Cambridge O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

0288057780

ENVIRONMENTAL MANAGEMENT **5014/22**

Paper 2 **October/November 2016**

1 hour 30 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

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 an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

Study the appropriate source materials before you start to write your answers.
Credit will be given for appropriate selection and use of data in your answers and for relevant interpretation of these data. Suggestions for data sources are given in some questions.
You may use the source data to draw diagrams and graphs or to do calculations to illustrate your answers.

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.

This document consists of **14** printed pages and **2** blank pages.

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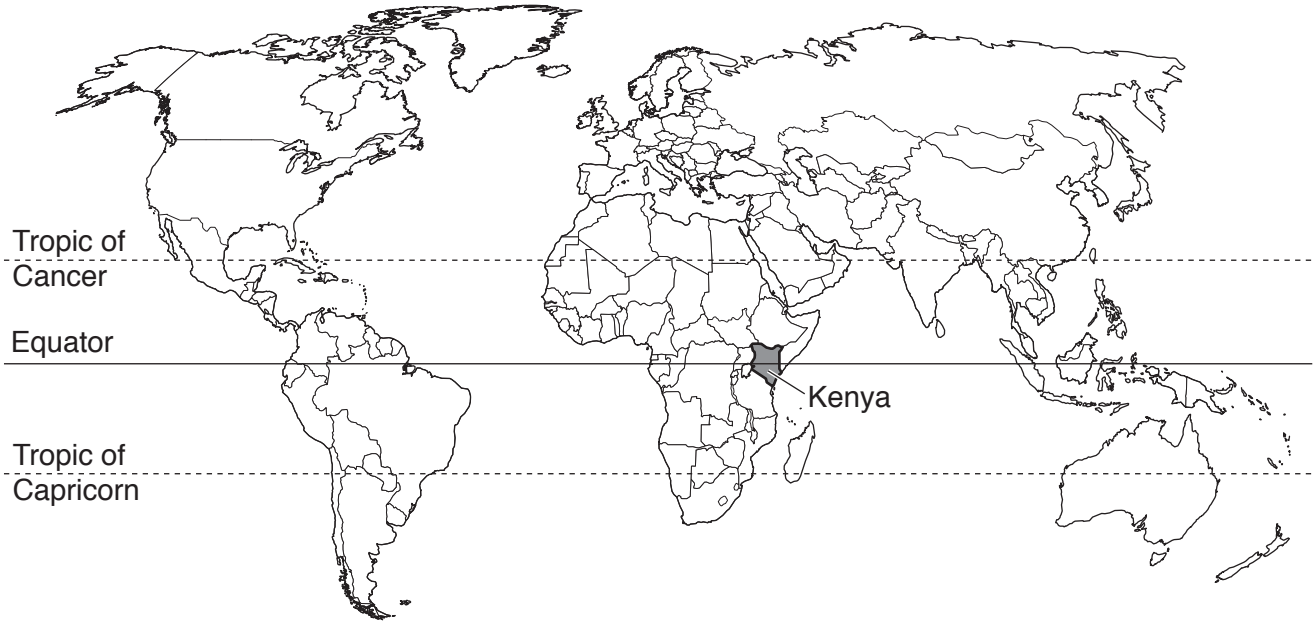
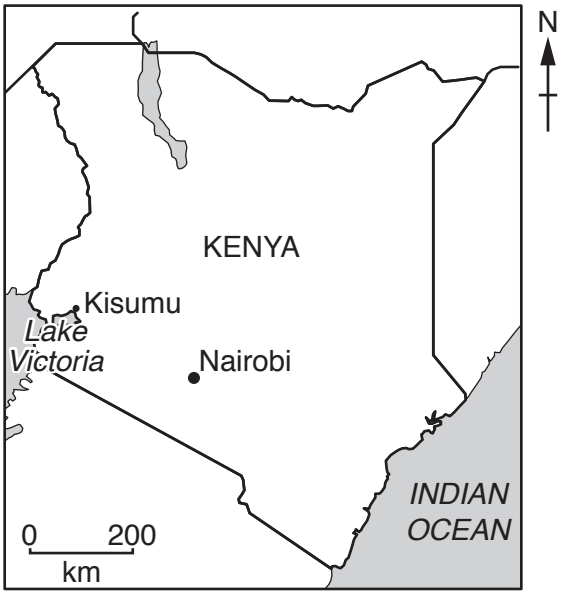
CAMBRIDGE International Examinations

