Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER						CANDIDATE NUMBER				

GEOGRAPHY **0460/41**

Paper 4 Alternative to Coursework **May/June 2023**

1 hour 30 minutes

You must answer on the question paper.

You will need: Insert (enclosed) Ruler
Calculator
Protractor

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.

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

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1 A teacher read a newspaper report about the impacts of a new cement factory in Kamalpur, Pakistan.

(a) Fig. 1.1 (Insert) shows some information about the cement industry.

(i) Which **one** of the following statements about the cement factory is correct? Tick (✓) your answer.

	tick (✓)
It is a tertiary industry.	
It is a high technology industry.	
It is an assembly industry.	
It is a manufacturing industry.	

[1]

(ii) From Fig. 1.1, name **one** input and **one** process.

Input ....

Process .... [2]

The teacher read the newspaper report to her students. The report is shown in Fig. 1.2 (Insert). She suggested that they did their own investigation into the effects of the cement factory.

The students agreed to test the following hypotheses:

Hypothesis 1: *People in different age groups have the same level of concern about each problem caused by the factory.*

Hypothesis 2: *People think that the best method to reduce the negative impacts of the cement factory is to close it down.*

(b) To investigate **Hypothesis 1**, the students used a questionnaire with 100 residents of Kamalpur to learn about the problems caused by the cement factory. This questionnaire is shown in Fig. 1.3 (Insert).

(i) Name a suitable sampling method for the students to select 100 people. Describe the method and explain why it is suitable.

Name of sampling method ....

Description of sampling method

....

....

Why this sampling method is suitable

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.... [3]

(ii) The students wanted to find out whether people had different levels of concern about the problems caused by the cement factory. Describe how Section A in the questionnaire (Fig. 1.3) provides the evidence of different levels of concern.

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.... [2]

(iii) The results of section A in the questionnaire are shown in Table 1.1 (Insert). Use this data to **complete Fig. 1.4**. [1]

Results of section A

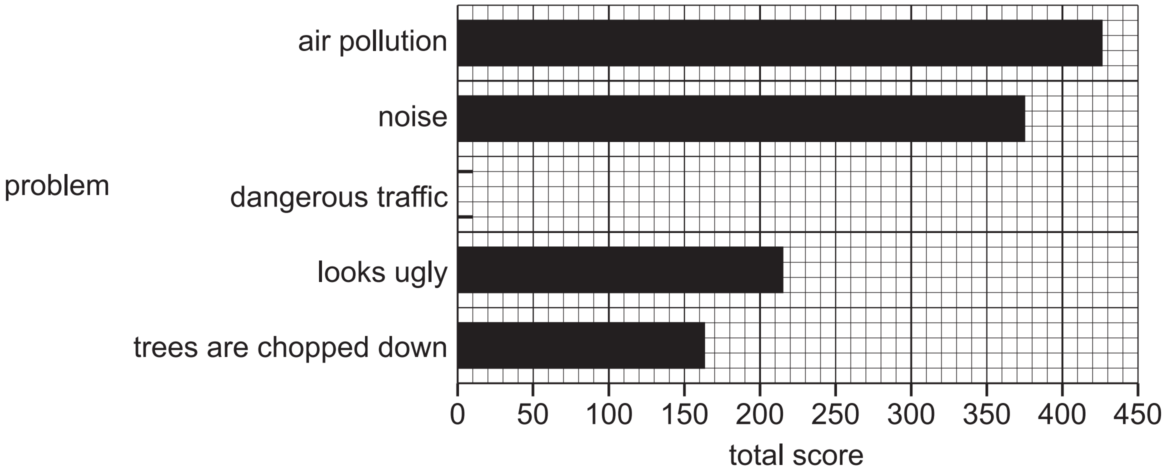
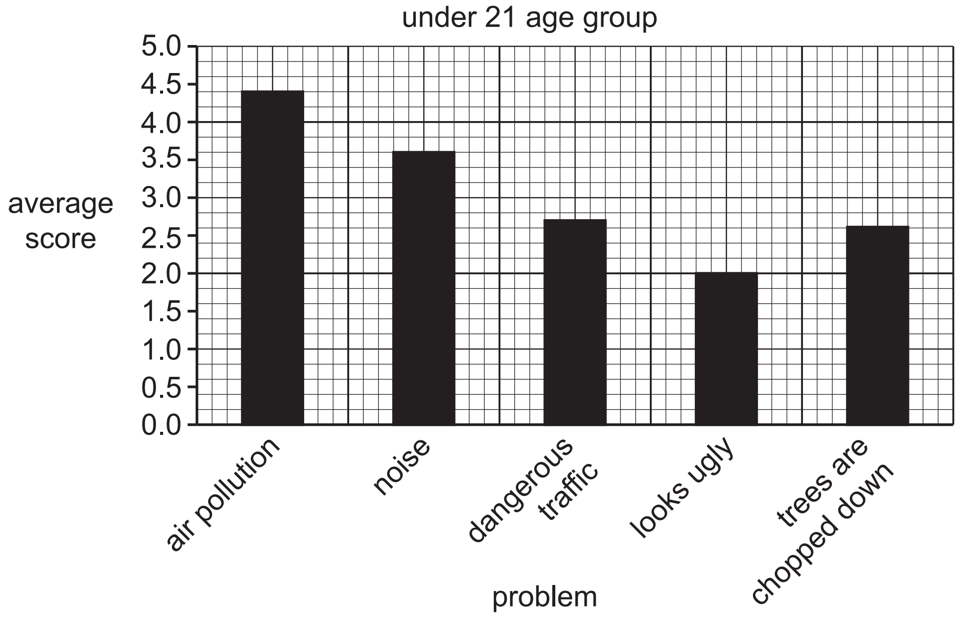


