Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

0722278584

GEOGRAPHY **0460/41**

Paper 4 Alternative to Coursework **October/November 2017**

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Calculator
Protractor
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 the booklet. The question number(s) must be clearly shown.

Answer **all** questions.

The Insert contains Figs. 1 and 3, Tables 1 and 3 for Question 1, and Tables 4, 5, 6 and Fig. 10 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 **17** printed pages, **3** blank pages and **1** Insert.

DC (CE/CGW) 132839/5

CAMBRIDGE International Examinations

[Turn over

1 A class of students were studying how a river changes downstream. As part of their study they did some fieldwork on a river in their local area. The teacher divided the class into two groups which each investigated one hypothesis.

The hypotheses investigated by the two groups of students were:

Hypothesis 1: *The area of the cross section of the river channel increases downstream.*

Hypothesis 2: *Water quality decreases downstream.*

(a) The class agreed to do their fieldwork tasks at six sites along the river.

Suggest **three** things they should consider in choosing their fieldwork sites.

1 .....

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2 .....

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3 .....

.....[3]

(b) To investigate **Hypothesis 1** the students measured the width of the river channel and the depth of the river at points across the channel.

(i) Which **two** of the following pieces of equipment would they use to measure the width of the river channel? Tick (✓) your choices.

Equipment	Tick (✓)
clinometer	
floating object	
quadrat	
ranging poles	
tape measure	

[2]

(ii) Describe how the students measured the width of the river channel.

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.....[2]

(c) The students measured the depth of the river every 20 centimetres (0.2 metres) across the channel. They used their results to draw a cross section of the river channel at each site. The cross section at site 2 is shown in Fig. 1 (Insert).

(i) The results of the students' fieldwork at site 5 are shown in Table 1 (Insert).
Use these results **to complete the cross section** of the river channel and then **shade in** the river channel at site 5 on Fig. 2 below. [3]

Cross section at site 5

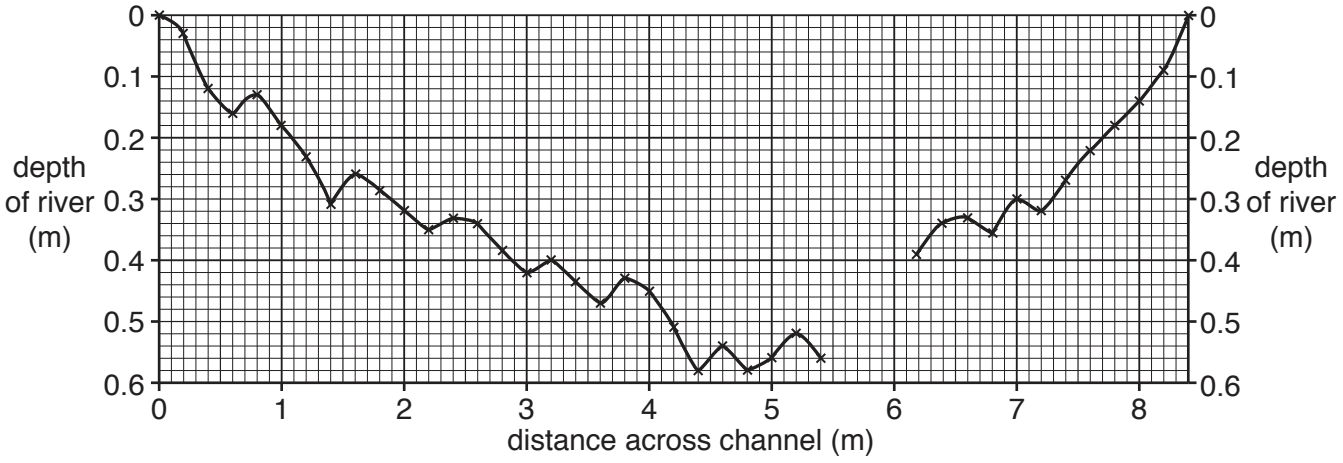

Fig. 2

(ii) Describe **two** differences between the cross sections at site 2 (Fig. 1 (Insert)) and site 5 (Fig. 2).

1 .....

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2 .....

.....[2]

(d) The students used their measurements to calculate the area of the cross section of the river channel at each site. Their results are shown in Table 2 below.

