Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

6636393574

GEOGRAPHY **0460/42**

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

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 **20** pages. Any blank pages are indicated.

© UCLES 2022

1 A class of students planned to do fieldwork on the River Gulp in the Netherlands (an MEDC in Europe). The Gulp is a tributary of the River Maas, which flows through the Maas drainage basin.

(a) (i) What is a *tributary*?

.....

..... [1]

(ii) Explain what is meant by a *drainage basin*.

.....

.....

.....

..... [2]

Some students decided to investigate possible differences in velocity (speed of flow) and channel cross-section between meanders and straight sections of the river.

Two groups of students chose the following hypotheses:

Hypothesis 1: *The velocity is faster on the outside of the channel in river meanders.*

Hypothesis 2: *The velocity is faster in the middle of the channel in straight sections of the river.*

(b) One group of students did their fieldwork at three different meanders and the other group did their fieldwork at three different straight sections of the river channel.
To investigate the two hypotheses the students used the following equipment:

float	stop-watch
tape measure	two ranging poles

(i) Describe how the students would use this equipment to measure river velocity.

.....

.....

.....

.....

.....

.....

.....

..... [4]

© UCLES 2022

(ii) The results of one group's measurements at one site are shown in Fig. 1.1. **Fill in the students' working** in the two boxes in Fig. 1.1. [2]

River velocity recording sheet

Study site: Meander 1 2 3 Straight section 1 2 (3) (circle)

Position: (Left side of channel) Middle of channel Right side of channel (circle)

Length of time for float to travel 10 metres:

measurement 1 23 seconds
measurement 2 25 seconds
measurement 3 18 seconds
measurement 4 17 seconds
measurement 5 19 seconds

Average (mean) length of time to travel 10 metres = [ ]

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

= [ ]

= 0.49 metres per second (m/s)

Fig. 1.1

(iii) Suggest **two** reasons why the results of the five measurements of time for the float to travel 10 metres, shown in Fig. 1.1, were different.

1 .....

.....

2 .....

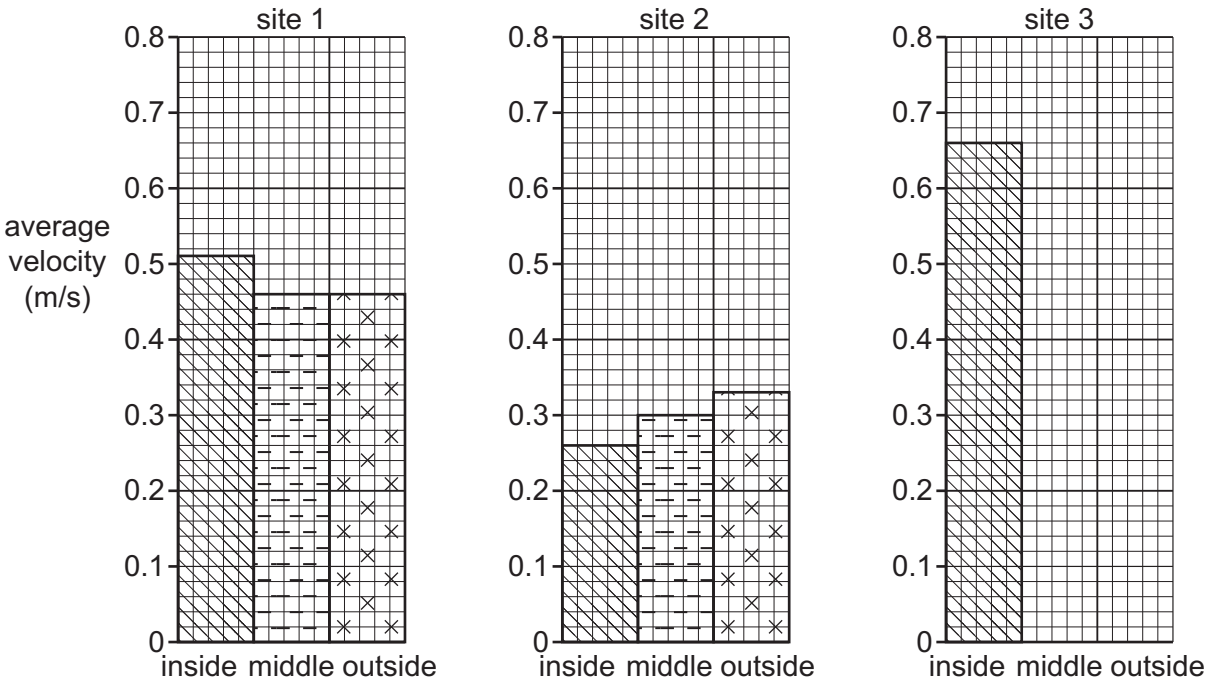
..... [2]

(c) The results of the average river velocity at the six sites are shown in Table 1.1 (Insert).

