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ENVIRONMENTAL MANAGEMENT **0680/22**

Paper 2 Management in Context **February/March 2021**

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

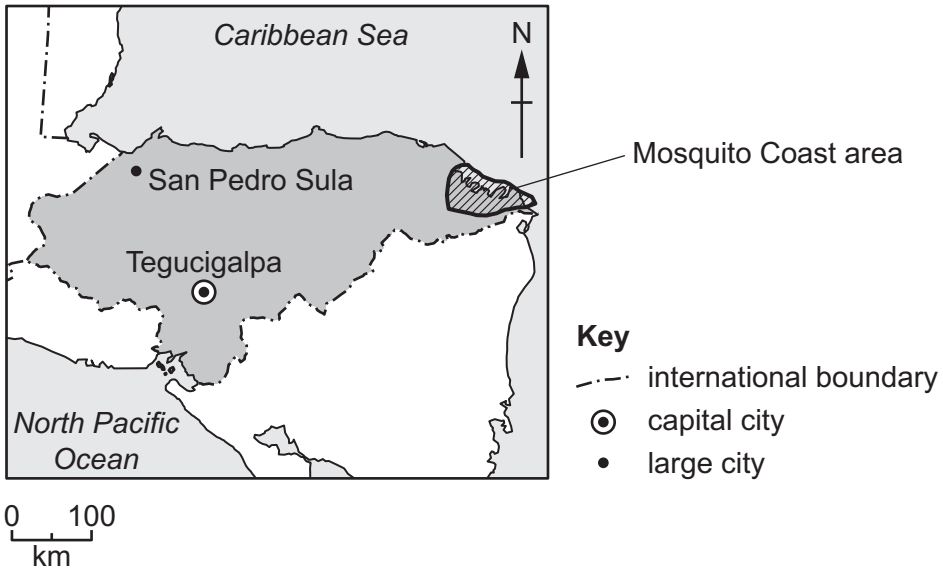
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[Turn over

world map showing the location of Honduras



map of Honduras



Area of Honduras: 112 090 km^2

Population: 9.2 million (in 2019)

Children per woman: 2.61

Life expectancy: 71.3 years

Currency: Honduran lempira (24.4 HNL = 1 USD)

Language: Spanish, local languages

Climate of Honduras: subtropical in the lowlands, temperate in the mountains

Terrain of Honduras: flat coastal areas, mountains in the interior, with fertile valleys

Main economic activities of Honduras: agricultural production, mineral mining and manufacture of consumer goods

Honduras is a less economically developed country (LEDC). Most sectors of the economy are growing. Unemployment remains a problem.

Many people have been displaced from rural and coastal areas by natural hazards. They now live in unplanned (informal) housing near to the capital city, Tegucigalpa, and the city of San Pedro Sula.

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[Turn over

1 **(a)** In 2019, the population of Tegucigalpa was 1.12 million people and the population of San Pedro Sula was 639 000 people.

Calculate the percentage of the total population of Honduras living in these two cities in 2019.

..... % [2]

(b) Many people in Honduras had to leave their homes as a result of landslides.

Suggest the causes of landslides.

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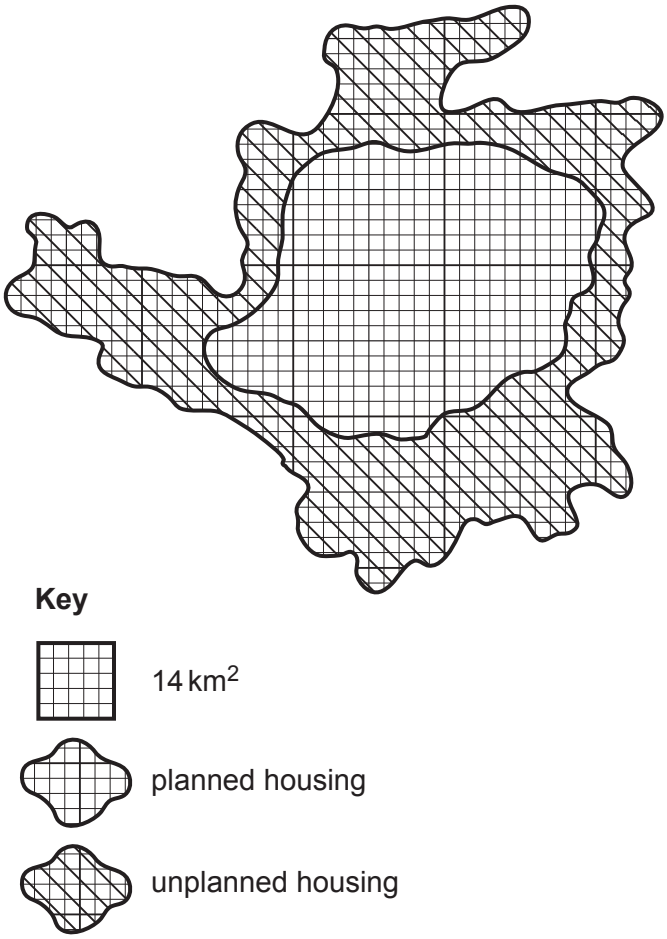
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..... [3]