Table 2

Site number	Distance downstream from source (km)	Width of channel (m)	Mean (average) depth of river (m)	Area of river channel cross section (sq m)
1	3	2.3	0.14	0.32
2	7	4.6	0.16	0.74
3	11	4.8	0.18	0.86
4	15	5.1	0.19	0.97
5	23	8.4	0.33	2.77
6	37	18.5	0.51	9.44

(i) Which **one** of the following is the correct calculation to work out the area of the cross section? Tick (✓) your choice.

Calculation	Tick (✓)
width + mean (average) depth	
width × mean (average) depth	
width ÷ mean (average) depth	

[1]

(ii) Do the results shown in Table 2 support **Hypothesis 1:** *The area of the cross section of the river channel increases downstream*? Support your answer with data from Table 2.

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.....[2]

(e) To investigate **Hypothesis 2:** *Water quality decreases downstream*, the students did a visual survey of the river at the six sites to assess the quality of the water. They used the survey sheet shown in Fig. 3 (Insert).

(i) The table below shows three possible problems of using the visual pollution survey sheet which may make results unreliable.

Suggest **one** different way to solve each problem.

Problem	Possible solution
Students in the group may award different points for the same evidence	....
Conditions in the river may change over time	....
Students are unsure how to use the visual pollution survey sheet	....

[3]

(ii) At each site the students calculated a total pollution score. They also recorded a description of the main land use at the site. These are both shown in Table 3 (Insert). Use these results **to plot** the total pollution score for site 2 on Fig. 4 below. [1]

Results of fieldwork

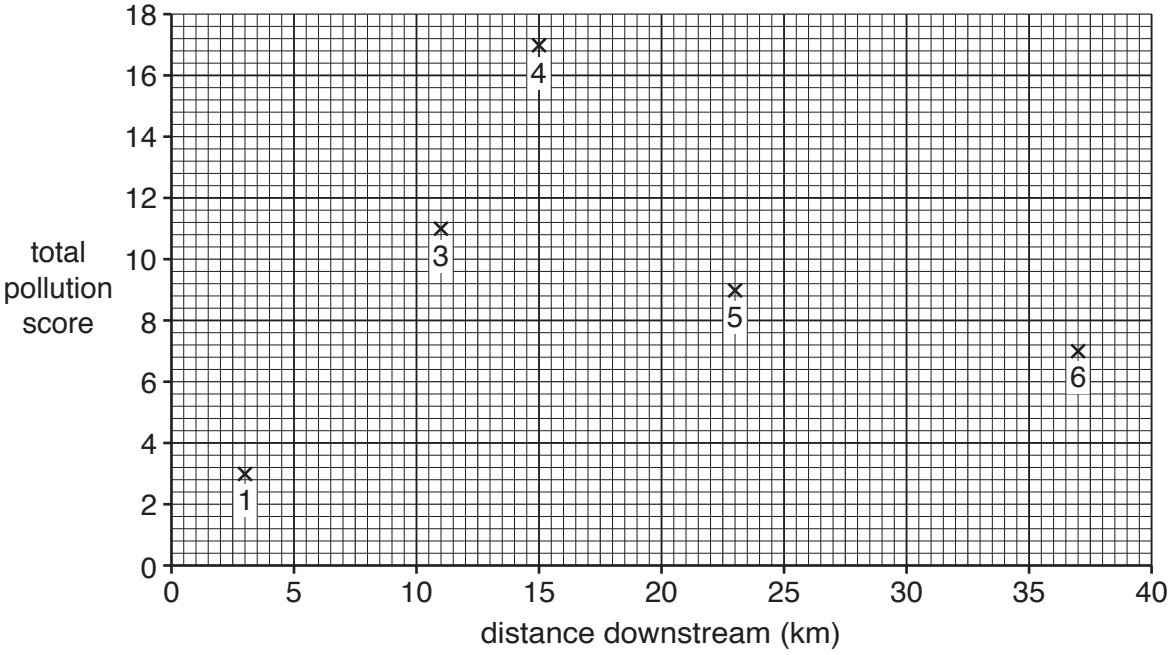

Fig. 4

(iii) What conclusion would the students make about **Hypothesis 2:** *Water quality decreases downstream*? Support your answer with evidence from Fig. 4 and Table 3.

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(iv) Use information in Table 3 to suggest why water quality varies along the river.

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.....[2]

(v) Suggest **one** way, other than the survey sheet in Fig. 3, that the students could have investigated water quality along a river.

