UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

GEOGRAPHY **0460/04**

Paper 4 Alternative to Coursework **May/June 2009**

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 a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
The Insert contains Table 1 and Fig. 2 for Question 1 and Fig. 4, Table 2 and Fig. 8 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.

For Examiner's Use	
Q1	
Q2	
Total	

This document consists of **11** printed pages, **1** blank page and **1** Insert.

1 Some students were studying traffic flow in and around a town centre. A map of the area studied is shown in Fig. 1.

For Examiner's Use

Number of vehicles going into and out of a town centre

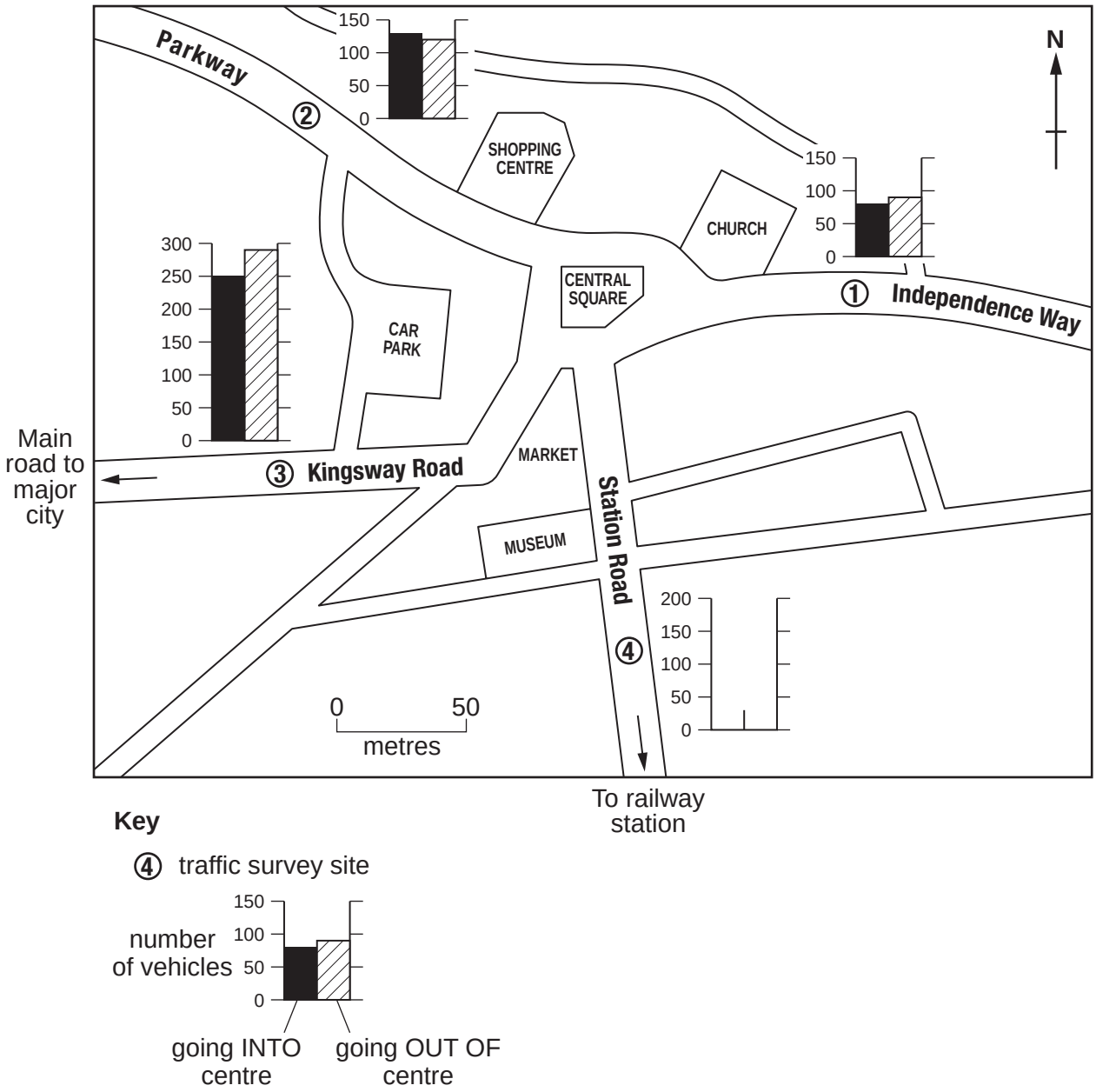

Fig. 1

The students decided to investigate the following hypotheses:

Hypothesis 1 *Traffic flows will vary in different directions from the town centre*

Hypothesis 2 *Traffic flows will vary at different times of the day*

Four sites were chosen to conduct traffic surveys. These are shown on Fig. 1. The students decided to do traffic counts three times during a weekday. The times chosen were 08.00, 12.30 and 17.00. They agreed to work in pairs, in order to count the number of vehicles travelling past the four survey sites. They decided that each traffic count would last for 10 minutes.

(a) **(i)** Describe how each pair of students would carry out their traffic count.

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(ii) Suggest why the students decided to conduct each traffic count for 10 minutes.

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(b) The results of the students' work are shown in Table 1 (Insert).

(i) Use the data in Table 1 to complete the bar graphs on Fig. 1 at the place indicated, to show the total number of vehicles travelling into and out of the town centre along Station Road. [2]

(ii) Use the data in Table 1 to rank the four sites in order of total number of vehicles. Rank from high to low.

Rank	Name of road
Highest	
Lowest	

[1]

(iii) Describe the pattern of the total number of vehicles going into and out of the town centre.

For Examiner's Use

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(iv) What would be the students' conclusion to **Hypothesis 1**, based on their results? What reasons might the students give to support their conclusion?

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(c) Look at Fig. 2 (Insert) and Fig. 3. They show the different traffic flows at 08.00 and 17.00 at the four survey sites.

