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Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

8265087442

GEOGRAPHY **0460/42**

Paper 4 Alternative to Coursework **October/November 2024**

1 hour 30 minutes

You must answer on the question paper.

You will need: Insert (enclosed)
Calculator
Ruler

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.
- If additional space is needed, you should use the lined pages at the end of this booklet; the question number or numbers must be clearly shown.

INFORMATION

- The total mark for this paper is 60.
- The number of marks for each question or part question is shown in brackets [ ].
- The insert contains additional resources referred to in the questions.

LEDCs – Less Economically Developed Countries
MEDCs – More Economically Developed Countries

This document has **16** pages. Any blank pages are indicated.

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1 Students in Hanoi, Vietnam, investigated air pollution in the city. They learned that Hanoi has poor air quality. One of the main reasons for this is the large amount of traffic. The students decided to do fieldwork to investigate the issue.

The students tested the following hypotheses:

Hypothesis 1: *The amount of traffic increases closer to the CBD (Central Business District)*.

Hypothesis 2: *There is a positive correlation (relationship) between the amount of traffic and the level of air pollution*.

(a) To investigate **Hypothesis 1**, the students did a traffic count at nine sites at increasing distances from the CBD.

(i) Which **four** of the following are important features of a traffic count? Tick (✓) your choices.

feature	tick (✓)
Traffic must be counted moving along the road in both directions.	
Counting must start and finish at the same time at all counting sites.	
Students should work by themselves so they are not distracted by others.	
The speed of each vehicle can be recorded using a stopwatch.	
A tally method can be used to count and record vehicles in groups of five.	
Every fifth vehicle which passes the counting site should be identified by make and model of vehicle.	
Students must not stand too near the road while counting the vehicles.	
A questionnaire should be used with drivers and passengers of the vehicles.	

[4]

(ii) The students agreed to count the number of vehicles for 10 minutes at each site. Suggest why the students decided to count for this length of time.

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(b) The results of the traffic count are shown in Table 1.1 (Insert).

(i) At which site were most vehicles counted?

site number ..... [1]

(ii) **Plot the number of vehicles** counted at site 4 on Fig. 1.1. [1]