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.....[1]

(f) Another group of students did fieldwork to measure how river velocity varied at the six sites. With the aid of an annotated (labelled) diagram explain how they could measure velocity at one site.

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[4]

[Total: 30 marks]

[Turn over

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2 Students in Nova Friburgo, Brazil were learning about different types of services, threshold populations and spheres of influence.

(a) (i) Which **one** of the following is the correct definition of *threshold population*? Tick (✓) your choice in the table below.

Definition	Tick (✓)
the maximum number of people using a service	
the distance people travel to get a service	
the minimum number of people needed to support a service	
the area which people come from to get a service	
the largest number of people who can afford a service	

[1]

(ii) Define the term *sphere of influence*.

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.....[1]

(iii) The Central Business District (CBD) of the city contains a variety of shops providing a range of high and low-order goods and services.

Explain how high-order goods and services are different from low-order goods and services.

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.....[3]

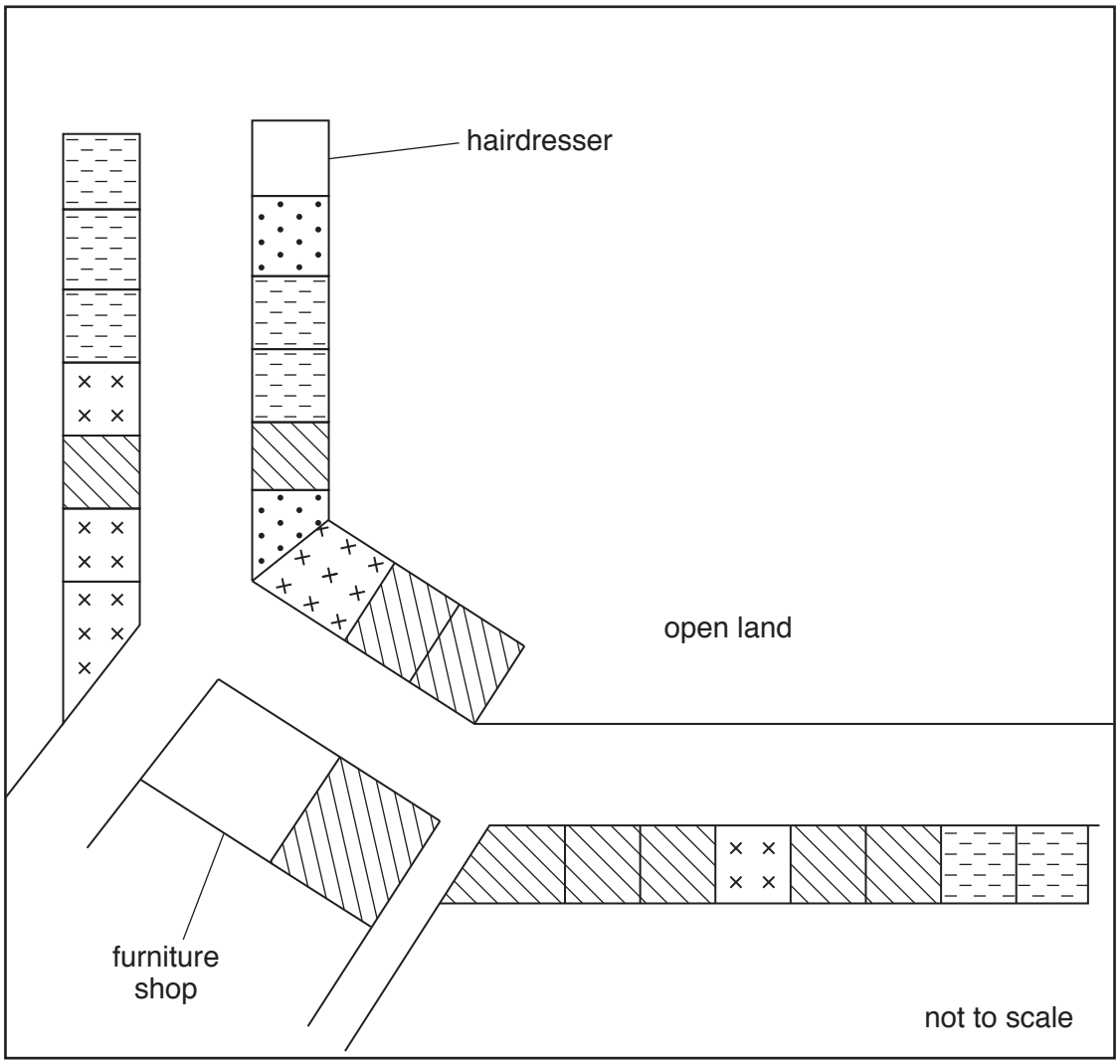
Some students decided to test the following hypotheses in Nova Friburgo:

Hypothesis 1: *The CBD contains more high-order shops and services than low-order shops and services.*

Hypothesis 2: *The sphere of influence of Nova Friburgo is equal in all directions.*

(b) To investigate **Hypothesis 1** the students recorded the shops and services as either high-order or low-order on a sketch map of the CBD. Part of their map is shown in Fig. 5 below.

Sketch map of part of the CBD



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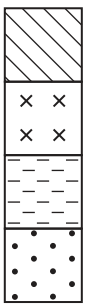

shop selling high-order goods

high-order service

shop selling low-order goods

low-order service

Fig. 5

(i) On Fig. 5, use the key provided to **shade in** the following shops and services:

- hairdresser
- furniture shop [2]

(ii) Using their results the students calculated the percentages of high and low-order shops and services in the CBD. These are shown in Table 4 (Insert).

Use the results in Table 4 to **complete the pie graph**, Fig. 6, below. [2]

Shops and services in the CBD

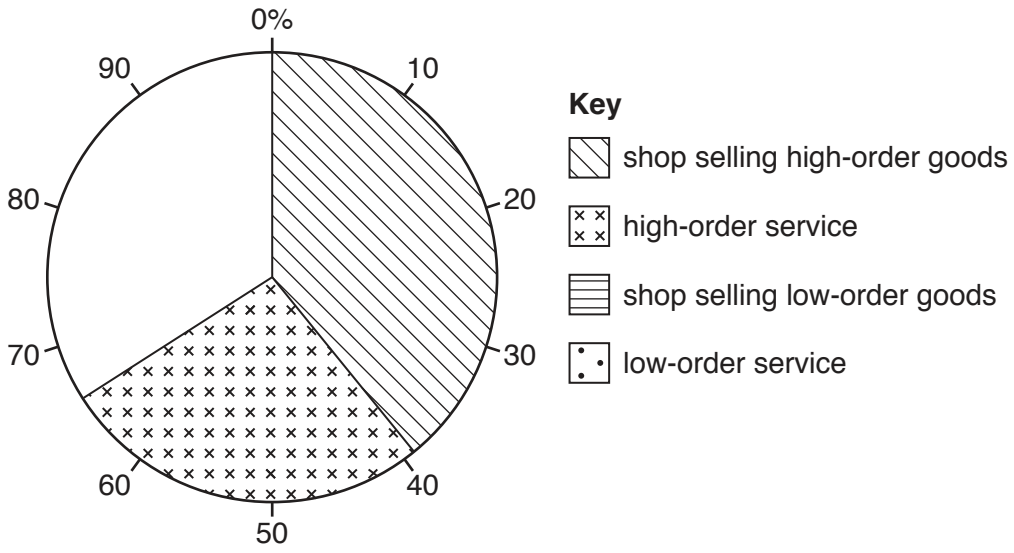

Fig. 6

(iii) What conclusion would the students make about **Hypothesis 1:** *The CBD contains more high-order shops and services than low-order shops and services*? Support your answer with evidence from Fig. 6 and Table 4.

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.....[3]

(iv) The students' teacher asked why they had not also investigated the number of middle-order shops and services.

Suggest **two** reasons why the teacher thought that this was a weakness in their method.

1 .....

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2 .....

.....[2]

(c) To investigate **Hypothesis 2:** *The sphere of influence of Nova Friburgo is equal in all directions*, the students used a questionnaire with some people in the CBD. The questionnaire is shown in Fig. 7 below.

Questionnaire

I'm a geography student at college. I am doing a survey to find out about shopping in the CBD of Nova Friburgo.

Please answer the following questions.

1. Which age group are you in?

☐ ..... ☐ 20–39 ☐ ..... ☐ 60 and over

2. Which settlement have you come from today?

.....

3. How did you travel to the CBD today? .....

☐ Male ☐ Female

Thank you for your time.

