UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

GEOGRAPHY **0460/42**

Paper 4 Alternative to Coursework **May/June 2012**

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 ON ANY BARCODES.

Answer **all** questions.

The Insert contains Figs 1 and 2 for Question 1, and Figs 6 and 7 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 **14** printed pages, **2** blank pages and **1** Insert.

For Examiner's Use

1 Students who lived near a desert area in Saudi Arabia, were investigating the effects of river processes in a valley called a wadi. Although there was no river flowing in the valley when the students were doing their fieldwork, they could see some evidence of the work of the river when it had flowed through the valley.

The students investigated the following hypotheses:

Hypothesis 1: *The gradient of the valley floor decreases downstream.*

Hypothesis 2: *The river's bedload becomes smaller and more rounded downstream.*

(a) To investigate these hypotheses the students worked at three sites along the valley, one in the upper, one in the middle and one in the lower course.

(i) To test **Hypothesis 1** they measured the slope of the valley floor as shown in Fig. 1 (Insert).
Describe how they measured the slope.

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The students made four measurements at each site. These are shown in Table 1 below.

Table 1

Students' measurements

	Upper course site	Middle course site	Lower course site
Measurement	angle of slope (°)	angle of slope (°)	angle of slope (°)
1	25	20	17
2	30	22	10
3	27	25	7
4	28	23	12
Average (mean)	27.5		11.5

(ii) Calculate the average (mean) angle of slope in the middle course of the valley. Put your answer into Table 1. [1]

(iii) Why did the students make four measurements at each site?

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(iv) What conclusion would the students make about **Hypothesis 1:** *The gradient of the valley floor decreases downstream*? Support your answer with evidence from Table 1.

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(b) To investigate **Hypothesis 2:** *The river's bedload becomes smaller and more rounded downstream* the students measured the bedload in the wadi at each of the three sites. Using a random sampling method they picked 20 rocks. They then measured the size and weight of each rock and estimated its roundness.
The equipment which the students used to measure the bedload is shown in Fig. 2 (Insert).

Describe how the students made each measurement.

Size .....

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Weight .....

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Roundness .....

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(c) The students' results from the middle course site are shown in Table 2 below.

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Table 2

Students' results at middle course site

Sample number	Size of rock (cm)	Weight of rock (grammes)	Roundness score
1	11	470	3
2	12	320	1
3	8	200	3
4	7	230	2
5	9	130	3
6	13	380	2
7	8	160	4
8	5	190	3
9	9	230	1
10	6	200	3
11	7	140	3
12	4	110	4
13	8	310	2
14	5	100	4
15	8	150	3
16	9	160	2
17	11	110	3
18	9	220	3
19	8	160	4
20	10	240	2

(i) Plot the size of rock samples 6 and 9 in the middle course site on Fig. 3 below. [2]