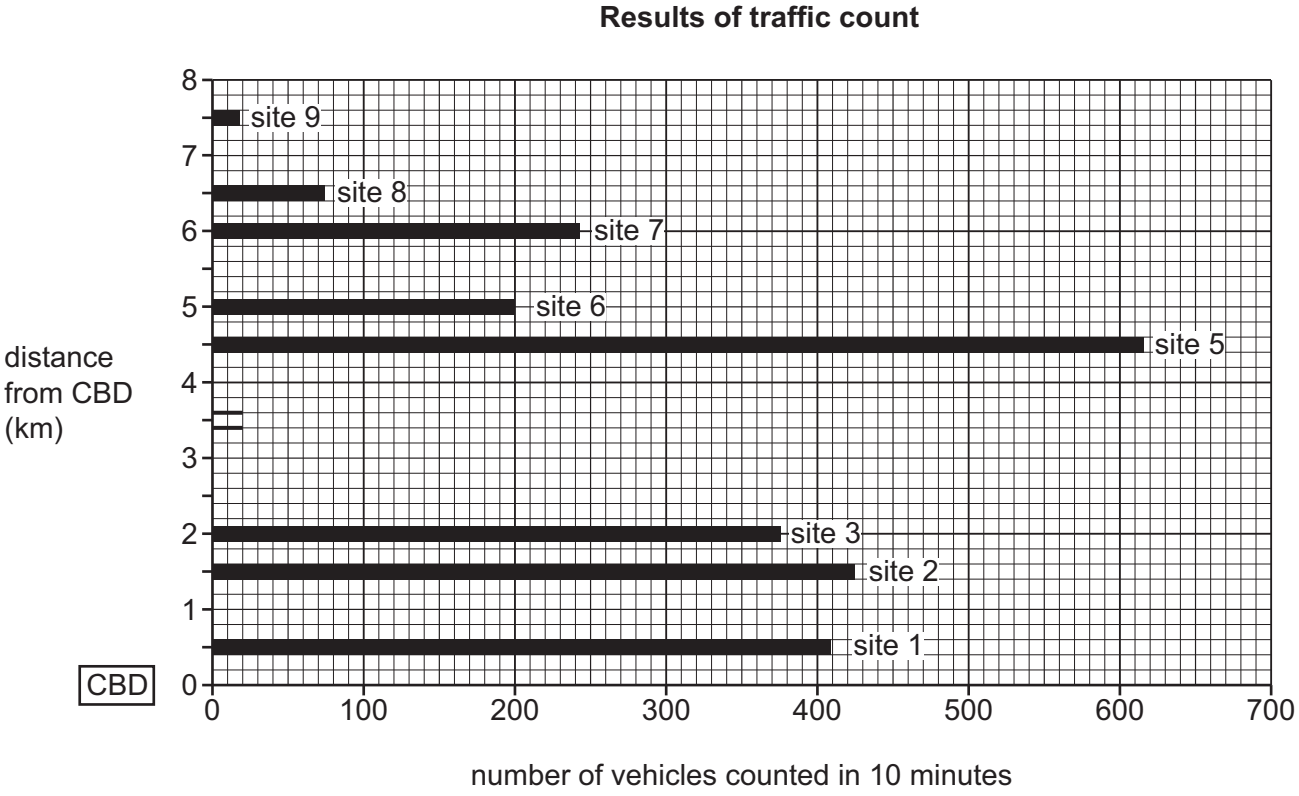

Fig. 1.1

(iii) What conclusion did the students make about **Hypothesis 1:** *The amount of traffic increases closer to the CBD*? Tick (✓) your decision below, and support it with evidence from Fig. 1.1 and Table 1.1.

	tick (✓)
The hypothesis is false.	
The hypothesis is partly true with some exceptions.	
The hypothesis is completely true.	

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(c) Before they investigated their second hypothesis, the students did some research using secondary sources about how to measure air pollution.

Explain what is meant by 'secondary sources'. Give an example of a secondary source.

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(d) The students decided to use a measurement called the Air Quality Index to measure the level of air pollution. This index is shown in Fig. 1.2 (Insert).

(i) Which level of health concern is shown by an Air Quality Index measurement of 235?

name of level ..... [1]

(ii) What colour on the Air Quality Index advises that children **should reduce prolonged outdoor exercise**?

colour of level ..... [1]

(e) To investigate **Hypothesis 2:** *There is a positive correlation (relationship) between the amount of traffic and the level of air pollution*, the students measured the air quality using the Air Quality Index at each site. They used the equipment shown in Fig. 1.3 (Insert).

(i) The results of the students' measurements of the Air Quality Index are shown in Table 1.2 (Insert).
Plot the results for sites 6 and 7 on Fig. 1.4. [2]