For Examiner's Use

Traffic flow at 17.00

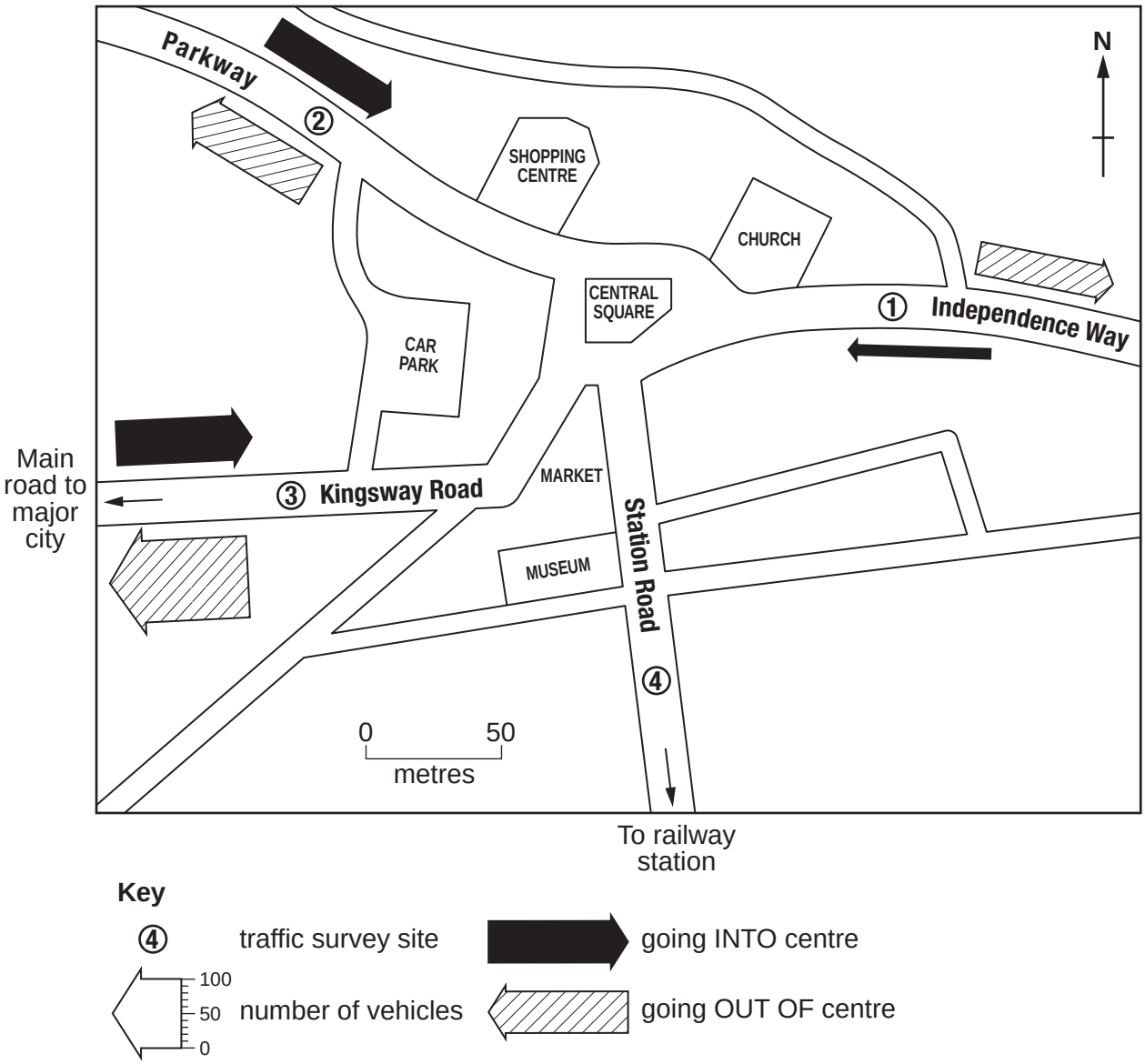

Fig. 3

(i) Use the data from Table 1 (Insert) to draw in the flow lines on Fig. 3, which show the number of vehicles travelling along Station Road at 17.00. [2]

(ii) Use the information on Fig. 2 (Insert) and Fig. 3 to describe the variation in traffic at the two survey times of 08.00 and 17.00 along Independence Way.

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(iii) What would be the students' conclusion to **Hypothesis 2**, based on their results? What reasons might the students give to support their conclusion?

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(d) (i) Suggest improvements to the data collection methods used in the students' investigation.

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(ii) State **two** other features of traffic in towns that could be investigated at the four traffic survey sites.

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[Total: 30 marks]

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2 A group of students studied how the characteristics of a river change downstream. A sketch map of the river is shown in Fig. 4 (Insert). They wanted to see if the river was typical of most rivers. To do this they decided to test the following hypotheses:

For Examiner's Use

Hypothesis 1 *Velocity increases downstream*

Hypothesis 2 *Size and shape of the bedload changes downstream*

(a) The students selected six sampling sites along the course of the river.
The distance of each site from the river's source is shown in Table 2 (Insert).
Suggest **three** factors the students should have considered in choosing the sampling sites.

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(b) At each site, the students measured the velocity of the river. The results of this test for sampling site 1 are shown in Fig. 5.

River recording sheet – Sampling site 1

Sampling site: 1

Measurement of velocity

Length of time for a small floating object to travel 10 metres;

Test 1 17 seconds
Test 2 23 seconds
Test 3 20 seconds

Mean length of time to float 10 metres = $\frac{60}{3}$ seconds = 20 seconds

Velocity = $\frac{\text{distance}}{\text{time}}$

= $\frac{10 \text{ metres}}{20 \text{ seconds}}$

= 0.5 metres per second

Fig. 5

(i) Use the information in Fig. 5 to describe how the students measured the velocity. Refer to equipment they would use.

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(ii) Before the students began their fieldwork, their teacher worked with them on a pilot study. The results of the study are shown in Fig. 6.
Complete Fig. 6 to calculate the mean velocity of the river at this sampling site. Show your calculations.