For Examiner's Use

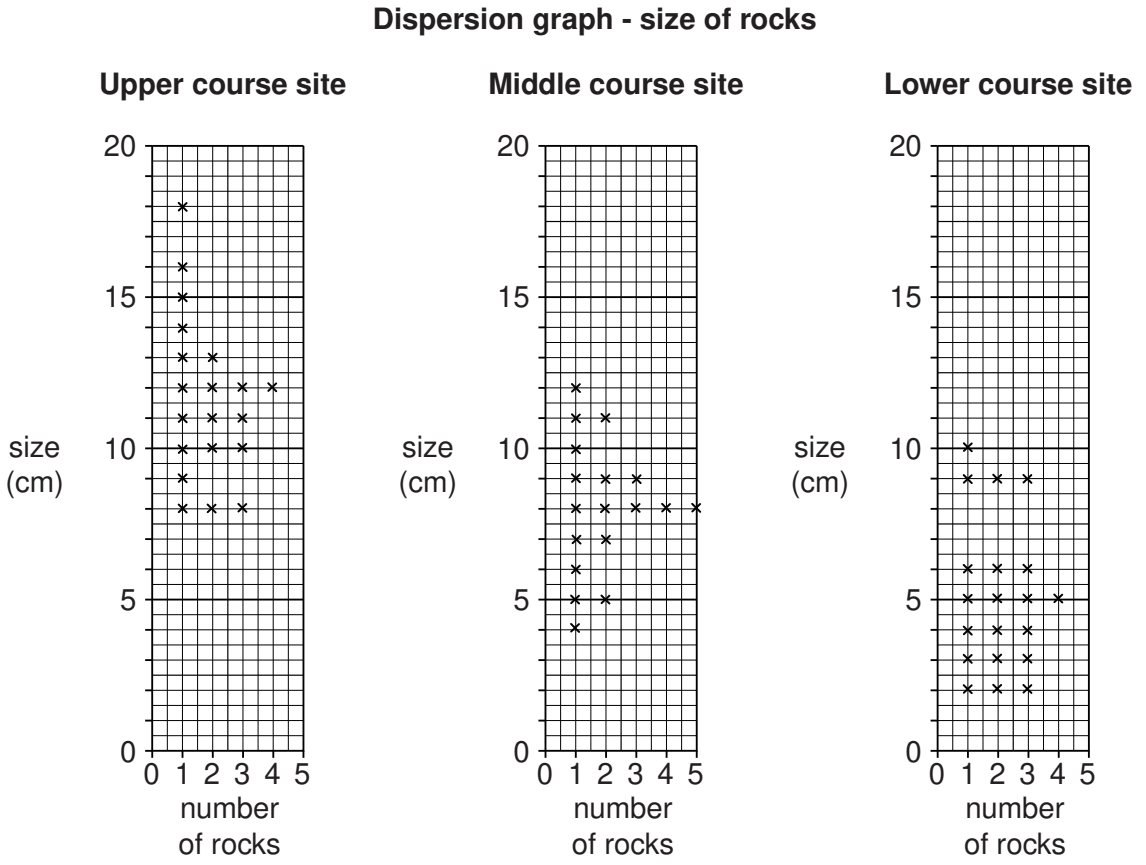

Fig. 3

(ii) Use the results in Table 2 to complete the histogram for the middle course site in Fig. 4 below. [3]