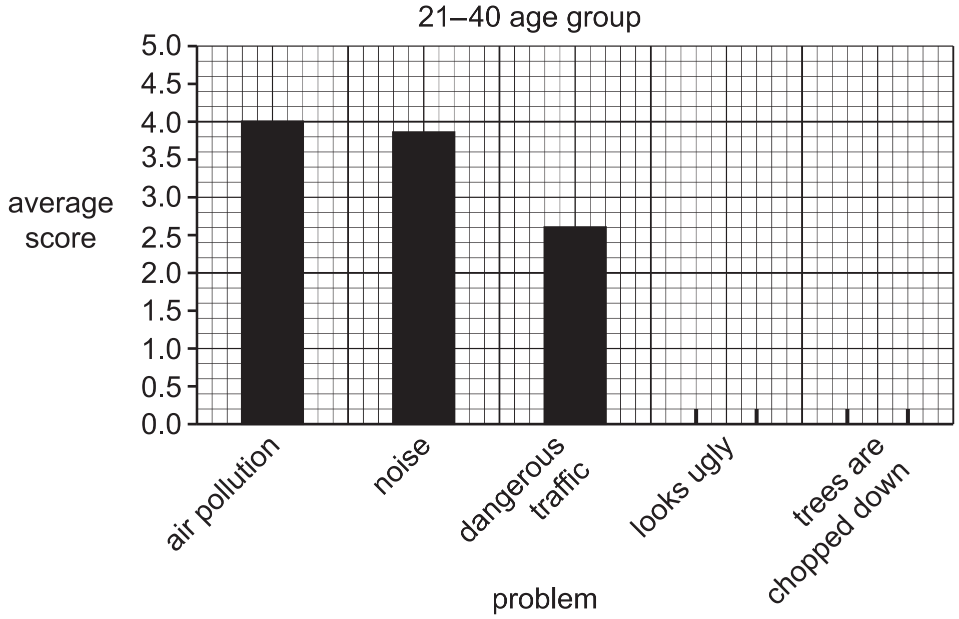
Fig. 1.4

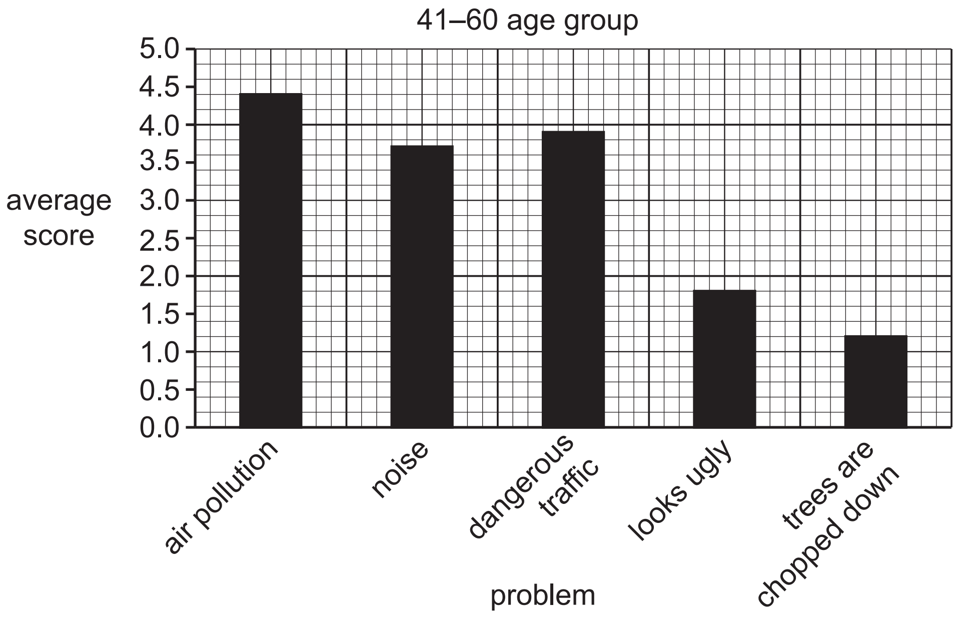
(iv) To answer **Hypothesis 1**, the students calculated the average score given by each of the different age groups for each problem. Their results are shown in Table 1.2 (Insert).

Complete the graph for the '21–40' age group in Fig. 1.5. [2]

