



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

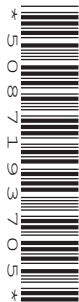
CANDIDATE  
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**GEOGRAPHY**

**0460/41**

Paper 4 Alternative to Coursework

**October/November 2015**

**1 hour 30 minutes**

Candidates answer on the Question Paper.

Additional Materials:      Calculator  
   Ruler

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name in the spaces provided.

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.**

Write your answer to each question in the space provided.

If additional space is required, you should use the lined pages at the end of this booklet. The question number(s) must be clearly shown.

Answer **all** questions.

The Insert contains Figs 1 and 2, Photographs A and B and Table 2 for Question 1, and Figs 6 and 9 and Tables 4, 5, 6 and 7 for Question 2.

The Insert is **not** required by the Examiner.

Sketch maps and diagrams should be drawn whenever they serve to illustrate an answer.

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.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **18** printed pages, **2** blank pages and **1** Insert.

- 1 A class of students studied the Bradshaw model. This geographical model describes how a river's characteristics vary between the upper course and lower course of a river. The model is shown in Fig. 1 (Insert).

Different groups of students in the class chose to investigate different aspects of the model. One group of six students chose the following hypotheses.

**Hypothesis 1:** *The gradient (angle of slope) of the river bed decreases downstream.*

**Hypothesis 2:** *Load particle size decreases downstream.*

Load particle size is a measurement of the size of individual particles carried by the river.

The students chose three sites to do their fieldwork at different distances downstream from the river source. The sites are shown in Fig. 2 (Insert).

- (a) To collect data for **Hypothesis 1** the students measured the angle of slope of the river bed using a clinometer, ranging poles and measuring tape. This method is shown in Photograph A (Insert).

- (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 the measurements. The digital clinometer is shown in Photograph B (Insert).

Suggest **one** advantage and **one** disadvantage of a digital clinometer compared with a traditional clinometer.

Advantage

.....  
 .....

Disadvantage

.....  
 .....[2]

3

- (iii) Each of the six students measured the angle of slope at the three sites. The results of their measurements are shown in Table 1 below.

Table 1

## Angle of slope measurements

Site	Angle measurement (degrees)						Average
	Student A	Student B	Student C	Student D	Student E	Student F	
1	18	4	19	16	18	15	17.2
2	9	13	10	12	18	12	11.2
3	7	5	5	4	8	6	

The group decided to exclude the results of student B at site 1 and student E at site 2 from their analysis. Explain why they made this decision.