(i) Use the results in Table 1.1 to **complete the average velocity graph** for meander site 3 in Fig. 1.2. [2]

Average river velocity at the six sites

Meander



Straight section

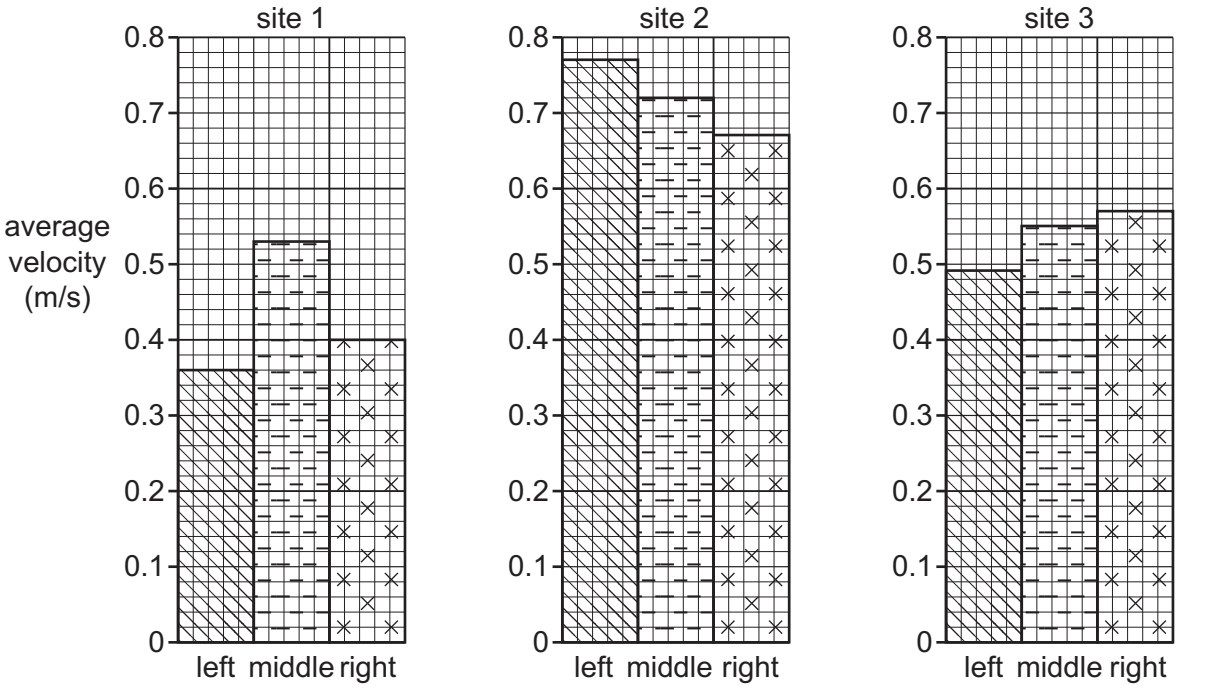


Fig. 1.2

© UCLES 2022

(ii) Which **one** of the following conclusions would the students make about **Hypothesis 1:** *The velocity is faster on the outside of the channel in river meanders*? Tick (✓) your decision below and support it with data from Fig. 1.2 and Table 1.1.

conclusion	tick (✓)
The hypothesis is true for all three meanders.	
The hypothesis is only true for some meanders.	
The hypothesis is false for all three meanders.	

.....

.....

.....

.....

.....

..... [4]

(iii) The students reached the conclusion that **Hypothesis 2:** *The velocity is faster in the middle of the channel in straight sections of the river* was **true for one site**.
For which site is Hypothesis 2 true? Support your decision with data from Fig. 1.2 and Table 1.1.

Hypothesis 2 is true for straight section site number .....

