Cambridge
O Level

**Cambridge International Examinations**
Cambridge Ordinary Level

| CANDIDATE NAME | |
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*6883505 20*

**GEOGRAPHY** **2217/22**

Paper 2 **October/November 2017**

**2 hours 15 minutes**

Candidates answer on the Question Paper.

Additional Materials: Ruler
Calculator
Protractor
Plain paper

1:50 000 Survey Map Extract is enclosed with this question paper.

**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.

**Section A**
Answer **all** questions.
**Section B**
Answer **one** question.

The Insert contains Photograph A for Question 3 and Figs. 8, 9 and 13 and Tables 1, 2 and 3 for Question 7, and Figs. 15 and 16 and Tables 4 and 5 for Question 8.
The Survey Map Extract and the Insert are **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.

This document consists of **31** printed pages, **1** blank page and **1** Insert.

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CAMBRIDGE
International Examinations

## Section A

Answer **all** questions in this section.

**1** Study the 1:50 000 map of Castletown, Isle of Man.

**(a)** **(i)** Measure the length of the Isle of Man Steam Railway from the station at Port Erin (197689) to the station at Castletown (267680). Give your answer to the nearest kilometre.

.....[1]

**(ii)** How many stations are **between** these two points?

.....[1]

**(iii)** What has been done to keep the railway level?

.....[1]

**(iv)** What has been done so that the railway can cross these roads?

- A28

.....

- B45

.....[2]

**(b)** **(i)** Give the six-figure grid reference of the road junction of the A27 and the A36, in the north of the map.

.....[1]

**(ii)** Using map evidence, explain why this is a good location for a viewpoint.

.....

.....

.....

.....[2]

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**(c)** A fort was located on South Barrule, in grid square 2575. Suggest why this would be a good defensive site.

.....

.....

.....

.....[2]

**(d)** State **three** facilities for tourists at South Barrule Forest Park in grid square 2776.

.....

.....

.....[3]

**(e)** Fig. 1 shows the location of the Southern 100 Course, a road used as a racing route.

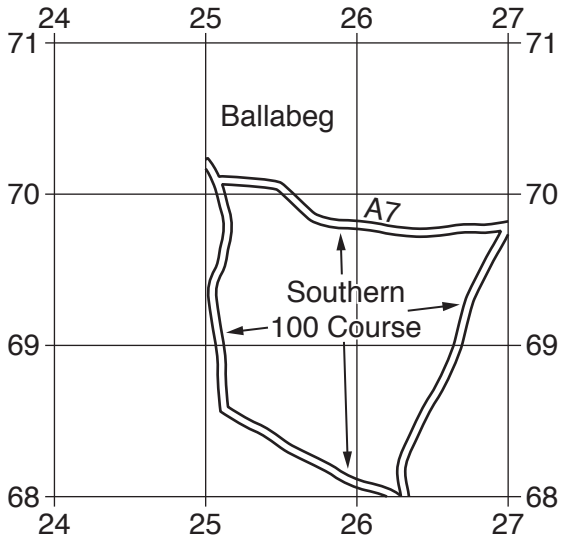


**Fig. 1**

Complete the description of the Southern 100 Course.

From Ballabeg (grid square 2570) follow the A7 towards ESE.

At the A3, turn to go ..... .

At the ..... , turn to go WNW.

At the A28, turn to go ..... to return to Ballabeg. [3]

**(f)** Study the area of the map shown in Fig. 2.

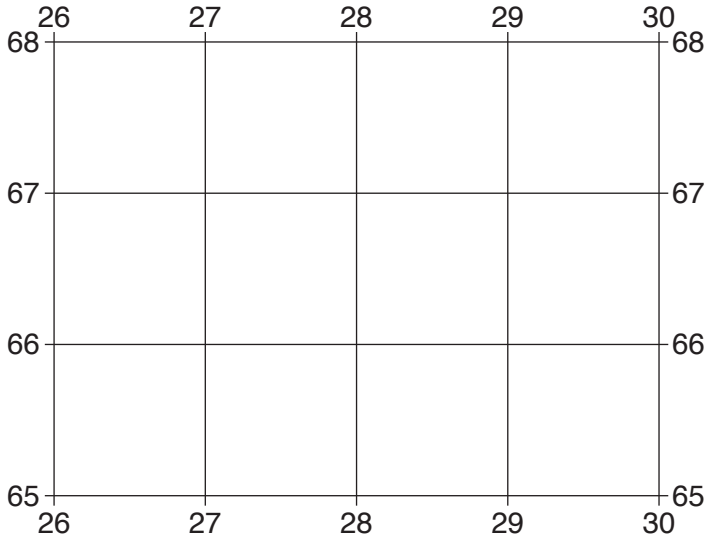


**Fig. 2**

Describe the physical features of the coastline in this area.

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.....[4]

[Total: 20 marks]

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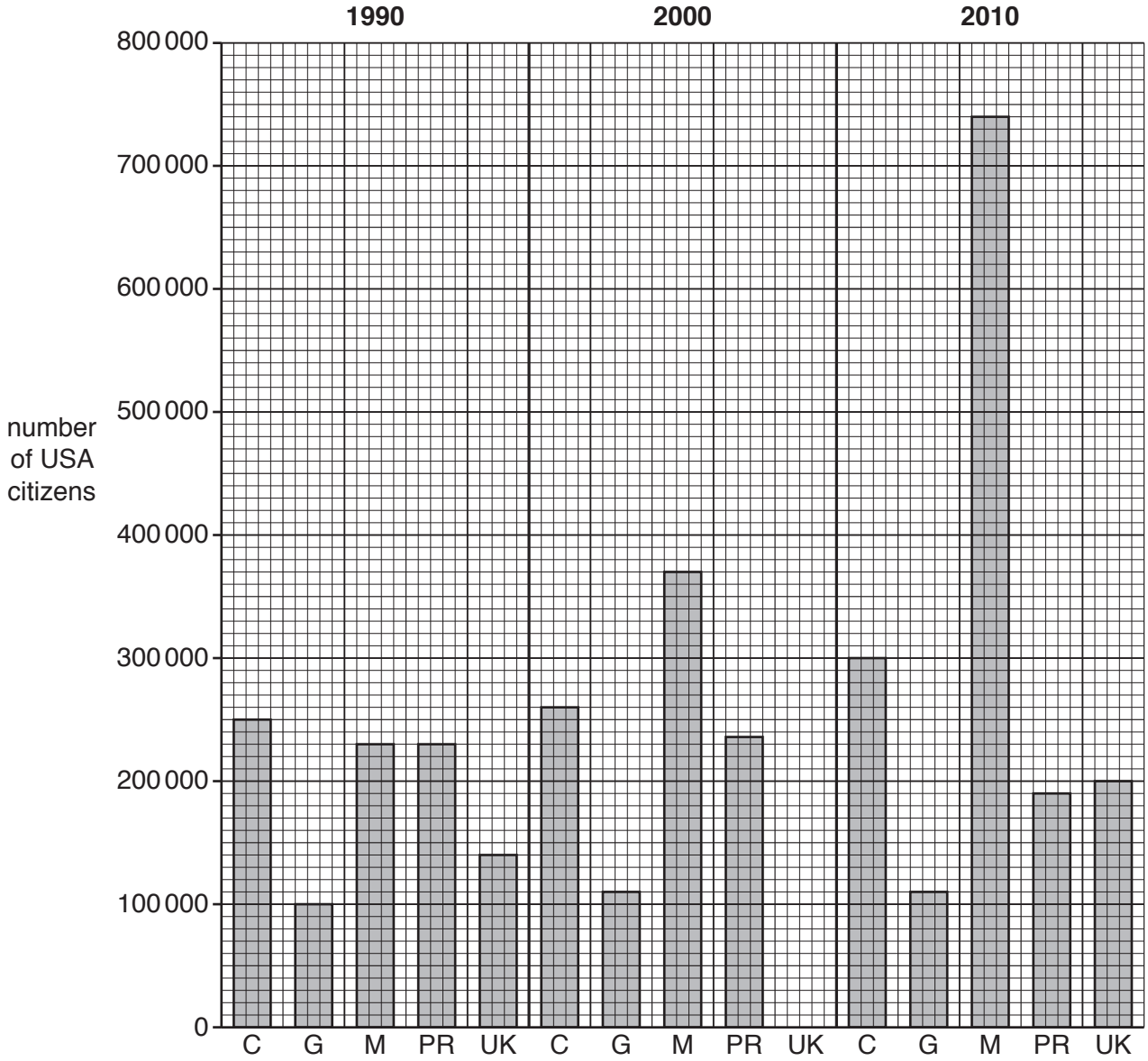
**2** Study Fig. 3 which shows the number of USA citizens living in five other countries, in 1990, 2000 and 2010.