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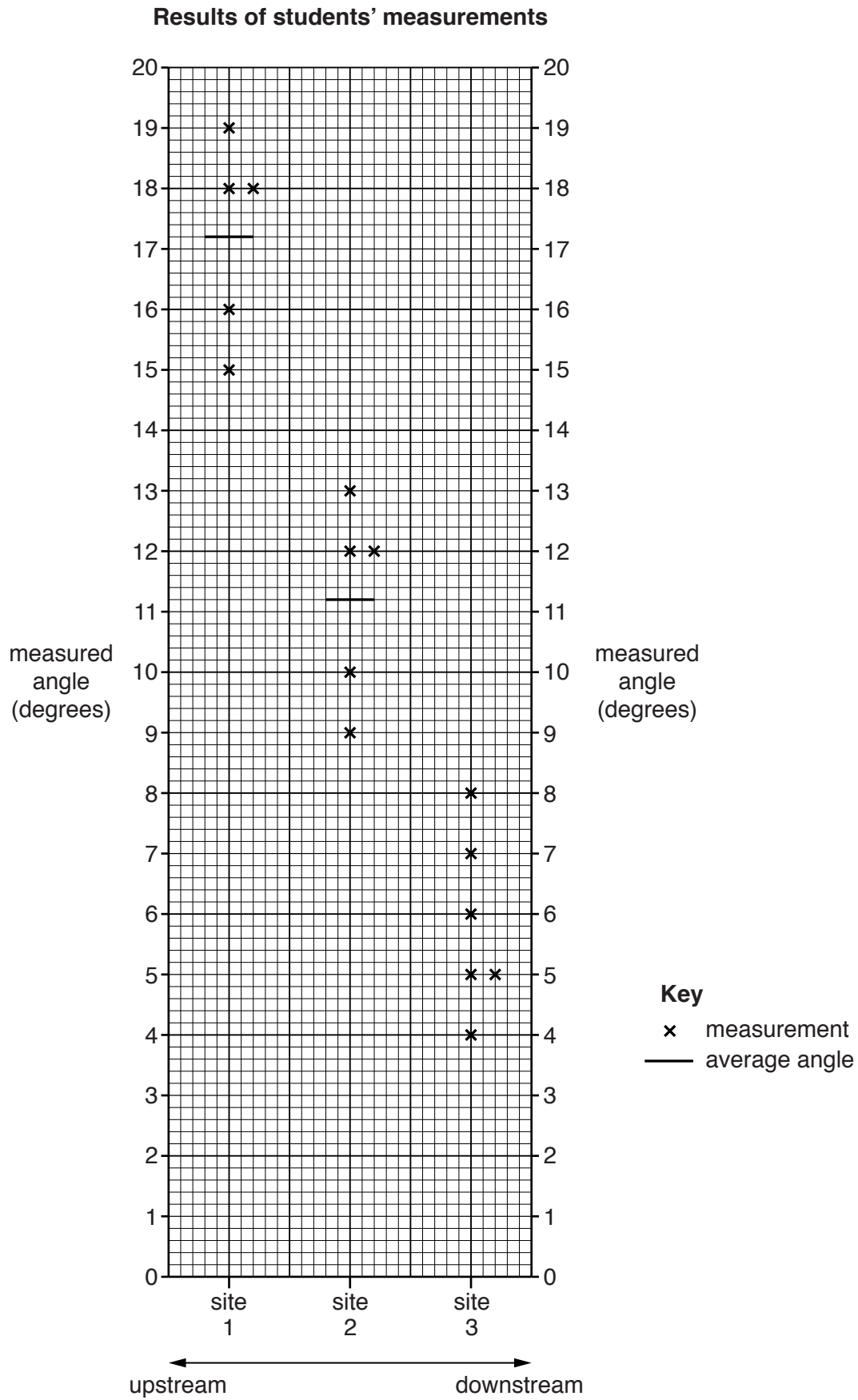
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.....[2]

- (iv) Calculate the average angle of slope at site 3. Write your answer in Table 1. [1]

- (v) The students then plotted the results for each site on a graph, Fig. 3 below. Plot the average angle calculated in (a)(iv) on Fig. 3. [1]



**Fig. 3**

(vi) Do the results shown in Table 1 and Fig. 3 support **Hypothesis 1: *The gradient (angle of slope) of the river bed decreases downstream?*** Use data to support your conclusion.

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.....[3]

(b) To investigate **Hypothesis 2: *Load particle size decreases downstream,*** the students measured one pebble from the bed every 30cm across the channel at each site. They measured the length, width and height of each pebble in order to calculate its volume.

(i) Why would the volume measurement be more reliable than only measuring the length?

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.....[1]