Supporting data

.....

..... [2]

(d) Other students in the class compared the cross-sections between meanders and straight sections of the river. They measured the depth of the river every 0.2 m across the channel at each fieldwork site.

(i) Describe how the students would make their measurements. Refer to the equipment they would use.

.....

.....

.....

.....

.....

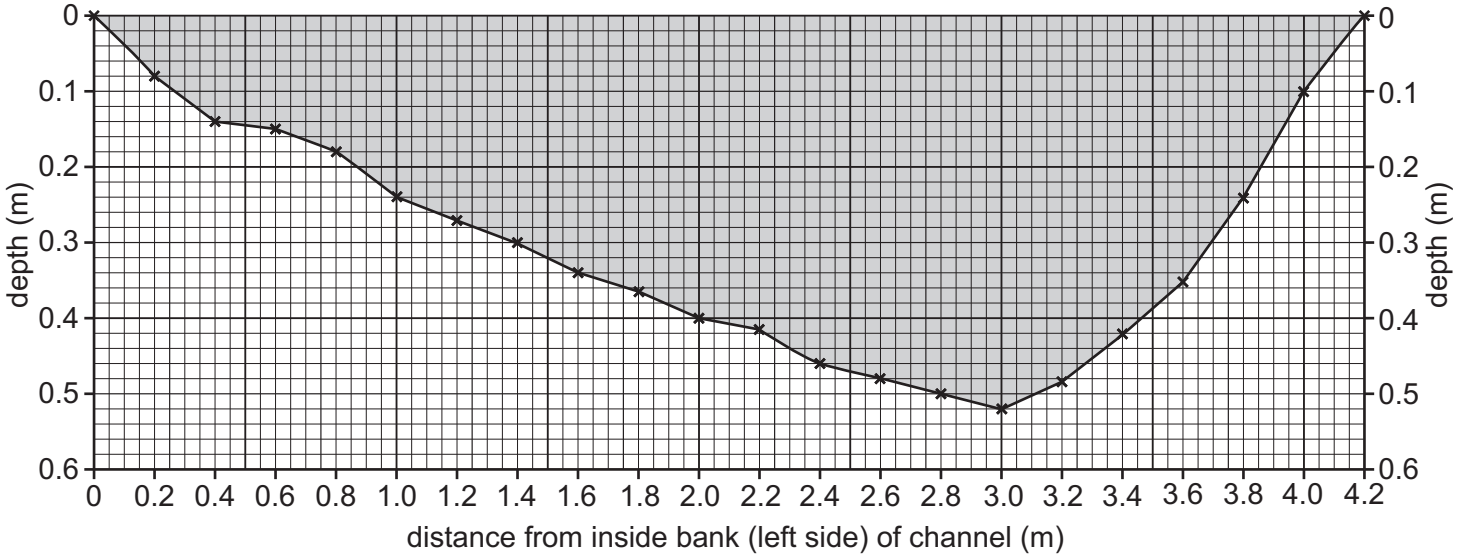
..... [3]

(ii) Using their measurements, the students drew cross-sections for each site. One meander cross-section and one cross-section on a straight river site are shown in Fig. 1.3.
Use the results in the table below to **complete the cross-section** of the river channel on the straight section and **shade in the river channel** in Fig. 1.3. [2]

distance from inside bank (m)	depth (m)
2.8	0.1
3.0	0.08

River channel cross-section

Meander



Straight section

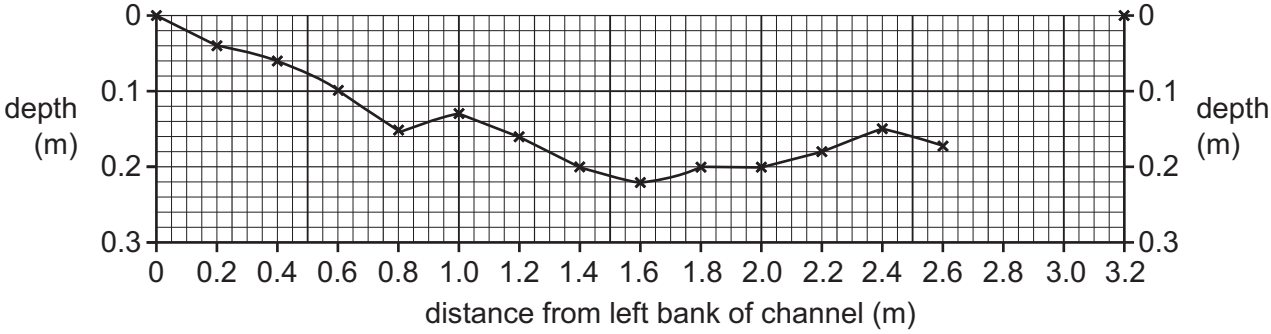


Fig. 1.3

(iii) Describe the differences between the two cross-sections shown in Fig. 1.3. Do **not** use data in your answer.