Amount of traffic and air pollution

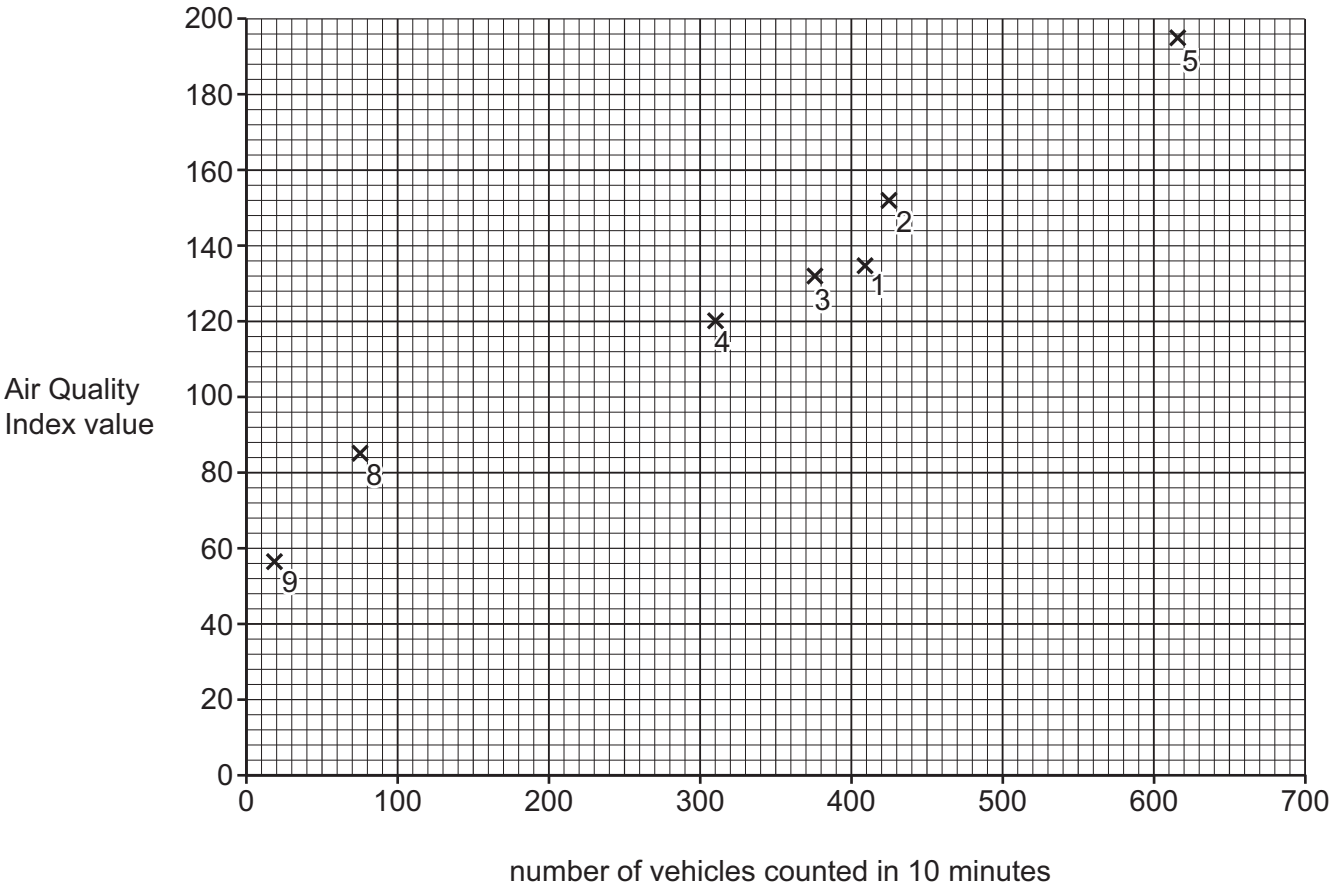

Fig. 1.4

(ii) Do the results shown in Fig. 1.4 and Table 1.2 support **Hypothesis 2:** *There is a positive correlation (relationship) between the amount of traffic and the level of air pollution*? Support your decision with data.

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(iii) Suggest **two** sources of air pollution (**not** including traffic) in a major city such as Hanoi.

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2 .....

[2]

(f) To extend his study, one student produced the bipolar survey sheet shown in Fig. 1.5 (Insert) to compare the environmental quality at the nine fieldwork sites.

(i) Describe how the student himself would use the survey sheet in his fieldwork.

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(ii) How could each of the following make the student's bipolar survey fieldwork results more reliable?

work with another student while doing the survey

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do all the surveys at the same time of day

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walk around each fieldwork site before making his decision

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2 Students were studying the processes in a drainage basin. They learned that infiltration is affected by factors such as:

- soil moisture content
- how steeply the land slopes
- type of vegetation
- number of people walking in the area.

(a) Identify the correct definition of infiltration. Tick (✓) your answer.

	tick (✓)
water going back into the atmosphere	
water soaking through bedrock	
water flowing over the ground surface	
water flowing down a river	
water soaking into the soil	

[1]

Two hypotheses chosen by one group of students were:

Hypothesis 1: *The rate of infiltration increases as soil moisture content decreases*.
(Soil moisture content is the quantity of water contained in the soil.)

Hypothesis 2: *The rate of infiltration is greater on steeper sloping land*.

(b) The students did some fieldwork to investigate infiltration at six sites.

(i) At each site, they used the equipment shown in Fig. 2.1 (Insert) to measure the rate (speed) of infiltration. Describe their method.

