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Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

0277791244

GEOGRAPHY **0460/41**

Paper 4 Alternative to Coursework **May/June 2022**

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 **16** pages.

DC (LK/CB) 304174/5
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[Turn over

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1 Students were learning about processes which take place in a drainage basin.

(a) Use arrows to match the processes with the correct definitions in the table below. One has been completed for you.

process	definition
evaporation	leaves of trees stop rain from reaching the ground
infiltration	water moves across the ground surface
interception	water is heated and turns into water vapour
overland flow	water soaking into the ground

[2]

The students did some fieldwork to investigate vegetation cover and infiltration around a path created by people walking across grassland.
They tested the following hypotheses:

Hypothesis 1: *Vegetation cover increases as distance from the centre of the path increases.*

Hypothesis 2: *The rate of infiltration is faster where there is more vegetation cover.*

(b) To estimate the amount of vegetation cover at each site the students used a quadrat at seven sites on and around the path.

(i) In the space below **draw a labelled diagram** of a quadrat to show a result of 60% vegetation cover and 40% bare soil. [3]

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(ii) The results of the students' measurements of vegetation cover at each site are shown in Table 1.1 (Insert). Use these results to **complete the divided bar** at site 6 in Fig. 1.1. [1]

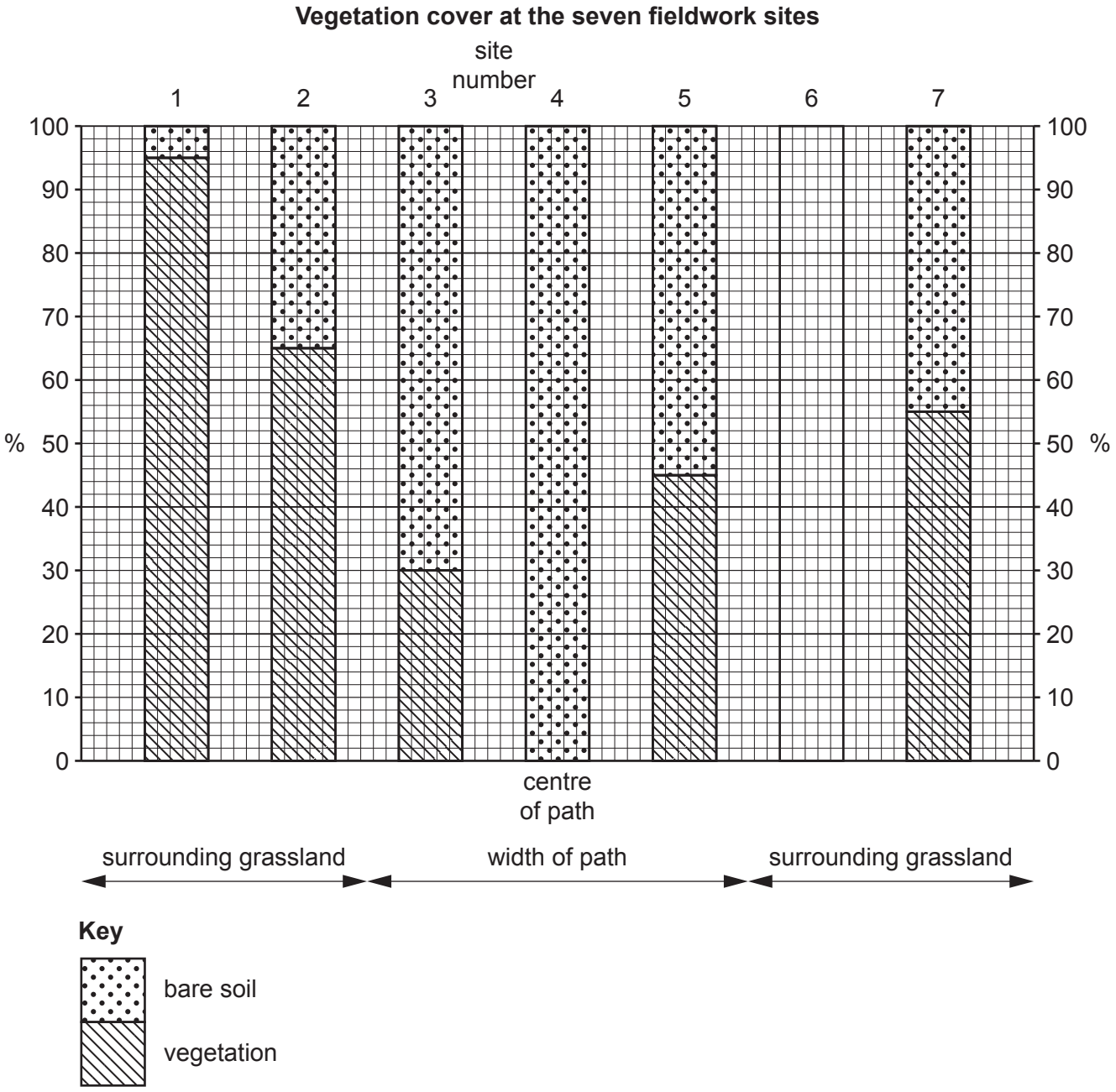

Fig. 1.1

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(iii) The students made the conclusion that **Hypothesis 1:** *Vegetation cover increases as distance from the centre of the path increases* was **partially correct**. Use data from Table 1.1 and Fig. 1.1 to explain why they made this conclusion.