.....

.....

.....

.....

.....

..... [3]

(e) Fig. 1.4 (Insert) is a diagram from a textbook. It shows a typical river meander. Use the information on Fig. 1.4 to explain the shape of the meander cross-section.

.....

.....

.....

.....

.....

..... [3]

[Total: 30]

BLANK PAGE

© UCLES 2022

2 Students did fieldwork on Ubin island, a small island between Malaysia and Singapore. Ubin is a rural area with little economic development. There has been much local discussion about whether the island should be protected from future development.

(a) In the table below **tick** (✓) **two** characteristics of *economic development*.

	tick (✓)
life expectancy decreases	
modernisation of industry	
percentage employed in the primary sector increases	
decrease in GNP per capita	
introduction of new technology	

[2]

The students did their fieldwork at 20 sites on the eastern side of the island near to the main village.
They decided to investigate the following hypotheses:

Hypothesis 1: *Environmental quality increases away from the village.*

Hypothesis 2: *Economic development on the island would bring more benefits than problems for local people.*

(b) To investigate **Hypothesis 1** each student completed a bi-polar survey on environmental quality at the different sites. The survey sheet is shown in Fig. 2.1 (Insert).

© UCLES 2022

(i) The decisions made by two students at site 2 are shown in Fig. 2.2.

Students' decisions

Student A

site number: 2	score					
positive description	**+2**	**+1**	**0**	**–1**	**–2**	**negative description**
beautiful landscape					✓	ugly landscape
unspoilt by human activity, e.g. no litter				✓		human activity spoils the landscape e.g. litter
varied types of scenery				✓		no variety of scenery
safe and appealing			✓			unsafe and hostile
peaceful		✓				noisy
human development fits in with the natural environment		✓				development by people does not fit in with the natural environment

Total environmental quality score: –2

Student B

site number: 2	score					
positive description	**+2**	**+1**	**0**	**–1**	**–2**	**negative description**
beautiful landscape				✓		ugly landscape
unspoilt by human activity, e.g. no litter			✓			human activity spoils the landscape e.g. litter
varied types of scenery			✓			no variety of scenery
safe and appealing				✓		unsafe and hostile
peaceful	✓					noisy
human development fits in with the natural environment			✓			development by people does not fit in with the natural environment

Total environmental quality score: 0

Fig. 2.2

© UCLES 2022

Suggest **two** reasons why the decisions made by the two students were different.

1 .....

.....

2 .....

..... [2]

(ii) How could the students be sure that their bi-polar survey results were reliable?

.....

.....

.....

..... [2]

(c) Table 2.1 (Insert) shows Student A's results of the bi-polar survey for the 20 fieldwork sites.

(i) Which site has the lowest total environmental quality score?