Fig. 7

(i) In the spaces provided on Fig. 7 **add two age groups** which are appropriate for classifying the people interviewed. Two age groups have already been included. [1]

(ii) To make their results reliable the students needed to use a sampling method.
Name an appropriate sampling method **and** explain how the students would use this method to choose people to interview.

Name of sampling method .....

Explanation .....

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.....[3]

(iii) Suggest **two** pieces of advice their teacher gave the students about using the questionnaire in the CBD.

1 .....

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2 .....

.....[2]

(d) The results of Question 2 *'Which settlement have you come from today?'* are shown in Table 5 (Insert).

(i) Use these results to **draw flow lines** on Fig. 8 below, to show the number of people coming from Sumidouro and São Jorge. [2]

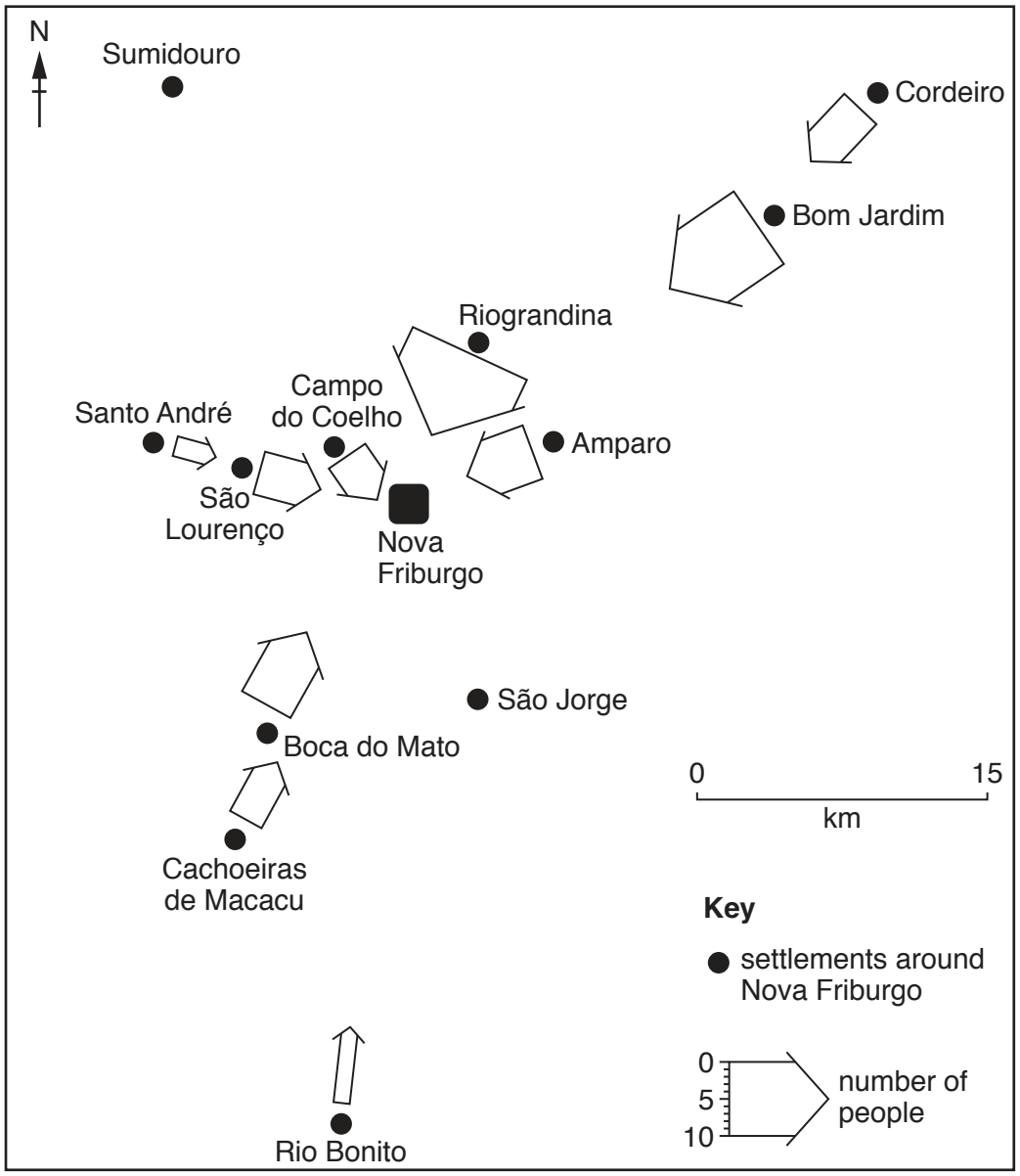

Fig. 8

(ii) The students made the conclusion that **Hypothesis 2:** *The sphere of influence of Nova Friburgo is equal in all directions* is incorrect (false). Use evidence from Fig. 8 and Table 5 to support this conclusion.