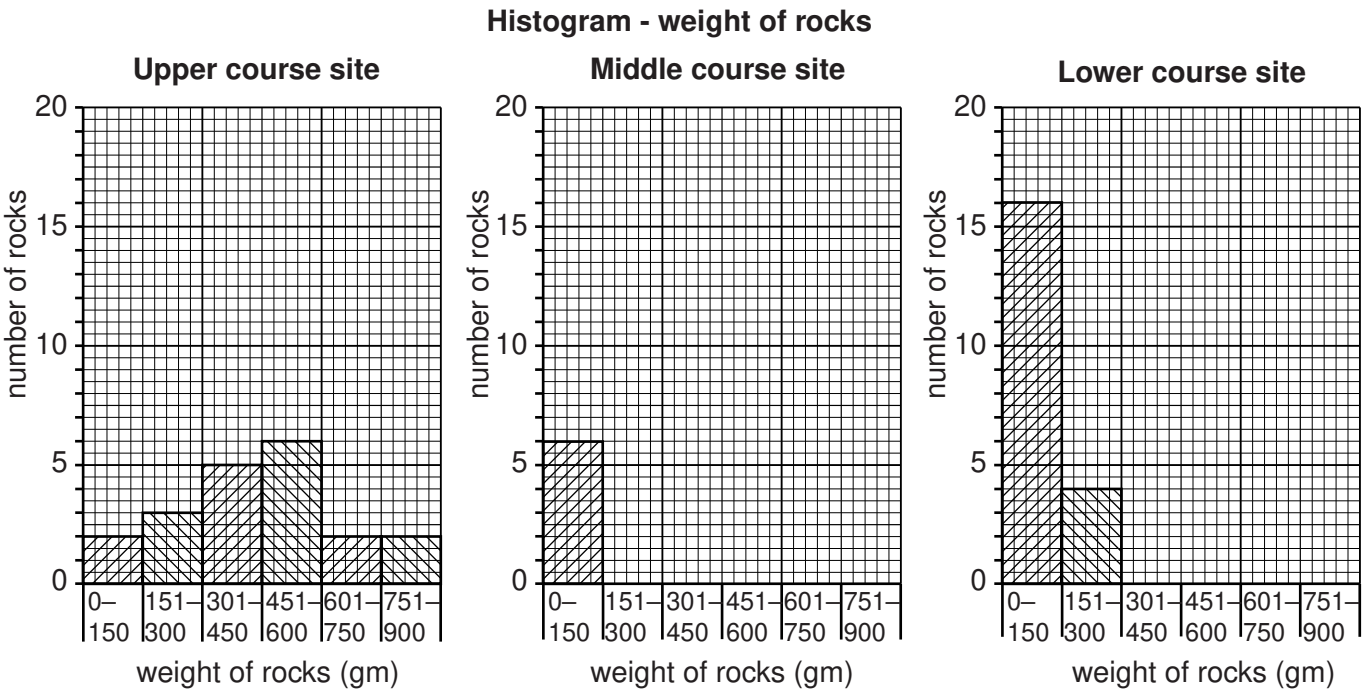

Fig. 4

(iii) Look again at the roundness score chart in Fig. 2 (Insert). To plot the classification of roundness on pie graphs, the students produced Table 3 below.

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Table 3

Percentage of rocks in roundness classes

	Class 1	Class 2	Class 3	Class 4	Class 5
Upper course site	30	50	20	0	0
Middle course site	10	25	45	20	0
Lower course site	0	20	30	45	5

Use the data in Table 3 to complete the middle course site pie graph in Fig. 5 below. [2]

Roundness of rocks

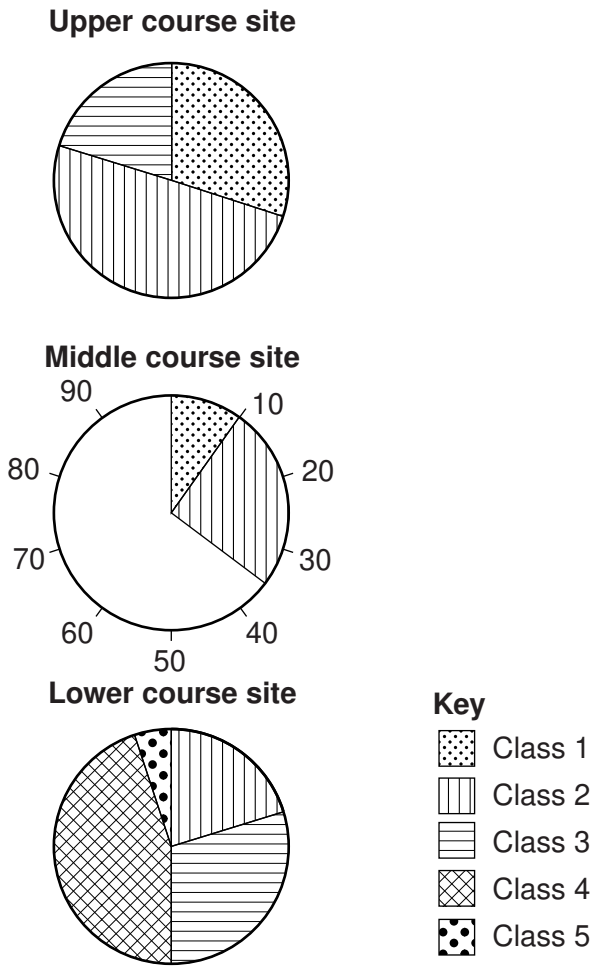

Fig. 5

(iv) Do the results of the students' fieldwork support **Hypothesis 2:** *The river's bedload becomes smaller and more rounded downstream*?
Support your conclusions with evidence from Figs 3, 4 and 5.

For Examiner's Use

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(v) Give **two** reasons why the river's bedload changes downstream.

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(d) Exfoliation is one weathering process which affects rocks in a dry river bed in a desert. Describe this process.

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(e) Suggest **three** ways that the students could have improved their data collection methods used to investigate the two hypotheses.

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[Total 30 marks]

2 Four students in Workington in Cumbria in the U.K. read in the local newspaper about a plan to build six wind turbines on a local hilltop near to their school. The newspaper report said that some local people were objecting to the plan. The students decided to investigate the views of local people on wind power and the possible location of the wind turbines near to where they lived.