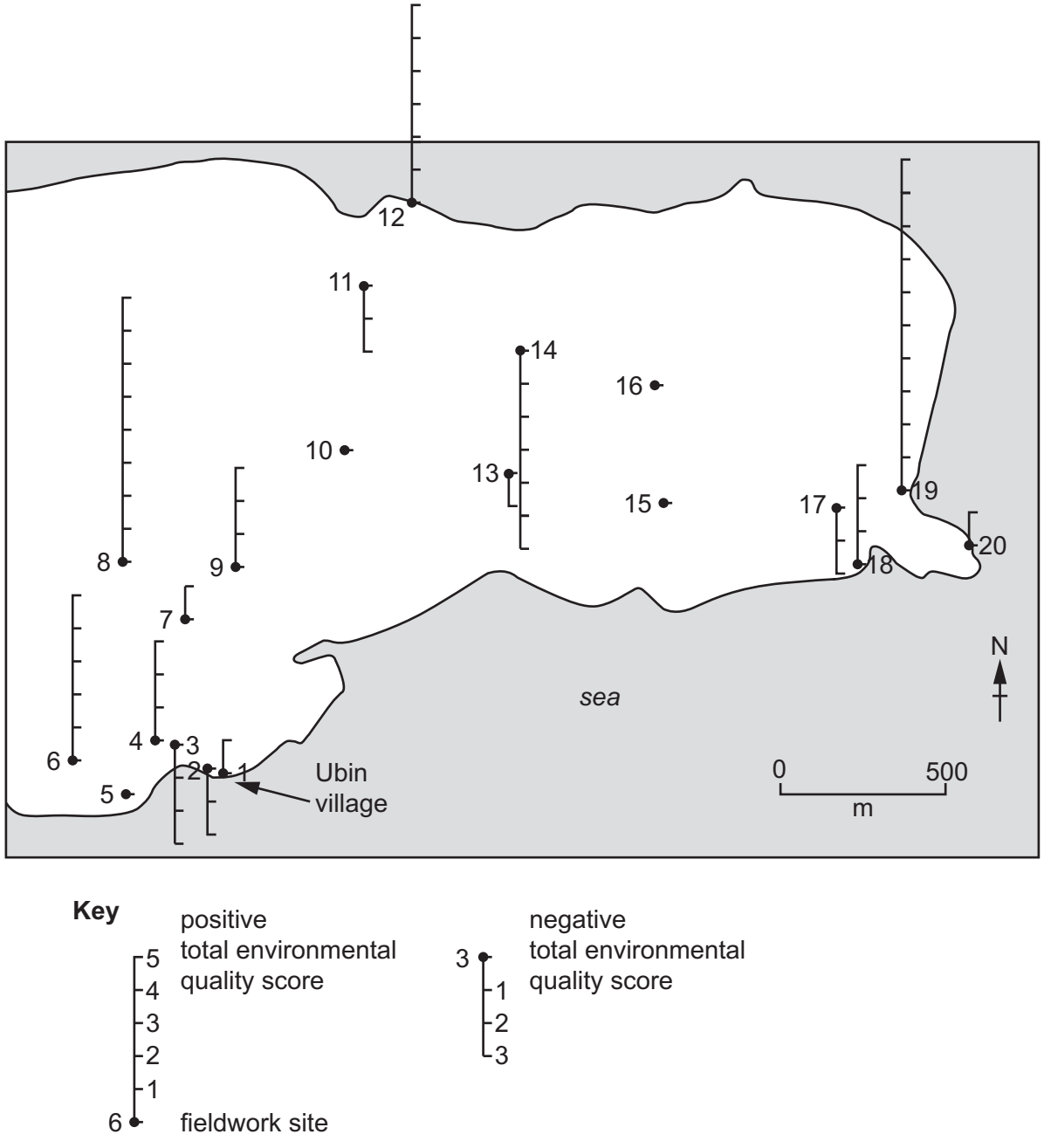
site ..... [1]

(ii) Which **one** of the following has the highest total score across all 20 sites? Circle your answer. [1]

result of human activity	safety and appeal
noise level	sensitivity of human development

(iii) **Plot the total environmental quality score** for sites 15 and 16 on Fig. 2.3. [2]

Total environmental quality scores at 20 fieldwork sites



Key

positive total environmental quality score

5
4
3
2
1
6 fieldwork site

negative total environmental quality score

3
1
2
3

Fig. 2.3

© UCLES 2022

(iv) Fig. 2.4 shows the relationship between the total environmental quality score and distance of the fieldwork sites away from the village. **Plot the following information** in Fig. 2.4. [2]

site number	distance from the village (m)	total environmental quality score
6	450	+5
17	2000	–2