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..... [3]

(c) Fig. 1.2 (Insert) describes and shows the students' method to measure the speed of infiltration.

(i) What did the students use the following equipment for?

bottomless cylinder

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ruler

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stop-watch

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..... [3]

(ii) The students measured infiltration at the seven fieldwork sites. The results of their measurements are shown in Table 1.2 (Insert).
Compare the fall in water level between site 1 and site 4.

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(iii) The students then calculated the infiltration rate at each site. Use the data in Table 1.2 to **complete the calculation** for site 7 in the space below. [1]

Site 7

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

=

= 11.5 mm per minute

(iv) The students' calculations of the infiltration rate at each site are shown in Table 1.3.

Table 1.3

Infiltration rate at each site

site	1	2	3	4	5	6	7
infiltration rate (mm per min)	17.1	13.3	9.1	5.5	10.5	15.0	11.5

At which site did the water soak into the ground fastest?

site ..... [1]

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(d) (i) To make their conclusion to **Hypothesis 2:** *The rate of infiltration is faster where there is more vegetation cover*, the students plotted a scatter graph, Fig. 1.3, to compare the rate of infiltration and amount of vegetation cover. **Plot the data** in Table 1.4 into Fig. 1.3. [1]

Table 1.4

site 7	infiltration rate = 11.5 mm per min	vegetation cover = 55%

Relationship between infiltration rate and vegetation cover

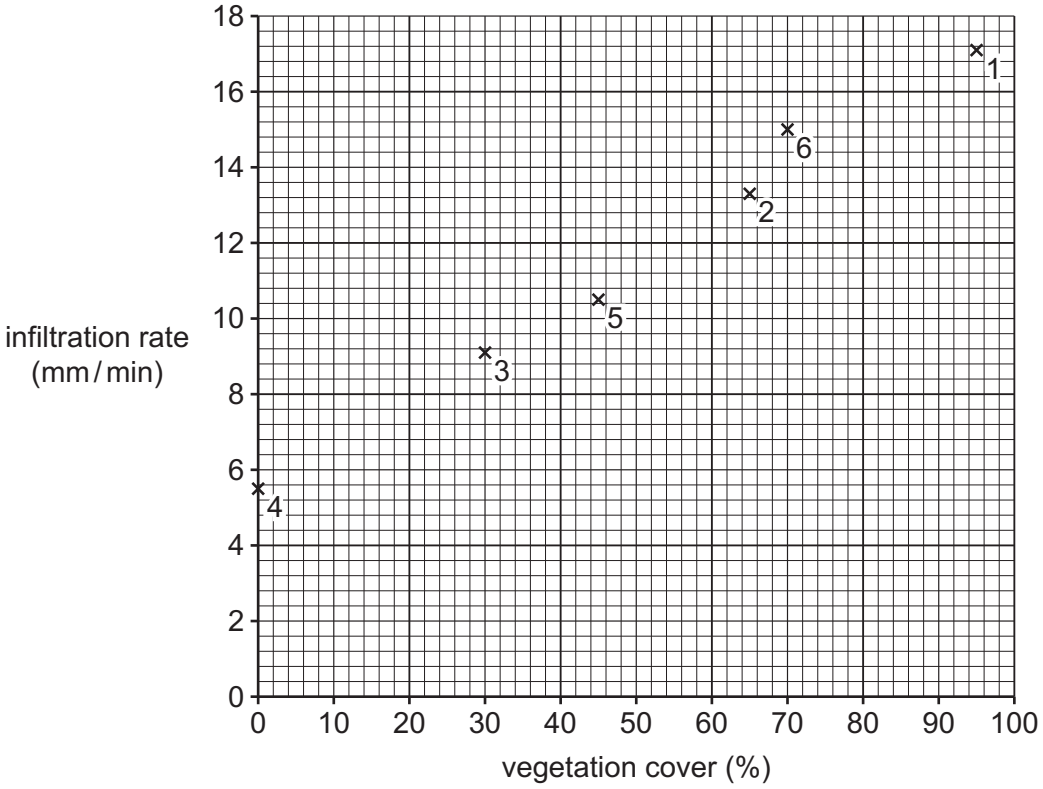

Fig. 1.3

(ii) What conclusion would the students make about **Hypothesis 2:** *The rate of infiltration is faster where there is more vegetation cover*? Support your decision with evidence from Fig. 1.3 and Table 1.4.