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(c) The diagram shows the capital city with the predicted area of planned and unplanned (informal) housing for 2031.



Estimate the predicted area of **planned** housing in the capital city by 2031.

..... km^2 [2]

(d) A survey of the capital city recorded two types of housing, **A** and **B**.

Information about the two types of housing is shown.

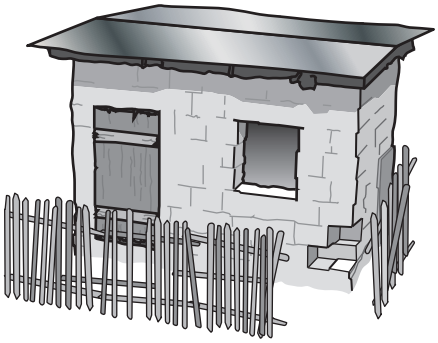
type **A** house



typical features of a type **A** house

- house built on reinforced concrete foundations
- brick and block walls
- tiled roof
- solid floors
- glass windows
- hot and cold water
- average value 30 000 USD

type **B** house



typical features of a type **B** house

- house built on poor-quality cement foundations
- unfinished block walls
- sheet metal roof
- earth floors
- open windows
- cold water
- average value 2500 USD

(i) Suggest reasons why type **B** houses are mostly found in unplanned (informal) housing areas.

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..... [2]

(ii) Suggest reasons why living in type **B** housing is less healthy than living in type **A** housing.

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..... [2]

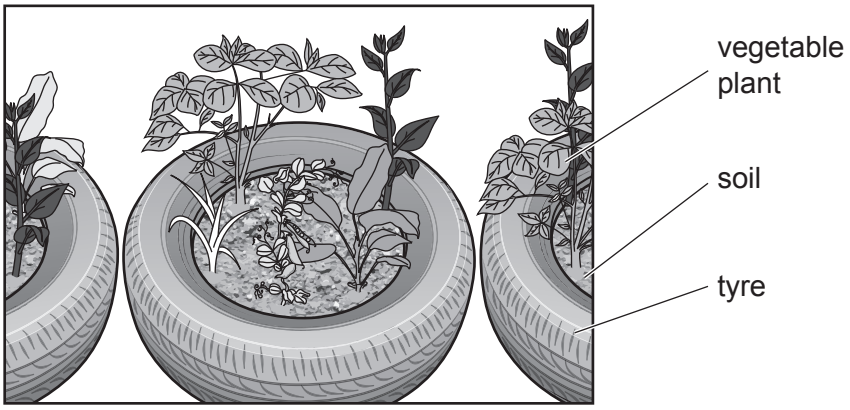
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(e) An urban agriculture project was started in the poor housing areas of the capital city. The people living in these areas often have a low income.

The aim of the project was to encourage people to use urban gardening methods to grow their own vegetables.

The project was designed as follows:

- Three poor housing areas were selected.
- Local people volunteered to be trained in urban gardening methods.
- Small gardens were made from old car tyres.
- At least five different types of vegetable were grown in each tyre.
- Water barrels, seeds and tools were provided at low cost.



(i) Suggest **one** reason why three poor housing areas were selected for the project.

.....

..... [1]

(ii) Suggest why it is important that people volunteered to be trained in urban gardening methods.

.....

..... [1]

(iii) Suggest why five different types of vegetable were grown in each tyre.

.....

..... [1]

(iv) Suggest the benefits of using old car tyres to grow vegetables.

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..... [2]

(v) More than 1000 people were trained by the urban agriculture project.

Three years after the end of the project, a student wanted to find out if people were still using urban gardening methods.

The student used a questionnaire to survey some people who had been trained by the project.

The results are shown in the table.

	% response	
question	**yes**	**no**
Do you grow five or more types of vegetable?	90	10
Do you collect rain water in a water barrel?	72	28
Do you grow any fruit trees?	15	85
Do you sell any vegetables?	27	73

Use the results to discuss whether the urban agriculture project was successful.