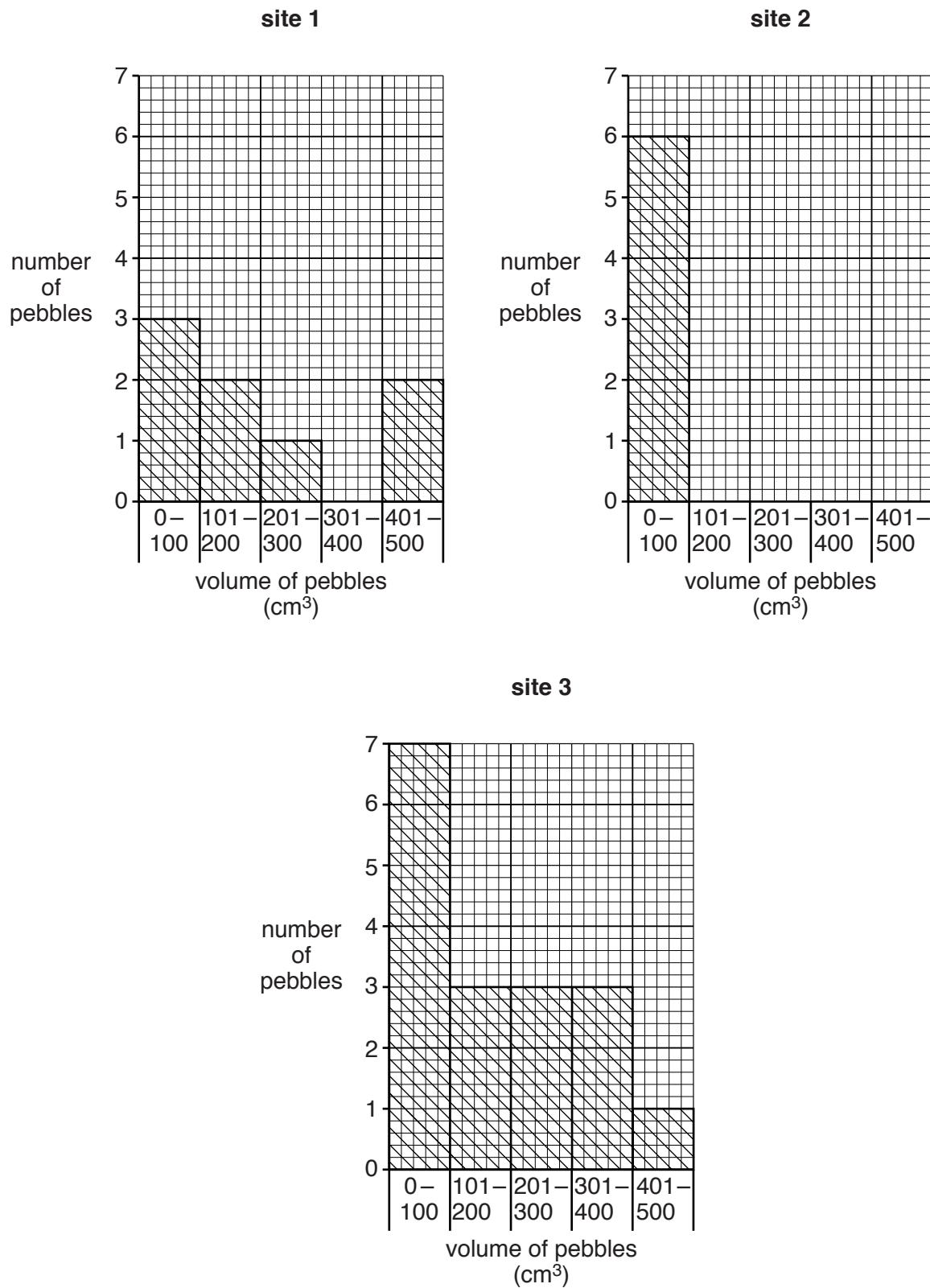
(ii) Which **two** of the pieces of equipment in the table below could the students use to measure the volume of each pebble? Tick (✓) your choices.

Equipment	Tick (✓)
callipers	
flowmeter	
quadrat	
ruler	
stopwatch	

[2]

(iii) The students' results are shown in Table 2 (Insert). Use these results to complete the histogram for **site 2**, below. [2]