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..... [3]

(e) To extend their fieldwork the students decided to investigate the impact of people creating the path by walking across grassland. This is known as 'footpath erosion'.

(i) Fig. 1.4 (Insert) is a diagram in a student's fieldwork notebook which shows their method. Describe how the students would carry out this task.

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(ii) The results of the students' fieldwork are shown in Table 1.5 (Insert). Use these results to **complete the cross-section of the path** in Fig. 1.5 below. [2]

Cross-section of path

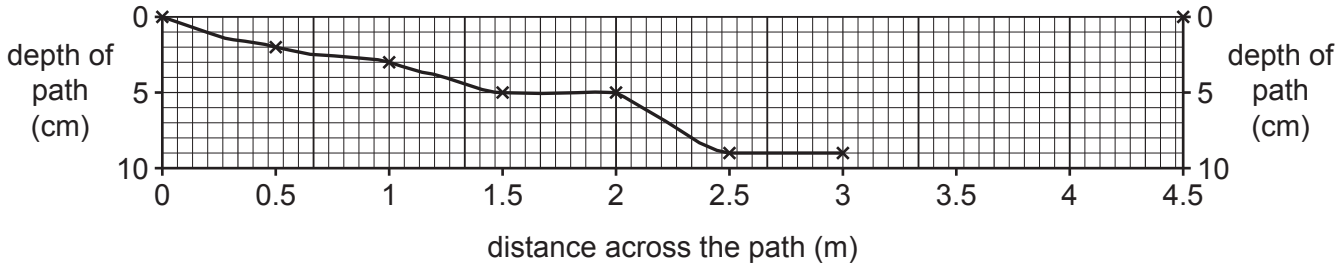

Fig. 1.5

(iii) Explain how footpath erosion may affect infiltration.

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..... [2]

(iv) Suggest **three** ways to prevent footpath erosion happening.

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2 .....

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3 .....

..... [3]

[Total: 30]

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2 Students in Manchester, England were studying shops and service provision. They did fieldwork in three nearby shopping areas:

- the Central Business District (CBD) in the centre of the city
- a local neighbourhood shopping centre located on a main road into the city centre
- an out-of-town shopping mall located in the rural-urban fringe near to a motorway.

Some students decided to test the following hypotheses:

Hypothesis 1: *People go to the local neighbourhood shopping centre more frequently than the CBD or the out-of-town shopping mall.*

Hypothesis 2: *The **importance** of reasons why people visit the three shopping centres are the same.*

(a) To test these hypotheses the students used a questionnaire with people in the three shopping centres. The questionnaire is shown in Fig. 2.1 (Insert).

(i) When their teacher approved the questionnaire, she advised the students how to use it with people who are shopping. Suggest **three** pieces of advice which she might give them.

1 .....

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2 .....

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3 .....

..... [3]

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(ii) Table 2.1 (Insert) shows the results of question 1 in the questionnaire (*How often do you come to the shopping centre?*). Use the results to **complete the graph** for the out-of-town shopping mall in Fig. 2.2. [2]

