UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

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ENVIRONMENTAL MANAGEMENT **0680/21**

Paper 2 **May/June 2013**

1 hour 45 minutes

Candidates answer on the Question Paper.

Additional Materials: Ruler

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
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 IN ANY BARCODES.

Electronic calculators may be used.

Answer **both** questions.

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.

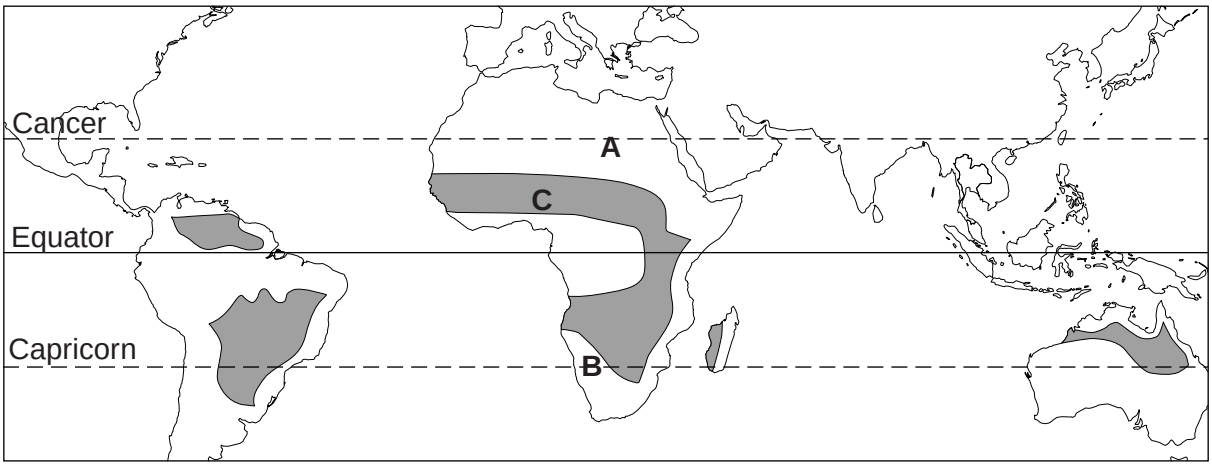
For Examiner's Use	
1	
2	
Total	

This document consists of **16** printed pages.

Answer **both** questions.

For Examiner's Use

1 **(a)** Look at the map showing the world distribution of savanna vegetation.



Key:

Savanna

(i) Name the continent with the largest area of savanna vegetation.

.....[1]

(ii) Describe the other main features of the distribution of savanna vegetation.

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.....[2]

(iii) Name the type of natural vegetation found in the areas marked **A** and **B** on the map.

.....[1]

(b) The savanna climate is tropical with a wet and dry season.

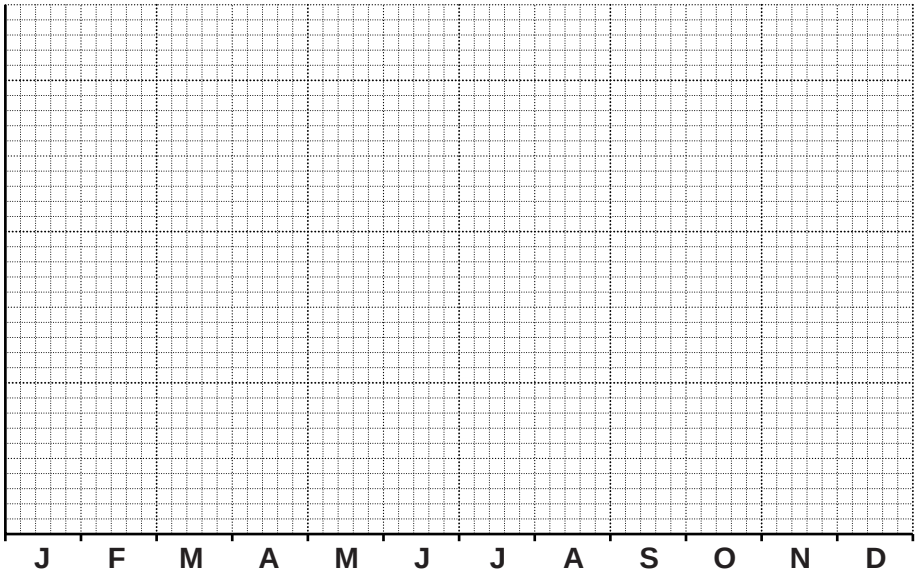
For Examiner's Use

Summary of climate in northern Nigeria
(area **C** on the map of savanna vegetation)

Temperature – mean monthly temperatures / °C											
J	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
22	24	28	31	30	28	26	25	26	27	25	22

Rainfall – averages

Wet season (May to September)	844 mm
Dry season (October to April)	26 mm
Total annual rainfall	870 mm



(i) Plot the mean monthly temperatures on the graph paper using a line graph. [3]

(ii) What percentage of total annual rainfall falls in the wet season? Circle **one** answer.