map of the world



map of Kenya



area: 580 370 km^2

population: 46 million

children per woman: 3.54

life expectancy: 63 years

currency: Kenyan Shillings (103 KES = 1 USD)

languages: English, Kiswahili, indigenous languages

climate: tropical, cooler in the highlands

terrain: coastal plain, central highlands divided by one branch of the East African Rift Valley

main exports: tea, coffee, fruits, flowers, fish, petroleum products, cement

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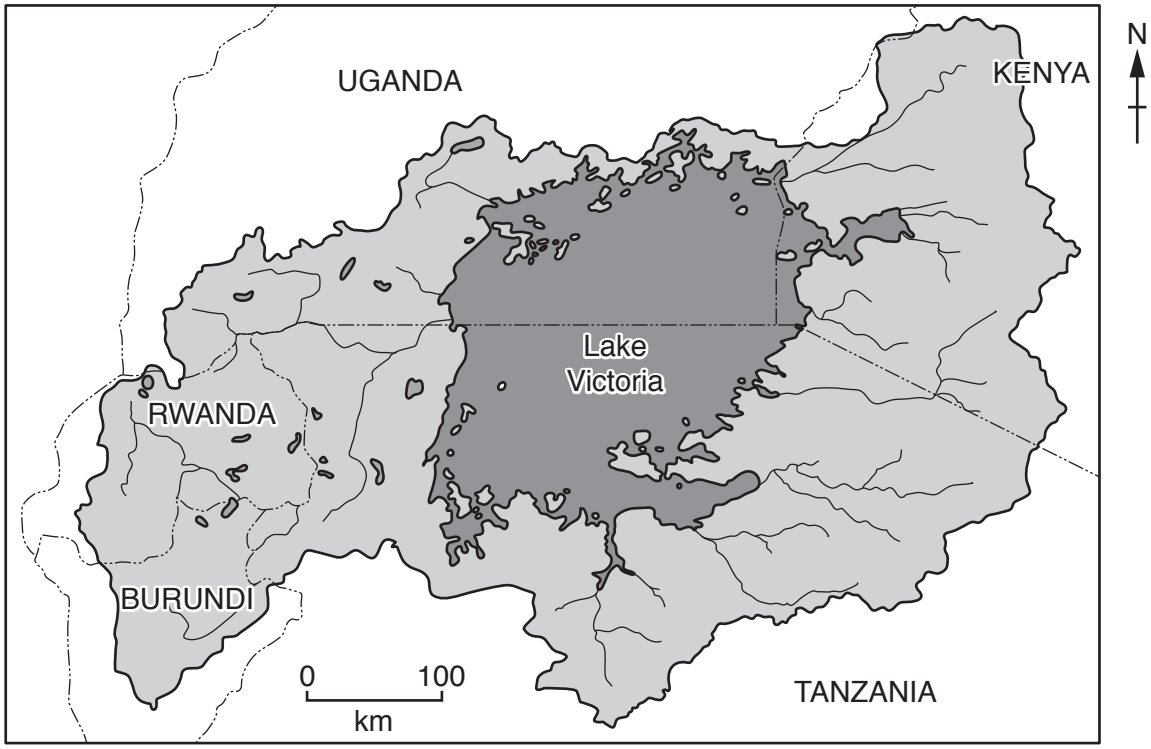
Lake Victoria basin



Key

international boundary

Lake Victoria

Lake Victoria basin

1 Kenya shares access to Lake Victoria with other countries. The lake is a valuable source of fish. The wetlands surrounding Lake Victoria have high biodiversity and productive farmland. About 75% of the workforce are employed in agriculture. Tourism also makes an important contribution to the economy.

(a) What is meant by the term *biodiversity*?

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.....

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.....[2]

(b) Look at the map showing the Lake Victoria basin.

(i) Name the country with the largest share of Lake Victoria.

..... [1]

(ii) Name **two** countries that are part of the drainage basin but do not have a share of the lake.

..... and ..... [2]

(c) Kisumu is a town on the Trans-African Highway. Road transport services provide jobs for people in this area. A scientist noticed that several beaches by Lake Victoria, near Kisumu, were being used by vehicle-washing businesses. To find out if vehicle washing was having any impact on the lake the following method was used.