Average scores given by each age group







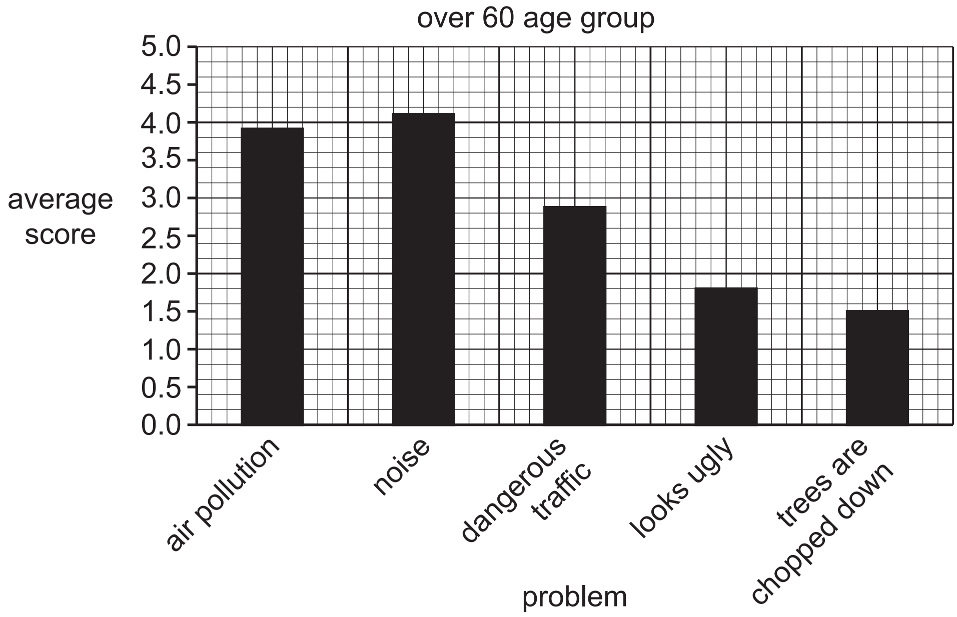


Fig. 1.5

(v) The students made the conclusion that **Hypothesis 1**: *People in different age groups have the same level of concern about each problem caused by the factory* was **generally true**. Explain why they made this conclusion by using evidence from Fig. 1.5 and Table 1.2.