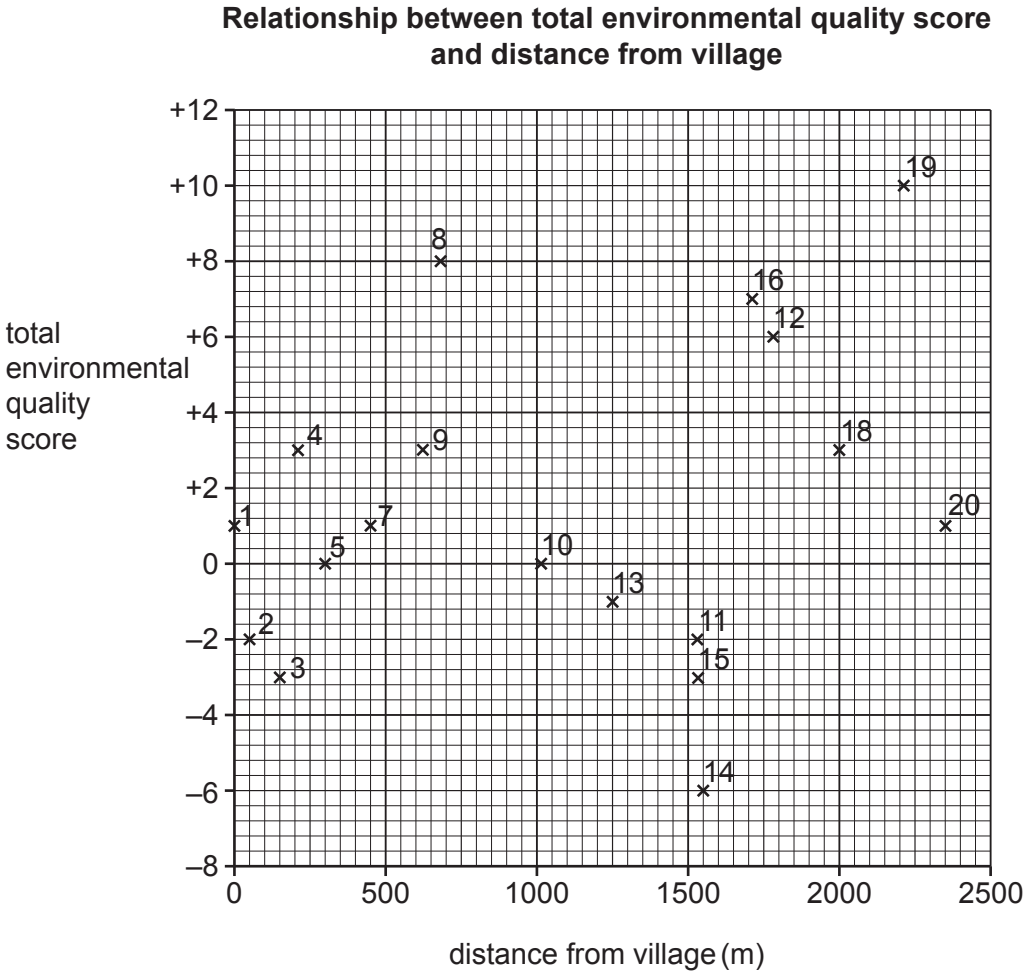


Fig. 2.4

(v) What conclusion would the student make about **Hypothesis 1:** *Environmental quality increases away from the village*?
Support your decision with evidence from Fig. 2.4.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(d) To test **Hypothesis 2:** *Economic development on the island would bring more benefits than problems for local people*, the students used a questionnaire with people at the fieldwork sites. The questionnaire is shown in Fig. 2.5 (Insert).

Name and describe a sampling method to choose people to complete the questionnaire.

.....

.....

.....

.....

.....

..... [3]

(e) **(i)** What should the student do if a person answered 'No' to question 1 (Do you live on Ubin island?)?

.....

..... [1]

(ii) The answers to question 2 (What do you think would be the main benefits of economic development on Ubin island?) and question 3 (What do you think would be the main problems of economic development on Ubin island?) are shown in Table 2.2 (Insert).

© UCLES 2022

Using their results, the students drew the graph in Fig. 2.6. **Plot the number of answers** for 'more modern services' and 'air pollution'. [2]