**Volume of pebbles**



**Fig. 4**

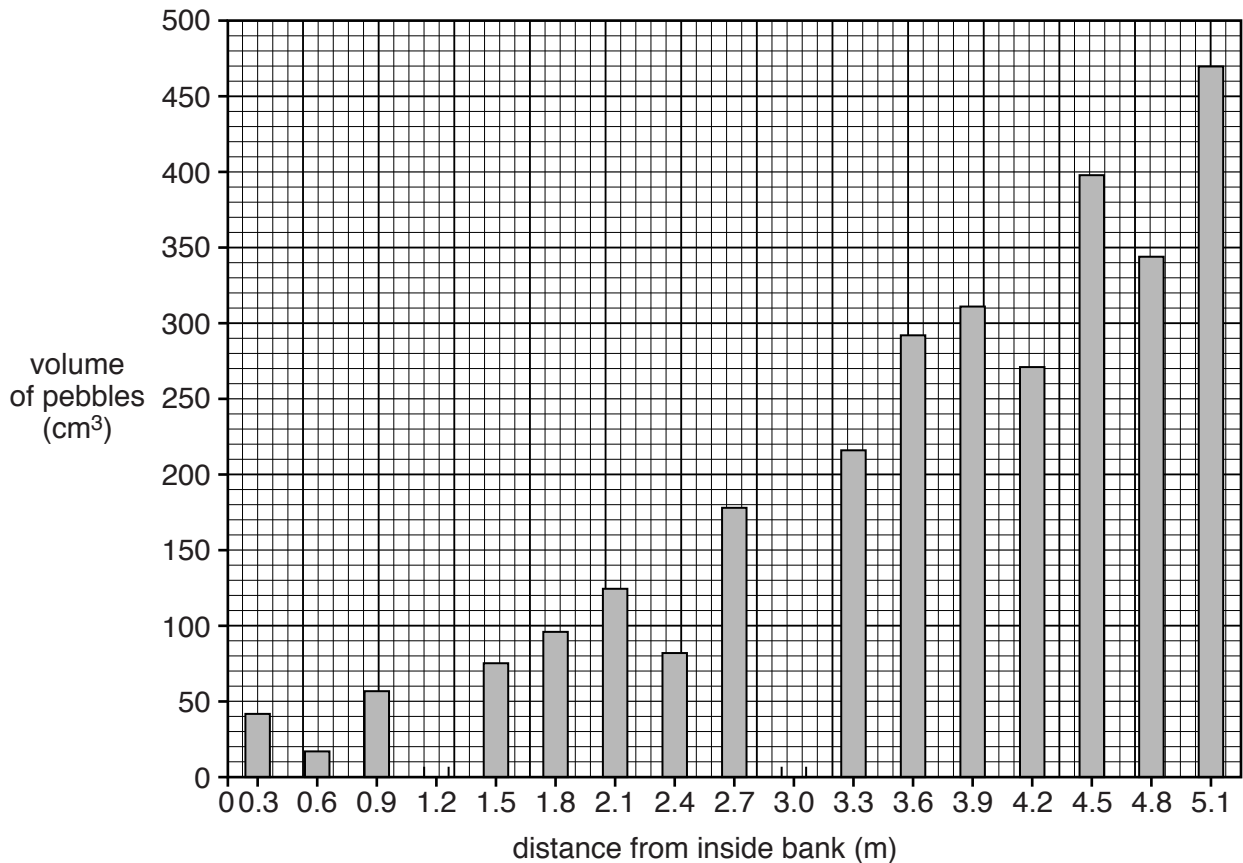
(iv) The students decided that there was no clear conclusion to **Hypothesis 2: Load particle size decreases downstream.** Use evidence from Fig. 4 and Table 2 to support this decision.

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 ..... [3]

(c) One student also plotted the measurements across the river at each site. These are shown in Fig. 5 below.

(i) Use the information in Table 2 (Insert) to complete Fig. 5 by plotting the volume of the pebbles at 1.2 m and 3.0 m from the inside bank at site 3. [2]

**Volume of pebbles at site 3**



**Fig. 5**

(ii) Site 3 is on a river meander. What pattern is shown by the results at site 3?

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

(iii) Using Fig. 5 and Table 2, explain why the results at site 3 show this pattern.

.....  
.....  
.....  
.....[2]

(d) Suggest **four** ways that the students could have improved their data collection methods to make their results more reliable.

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2.....  
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3.....  
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4.....  
.....[4]

[Total: 30 marks]



- 2 Some students in the UK wanted to compare areas of the town they lived in. They decided to divide their investigation into two parts. First they looked at the environment of different areas, and second they investigated the quality of life of people who live in the different areas.

Quality of life is a measurement of a person's well-being and happiness which could include things such as safety, community spirit and level of crime.

The students chose five sites to investigate in different areas of the town. These are shown in Fig. 6 (Insert).

They decided to investigate the following hypotheses:

**Hypothesis 1:** *The quality of the environment improves as distance from the town centre increases.*

**Hypothesis 2:** *People's quality of life improves as distance from the town centre increases.*

- (a) To investigate **Hypothesis 1** the students did an environmental quality survey at one site in each area. To make their survey more reliable the students produced brief descriptions of each category for the survey. An example for traffic is shown below.