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.... [3]

(vi) Suggest reasons why some people in Kamalpur are more concerned than others about the impacts of the cement factory.

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.... [3]

(c) To test **Hypothesis 2**: *People think that the best method to reduce the negative impacts of the cement factory is to close it down*, the students asked the question in Section B of the questionnaire (Fig. 1.3).

(i) The results are shown in Table 1.3 (Insert). Use these results to **complete the pie graph** in Fig. 1.6. [2]

Percentage of people choosing each method

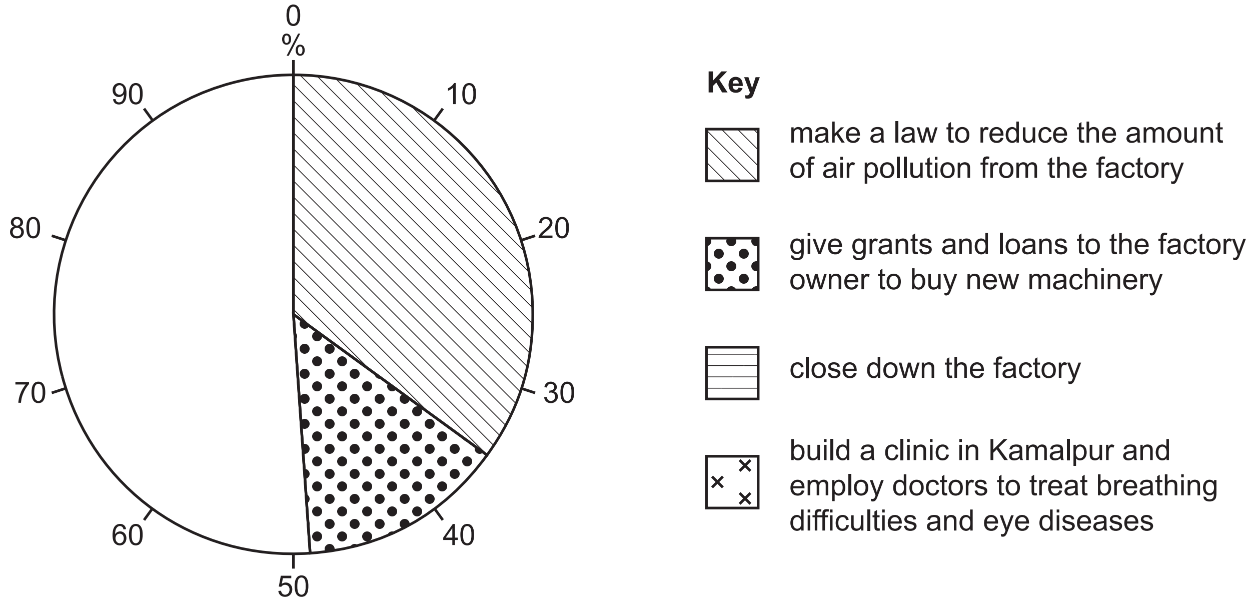

Fig. 1.6

(ii) What conclusion would the students make to **Hypothesis 2**: *People think that the best method to reduce the negative impacts of the cement factory is to close it down*? Support your answer with evidence from Fig. 1.6 and Table 1.3.

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.... [3]

(iii) Choose **one** of the methods shown in Section B of the questionnaire (Fig. 1.3) to reduce the negative impacts of the factory. Tick (✓) your choice.

method	**tick (✓)**
make a law to reduce the amount of air pollution from the factory	
give grants and loans to the factory owner to buy new machinery	
close down the factory	
build a clinic in Kamalpur and employ doctors to treat breathing difficulties and eye diseases	

Suggest advantages and disadvantages of the method you have chosen.