26 **54** **84** **97** [1]

(iii) Describe how the data shows that this area of savanna has a tropical climate.

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..... [1]

(iv) Describe how the appearance of the natural vegetation changes between wet and dry seasons in savanna lands.

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.....[2]

(v) Using both the temperature and rainfall data given, describe the advantages and disadvantages of a savanna climate for farmers growing crops.

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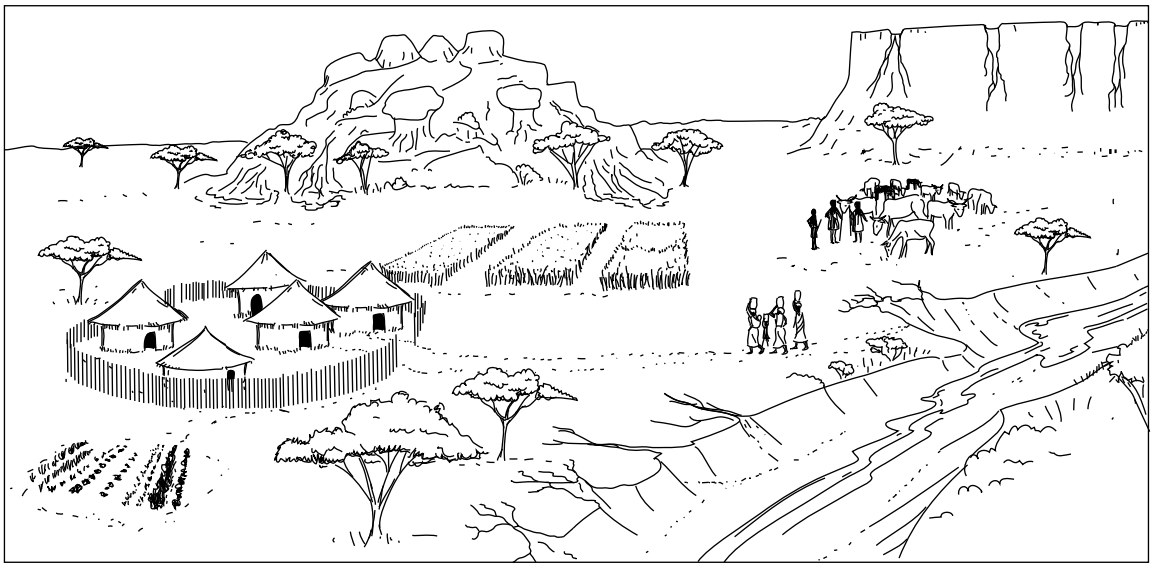
(c) Look at the sketch which shows how tribal groups use traditional subsistence farming in the savanna lands of West Africa.



(i) State the two ways in which farmers are making their living here.

1 ..... 2 ..... [1]

For Examiner's Use

(ii) Looking at the sketch, describe how it shows that this is an area of traditional subsistence farming.

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.....[3]

(iii) How different would the sketch look if this was an area of modern commercial farming instead of traditional subsistence farming? Suggest **two** ways.

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.....[2]

(d) Population growth is increasing pressure on the land and the risk of soil erosion in many countries in the savanna lands of West Africa.

(i) State the evidence from the sketch which shows that this area is at high risk of soil erosion.

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.....[2]

For Examiner's Use

(ii) Four strategies of soil conservation are

D tree planting **E** dry land farming

F rural development programmes **G** community participation

Choose two of these strategies. For each one, describe how it reduces the risk of soil erosion and helps with soil conservation.

Letter ....

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Letter ....

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.....[4]

(iii) Introducing strategies of soil conservation is difficult in areas like the one shown in the sketch on page 4. Suggest some of the difficulties.

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(iv) Give reasons why population growth continues to be high in developing countries like those in the savanna land of West Africa.

