Cambridge O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

2827265699

ENVIRONMENTAL MANAGEMENT **5014/21**

Paper 2 **October/November 2018**

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 Mexico

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area of Mexico: 1 964 375 km^2

population: 123 million (in 2016)

children per woman: 2.27

life expectancy: 75.6 years

currency: Mexican pesos 19.2 = 1 USD

languages: Spanish, local languages

main economic activities: agricultural products, electronics, chemicals, petroleum, textiles and tourism

1 Mexico's economy depends on modern manufacturing industries, agriculture and tourism. There are abundant reserves of oil, natural gas and minerals. Large scale rural to urban migration is taking place. Environmental problems include a shortage of clean drinking water, deforestation and desertification.

(a) Describe **two** problems caused by rural to urban migration.

1 .....

.....

2 .....

.....
[2]

(b) The state of Michoacan has the largest production of strawberries in Mexico.

In 2016, strawberries were planted on 23 000 hectares and 539 000 tonnes were harvested.

(i) Calculate the average number of tonnes per hectare of strawberries harvested in Michoacan in 2016.

Show your working.

..... tonnes per hectare [2]

(ii) The demand for strawberries in Mexico and the USA is increasing.

Suggest how this benefits farm workers and the government of Mexico.

farm workers .....

.....

the government .....

.....
[2]

(iii) Farm workers can harvest 100 kg of strawberries in one day. They work 50 hours a week and earn between 60 to 80 USD per week.

Suggest **two** reasons why some farm workers decide to leave their job and move to the capital city.

1 .....

.....

2 .....

.....
[2]

(c) A student visited a strawberry farm. The student collected ten ripe strawberries from one plant in a field and found their mass. The table shows the results.

strawberry	mass of strawberry / g
1	16
2	14
3	24
4	37
5	31
6	29
7	33
8	40
9	19
10	27

(i) Calculate the average mass of one strawberry.

..... g [1]

(ii) Calculate the average number of strawberries in a 5 kg tray.

Show your working.

.....[2]

The student decided that this sample of strawberries was not representative of the field of strawberries. The student proposed three further sampling methods.

Method one

Walk down one row of strawberry plants in the field and collect the largest ripe strawberry from ten different plants.

Method two

Walk down one row of strawberry plants in the field and collect the largest ripe strawberry from every fifth plant. Collect a total of ten strawberries.

Method three

Use a table of random numbers to select the rows and the plants in the field. Collect one ripe strawberry from each of the ten selected plants.

(iii) Suggest why the student decided **not** to carry out **method one**.

.....

.....[1]

(iv) Explain why **method three** is better than **method two**.

.....

.....

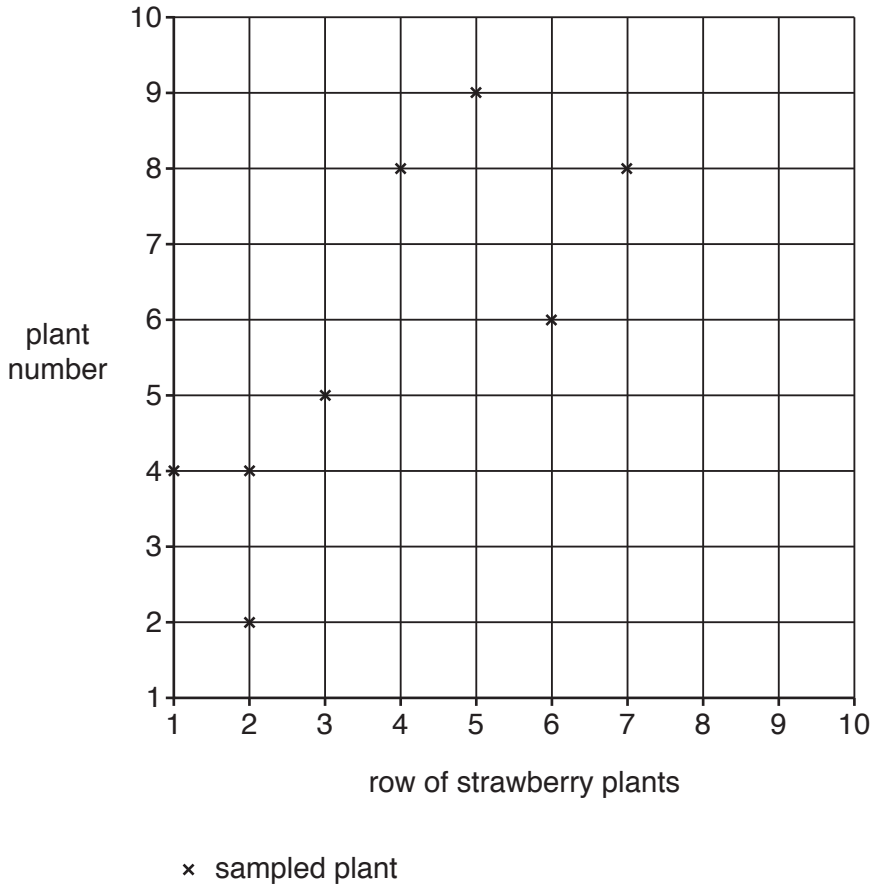
.....