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..... [4]

(vi) For families involved in the project, the quantity of vegetables eaten per person increased to 260 g per day.

Suggest ways that these families have benefited from growing vegetables.

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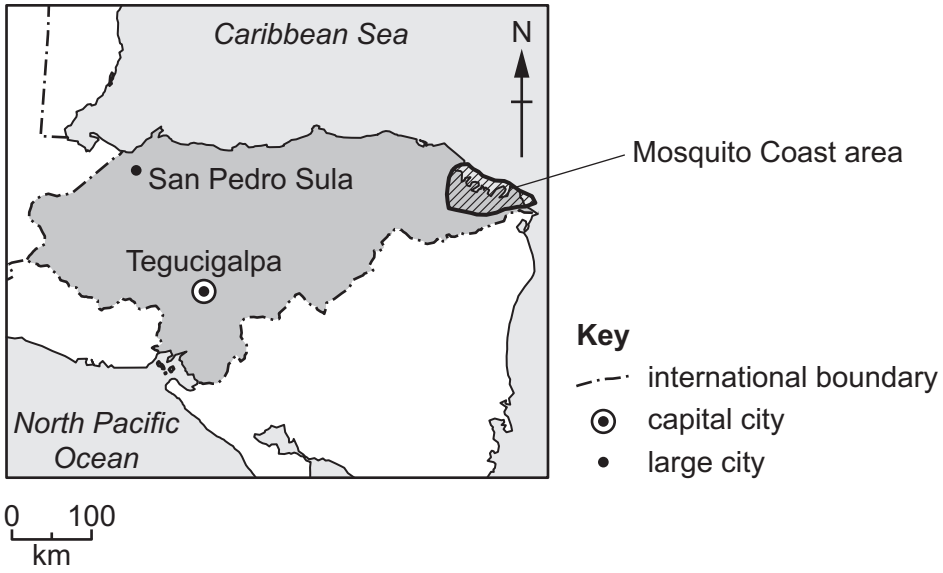
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[Total: 22]

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2 The map shows the location of the Mosquito Coast area in Honduras. This is a high-risk area for malaria.



(a) (i) Describe the life cycle of the malaria parasite.

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..... [4]

(ii) State **four** strategies to control malaria.

1 .....

2 .....

3 .....

4 .....

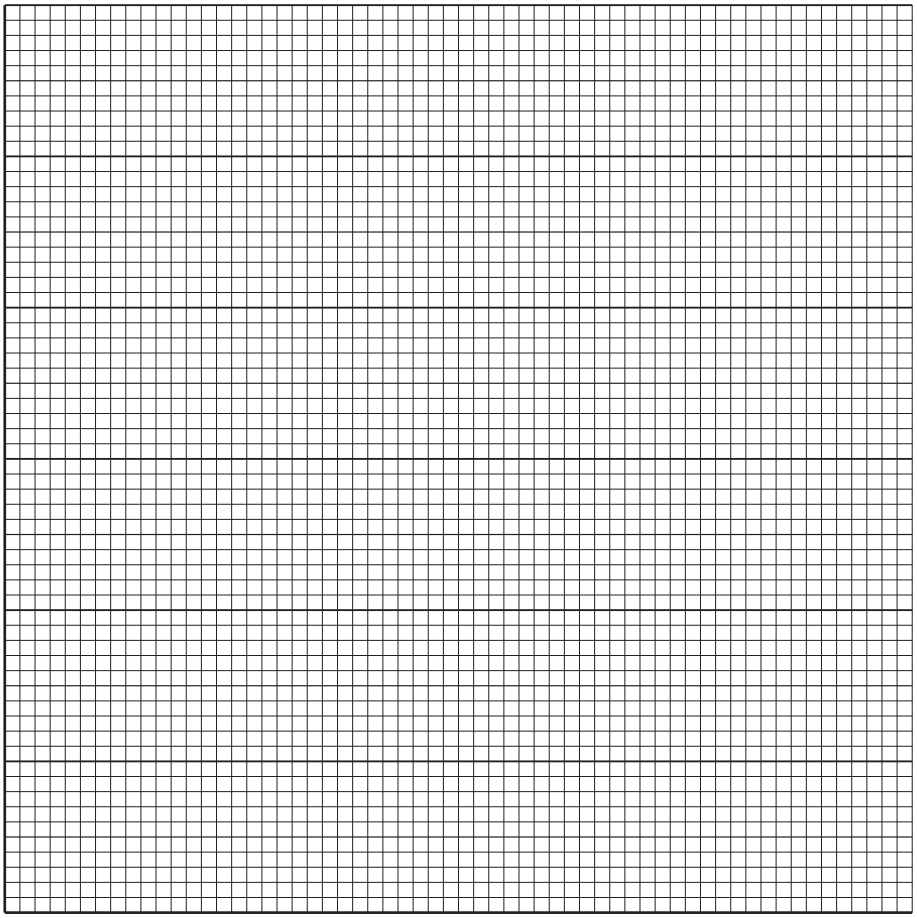
[4]

(b) The government of Honduras invests in control of malaria every year. Honduras also gets money from an international fund for control of malaria every year.