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(ii) The students recorded the water level in the tube over 10 minutes. The results of the measurements at two sites are shown in Table 2.1 (Insert).
Use the results in Table 2.1 to **complete the measurements** for site 4 on Fig. 2.2. [2]

Students' measurements of water level

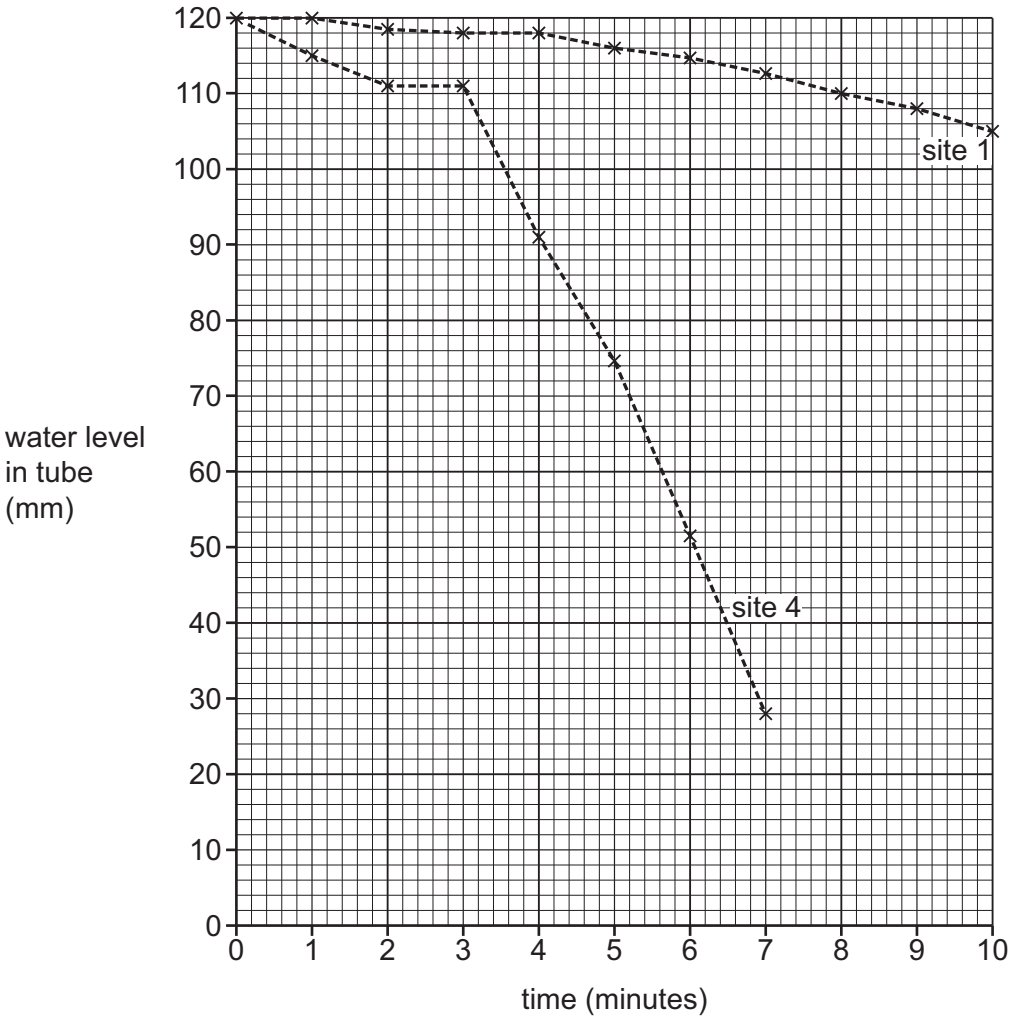

Fig. 2.2

(iii) Use Fig. 2.2 and Table 2.1 to compare the fall in water level between site 1 and site 4.

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(iv) The students calculated the infiltration rate at each site.
Use the data in Table 2.1 (Insert) to show the calculation which produced the result for **site 4** in the space below. [1]

$$\text{Infiltration rate} = \frac{\text{fall in water level (mm)}}{\text{time}}$$

$$=$$

$$= 11.4 \text{ mm per min}$$

(c) To investigate **Hypothesis 1:** *The rate of infiltration increases as soil moisture content decreases*, the students researched how to find out the moisture content of soil. They found two methods, which are described in Fig. 2.3 (Insert).