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.... [4]

(d) To extend his fieldwork one student did his own research into some problems caused by the cement factory. He used the bi-polar survey sheet shown in Fig. 1.7 (Insert) to assess impacts at different distances away from the cement factory.
Describe how the student did his bi-polar survey.

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.... [4]

[Total: 30]

2 A group of students in Thailand studied how the characteristics of a river change downstream. The characteristics are shown in Fig. 2.1 (Insert).

The students decided to investigate two characteristics by testing the following hypotheses at five sites along the River Huai Kup Kap:

Hypothesis 1: *Pebbles on the river bed (bedload) become smaller further downstream.*

Hypothesis 2: *The angle of slope (gradient) of the river bed becomes less steep further downstream*.

(a) Before they began their work, the students did a pilot study at a site on the river.

Identify **two** advantages of doing a pilot study from the table. Tick (✓) **two** choices.

	tick (✓)
draw a field sketch of the river's course	
get to know other students before they begin fieldwork	
learn how to work safely in the river	
practise fieldwork techniques	
look at different features along the river	

[2]

(b) To investigate **Hypothesis 1**: *Pebbles on the river bed (bedload) become smaller further downstream*, the students selected 20 pebbles from the bed of the river at each site.

(i) Which piece of fieldwork equipment from the table did the students use when they measured the length of each pebble? Tick (✓) your choice.

equipment	**tick (✓)**
callipers	
hygrometer	
quadrat	
ranging pole	

[1]

(ii) The students' results at site 3 are shown in Table 2.1 (Insert). Use these results to **complete Fig. 2.2**. [2]