How often people come to the shopping centres

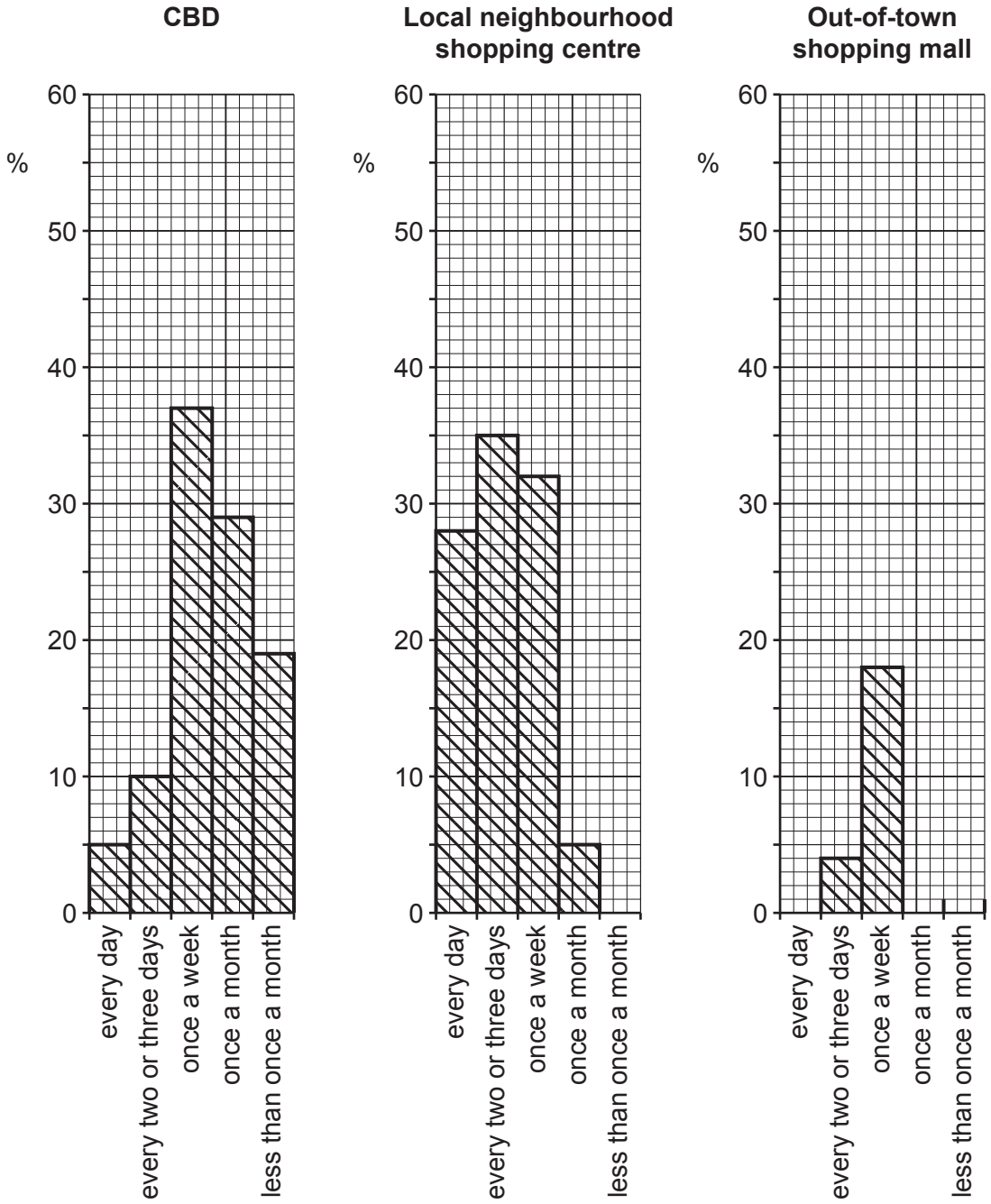

Fig. 2.2

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(iii) Do the results of question 1 agree with **Hypothesis 1:** *People go to the local neighbourhood shopping centre more frequently than the CBD or the out-of-town shopping mall*? Support your answer with data from Fig. 2.2 and Table 2.1.

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(iv) One student used the answers to question 2 in the questionnaire (*How did you travel to the shopping centre today?*) to make the results table shown in Table 2.2 (Insert).
Describe the differences between the methods of travel used to go to the three shopping centres. Include statistics from Table 2.2 in your answer.

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(v) Suggest **three** reasons why people's method of travel to the shopping centres is different.

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3 .....

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(b) To investigate **Hypothesis 2:** *The **importance** of reasons why people visit the three shopping centres are the same*, the students used their answers to questions 3 and 4 in the questionnaire.

(i) The answers to question 3 (*Why did you decide to come to this shopping centre today?*) are shown in Table 2.3 (Insert). Use the results to **complete the pie graph** for the out-of-town shopping mall in Fig. 2.3. [2]

