UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

GEOGRAPHY **0460/43**

Paper 4 Alternative to Coursework **May/June 2011**

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 3, 4 and 5 for Question 1, and Fig. 8 and Tables 4 and 5 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.

The number of marks is given in brackets [ ] at the end of each question or part question.

This document consists of **13** printed pages, **3** blank pages and **1** Insert.

1 A class of students was studying weather measurements using a Stevenson Screen which contained a maximum-minimum thermometer and a wet and dry bulb thermometer (hygrometer). They were recording weather measurements throughout the year.

For Examiner's Use

A Stevenson Screen and maximum-minimum thermometer are shown in Figs 1 and 2 below and opposite.

A Stevenson Screen

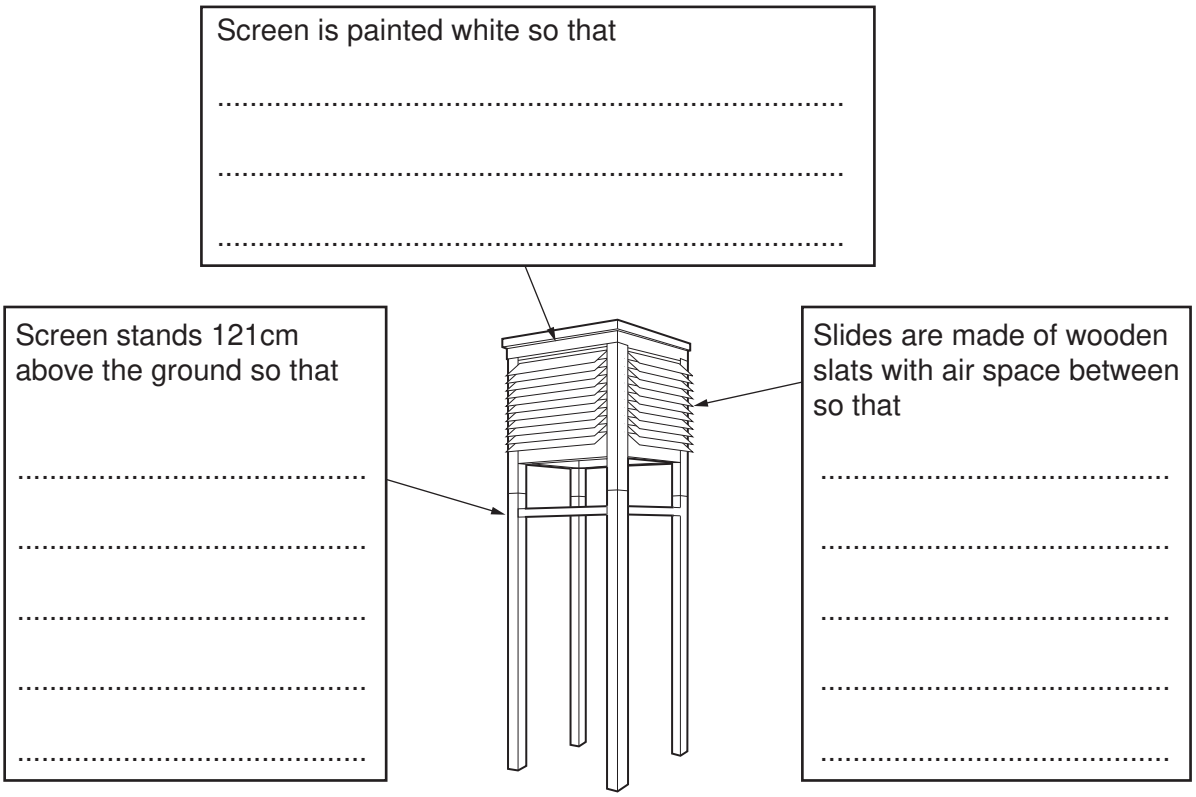

Fig. 1

(a) (i) Complete the **three** sentences on Fig. 1. [3]

(ii) What is the maximum and minimum temperature recorded on the thermometer shown in Fig. 2 (opposite)?