For Examiner's Use

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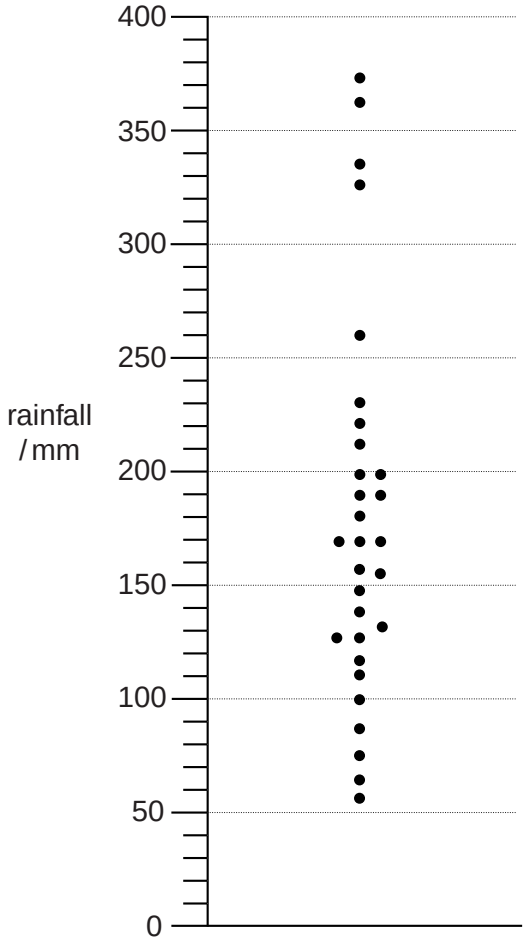
.....[5]

(e) Look at the rainfall diagram. It shows rainfall totals for the month of April at Kisumu in Kenya during a period of 30 years. Kisumu has a savanna climate and April is in the middle of the wet season.

For Examiner's Use

Each dot shows a rainfall total for April in one of the 30 years.

How August rainfall totals varied during a period of 30 years
Kisumu – Kenya



(i) Average (mean) monthly rainfall at Kisumu in April is 188 mm.
Show this average value on the diagram using a cross (**X**). [1]

(ii) What is the size of the difference in the amount of rainfall (in mm) between the wettest and driest months of April during this 30 year period?

..... mm. [1]

(iii) How and why do rainfall variations from year to year, like the ones shown in Kisumu, cause problems for subsistence farmers living in savanna lands?

For Examiner's Use

Refer to years with both higher and lower than average values.

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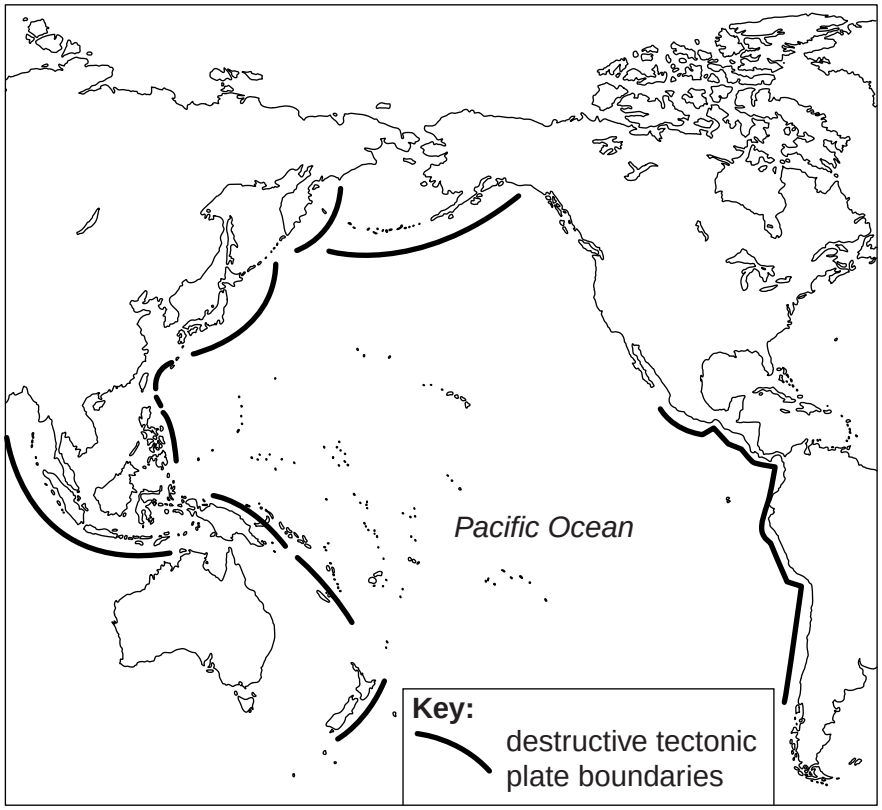
.....[4]

[Total: 40]

2 **(a)** Look at the map of the Pacific Ocean showing the location of destructive plate boundaries.