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The students investigated the following hypotheses:

Hypothesis 1: *Most local people think that wind power is a good way to generate electricity.*

Hypothesis 2: *Most local people think that wind turbines should not be built on the hilltop.*

(a) (i) To begin their investigation the students divided into two pairs to think of some questions to include in a questionnaire. The questions produced by one pair are shown in Fig. 6 (Insert).

Suggest **two** weaknesses of the **questions** in this questionnaire pointed out by their teacher.

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(ii) The questionnaire produced by the other pair was approved by their teacher. This is shown in Fig. 7 (Insert). Why is this a better questionnaire than the one in Fig. 6?

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(iii) Before using the questionnaire shown in Fig. 7, the four students thought about the best way to make use of it. They decided to ask the opinion of 100 people.

Describe a suitable sampling method for the students to select 100 people.
Explain why you have chosen this method.

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[Turn over

(b) The results of the question (*Do you think that generating electricity by wind power is a good idea?*) and reasons for the answer are shown in Table 4 below.

For Examiner's Use

Table 4

Answers to Question: Do you think that generating electricity by wind power is a good idea?

Answer	Number of people	Answer	Number of people
YES	72	NO	28
Wind power does not pollute the atmosphere	46	Wind turbines only work when it is very windy	16
Wind is free	19	Wind turbines do not produce much power	8
Wind power is renewable	7	Wind power is expensive	4

(i) What is the most common reason given by the 100 people questioned **against** using wind power to generate electricity?

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(ii) Complete Fig. 8 below, by drawing in the two missing bars on the graph. [2]

Reasons given by local people

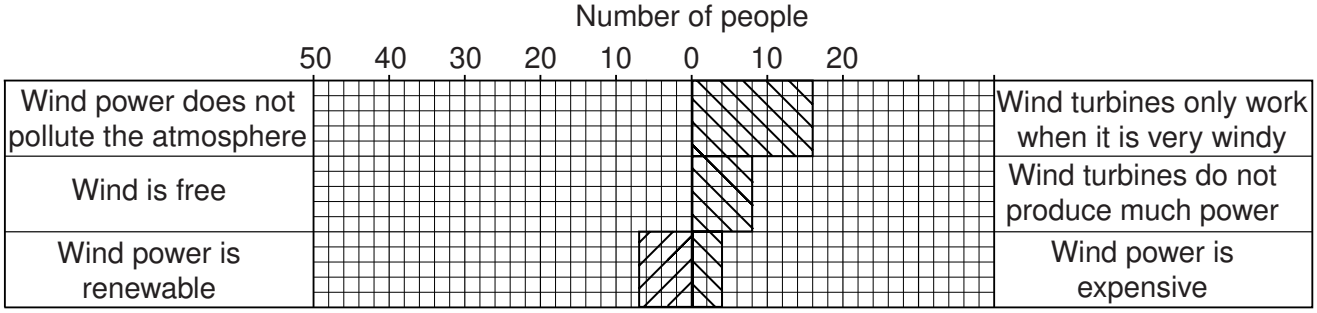

Fig. 8

(iii) Do the results shown in Table 4 and Fig. 8 support **Hypothesis 1:** *Most local people think that wind power is a good way to generate electricity*?
Use data to support your conclusion.

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(iv) Suggest **two** reasons, not shown in Table 4, why wind power is a good way to generate electricity.

For Examiner's Use

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(c) The opinions of people about whether the local area is a good location to build wind turbines are shown in Table 5, below.

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Table 5

The opinions of 100 local people

Opinion	Agree strongly	Agree	Disagree	Disagree strongly
Wind turbines will create a lot of noise	70	20	7	3
Wind turbines will spoil the view	20	40	28	12
Wind turbines will stop tourists visiting the area	7	23	52	18
Wind turbines will be a danger to walkers	7	9	60	24
Wind turbines will create few jobs in the area	21	31	26	22

(i) Complete the results of the statement 'Wind turbines will stop tourists visiting the area' on Fig. 9 below. [3]