Maximum ..... °C

Minimum ..... °C [2]

A maximum-minimum thermometer

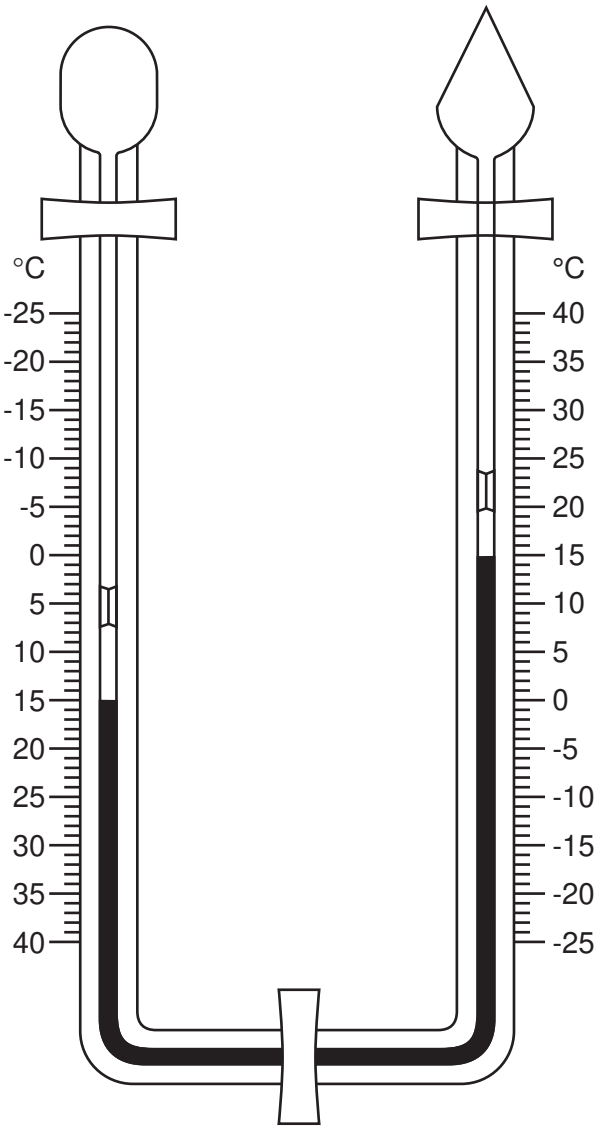

Fig. 2

(b) (i) A wet and dry bulb thermometer measures relative humidity.
Which **one** of the following is the correct definition of relative humidity?
Circle your answer.

- The amount of water vapour held in the air.
- The percentage of moisture in the air after rainfall.
- The amount of moisture in the air as a percentage of the total moisture it could hold at that temperature.
- The minimum amount of water vapour in the air when it is warmed up.

[1]

[Turn over

For Examiner's Use

(ii) Relative humidity is calculated using a relative humidity table like the one shown in Fig. 3 (Insert).
An example of how relative humidity is calculated is shown below.

Dry bulb temperature = 15 °C
Wet bulb temperature = 12.5 °C
Temperature difference = 2.5 °C
Relative Humidity = 75%

Use the relative humidity table in Fig. 3 (Insert) to calculate the relative humidity of the example below:

Dry bulb temperature = 19 °C

Wet bulb temperature = 18 °C

Temperature difference = ... °C

Relative Humidity = ... % [2]

(c) Two students in the class wanted to carry out an investigation around their school to test the following hypotheses:

Hypothesis 1: *Temperatures are higher nearer to buildings.*

Hypothesis 2: *Relative humidity is affected by the type of ground surface.*

In order to make some weather measurements they decided to use a digital thermometer and hygrometer. This instrument is shown in Fig. 4 (Insert).
They selected 12 sites around the school campus. These are shown on Fig. 5 (Insert). They measured the distance from each site to the nearest building. At each site they measured temperature and relative humidity.

(i) What are **two** advantages of this digital thermometer and hygrometer over a maximum-minimum thermometer and a wet and dry bulb thermometer?

1 .....

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2 .....

.....[2]

(ii) How could the students check that their temperature and relative humidity readings were accurate?

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(d) The temperatures at the twelve sites are shown in Table 1 below.

For Examiner's Use

Table 1

Temperatures at 12 measuring sites

Site	A	B	C	D	E	F	G	H	J	K	L	M
Distance from school building (m)	32	2	3		1	17	9	2	10	24	30	42
Temperature (°C)	8.2	8.5	9.1	8.1	8.9	8.2	8.4	8.8	8.6	8.3	8.1	8.0

(i) Use Fig. 5 (Insert) to complete Table 1 by filling in the distance of site D from the edge of the nearest building. [1]

(ii) On Table 1 circle the **three** sites where the highest temperatures were recorded. [1]

(iii) Do you think **Hypothesis 1:** *Temperatures are higher nearer to buildings* is correct? Support your answer with evidence from Table 1.