The table shows the total money spent on control of malaria over a nine-year period in Honduras.

year	total money spent on control of malaria /USD (million)
1	1.9
2	2.6
3	1.7
4	1.8
5	2.1
6	2.0
7	1.2
8	2.1
9	1.3

(i) On the grid, plot a bar chart of the data in the table.



[4]

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(ii) State what the bar chart shows about the money spent on control of malaria over the nine-year period.

..... [1]

(iii) The government of Honduras provided 42% of the budget for control of malaria in year 6.

Calculate how much money the government of Honduras provided in year 6.

..... USD [1]

(iv) Suggest whether it is possible to eradicate malaria from Honduras by 2030.

Give reasons for your point of view.

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..... [3]

(c) The table shows climate data for the Mosquito Coast area and for the capital city.

location	**average annual temperature range / °C**	**average annual rainfall / mm**
Mosquito Coast area	28–31	3330
capital city	21–25	760

Explain why the capital city is free from malaria.

Use information from the table to support your answer.

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.....

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..... [2]

[Total: 19]

3 The government of Honduras wants 95% of the country's electricity to come from renewable resources by 2027.

(a) Honduras has several large rivers and many smaller ones.

The table shows some information about the five largest dams in Honduras.

dam	year completed	dam height / m	maximum volume of water / million m^3	reservoir use		
				water supply	hydroelectric power	recreation
A	1965	64	13		✓	
B	1976	50	12	✓		
C	1985	226	5700		✓	✓
D	1992	68	36	✓		
E	1994	54	43	✓	✓	✓

(i) Use the information to complete the sentences.

- The oldest dam is ..... .
- The dam with the largest volume of water is ..... .
- The number of dams used for hydroelectric power is ..... .
- The dam with the greatest volume used for water supply is ..... .
- The total maximum volume of water in the five dams is ..... million m^3.

[5]

(ii) Many people live on small farms near dams.

Suggest the benefits of farming near dams.

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..... [3]

(iii) Dam **E** is a multipurpose dam.

Describe the economic benefits of a multipurpose dam compared with a single-purpose dam.

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..... [2]

(iv) Describe how hydroelectric power is used to generate electricity.

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..... [3]

(b) To meet the target of 95% of electricity from renewable resources by 2027, the government of Honduras plans to build new dams.

These new dams will be funded using money loaned from other countries.

(i) Describe the environmental impacts of building a dam.

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..... [3]

(ii) Suggest the economic impacts of borrowing money from other countries.

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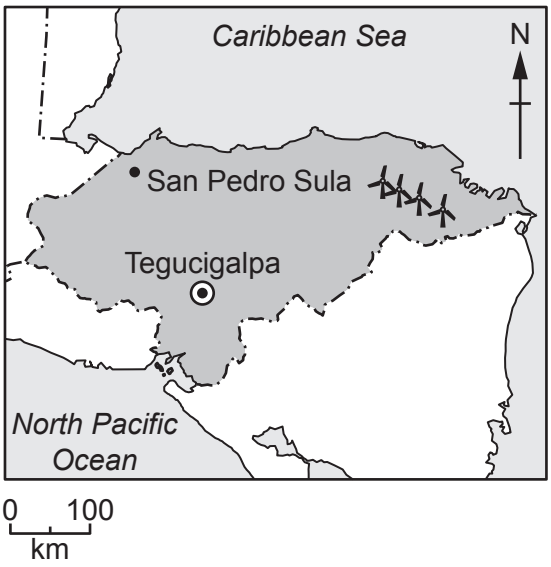
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(c) The government of Honduras also plans to build new wind turbines.

The map shows the location of the planned new wind turbines.