(i) The students chose method 2. Suggest **three** advantages of using this method rather than method 1.

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(ii) The results of the students' measurements of the infiltration rate and soil moisture content are shown in Table 2.2 (Insert). **Plot the results at site 3** on Fig. 2.4. [2]

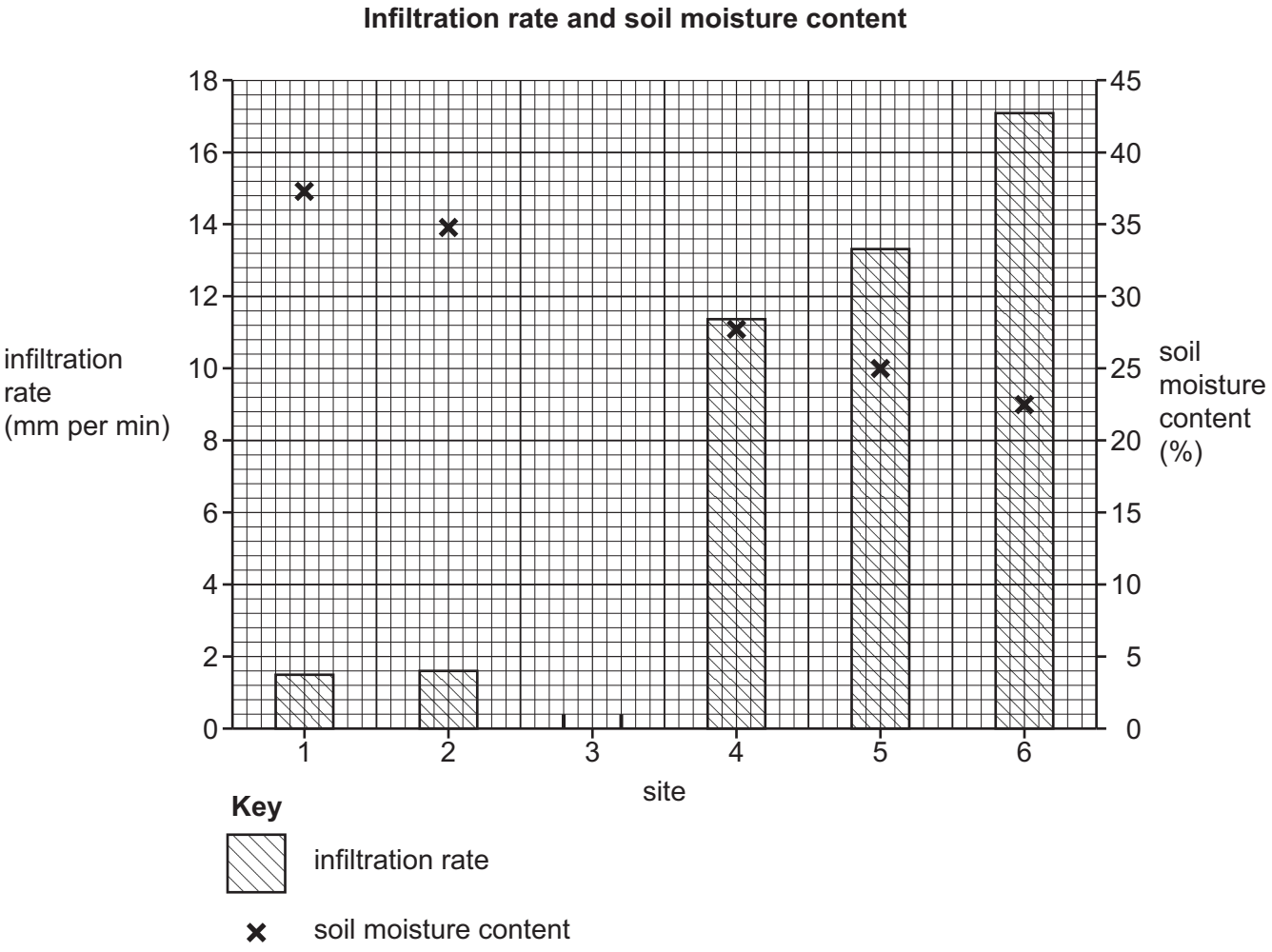

Fig. 2.4

(iii) What conclusion would the students make to **Hypothesis 1:** *The rate of infiltration increases as soil moisture content decreases*? Support your decision with evidence from Fig. 2.4 and Table 2.2.