Category:	Description	Score
Traffic	Very little traffic which is moving freely	4
	Little traffic which is moving steadily	3
	Lots of traffic which is moving slowly	2
	Lots of traffic which is causing congestion and queues	1

- (i) Put the following descriptions of public open space into the correct order in the table below. [1]

- Very little vegetation, land is derelict
- Well kept vegetation which is regularly maintained
- Vegetation is not maintained and is overgrown
- Vegetation is maintained but not to a high level

Category:	Description	Score
Public open space		4
		3
		2
		1

- (ii) The students went as a group with their teacher to do a practice survey in an area near school. The scores of two students are shown in Table 3 below.

**Table 3**

**Students' scores**

<b>Category</b>	<b>Student A</b>	<b>Student B</b>
Building condition	4	2
Public open space	3	2
Traffic	3	1
Noise	2	2

Suggest **one** reason why the scores of the two students are different.

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

- (iii) Explain how the students would organise and carry out the environmental quality survey.

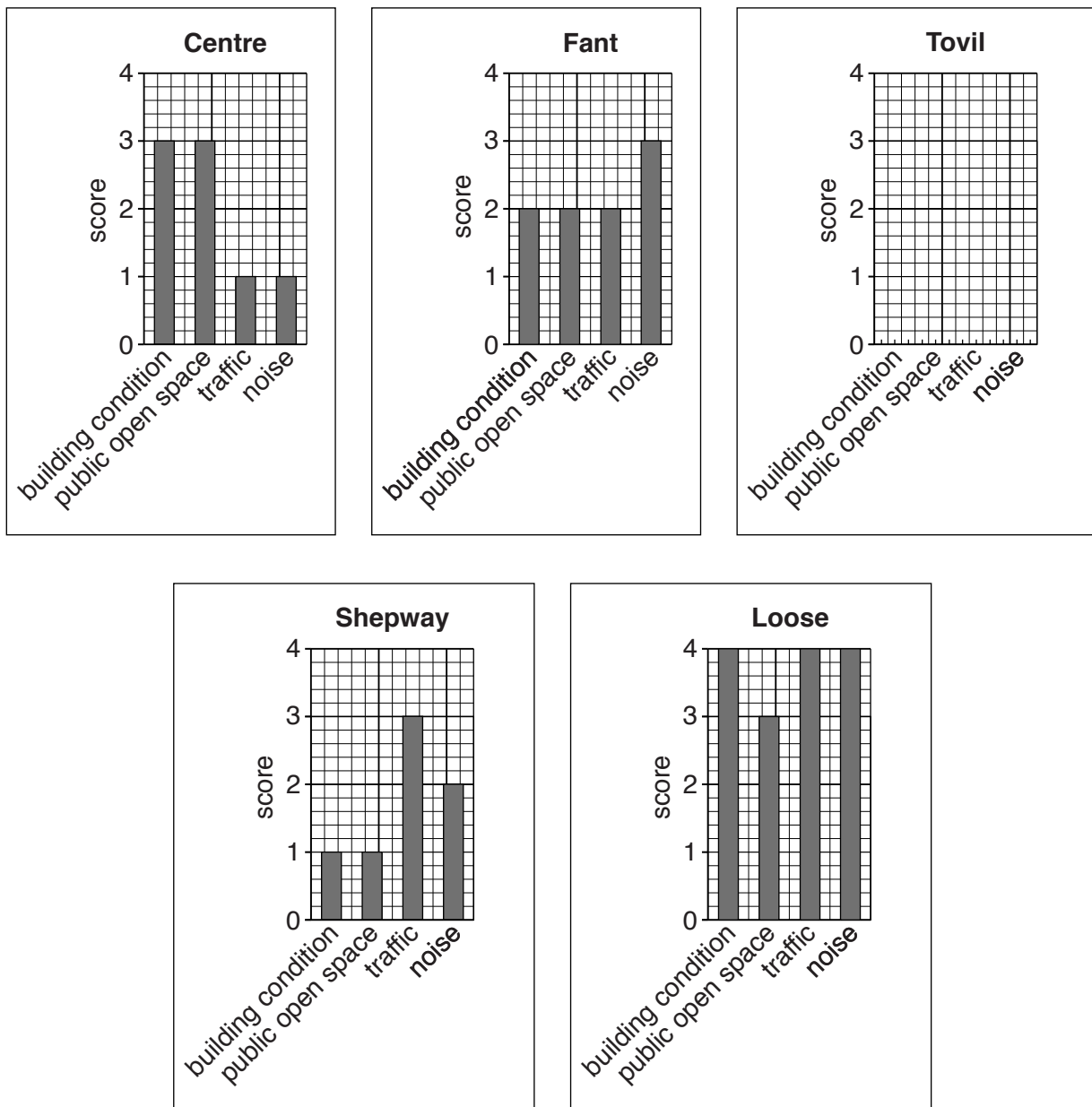
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(b) The results of the environmental quality survey are shown in Table 4 (Insert).