**Key**

C = Canada
G = Germany
M = Mexico
PR = Puerto Rico
UK = United Kingdom

**Fig. 3**

**(a)** **(i)** Complete Fig. 3 to show 160 000 USA citizens living in the UK in 2000. [1]

**(ii)** How many USA citizens were living in Germany in 1990?

.....[1]

**(iii)** For which country was there no change in the number of USA citizens between 2000 and 2010?

.....[1]

**(iv)** Which country showed a decrease in the number of USA citizens between 2000 and 2010?

.....[1]

**(b)** **(i)** For the 2010 data, rank the countries from highest to lowest number of USA citizens.

Highest .....

.....

.....

.....

Lowest ..... [1]

**(ii)** State **two** countries that have exchanged rank positions between 1990 and 2010.

.....[1]

**(c)** Compare the change in the number of USA citizens in Canada and Mexico between 1990 and 2010.

.....

.....

.....

.....[2]

[Total: 8 marks]

**3** Study Photograph A (Insert) which shows a river bank, where an engineering method has been used to prevent erosion.

**(a)** Describe and explain the method used to prevent bank erosion.

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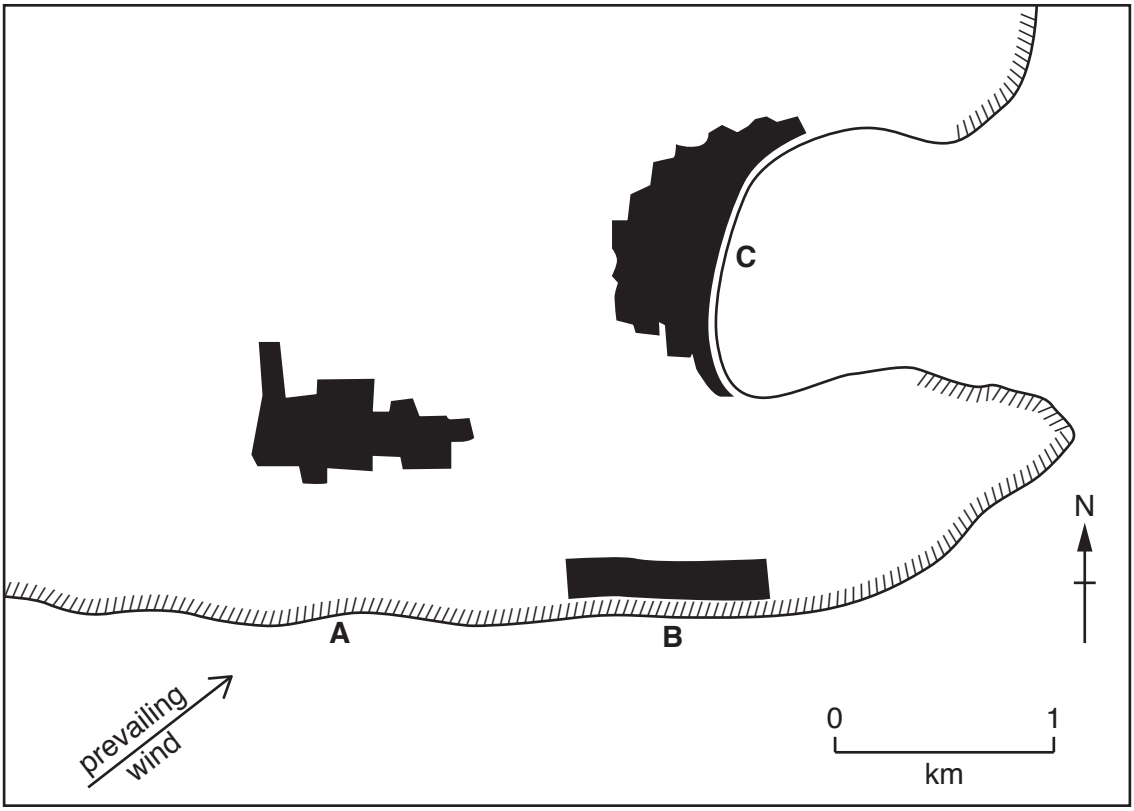
.....[5]

**(b)** **(i)** Fig. 4 shows a coastal area. Coastal protection has been used at **B** to prevent erosion.




**Key**

//////// cliff

settlement

**Fig. 4**

For each of **A** and **C**, suggest **one** reason why coastal protection was not thought to be necessary.

**A** .....

.....

**C** .....

.....[2]

**(ii)** Suggest a group of people who would be against the use of coastal protection at **B**. Give a reason for your answer.

Group .....

Reason .....

.....[1]

[Total: 8 marks]