Length of selected pebbles

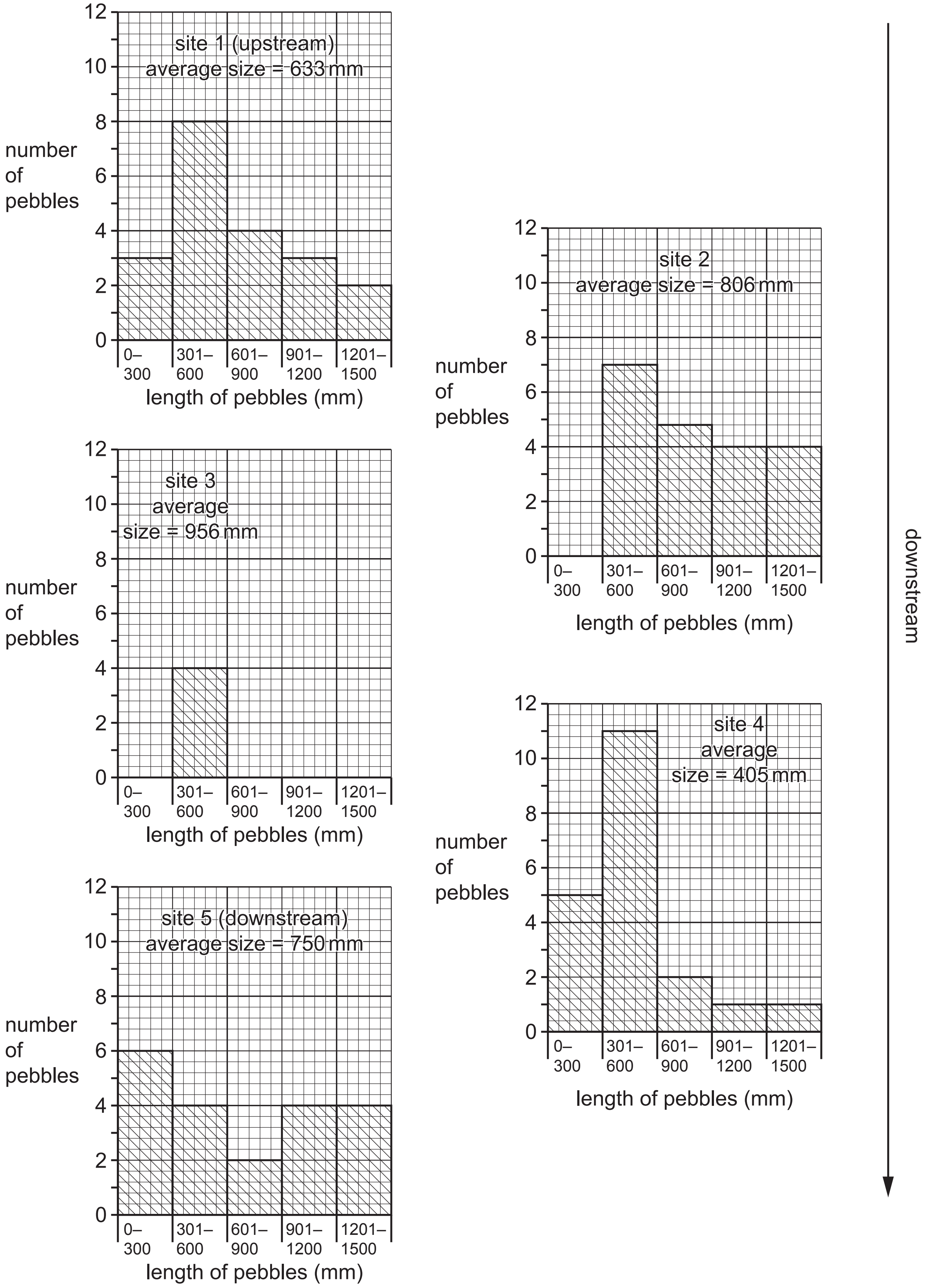

Fig. 2.2

(iii) The students decided that **Hypothesis 1**: *Pebbles on the river bed (bedload) become smaller further downstream* was **false**. Use evidence from Fig. 2.2 and Table 2.1 to support this decision.

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.... [3]

(c) The students' results do not support the change in bedload size shown in Fig. 2.1.

(i) Explain why pebbles on the river bed usually become smaller further downstream as shown in Fig. 2.1.

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.... [3]

(ii) Suggest how the following could have improved the reliability of the students' fieldwork method.

measure 40 pebbles at each site

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....

two students individually measure the length of each pebble

....

.... [2]

(d) To collect data for **Hypothesis 2**: *The angle of slope (gradient) of the river bed becomes less steep further downstream*, the students used a clinometer, which is shown in Fig. 2.3 (Insert), ranging poles and a measuring tape.

(i) Describe how the students measured the angle of slope of the river bed.

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.... [4]

(ii) One student in the group then used a digital clinometer app on his mobile phone to check the accuracy of some measurements. The digital clinometer is shown in Fig. 2.4 (Insert).

Suggest **one** advantage and **one** disadvantage of a digital clinometer compared with the traditional clinometer shown in Fig. 2.3.

Advantage

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Disadvantage

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.... [2]

(iii) The students measured the angle of slope in different places across the river channel at the five sites. The results of their measurements are shown in Table 2.2.
When they calculated the average angle of slope at each site the students did **not** include one measurement at site 1.
Circle this measurement in Table 2.2 and explain why they made this decision.

Table 2.2

	measurements at different places across the channel (degrees)						**average**
site 1	9	13	10	11	18	13	11
site 2	10	9	7	11	8	10	9
site 3	7	5	5	4	9	6	6
site 4	8	7	6	4	8	9	**7**
site 5	3	4	6	5	6	8	5

....

.... [2]

(iv) The students plotted the results for each site on Fig. 2.5. **Plot the average angle** at site 4 on Fig. 2.5. [1]