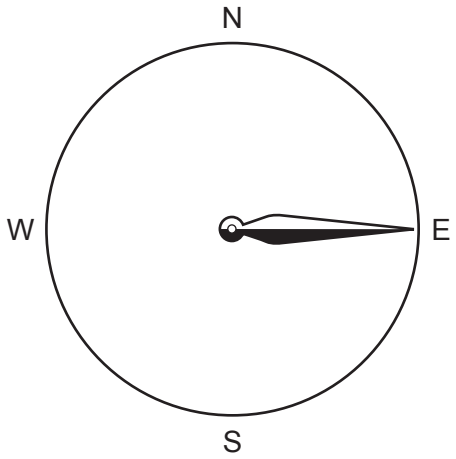


Key

planned new wind turbines

The wind turbines need a minimum wind speed of 4.0 m / s to generate electricity.

The diagram shows the wind direction for one year at this location.



(i) The wind speed at this location is between 4.1 m / s and 6.7 m / s all year.

Suggest reasons why this location is suitable for generating electricity using wind turbines.

.....

.....

.....

..... [2]

(ii) Suggest **one** problem with using this location for the site of the wind turbines.

.....

..... [1]

(iii) State **two** renewable energy resources other than hydroelectric and wind power.

1 .....

2 .....
[2]

[Total: 23]

4 Honduras has many mineral resources, including antimonite.

Antimonite is a metal ore that is processed to obtain the metal antimony.

The world demand for antimony is increasing.

(a) Several known deposits of antimonite in Honduras have not been extracted.

Give reasons why some known deposits of minerals are **not** extracted.

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..... [3]

(b) The dust particles from antimonite can damage the health of humans.

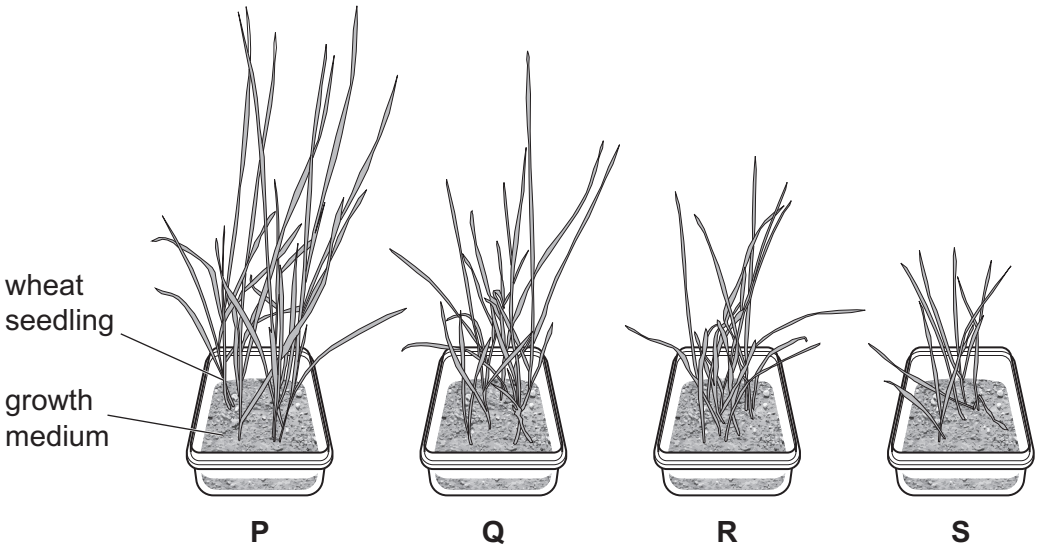
Suggest **one** risk to the health of humans from these dust particles.

..... [1]

(c) A scientist investigated the effect of antimonite dust particles on the growth of crops.

The scientist added different masses of antimonite dust particles to the growth medium of four wheat seedling samples, **P**, **Q**, **R** and **S**.

The diagram shows the growth of the wheat seedling samples after seven days.



All the wheat seedling samples were collected and dried in an oven at 95 °C for 24 hours. The dry biomass of each sample was measured.

The results are shown in the table.

wheat seedling sample	**P**	**Q**	**R**	**S**
mass of antimonite dust added to growth medium / mg	0	50	100	150
dry biomass of wheat samples / g	0.05	0.03	0.02	0.01

(i) Explain why the scientist included sample **P** in the investigation.

.....

..... [1]

(ii) Describe the trend shown by the results.

.....

..... [1]

(iii) Suggest **three** factors that the scientist should control in this investigation.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(iv) The scientist used dry biomass as a way of measuring the growth of the wheat seedling samples.

Suggest **two** other ways of measuring the growth of the wheat seedling samples.

1 .....

.....

2 .....

.....

[2]

(v) The scientist concluded that the roots of crops absorb antimony from the growth medium.

Suggest **two** limitations of the scientist's investigation.

1 .....

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2 .....

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[2]

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(d) Describe how toxic substances, such as antimony, can pass along a food chain.

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..... [3]

[Total: 16]

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