**4** Study Fig. 5 which shows climate data for two locations in West Africa.

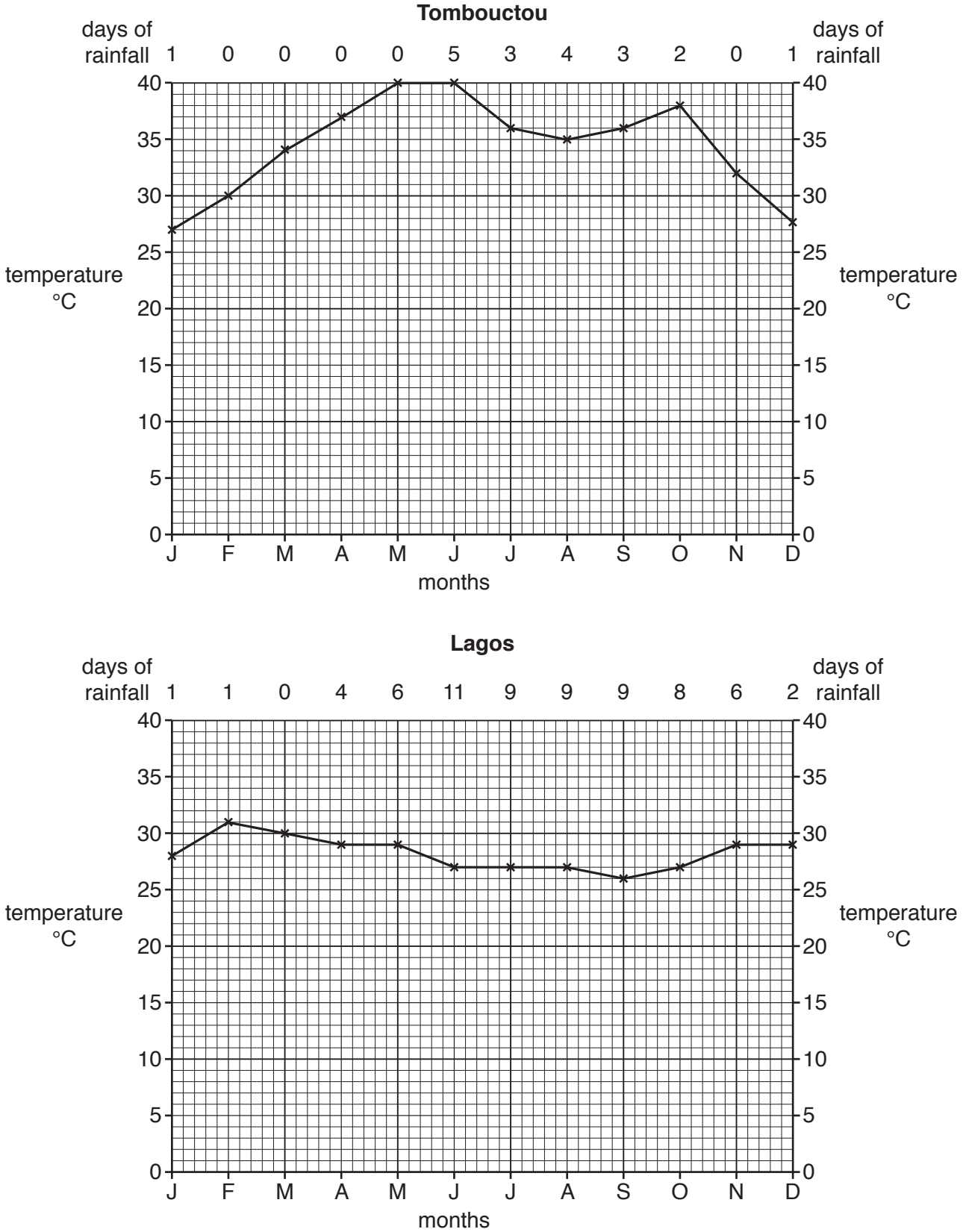



**Fig. 5**

**(a)** Use the information in Fig. 5 to complete the table below.

| | Tombouctou | Lagos |
|---|---|---|
| Highest temperature °C | 40 | |
| Lowest temperature °C | 27 | |
| Annual range °C | 13 | |
| Total days with rain | | 66 |
| Month with rain on most days | June | |

[5]

**(b)** **(i)** During which months would you expect to see the highest temperatures for places in the northern hemisphere?

.....[1]

**(ii)** Suggest **two** factors that would influence temperature in a desert.

.....

.....

.....

.....[2]

[Total: 8 marks]

**5** Study Fig. 6, which shows New York's water supply system.

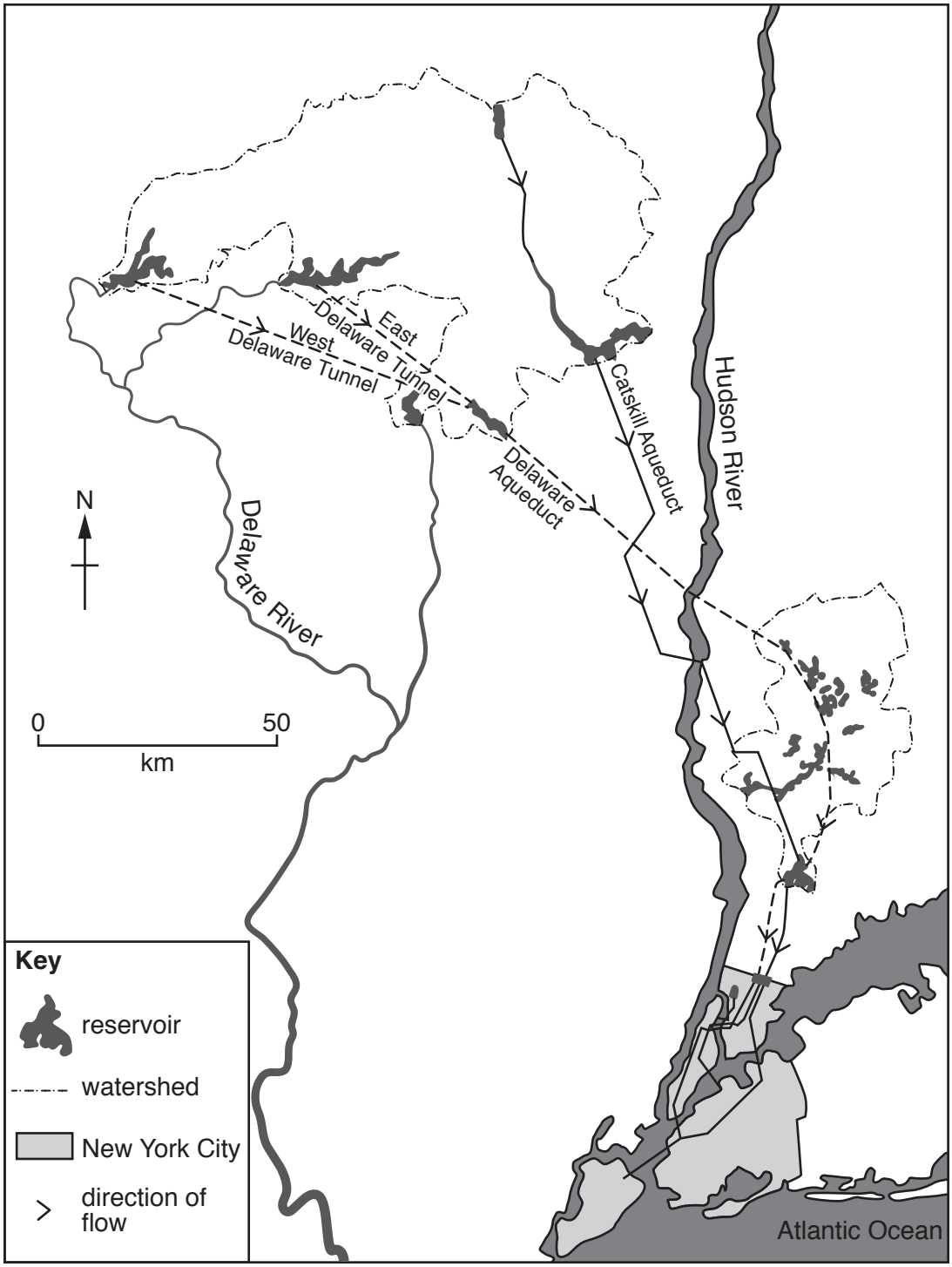



**Fig. 6**

**(a)** What is a watershed?

.....

.....[1]

**(b)** **(i)** Identify **two** methods used to transport water towards New York City.

.....

.....[2]

**(ii)** Identify **two** different types of named fresh water source shown on Fig. 6.

.....

.....[2]

**(c)** Describe the location of New York City in relation to its areas of water supply.

.....