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.....[3]

(iii) The results of Question 3 *'How did you travel to the CBD today?'* are shown in Table 6 (Insert).
Use these results to **draw in the missing bars** in Fig. 9 below. [2]

Answers to Question 3:
How did you travel to the CBD today?

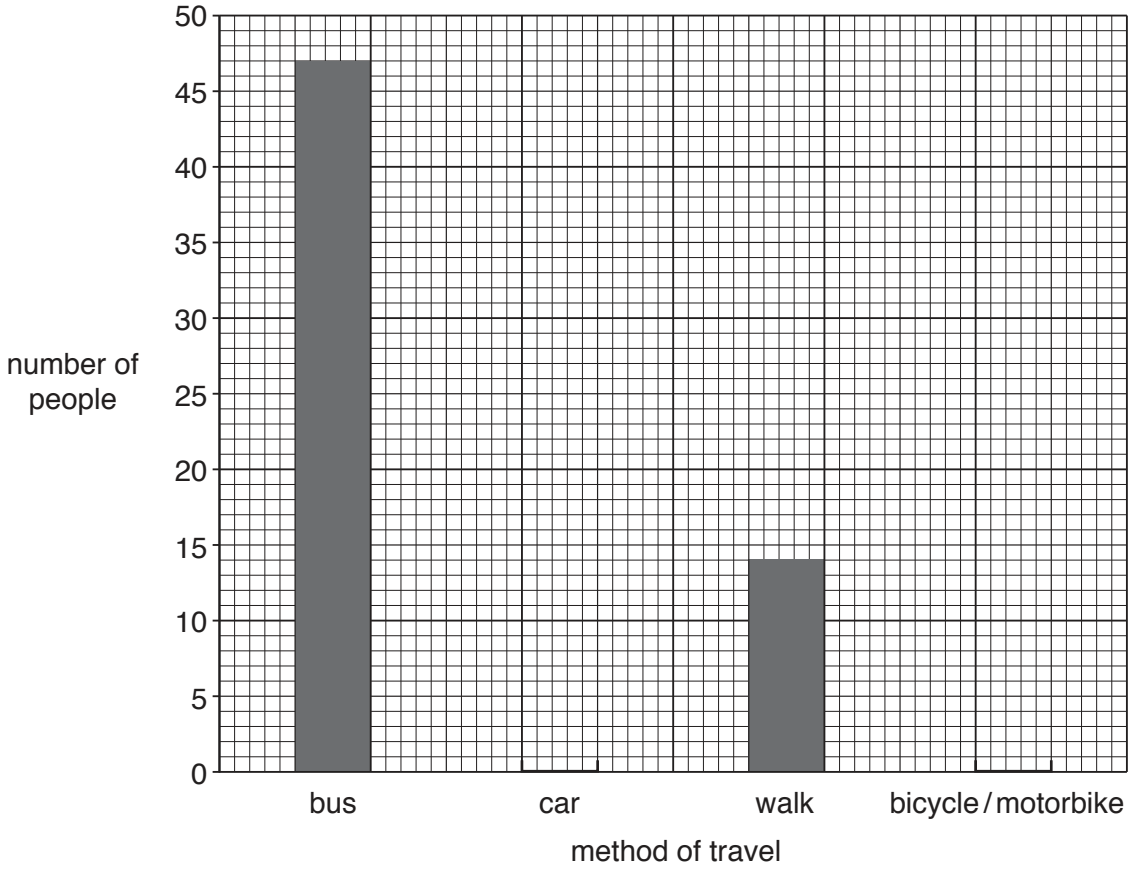

Fig. 9

(iv) The answers to Question 3 show that the main ways of travelling to the CBD were by bus and car. One student drew the main roads leading to the CBD on her map. She also added upland areas on the map. Her completed map is shown in Fig. 10 (Insert).

Use evidence from Figs. 9 and 10 to explain why the sphere of influence of Nova Friburgo is NOT equal in all directions.

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.....[3]

[Total: 30 marks]

Additional Pages

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

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