Reasons for visiting the shopping centres

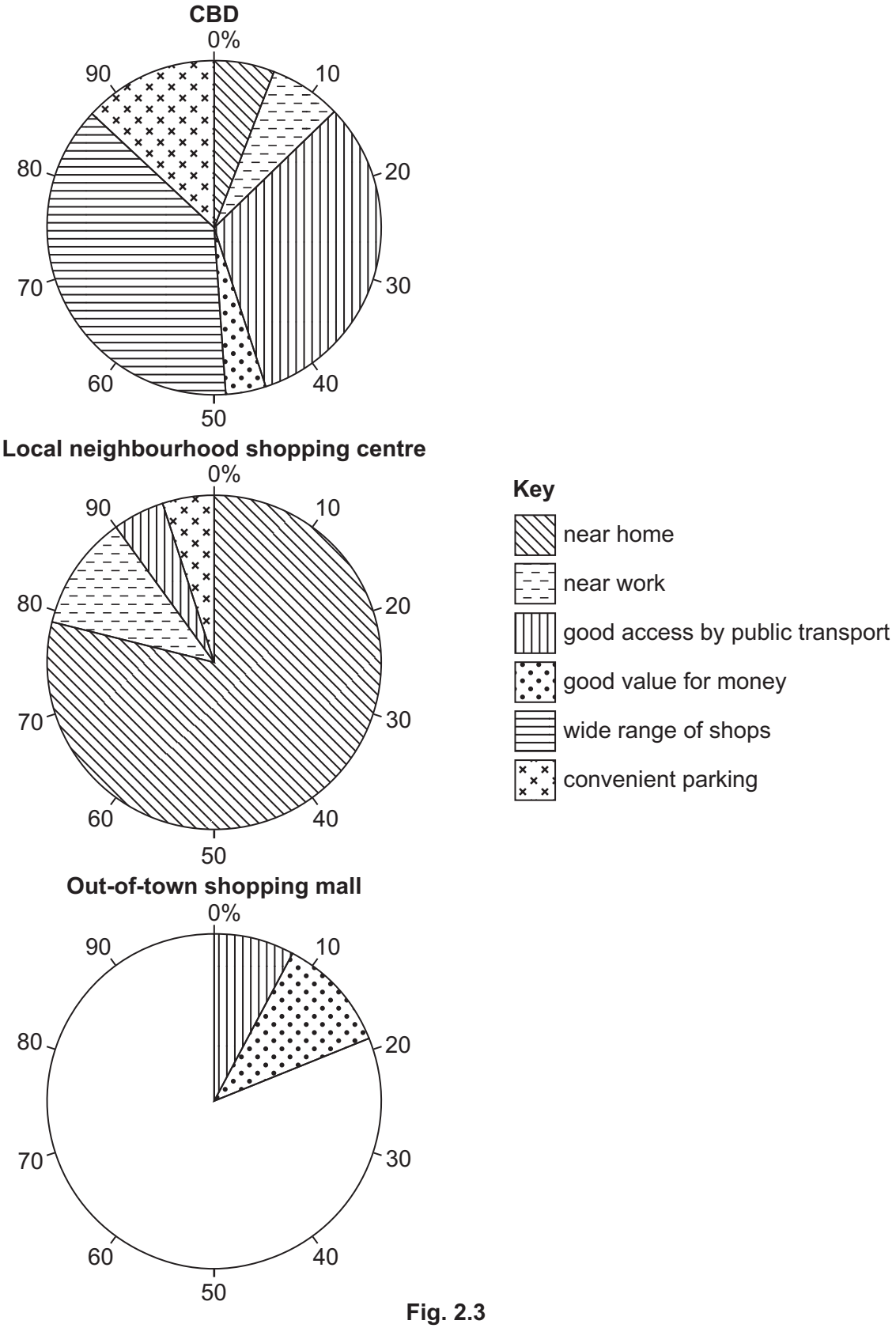

Fig. 2.3

(ii) The answers to question 4 (*What are the main items you are buying here today?*) are shown in Table 2.4 (Insert). Use the results to **complete the graph** for the CBD in Fig. 2.4. [2]

Main items bought in the three shopping centres



Fig. 2.4

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(iii) What conclusion would the students make about **Hypothesis 2:** *The **importance** of reasons why people visit the three shopping centres are the same*? Support your answer with evidence from Figs. 2.3 and 2.4 and Tables 2.3 and 2.4.

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..... [4]

(c) As an extension task two students wanted to compare the spheres of influence of the local neighbourhood shopping centre and the out-of-town shopping mall. The shopping centres are shown in Fig. 2.5 and Fig. 2.6 (Insert).
The 'sphere of influence' of a shopping centre is the area served by the shops and services located there.

(i) Suggest a question which the students could include in their questionnaire to find out about the spheres of influence of the two shopping centres.

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..... [1]

(ii) Describe how the students could use the answer to the question in **c(i)** to investigate the spheres of influence of the two shopping centres.

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..... [3]

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[Turn over

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(iii) Why is the sphere of influence of an out-of-town shopping mall larger than that of a neighbourhood shopping centre?

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..... [3]

[Total: 30]

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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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