.....

.....

.....[2]

**(d)** Suggest a source of river pollution that may prevent water supply being taken from the Hudson River.

.....

.....[1]

[Total: 8 marks]

**6** Study Fig. 7, which shows percentage of energy production from renewable energy.

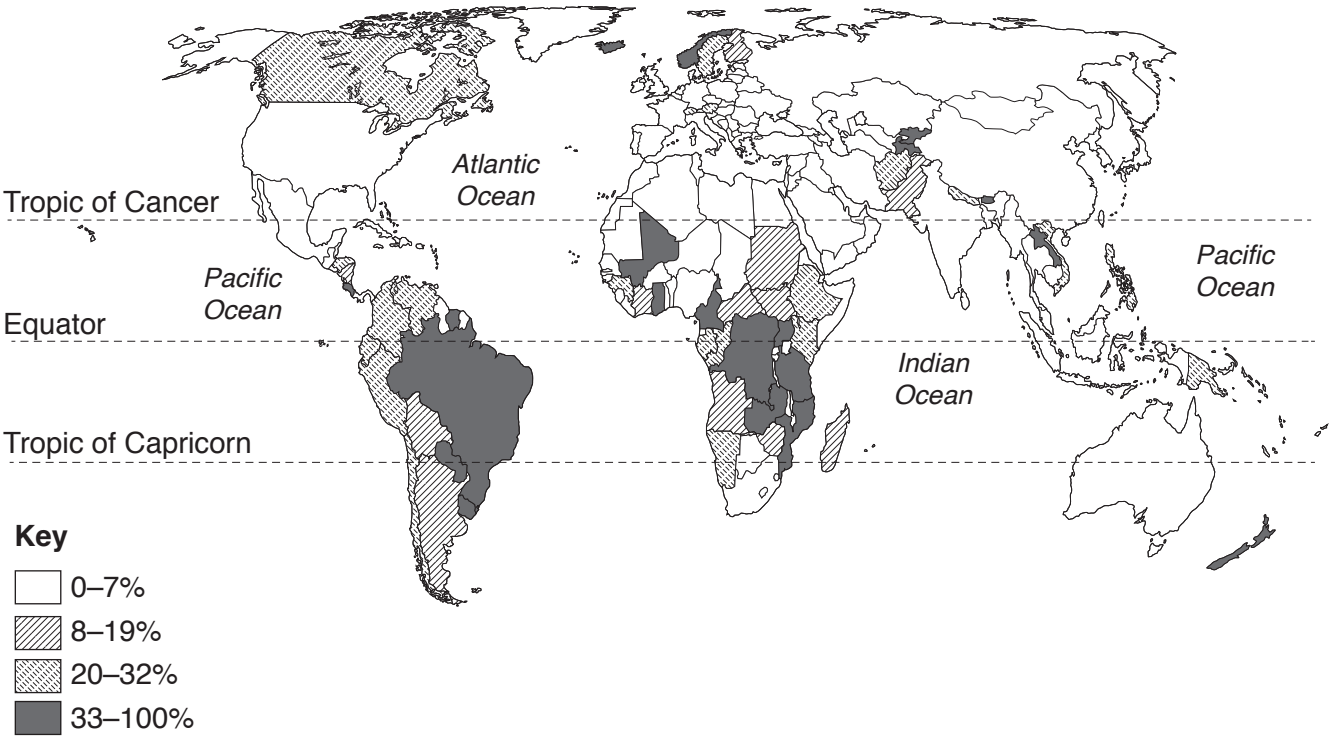



**Fig. 7**

**(a)** **(i)** What is renewable energy?

.....

.....[1]

**(ii)** Describe the distribution of areas that produce 33% or more of renewable energy.

.....

.....

.....

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.....

.....[4]

**(b)** Which type of renewable energy would be more readily available:

- at a plate boundary?

.....

- in a hot desert?

.....[2]

**(c)** What is meant by HEP?

.....[1]

[Total: 8 marks]

## Section B

Answer **one** question in this section.

**7** Students in Brazil did fieldwork to investigate infiltration. Infiltration is the process by which water soaks into the soil.

**(a)** The students worked in two groups to do their fieldwork in a river valley. They created two transects (**A** and **B**) going away from the river. These are shown in Fig. 8 (Insert).

Which **one** of the following pieces of equipment would they use to create a transect? Tick (✓) your answer.

| Equipment | Tick (✓) |
|---|---|
| callipers | |
| clipboard | |
| quadrat | |
| rope | |
| ruler | |

[1]

The hypotheses investigated by the students were:

**Hypothesis 1:** *The infiltration rate decreases as distance from the river increases.*

**Hypothesis 2:** *The infiltration rate decreases as soil moisture content increases.*

Soil moisture content is the quantity of water in the soil.

**(b) (i)** To investigate **Hypothesis 1** the students in group A collected data to measure the rate (speed) of infiltration at equal distances along transect A. Fig. 9 (Insert) shows the method they used to do this. Describe how the students measured the rate (speed) of infiltration to get the results shown in Table 1 (Insert).

.....

.....

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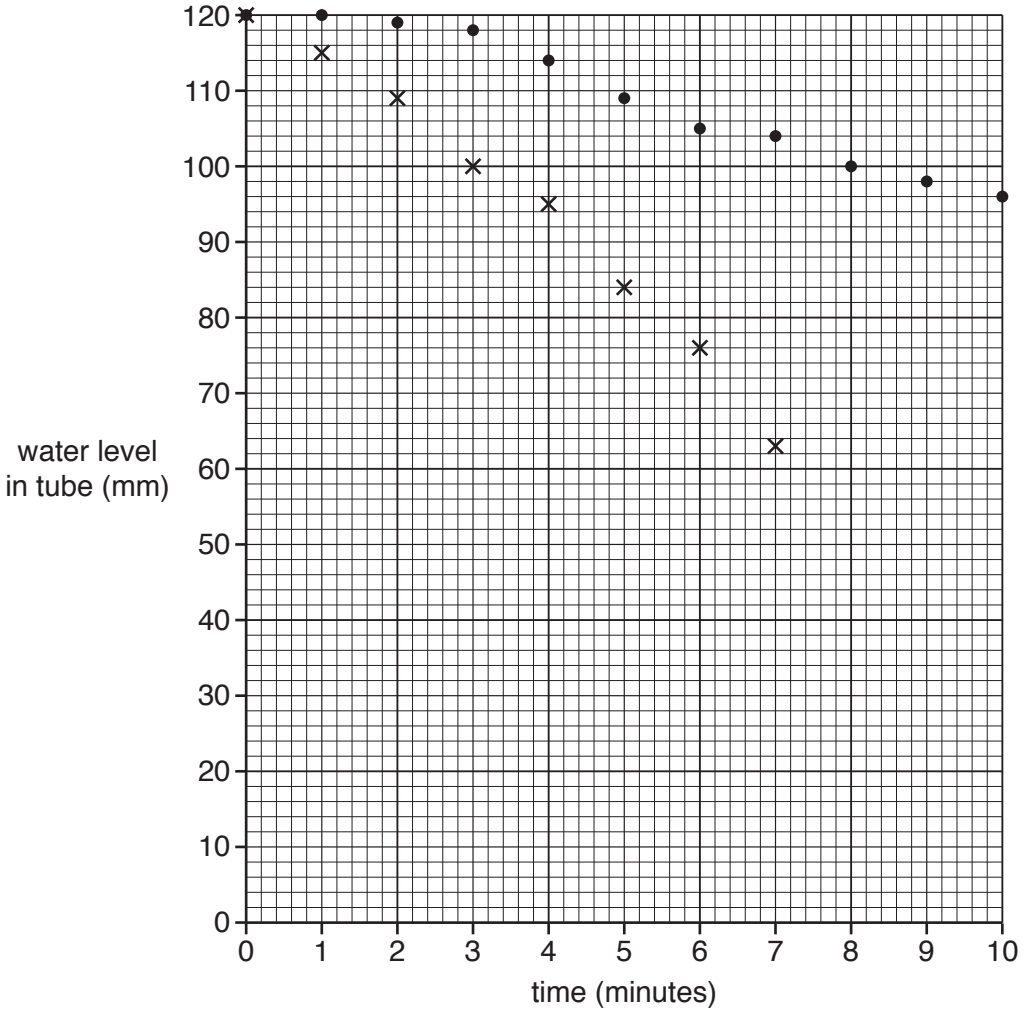
.....