Results of students' measurements of angle of slope

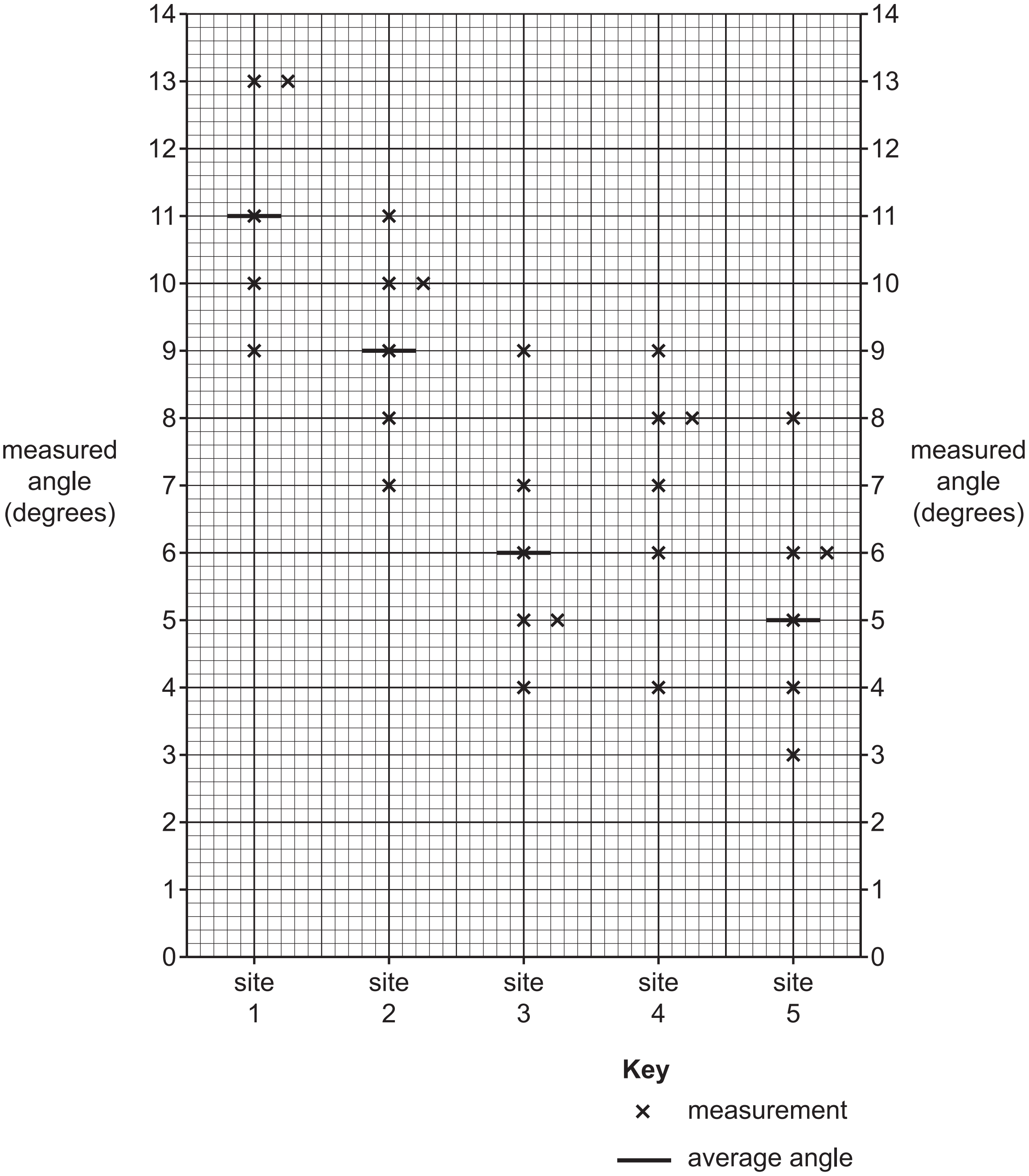

Fig. 2.5

(v) Do the results shown in Fig. 2.5 and Table 2.2 support **Hypothesis 2**: *The angle of slope (gradient) of the river bed becomes less steep further downstream*? Use data to support your conclusion.

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.... [3]

(e) Look again at the diagram shown in Fig. 2.1 (Insert).

(i) Suggest a suitable hypothesis to investigate **one** other characteristic shown in the diagram. Do **not** choose size of bedload or angle of slope (gradient) of the river bed.

Hypothesis:

....

.... [1]

(ii) Describe a method to investigate your hypothesis at the five fieldwork sites.

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.... [4]

[Total: 30]

Additional pages

If you use the following pages to complete the answer to any question, the question number must be clearly shown.

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