1. Select five sites:
   - three sites used for vehicle washing
   - one site not used for vehicle washing but at a sewage outlet site
   - one control site, not used for vehicle washing or at a sewage outlet site.

2. Take water samples from each site at 18.00 once a week for six weeks.

3. Ask a student to record all the vehicles washed on six separate days for each of the three vehicle-washing sites.

(i) Suggest why the scientist took water samples at 18.00.

.....[1]

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(ii) The table below shows the average number of vehicles recorded.

vehicle type	average number of vehicles washed per day	percentage of all vehicles washed
car	91	36.4
small truck	33	13.2
bus	104	.....
large truck	22	.....
total	250	100.0

Complete the table. [2]

Space for working.

(iii) The table below shows average results from the analysis of the water samples at the five sites.

	control site	vehicle-washing site one	vehicle-washing site two	vehicle-washing site three	sewage outlet site
pH	7.5	6.8	6.7	6.9	7.3
phosphate concentration /ppm	0.2	0.3	0.5	0.6	2.4
salinity /arbitrary units	145	171	184	186	300

Describe the differences between the water samples from the vehicle-washing sites and the control site.

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.....[3]

(iv) Suggest **two** sources of chemical pollution caused by vehicle washing.

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.....[2]

(v) The student recorded all the vehicles being washed at one site on one day using a tally chart.

In the space below draw and complete a tally chart to record the following information.

16 cars **3 small trucks** **8 buses** **2 large trucks** [3]

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(d) The scientist interviewed some fishermen working near the vehicle-washing sites.

‘We sell our fish to the restaurants beside the vehicle-washing sites. People buy fish meals while they are waiting for their vehicles to be washed.’

‘We do not catch many fish now and those we catch are smaller than they used to be.’

(i) The scientist thought that the process of eutrophication might be occurring in this part of Lake Victoria.

Using information from the table in **(c)(iii)** and your own knowledge, explain how eutrophication could occur in Lake Victoria.

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.....[5]

(ii) Suggest **one** advantage to people of eating fish.

.....[1]

(iii) Do you think eating fish at these lakeside restaurants is unhealthy? Give a reason for your point of view.

.....

.....[1]

(e) The scientist noticed that at each of the vehicle-washing sites there were very few snails. The scientist asked a student to propose a plan for surveys of the snails at more lakeside sites. The student proposed three different plans.

plan one
I will find three more vehicle-washing sites and record their location on a map. I will look for snails.

plan two
I will find five more vehicle-washing sites and record their location on a map. I will count the number of snails I can find in five minutes at each site.

plan three
I will find five more vehicle-washing sites and two sites without vehicle washing. I will record their location on a map. I will count the number of snails I can find in five minutes at each site.

(i) Give **two** reasons why **plan two** is better than **plan one**.

.....

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.....[2]

(ii) **Plan one** and **plan two** are both incomplete.

State what is missing from both of these plans and explain its importance.

.....

.....

.....

.....[2]

(iii) The scientist and the student carried out **plan three**. The results are shown in the tables below.

site without vehicle washing	number of snails counted in five minutes
1	48
2	56
total	104
average	52

vehicle-washing site	number of snails counted in five minutes
1	5
2	2
3	7
4	12
5	6
total	32
average	.....

Complete the table. [1]

Space for working.

(iv) Suggest **one** other method that could have been used to find the numbers of snails at each site.

.....

.....

.....