.....[3]

**(ii)** The students recorded the water level in the tube every minute for 10 minutes or until there was no water left. The results of their measurements at sites 4 and 7 are shown in Table 1 (Insert).
Use these results to **complete the measurements** for site 4 in Fig. 10 below. [2]

**Results of measurement of water height at two sites on transect A**




**Key**

× site 4

• site 7

**Fig. 10**

**(iii)** The students then calculated the infiltration rate at each site. Their calculation for site 4 is shown below.

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

$$= \frac{70}{10}$$

$$= 7.0 \text{ mm per min}$$

Use the data in Table 1 to show the calculation which produced the result for site 7 in the space below. [1]

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

= .....

= 2.4 mm per min

**(iv)** The measurements of distance from the river and infiltration rate at the different fieldwork sites on transect **A** are shown in Table 2 (Insert). The students plotted these results on a graph, Fig. 11 below. **Complete the graph** by plotting the result for site 7. [1]

**Infiltration rate at the sites on transect A**

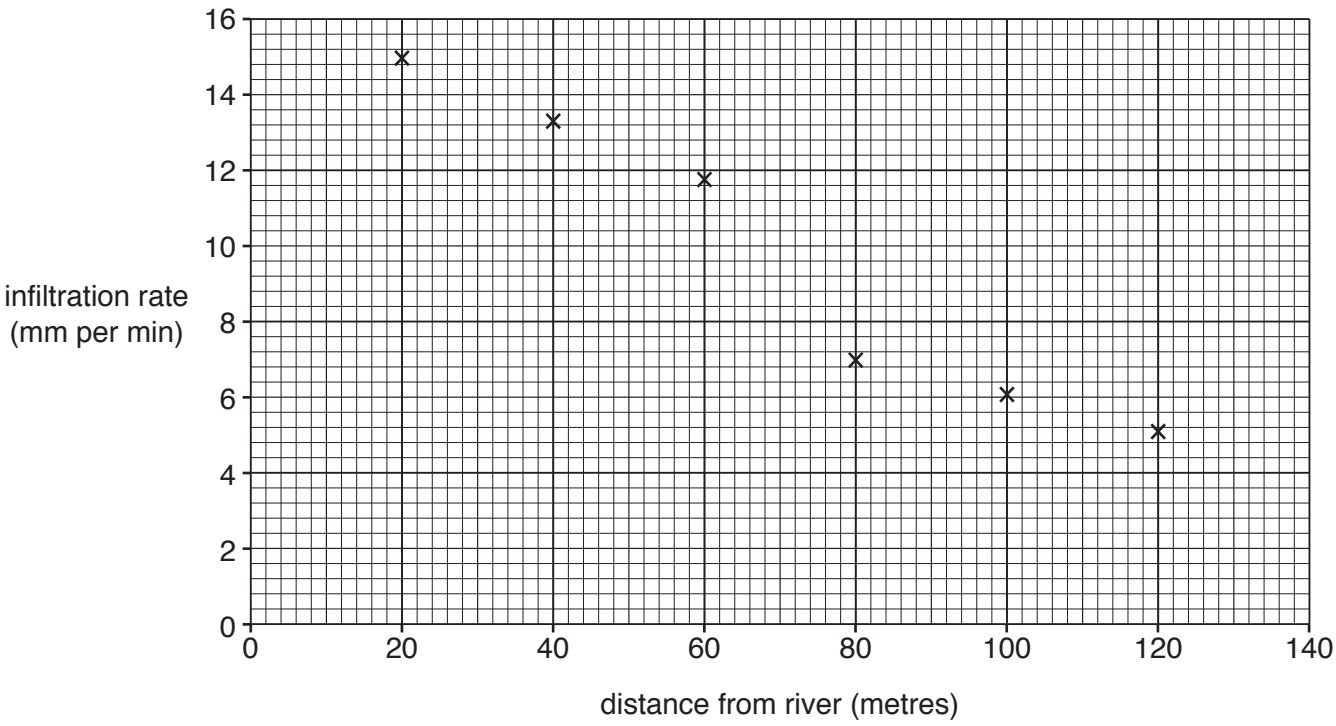



**Fig. 11**

**(v)** What conclusion would the students in group A make about **Hypothesis 1:** *The infiltration rate decreases as distance from the river increases*? Support your answer with evidence from Fig. 11 and Table 2.

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.....[3]

**(c)** The students in group B did the same fieldwork along transect **B** shown in Fig. 8 (Insert). Their results are shown in Fig. 12 below.