Benefits and problems of economic development for residents

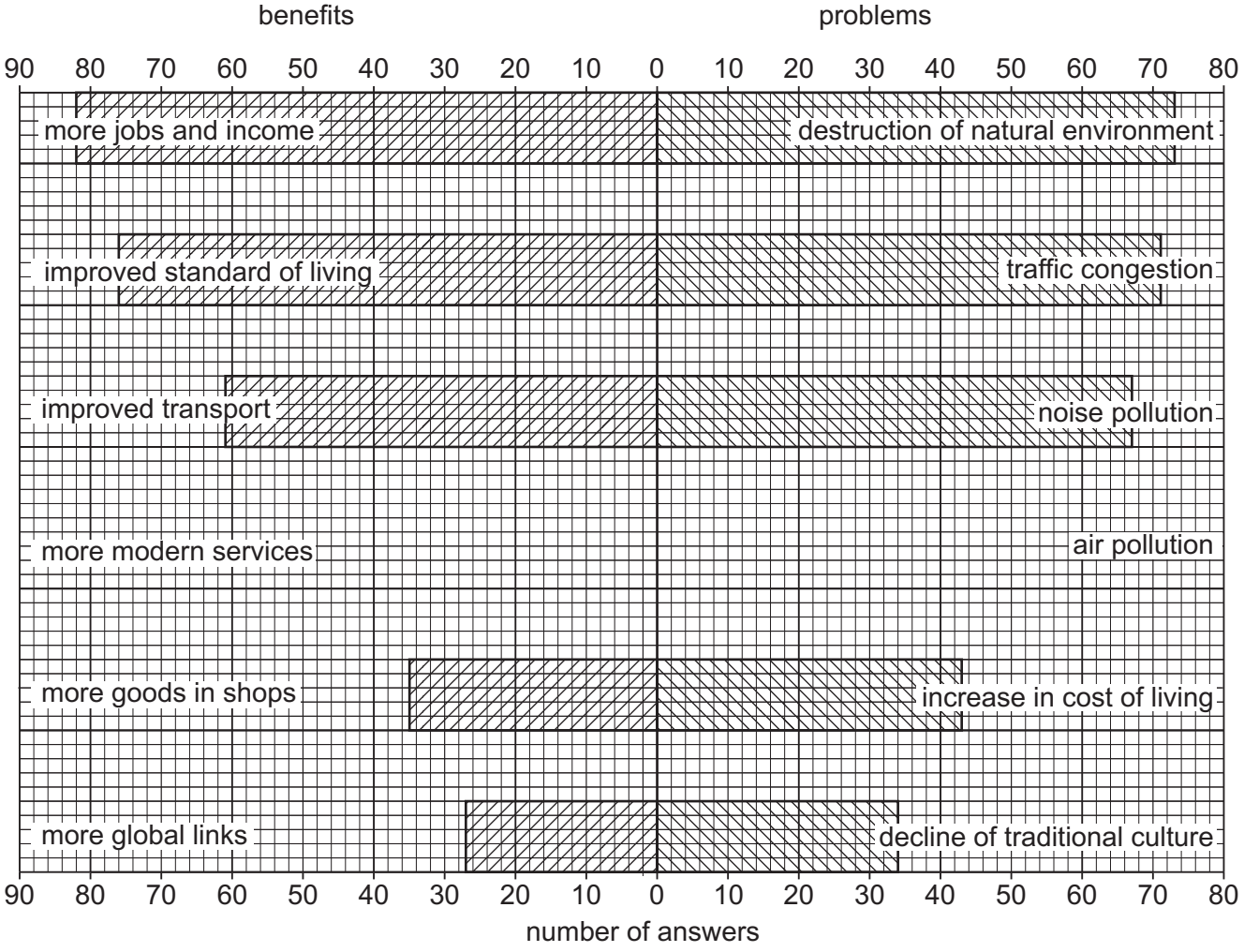


Fig. 2.6

(iii) The students decided that **Hypothesis 2:** *Economic development on the island would bring more benefits than problems for local people* was **false**. Support their decision with data from Fig. 2.6 and Table 2.2.

.....

.....

.....

..... [2]

(iv) Identify **one** piece of evidence from Fig. 2.6 and Table 2.2 which shows that economic development might help local people. Give supporting data.

.....

.....

.....

..... [2]

(f) The fieldwork centre located on the island contains a traditional weather station. Describe how the students could measure and record data for **one** of the following weather features. Circle your choice below.

rainfall temperature wind speed

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 30]

Additional pages

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

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

© UCLES 2022

© UCLES 2022

BLANK PAGE

BLANK PAGE

The boundaries and names shown, the designations used and the presentation of material on any maps contained in this question paper/insert do not imply official endorsement or acceptance by Cambridge Assessment International Education concerning the legal status of any country, territory, or area or any of its authorities, or of the delimitation of its frontiers or boundaries.

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

© UCLES 2022