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(d) To investigate **Hypothesis 2:** *The rate of infiltration is greater on steeper sloping land*, the students measured the slope gradient at each site.

(i) Describe a method to measure the slope gradient. Refer to the equipment the students would use.

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(ii) The slope gradient and infiltration rate for each fieldwork site are shown in Table 2.3 (Insert). Use this data **to plot the results at site 3** on Fig. 2.5. [1]

Slope gradient and infiltration rate

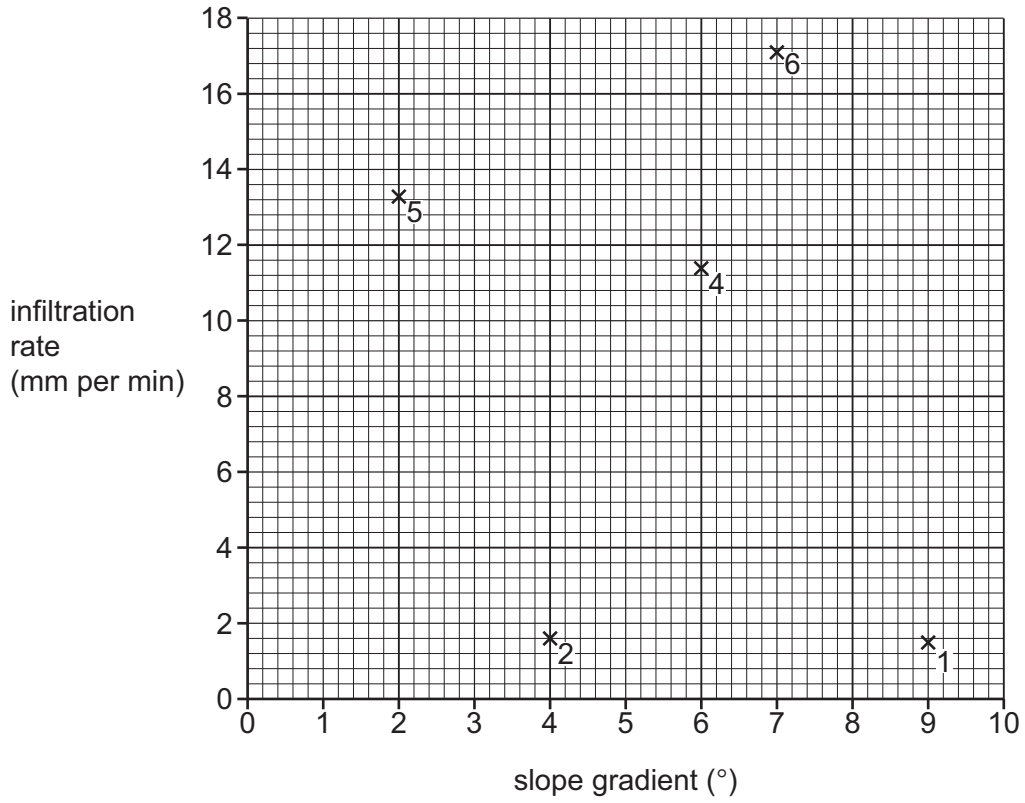

Fig. 2.5

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(iii) What is the correct conclusion to **Hypothesis 2:** *The rate of infiltration is greater on steeper sloping land*? Support your decision with evidence from Fig. 2.5 and Table 2.3.

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(e) Other students recorded the types of vegetation found at each measuring site. Their results are shown in Fig. 2.6 (Insert). Use these results to describe how the infiltration rate varies between different types of vegetation in this area.

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(f) The area where the students did their fieldwork is visited by many people. Describe how people walking in the area reduces the infiltration rate. Explain why this would happen.

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