**Infiltration rate at the sites on transect B**

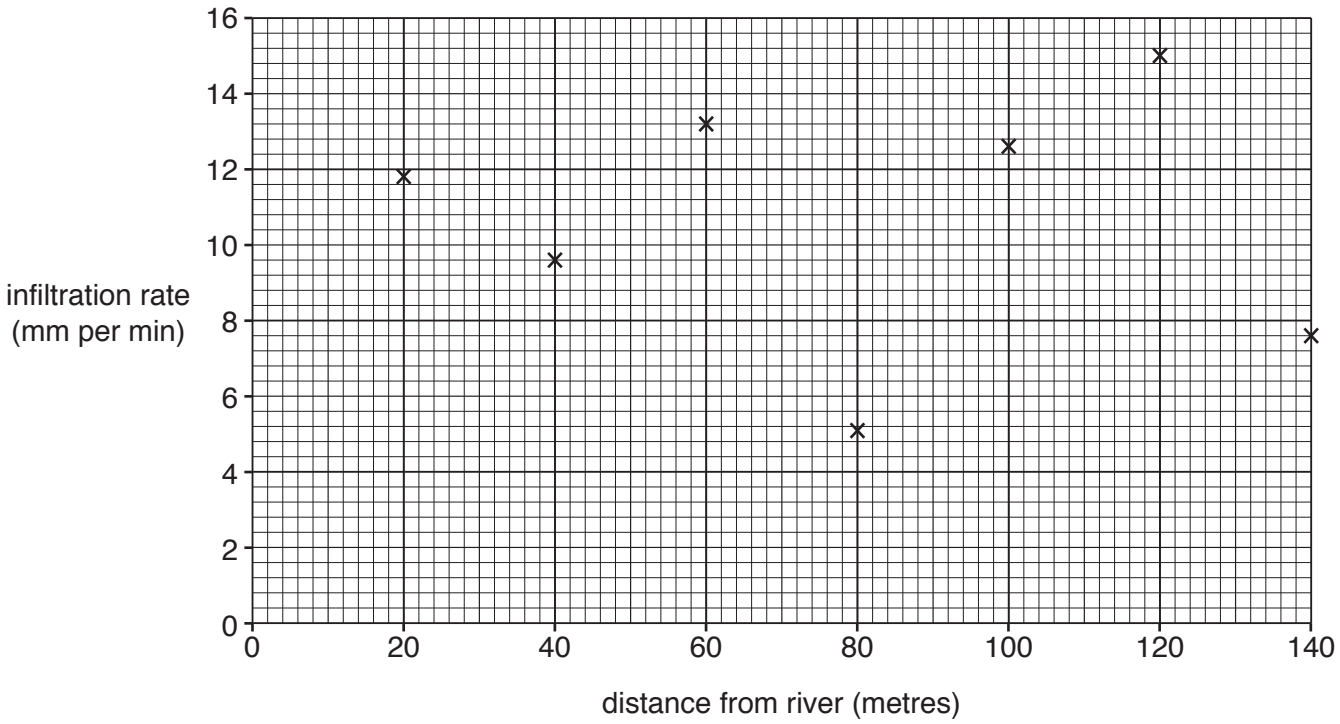


**Fig. 12**

**(i)** Compare the results of the two groups on transects **A** and **B**. Use evidence from Figs. 11 and 12 in your answer.

.....

.....

.....

.....[2]

**(ii)** As the results of the two groups were different their teacher checked their measurements and calculations and agreed that they had not made any errors. Suggest why the two groups got different results. Look at Fig. 8 to help you to answer.

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.....[4]

**(d)** To investigate **Hypothesis 2:** *The infiltration rate decreases as soil moisture content increases*, the two groups of students measured the soil moisture content at each sampling site along their transects. Fig. 13 (Insert) shows students' fieldwork notes which describe the two different methods that the groups used.

**(i)** Suggest **three** advantages of method 2 for measuring soil moisture content.

1 .....

.....

2 .....

.....

3 .....

.....[3]

**(ii)** The results for transects **A** and **B** are shown in Table 3 (Insert). Use this data **to plot the results** at site 3 on transect **B** in Fig. 14 below. [2]

**Results of measurements of infiltration rate and soil moisture content**

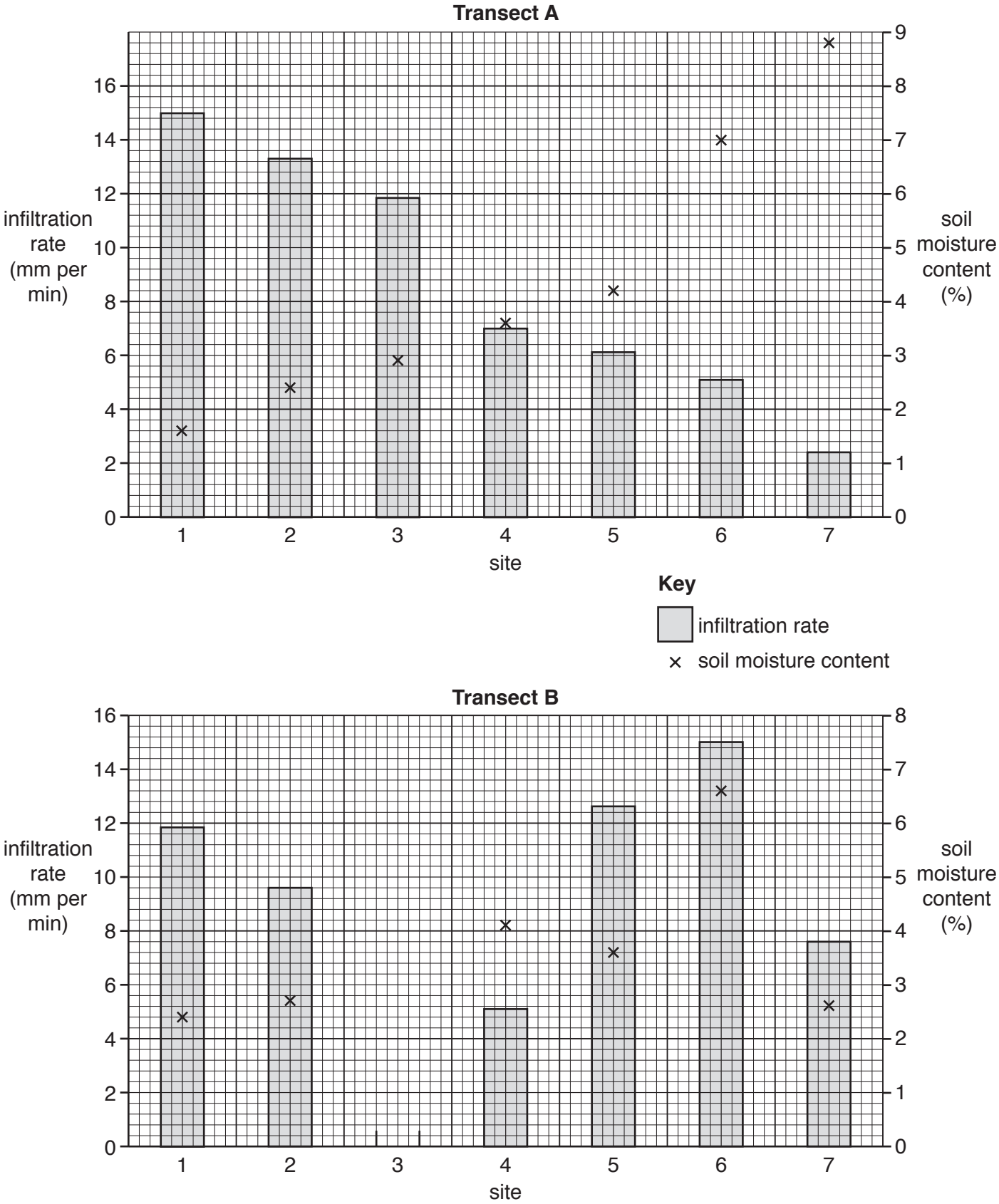


**Fig. 14**

**(iii)** Which group's results agree with **Hypothesis 2:** *The infiltration rate decreases as soil moisture content increases*? Circle your decision below.

Group A on Transect **A** Group B on Transect **B**

Support your decision with evidence from Fig. 14 and Table 3.

.....

.....

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.....

.....

.....[3]

**(e)** If the students repeated their infiltration measurements after a week of heavy rain, how and why would the infiltration rates be different?

.....

.....

.....

.....[2]

**(f)** The area around the river where the students did their fieldwork is a popular tourist area. Suggest how and explain why people walking in the area might affect the infiltration rate.

.....

.....

.....

.....

.....

.....[3]

[Total: 30 marks]

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**8** Students in the UK wanted to investigate how areas of their city were different from each other. In particular they decided to find out about differences in the quality of the urban environment and access to local services.

The students selected six sites to do their fieldwork in different areas of the city. These are shown in Fig. 15 (Insert).

The students decided to test the following hypotheses:

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

**Hypothesis 2:** *Access to local services is better further away from the city centre.*

**(a)** To investigate **Hypothesis 1** the students did an environmental quality survey at one site in each area of the city. Their recording sheet is shown in Fig. 16 (Insert).

**(i)** Describe how the students would use the recording sheet.

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.....