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.....[3]

(iv) Use Fig. 5 (Insert) to suggest **two** reasons why temperatures vary around the school campus.

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2 .....

.....[2]

(e) The relative humidity readings at the 12 sites are shown in Table 2 below. Fig. 6, below, shows these results plotted onto a dispersion graph.

For Examiner's Use

Table 2

Relative Humidity at 12 measuring sites

Site	A	B	C	D	E	F	G	H	J	K	L	M
Type of ground surface	Grass	Bushes	Concrete	Tarmac	Concrete	Trees	Next to water	Concrete	Grass	Tarmac	Grass	Tarmac
Relative Humidity (%)	73	77	73	73	76	73	75	77	75	77	76	75

Relative Humidity on different ground surfaces

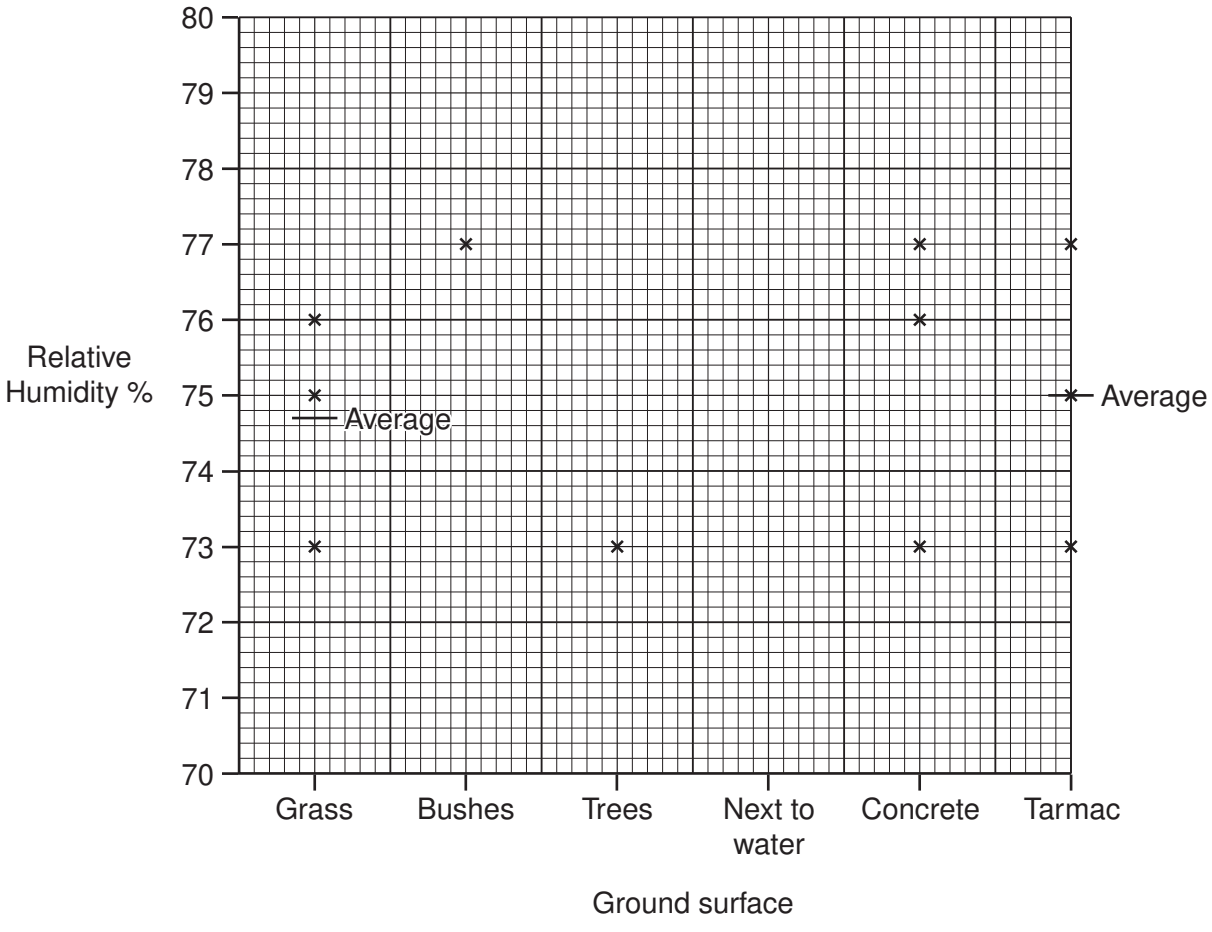

Fig. 6

(i) Plot the result of site G on the dispersion graph (Fig. 6) above. [1]

(ii) The average (mean) relative humidity for readings made on a concrete surface is shown below. Show the calculation which produced this answer.