Pilot survey river recording sheet

Sampling site:

Measurement of velocity

Length of time for a small floating object to travel 10 metres;

Test 1 27 seconds

Test 2 20 seconds

Test 3 28 seconds

Mean length of time to float 10 metres =

$$\text{Velocity} = \frac{\text{distance}}{\text{time}}$$

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Fig. 6

[3]

(iii) The results which the students obtained at the sampling sites are shown in Table 2 (Insert). Use these results to complete Fig. 7 to show how velocity changes downstream.

For Examiner's Use

Changes in velocity downstream

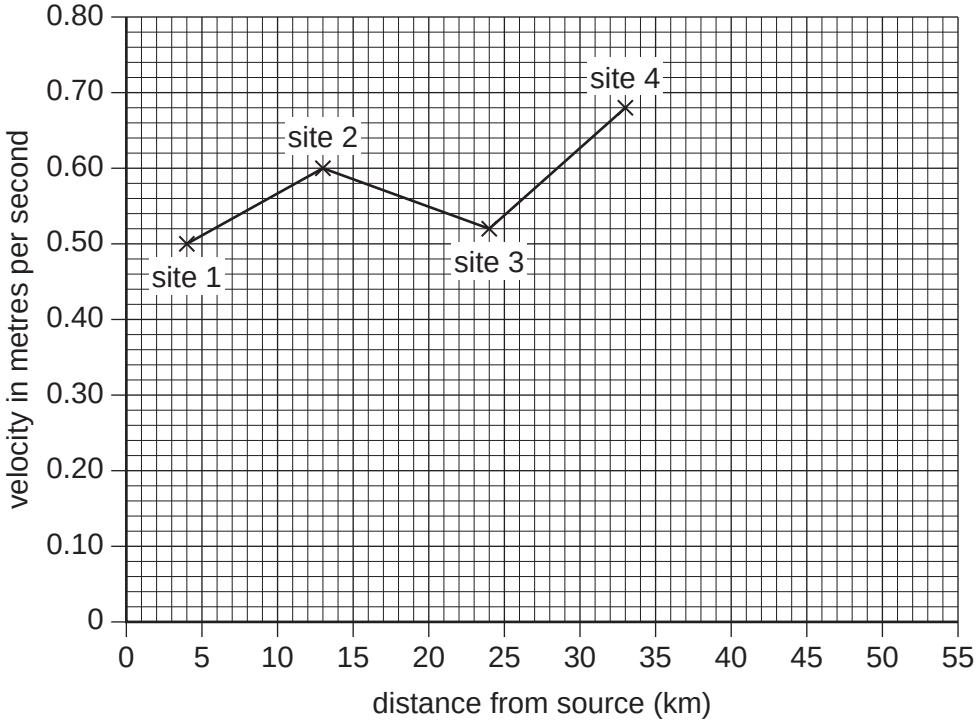

Fig. 7

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(iv) By looking at their results, what conclusion could the students make about **Hypothesis 1** (*Velocity increases downstream*)?

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(c) At each site, the students also sampled and measured stones on the river bed (bedload).

(i) Describe a sampling technique they could use to get an accurate sample of bedload material.

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(ii) Having collected their sample, the students wanted to find out the size and 'roundness' of each stone. Using the equipment shown in Fig. 8 (Insert) they decided to make two simple measurements:

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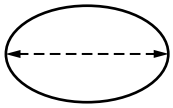
- the longest axis, as shown below



- the roundness of the stone

Describe how they made the measurements.

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(iii) The results of this investigation are shown in Table 2 (Insert). From these results, what conclusions could the students make about how the size and shape of bedload changes downstream (**Hypothesis 2** – *Size and shape of the bedload changes downstream.*)?

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(iv) Explain why the size and shape of bedload changes downstream.

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(d) Suggest improvements the students could have made to the data collection methods to make the results more reliable.

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(e) In order to extend their fieldwork, the students could have investigated the impact of people on the river. State **one** impact people could have had on a river. Describe how the impact could be investigated.

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[Total: 30 marks]