.....[2]

**(ii)** Explain how an environmental quality survey should be organised and carried out to make sure that results are reliable.

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.....[4]

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

**(i)** Identify **one** difference in the quality of the urban environment between each of the following areas:

- Tettenhall and Pendeford

.....

.....

- Whitmore Reans and Low Hill

.....

.....[2]

**(ii)** Use the data in Table 4 to **complete the bi-polar graph** for Low Hill in Fig. 17 below. [1]

**Bi-polar graph to show environmental quality scores in Low Hill**

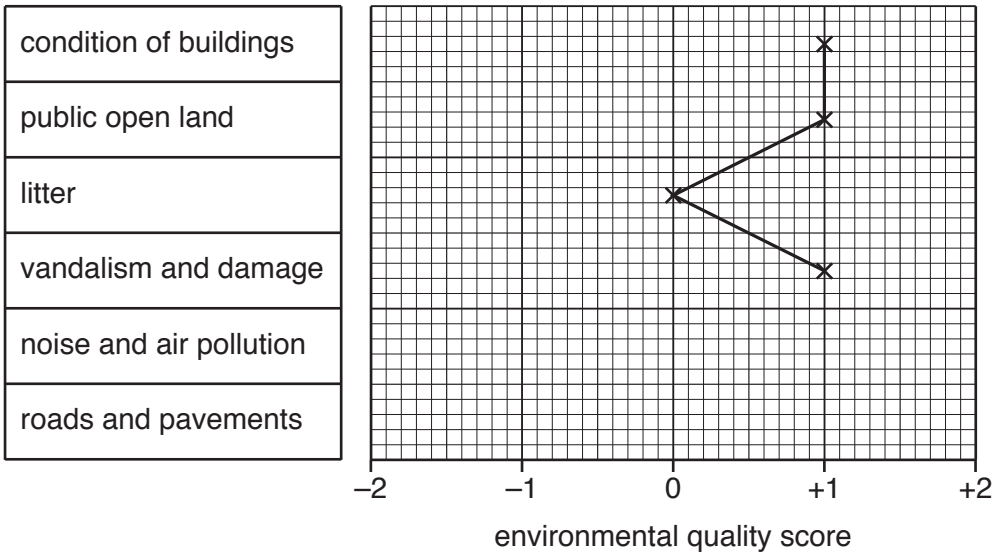


**Fig. 17**

**(iii)** Using the data in Table 4 the students plotted the total environmental quality score for each area on Fig. 18 below. Use the scale to **plot the total environmental quality score** for Whitmore Reans on Fig. 18. [1]

**Total environmental quality score for each area**

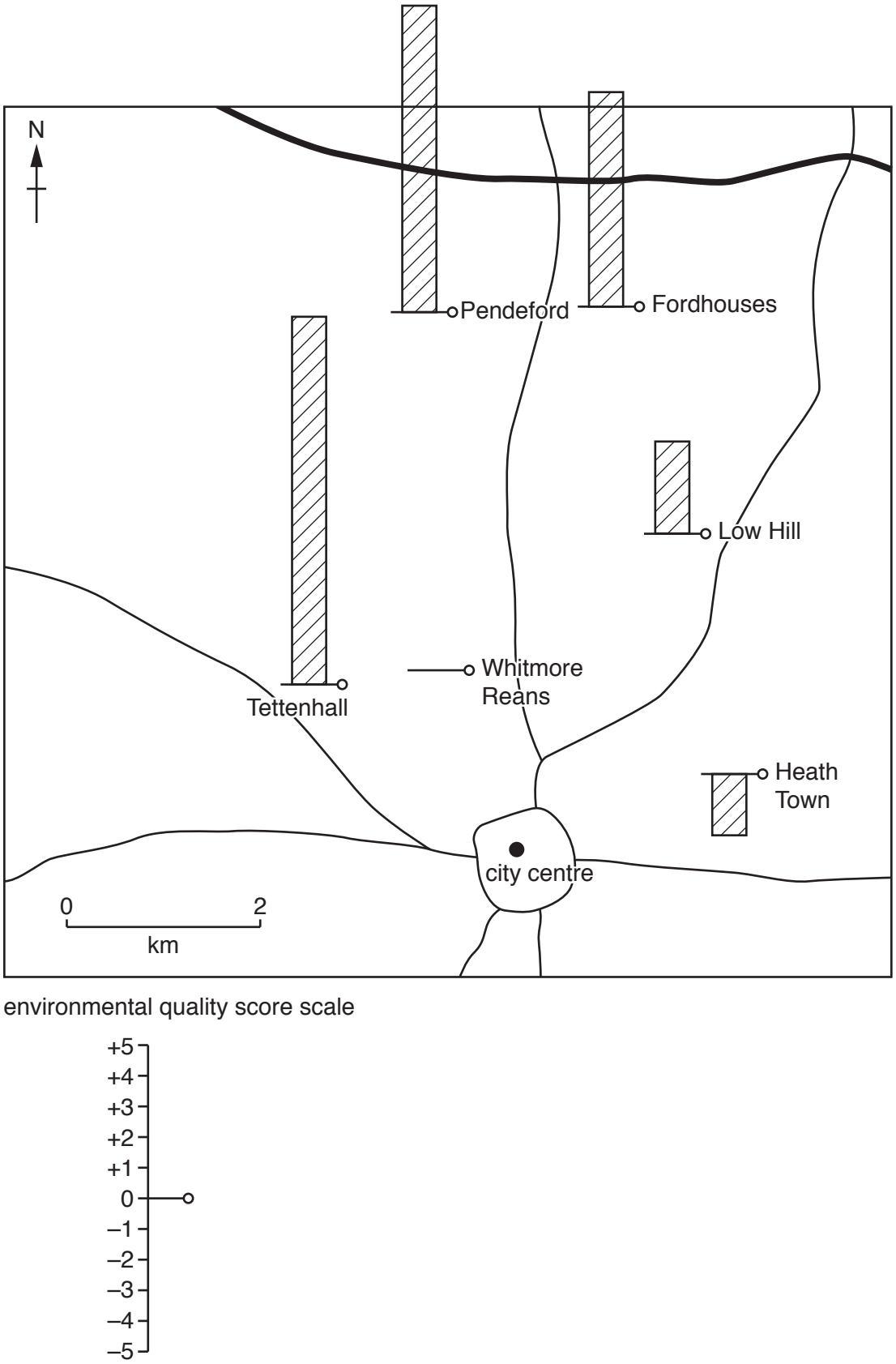


**Fig. 18**

**(iv)** Which **one** of the following conclusions about **Hypothesis 1:** *The quality of the urban environment improves as distance from the city centre increases* is correct? Support your decision with evidence from Fig. 18 and Table 4.

| Conclusion | Tick (✓) |
|---|---|
| Hypothesis 1 is true | |
| Hypothesis 1 is partly true | |
| Hypothesis 1 is false | |

.....

.....

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.....

.....

.....[4]

**(c)** To investigate **Hypothesis 2:** *Access to local services is better further away from the city centre*, the students asked residents in each area to tell them how much time they took to walk to different services.

The students used a random sampling method to select people to interview.

Describe this method and give **one** advantage of the method.

Description

.....

.....

Advantage

.....

.....[2]

**(d)** Fig. 19 below is an example of a partly completed survey sheet.

**Survey sheet**

**Name of residential area: Pendeford**

How many minutes does it take you to walk to the nearest service for each of the following?