Answer: **75.3%** [1]

(iii) Plot this answer on Fig. 6. [1]

(iv) The students reached the conclusion that **Hypothesis 2:** *Relative humidity is affected by the type of ground surface* was incorrect. Use evidence from Fig. 6 to support their conclusion.

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(f) (i) Suggest a suitable hypothesis for the class to investigate using a maximum-minimum thermometer in a Stevenson Screen.

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(ii) Describe how the students would carry out an investigation into this hypothesis.

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[Total: 30 marks]

2 A student decided to investigate the land use on a farm in Portugal. It was located on a hillside and contained both crops and animals.

He decided to investigate **two** hypotheses:

Hypothesis 1: *The land use changes as land gets steeper and higher.*

Hypothesis 2: *Farming is more labour intensive in larger fields.*

(a) The student got a map of land use on the farm from the farmer. Using the map he was able to estimate the area used for different types of farming.
His results are shown in Table 3 below.

Table 3

Land use on the farm

Land use	Area (hectares)	Percentage of farm area
Olives	25	27.2
Oranges	17	18.5
Barley	13	
Sheep	10	10.9
Potatoes	8	8.7
Onions	7	7.6
Artichokes	7	7.6
Tomatoes	5	5.4
Total		100

(i) Calculate the total area of the farm.

..... hectares [1]

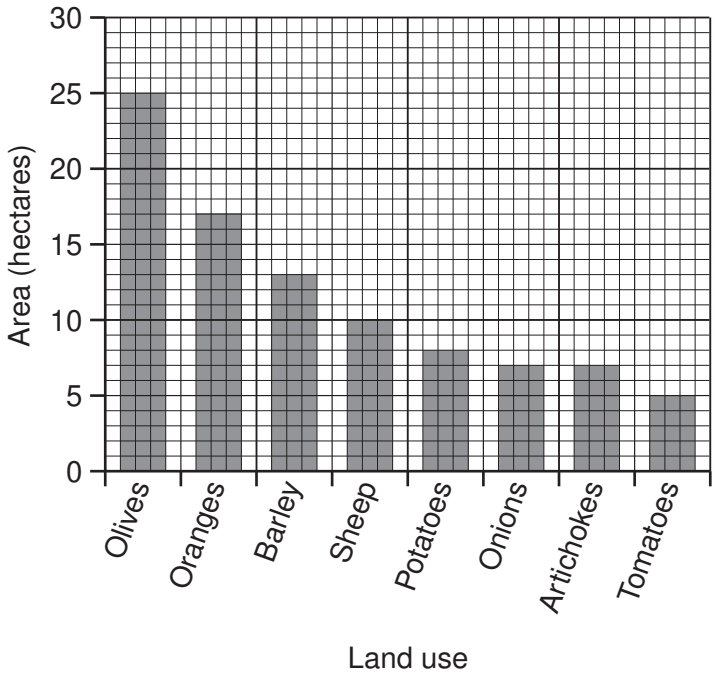
(ii) Calculate the percentage of land on the farm used to grow barley.

..... % [1]

(iii) The student plotted the area of each land use on a bar graph, and the percentage of the total farm land in each land use on a pie graph.
These are shown in Fig. 7 below.

For Examiner's Use

Area used for each type of land use



Percentage of total farm area in each land use

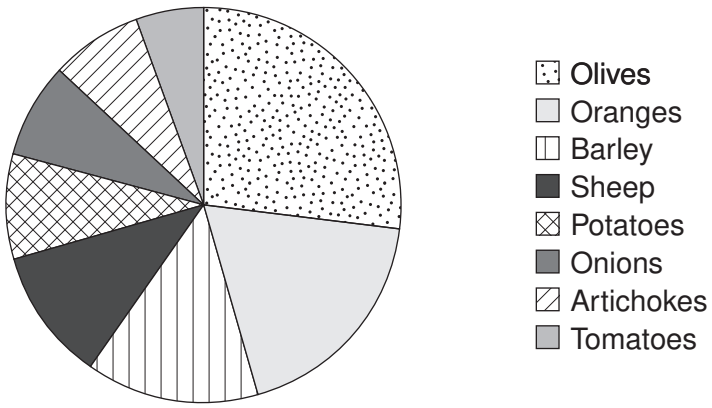


Fig. 7

Give **one** advantage of each graph to show the data collected.