For Examiner's Use



(i) Describe the distribution of destructive plate boundaries in the Pacific Ocean.

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.....[2]

(ii) State what is happening to the plates at destructive plate boundaries.

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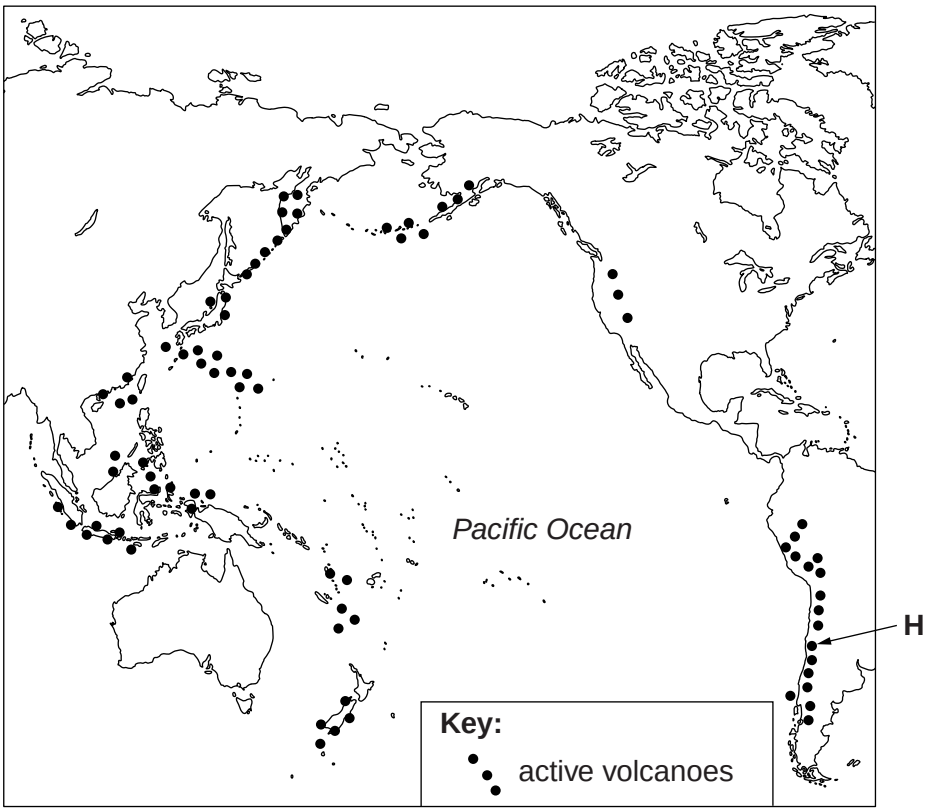
.....[3]

(b) Look at the map of the Pacific Ocean showing the location of active volcanoes.

For Examiner's Use



(i) Suggest why the distribution of active volcanoes in the Pacific Ocean is known as 'The Pacific Ring of Fire'.

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.....[2]

(ii) Explain how volcanoes are formed along destructive plate boundaries.

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(c) Read the information about a volcanic eruption in Chile in June 2011 (marked **H** on the map of active volcanoes).

For Examiner's Use

Volcano Puyehue erupts in Chile

Chile is the most volcanic country on Earth with over 3000 volcanoes, up to 80 of them active.

The eruption of the Puyehue volcano in central Chile on 4th June led to the Authorities evacuating 3,500 people to temporary shelters in safe areas. Large columns of smoke and ash, mixed with rocks, were thrown out 10 km into the air. Among the gases released were high levels of SO^2. There were no reports of any injuries. The previous eruptions from this volcano were in 1960 and 1921; these eruptions lasted for about two months.

The prevailing westerly winds took the ash cloud east over the Andes mountains into Argentina. One resident of the ski resort of Bariloche in Argentina said that 'Ash was falling like snow'. Levels of air pollution were high and people complained of sore eyes and skin, and breathing problems. They were advised to stay indoors.

