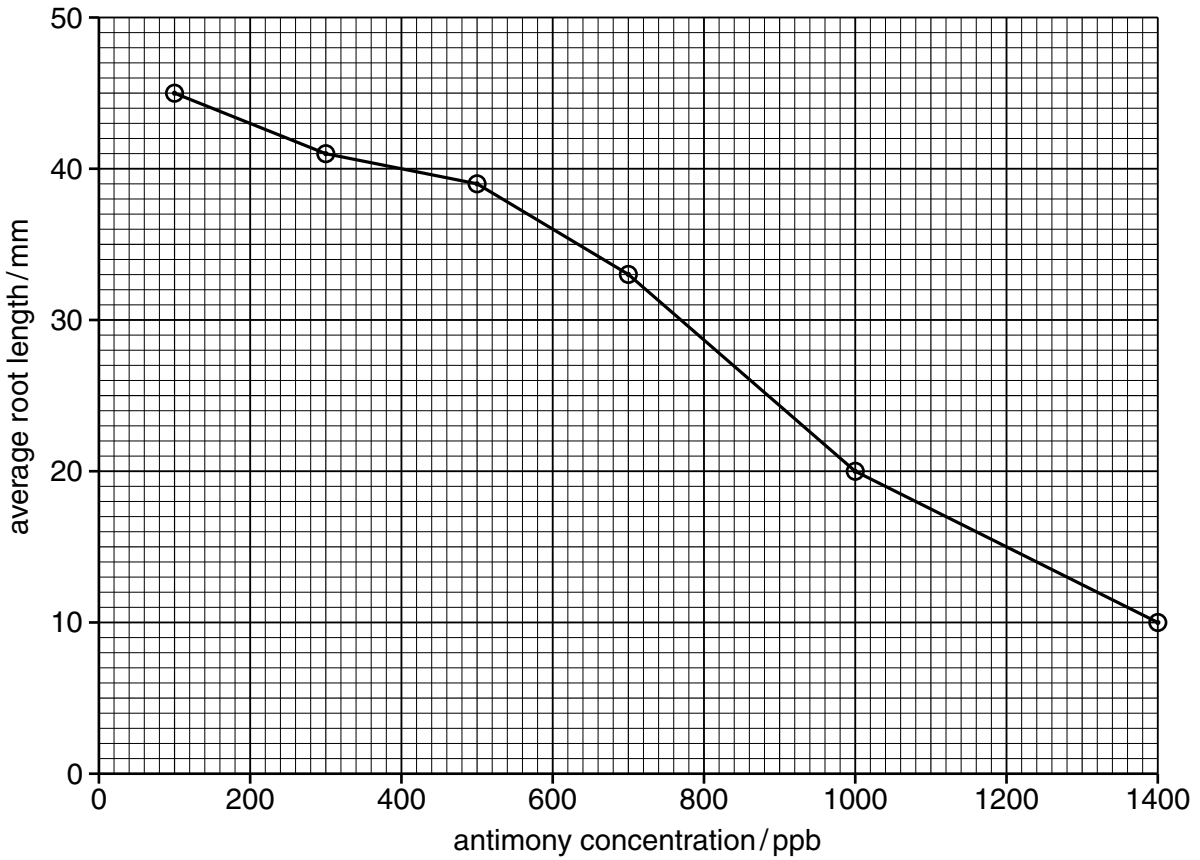
(ii) Explain why the student used a control dish.

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[1]

(iii) List **two** factors the student should have kept the same for all the dishes.

.....
[2]

(iv) The student repeated the experiment using water with known concentrations of antimony. The results are shown in the graph below.

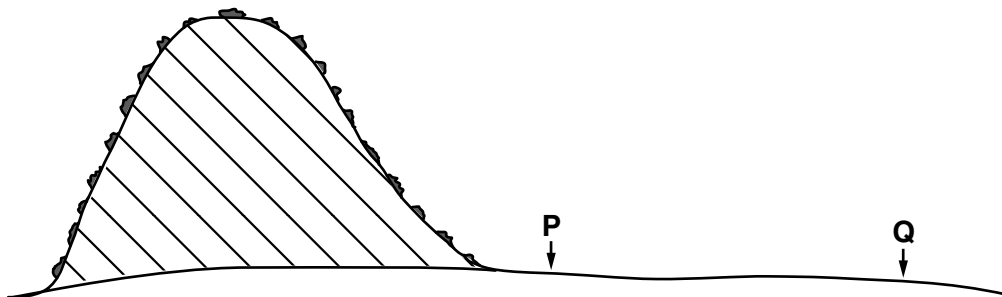


Using the graph, estimate the antimony concentration in the dishes **A**, **B**, **C** and **D**.

A ppb **C** ppb
B ppb **D** ppb

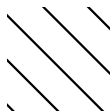
[2]

(v) Write the letters **A**, **B**, **C** and **D** between points **P** and **Q** to show the most likely position of each water sample on the cross section diagram below.



0 10
m

Key



waste pile

surface rocks

[2]

(d) The student studied the rainfall data for this mining region. Average monthly rainfall is shown in the table.

month	J	F	M	A	M	J	J	A	S	O	N	D
average rainfall/mm	12	2	1	26	177	180	70	74	151	87	38	14

The student carried out both surveys in March.

Suggest why the student decided to repeat both surveys in June and September.

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.....[2]

(e) Do you think more licences for antimony mining should be given in the future? Explain your point of view.

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[Total: 32]

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