Bar graph .....

.....

Pie graph .....

.....[2]

(b) The student then looked at how farming varied between different fields on the farm. He followed a path from the farmhouse up the hillside. Every 100 m along the path he performed three tasks.

For Examiner's Use

(i) He recorded a reading from a Global Positioning System (GPS). This is shown in Fig. 8 (Insert). Name **two** pieces of information shown by the GPS.

1 .....

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2 .....

.....[2]

(ii) He measured the angle of slope by looking up the path. Suggest what equipment he used and how he would have done this.

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(iii) He recorded the land use in the field next to the path. Unfortunately, the student did not recognise some of the crops growing in the fields. How could he solve this problem?

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(iv) Table 4 (Insert) shows the results of his fieldwork. The student reached the conclusion that his results supported **Hypothesis 1:** *The land use changes as land gets steeper and higher*. Use evidence from Table 4 to explain why he reached this conclusion.

For Examiner's Use

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(v) Give **two** reasons why farming activity changes as the land gets steeper and higher.

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2 .....

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(c) To test **Hypothesis 2:** *Farming is more labour intensive in larger fields*, the student obtained some secondary data from the farmer about average field size and labour input. This is shown in Table 5 (Insert).

For Examiner's Use

He plotted this data on a scatter graph, Fig. 9, below.

Scatter graph of field size and labour

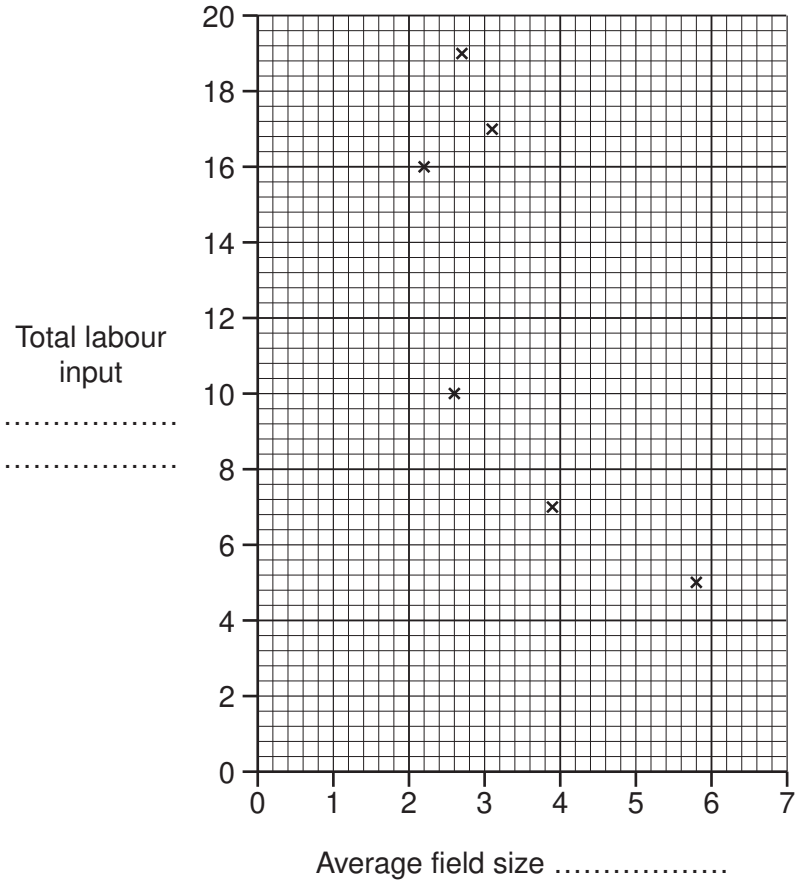

Fig. 9

(i) Label both axes on Fig. 9 with the correct units of measurement. [1]

(ii) Using Table 5 (Insert) plot the information for artichokes and barley on Fig. 9. [2]

(iii) Draw a best-fit line onto Fig. 9. [1]

(iv) What is your conclusion about **Hypothesis 2:** *Farming is more labour intensive in larger fields*? Support your conclusion with evidence from Fig. 9.

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(d) Labour input is one way to measure how 'intensive' farming is. Suggest **three** other inputs which could be used.

For Examiner's Use

1 .....

2 .....

3 .....[3]

(e) The student thought about ways to improve his investigation. Describe **two** ways he might do this, and explain how each would make the study better.

1 .....

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2 .....

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.....[4]

[Total: 30 marks]

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