(i) Use the results for Tovil in Table 4 to complete Fig. 7 below.

[1]

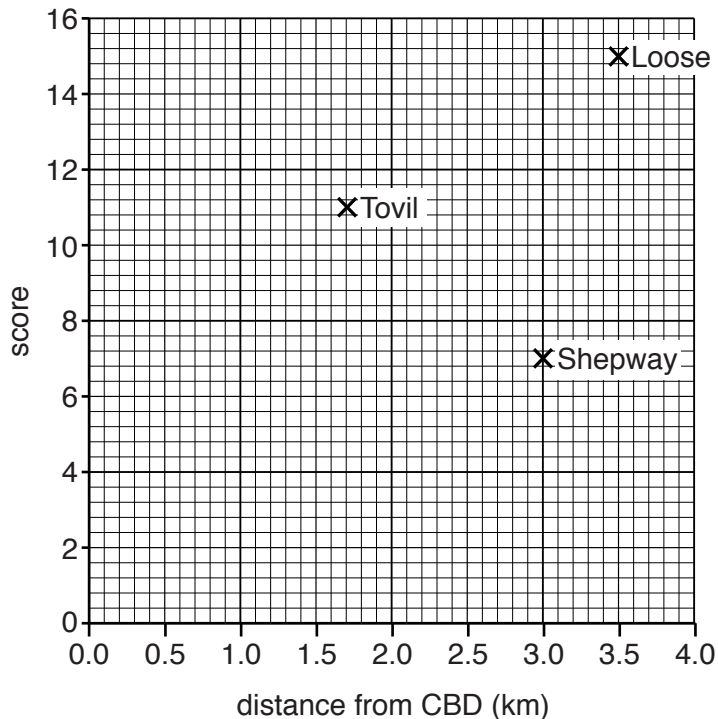
**Results of environmental quality survey**



**Fig. 7**

- (ii) The students also calculated the total environmental quality score for each area. Use these results from Table 4 (Insert) to complete the scores for Centre and Fant in Fig. 8 below. [2]

**Total environmental quality scores and distance from the CBD**



**Fig. 8**

- (iii) Which **one** of the following conclusions to **Hypothesis 1: *The quality of the environment improves as distance from the town centre increases*** is most accurate? Circle your answer below.

Conclusion is false      Conclusion is partly true      Conclusion is true

Support your decision with evidence from Fig. 8 and Table 4.

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[4]

- (c) To investigate **Hypothesis 2: People's quality of life improves as distance from the town centre increases**, the students needed to find out what residents thought about the area they lived in. To do this they produced an on-line questionnaire, which is shown in Fig. 9 (Insert).

The students delivered leaflets to 200 houses in each of the five areas. The leaflet asked residents to fill in the on-line questionnaire by using the link provided.

- (i) Suggest **two** advantages and **two** disadvantages of using the on-line questionnaire rather than asking people in the street.

Advantages

1 .....

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2 .....

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Disadvantages

1 .....