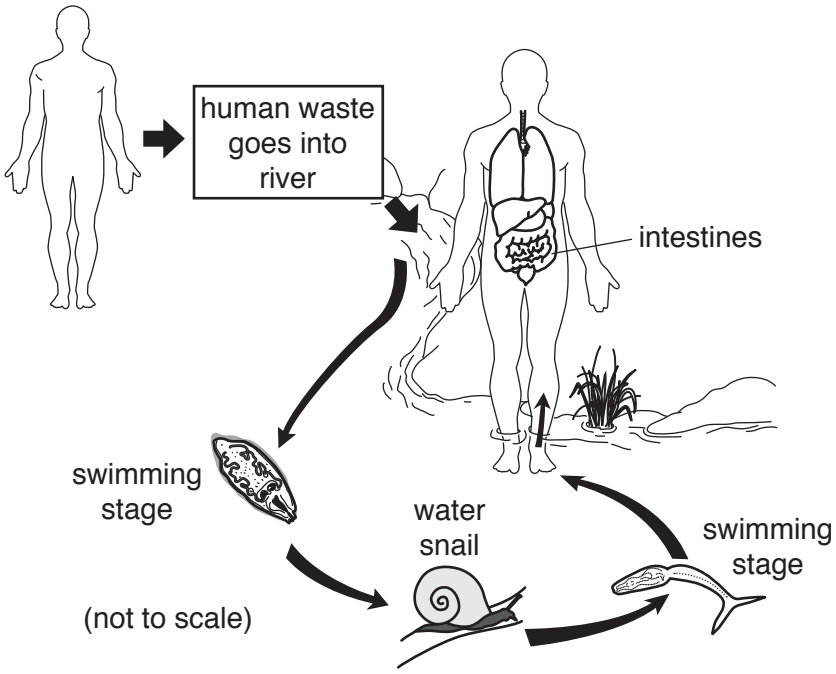
.....[2]

(v) Some snails are vectors of human disease.

State the name of a disease carried by snails.

..... [1]

(vi) Look at the diagram below which shows the life cycle of a disease carried by water snails.



Briefly explain how the disease can move from

infected human to snail, ...

.....

snail to uninfected human. .....

.....
[2]

(vii) Snails reproduce by producing eggs in very large numbers. Many species of young fish eat snail eggs.

Explain how vehicle washing could be contributing to a reduction in both the total numbers of fish and the number of species of fish being caught in this part of Lake Victoria.

.....

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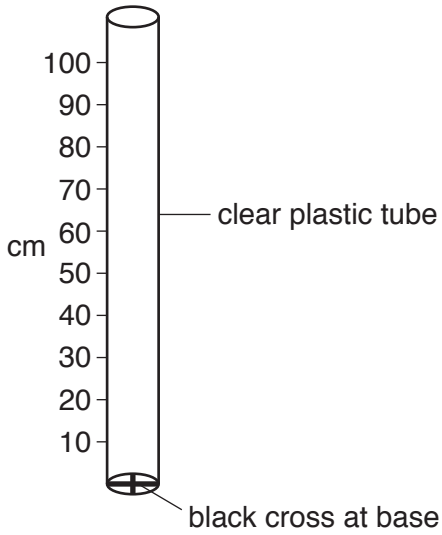
.....[2]

(f) The scientist noticed that the water at some vehicle-washing sites, **A**, **B**, **C** and **D**, was very cloudy. The equipment shown below was used to measure how cloudy the water was.



A water sample from the lake is poured slowly into the tube. When the cross at the bottom of the tube cannot be seen the height of the water is recorded. The scientist took three readings from each of five different sample sites. The results are shown in the table below.

site	control	**A**	**B**	**C**	**D**
average height / cm	82	42	60	35	47

(i) Complete the table below by adding the letters **A**–**D** in the correct order. [2]

least cloudy ⟶ most cloudy

control	.....	.....	.....	.....

(ii) The sample from site **D** was taken from an area of Lake Victoria next to farmland.

Suggest how farming could cause an increase in the sediments that make the water cloudy.

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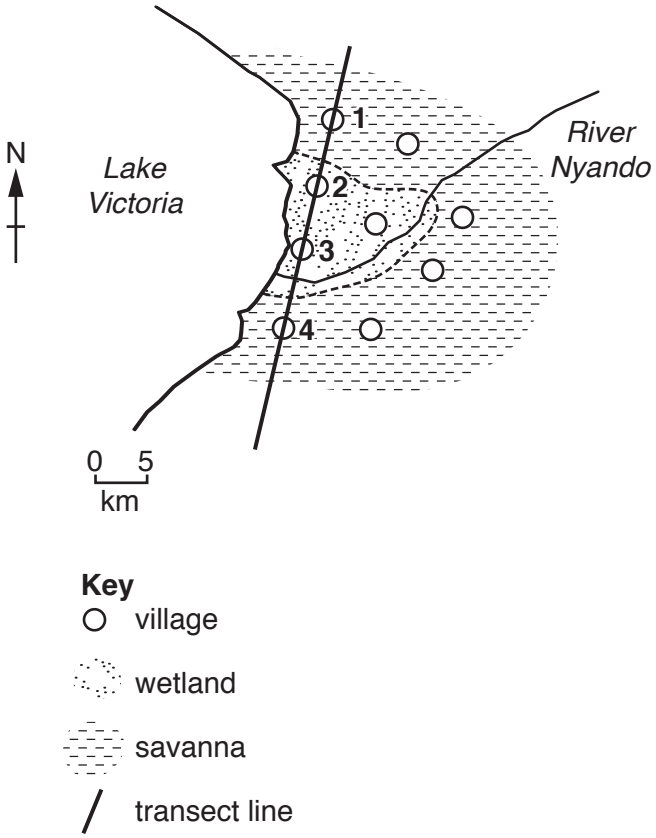
.....[2]