Circle your answer

| | | | | |
|---|---|---|---|---|
| Park | less than 5 | between 5 and 15 | between 16 and 30 | more than 30 |
| Supermarket | less than 5 | between 5 and 15 | between 16 and 30 | more than 30 |
| Primary school | less than 5 | between 5 and 15 | between 16 and 30 | more than 30 |
| Secondary school | less than 5 | between 5 and 15 | between 16 and 30 | more than 30 |
| Doctors' surgery / Health centre | less than 5 | between 5 and 15 | between 16 and 30 | more than 30 |
| Bus stop | less than 5 | between 5 and 15 | between 16 and 30 | more than 30 |
| City centre shops | less than 5 | between 5 and 15 | between 16 and 30 | more than 30 |
| Local store | less than 5 | between 5 and 15 | between 16 and 30 | more than 30 |

**Fig. 19**

**(i)** **Complete Fig. 19** using the following information.

- Time taken to walk to the nearest park: 7 minutes;
- Time taken to walk to the nearest secondary school: 40 minutes. [2]

**(ii)** Why might the question used in the survey (How many minutes does it take you to walk to the nearest service for each of the following?) result in an answer that is **not** useful?

.....

.....

.....

.....[2]

**(iii)** When the students had completed the survey they produced a 'household convenience index' by giving a score to each answer circled on the survey sheet. The scoring system is shown below.

| Time taken | Score |
|---|---|
| less than 5 minutes | 4 |
| between 5 minutes and 15 minutes | 3 |
| between 16 minutes and 30 minutes | 2 |
| more than 30 minutes | 1 |

Use this scoring system **to complete Fig. 20**, below, which shows the household convenience index for one person's answers in Low Hill. Insert the score for the local store and the total index score. [2]

**Household convenience index result in Low Hill**

**Name of residential area: Low Hill**

How many minutes does it take you to walk to the nearest service for each of the following?

| Circle your answer | | | | | **Score** |
|---|---|---|---|---|---|
| Park | less than 5 | between 5 and 15 | between 16 and 30 | more than 30 | 4 |
| Supermarket | less than 5 | between 5 and 15 | between 16 and 30 | more than 30 | 3 |
| Primary school | less than 5 | between 5 and 15 | between 16 and 30 | more than 30 | 3 |
| Secondary school | less than 5 | between 5 and 15 | between 16 and 30 | more than 30 | 2 |
| Doctors' surgery / Health centre | less than 5 | between 5 and 15 | between 16 and 30 | more than 30 | 3 |
| Bus stop | less than 5 | between 5 and 15 | between 16 and 30 | more than 30 | 4 |
| City centre shops | less than 5 | between 5 and 15 | between 16 and 30 | more than 30 | 1 |
| Local store | less than 5 | between 5 and 15 | between 16 and 30 | more than 30 | |
| Total household convenience index score | | | | | |
| Percentage household convenience score | | | | | 75% |

**Fig. 20**

**(e)** The students then calculated a percentage household convenience score for each area of the city. These results are shown in Table 5 (Insert).

**(i)** **Complete Fig. 21 below** by plotting the percentage household convenience score for Fordhouses. [1]

**Household convenience score of each area**

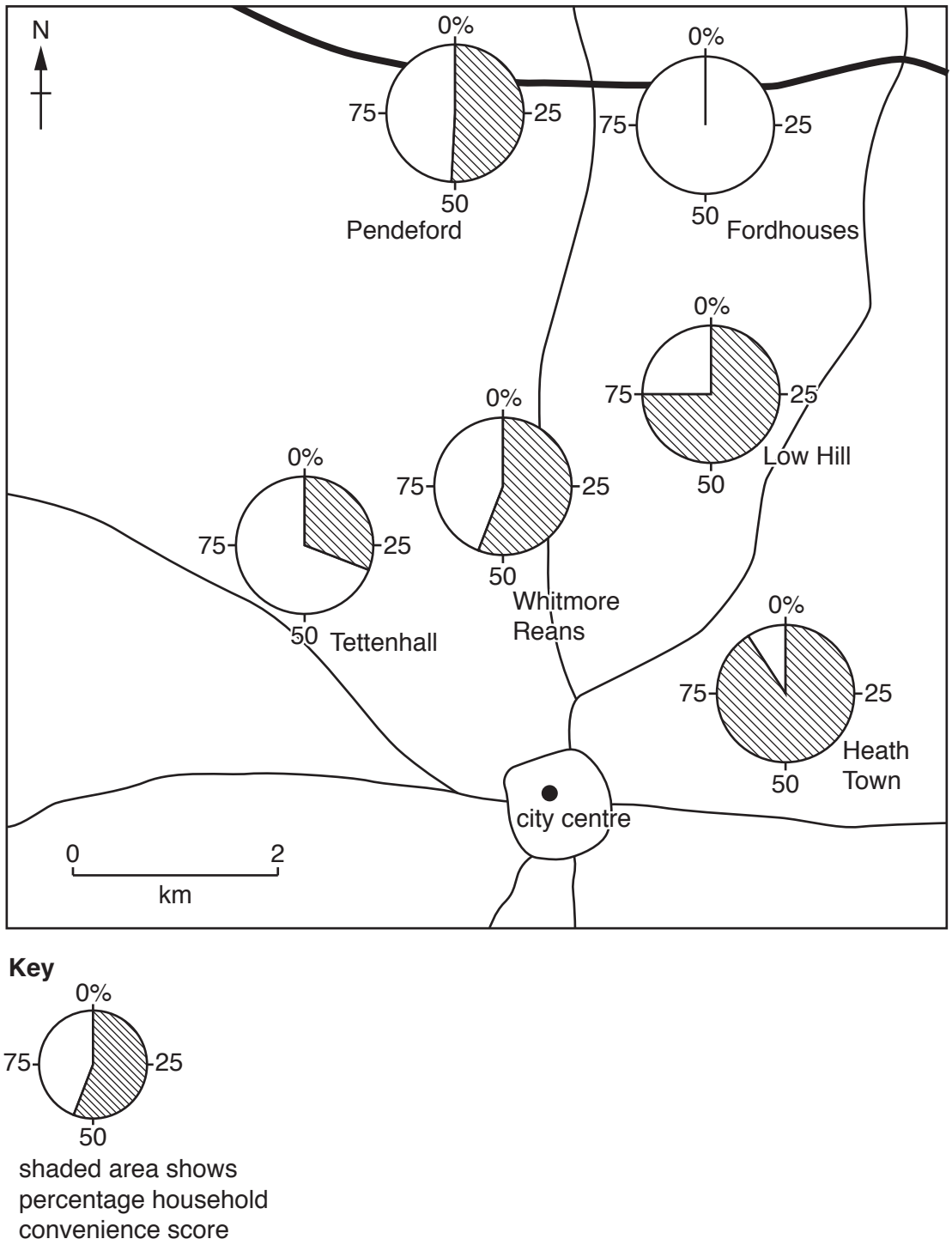


**Fig. 21**

**(ii)** What conclusions would the students make about **Hypothesis 2:** *Access to local services is better further away from the city centre*? Support your decision with evidence from Fig. 21 and Table 5.

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.....[3]

**(f)** For extension work the students wanted to investigate how the amount of traffic might vary between different areas of the city. Describe a fieldwork method for this investigation.

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.....[4]

[Total: 30 marks]

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## 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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