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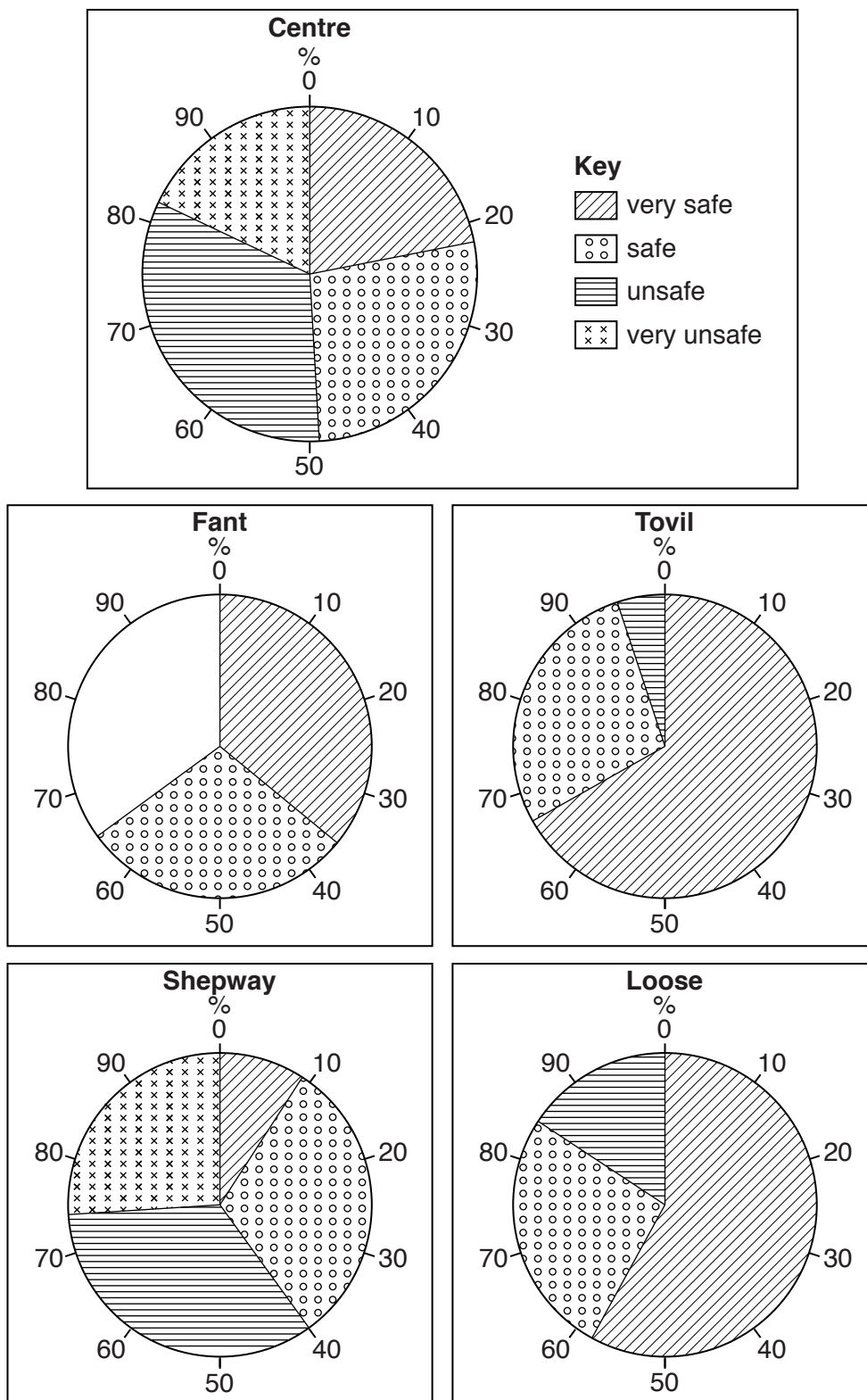
2 .....

.....[4]

When the students received the completed questionnaires they recorded the results and converted them into percentages. These are shown in Tables 5, 6 and 7 (Insert).

- (ii) The results to Question 1: *How safe do you feel in the local area?* are shown in Table 5. Use the results to complete the pie graph for Fant in Fig. 10, below. [2]

**Answers to Question 1: How safe do you feel in the local area?**



**Fig. 10**

(iii) The results to Question 2: *Which one of the following best describes the community in the local area?* are shown in Table 6. Use the results to complete the graph for Fant in Fig. 11, below. [2]