Towns in central Chile, used to making money from tourists coming to see the stunning volcanic scenery, were mostly empty. The airport in Bariloche in Argentina was closed for days. This stopped high spending Brazilians from coming, at the worst time, because it was right in the middle of the main ski season.

By 11th June the ash cloud from Puyehue had reached Australia and New Zealand, over 6,000 km away. The cloud hovered in the air between 4,000 and 7000 metres closing Australia's two biggest international airports in Sydney and Melbourne. As late as 21st June, the ash cloud was still hanging around.

(i) Name all four emissions from the Puyehue volcano during its June 2011 eruption.

1. ..... 2. .....

3. ..... 4. .....

[1]

(ii) Despite this being a major volcanic eruption, no one was killed or even injured. Suggest **three** reasons for this.

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.....[3]

For Examiner's Use

(iii) The economic effects of Puyehue's eruption were felt not only in Chile and neighbouring Argentina, but also thousands of kilometres away in Australia.

Why were the effects from this volcanic eruption international as well as national?

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(iv) Were these economic effects greater for the other countries than for Chile? Explain your views on this.

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(v) People living in central Chile and Bariloche complained of health problems caused by the volcano. Explain how these may have been caused.

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(d) Land close to and around the craters of active volcanoes is often barren wasteland, places where nothing will grow. One reason is the very acid ground due to frequent releases of toxic volcanic gases and liquids.

(i) The pH scale is shown below. Put a tick (✓) in **one** of the boxes to suggest the pH of a soil found in areas next to volcanic craters.

pH	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
tick one box															

[1]

(ii) State and explain **another** reason why areas on the higher slopes of active volcanoes cannot usually be used for farming.

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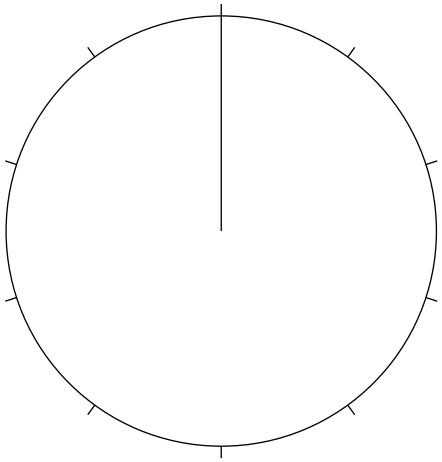
.....[2]

(iii) In areas further away from the crater, volcanic soils are some of the world's best soils for growing crops. Many of them have the texture of a loam soil;

33% sand: 33% clay: 34% silt

Complete the pie graph and key to show these characteristics of a loam soil.

Texture of a loam volcanic soil



Key:

Put your answer on the pie chart [3]

(iv) The pH scale is shown below. Put a tick (✓) in **one** of the boxes to suggest the pH of a volcanic soil with a loam texture.

pH	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
tick one box															

[1]

(v) Explain why this soil texture is good for crop growing.

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.....[3]

(e) The island of Java in Indonesia was made by volcanoes. Today it still has 45 active volcanoes. Its rich volcanic soils are some of the world's best for farming.
It has been suggested that even a stick planted in Java's volcanic soils will grow! Deposits from erosion on the mountains and from new eruptions are carried to Java's lowlands, forming thick layers of fertile sediment on the island's plains.

(i) Explain why fertile volcanic soils are present almost everywhere in Java.

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.....[2]

(ii) Look at the information about the island of Java.

Java in Indonesia

Area	Population	Population density	Birth rate	Death rate
7% of Indonesia	140 million	1025 per km²	18 per 1000	7 per 1000

The total population of Indonesia is 235 million. Approximately what percentage of these live on the island of Java? Circle **one** answer.

40% 50% 60% 70% [1]

(iii) What information shows that Java is a very overcrowded island compared with the rest of Indonesia?

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.....[1]

(iv) What is the rate of natural increase of population in Java?

.....[1]

For Examiner's Use

(v) The government of Indonesia is increasingly worried about environmental damage in Java as overcrowding forces subsistence farmers to extend cultivation to steep mountain slopes and forest reserves.

J, **K** and **L** are three ways that have been suggested to tackle the problem.

J	**K**	**L**
Manage the land Educate farmers about strategies of soil conservation	Manage population increase Put more money into family planning programmes	Promote economic development Support growth of industries in the large cities

In your view, which one of these ways would be the best for solving the problem of environmental damage in Java? Explain your view.

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.....[4]

[Total: 40]