The opinions of 100 local people

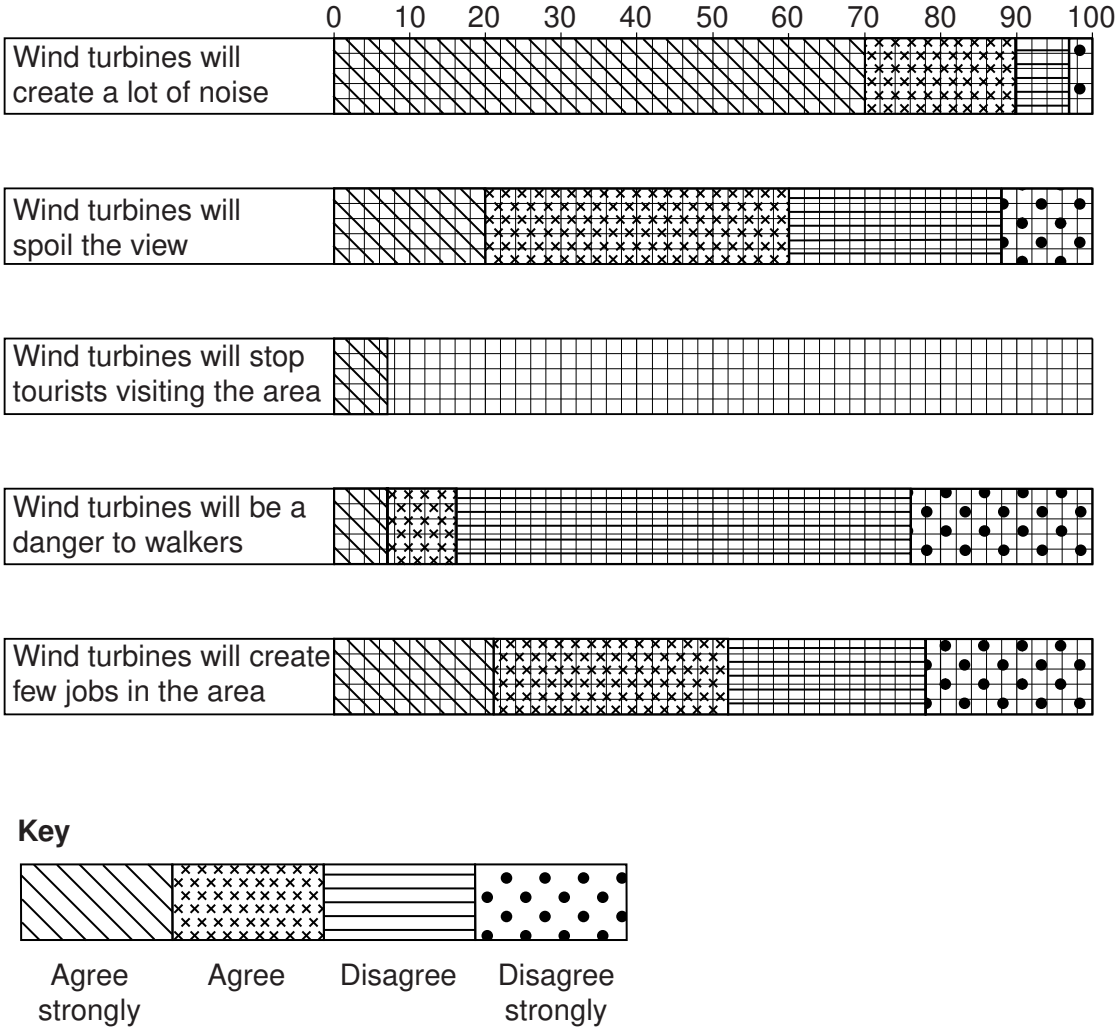

Fig. 9

(ii) Which **one** of the five statements has the most even balance of local people's opinions?

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(iii) What conclusion would the students make about **Hypothesis 2:** *Most local people think that wind turbines should not be built on the hilltop*? Refer to data in Table 5 and Fig. 9 to explain your answer.

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(d) To extend their study the students asked some local people for their opinions on renewable energy and global warming. However, some of the people they spoke to did not understand these topics. So the students decided to produce an information sheet to give to people. The following answers will be part of the information given to people.

(i) Wind power is one type of renewable energy. Give **two** other examples of renewable energy.

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(ii) Explain how global warming occurs.

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[Total 30 marks]

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