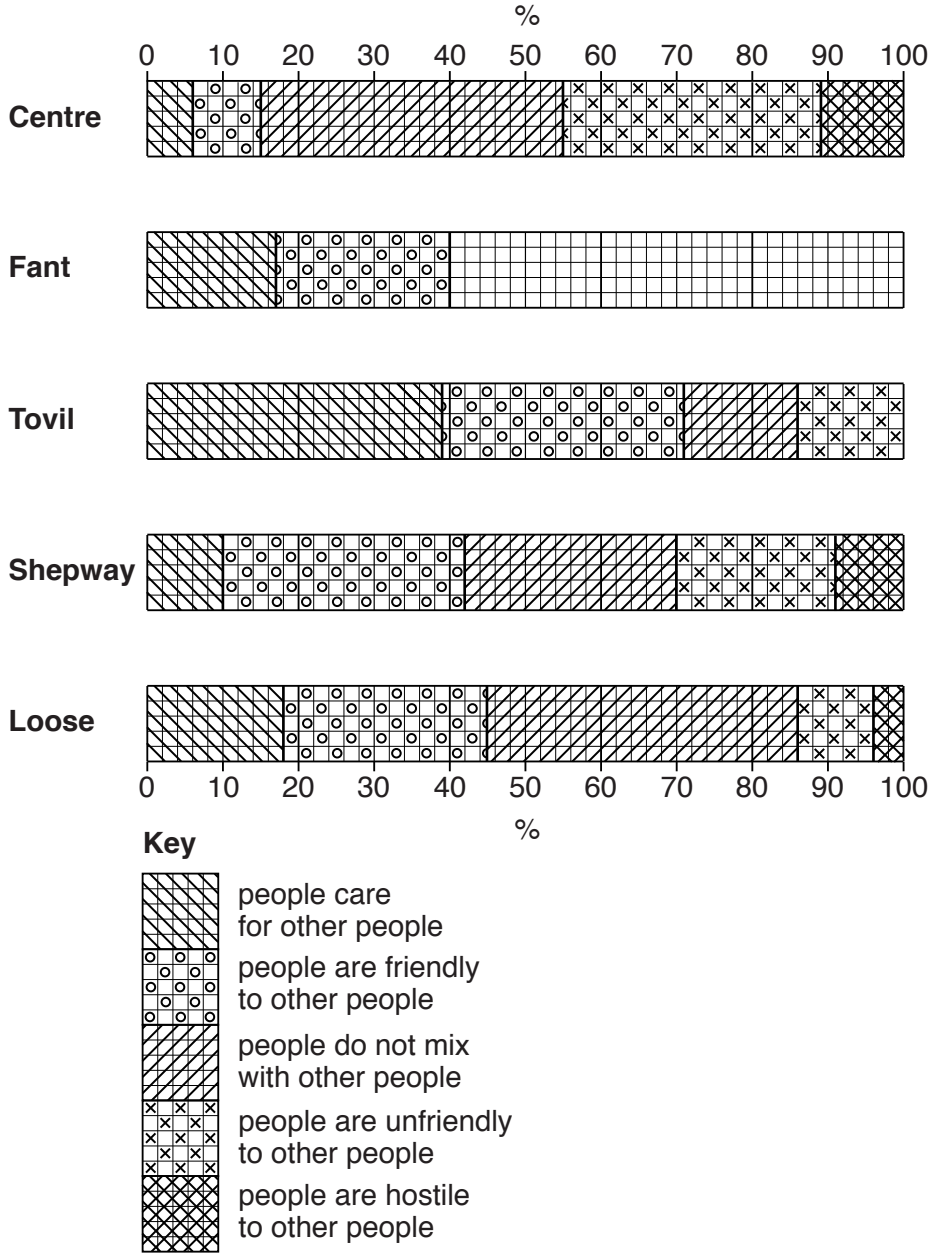


Fig. 11

(iv) In which **one** of the five areas do residents have the best quality of life? Give **one** piece of evidence from Fig. 10 and **one** piece of evidence from Fig. 11 to support your choice.

Chosen area .....

Fig. 10  
 .....  
 .....

Fig. 11  
 .....  
 .....

(v) The students decided that **Hypothesis 2**: *People's quality of life improves as distance from the town centre increases* was false.

Support this conclusion with **one** piece of evidence from each of Fig. 10, Fig. 11 and Table 7 (Insert).

Fig. 10

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Fig. 11

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Table 7

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.....[3]

(d) What **different** methods could the students have used to extend their investigations into environmental quality and quality of life?

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[Total: 30 marks]





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