2 **(a)** A researcher wanted to find out about the standard of living in villages in the Nyando District of Kenya.



The researcher used the following method:

1. Four villages (**1**, **2**, **3** and **4**) were selected. Their locations are shown on the map.

2. In each village, 20 households were selected.

3. One male and one female from each household were interviewed using a structured questionnaire.

(i) Explain why the researcher selected villages **1**, **2**, **3** and **4**.

.....[1]

(ii) Suggest how the households could have been selected from each village.

.....[1]

(iii) Explain why the researcher decided to interview both males and females from each household.

.....

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.....[2]

(iv) Suggest **two** reasons why the researcher used a structured questionnaire.

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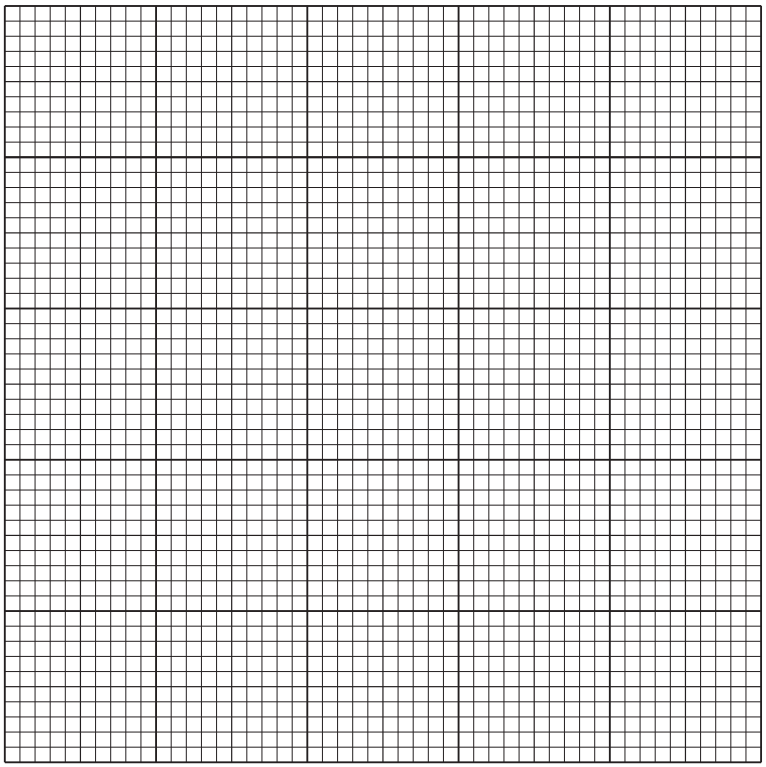
.....[2]

(b) Some results of the questionnaire are shown in the table below.

household asset	percentage of wetland households	percentage of savanna households
mobile/cellphone	75	80
radio	85	88
bank account	5	6
improved cooking stove	52	55
separate building for farm animals	47	55

(i) Draw a bar graph on the grid below to show the information from the table. Complete the key. [4]



Key

☐ wetland

☐ savanna

(ii) The researcher decided that wetland and savanna households had a similar standard of living.

Use information from the graph to explain this decision.

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.....[3]

(iii) Many households in the savanna villages suffer from food shortages in March, April and May.

Explain why the price of food in local markets is always high in April and May.

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.....[2]

(iv) Suggest **two** questions that the researcher could have asked about crop-growing in the savanna area.

1. .....

2. .....
[2]

(c) Describe ways in which the government could encourage a sustainable way of life in the Nyando District.

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.....[4]

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