.....[2]

(v) The student used sampling **method three**. The random numbers used by the student are shown in the table.

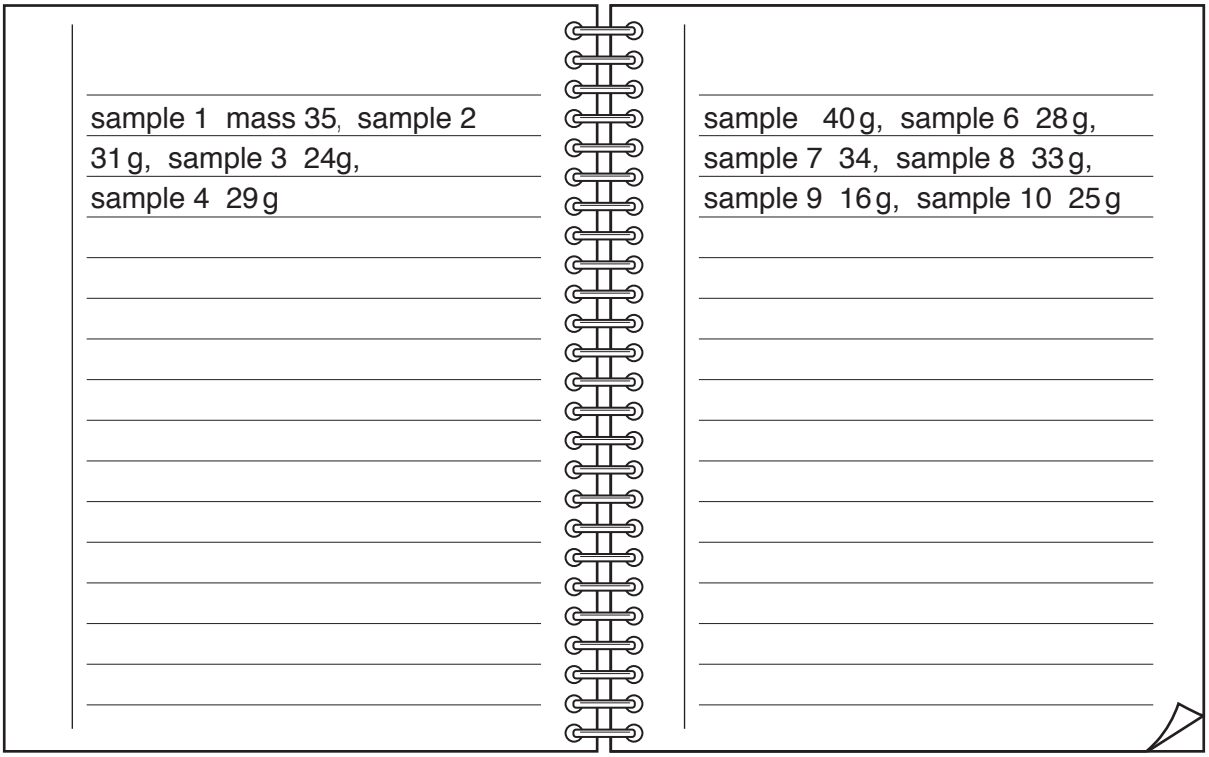
strawberry sample	row number	plant number
1	3	5
2	5	9
3	4	8
4	2	2
5	2	4
6	1	4
7	6	6
8	7	8
9	7	3
10	8	5

Complete the diagram to show the positions of the last two strawberry samples in the field.



[2]

(vi) The student recorded their results in a notebook.



Draw and complete a table to show these results.

[3]

(d) The table shows climate data from a weather station in the centre of the strawberry growing region.

month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
average monthly temperature / °C	14.3	15.6	17.9	19.8	20.9	20.1	18.7	18.6	18.3	17.3	15.8	14.5
average monthly rainfall / mm	14	7	6	15	46	137	172	171	141	55	14	13

(i) Calculate the annual average temperature range at this weather station.

..... °C [1]

(ii) Explain how the average monthly temperatures in this region allow strawberries to be produced all year.

.....

.....

.....

.....[2]

(iii) Strawberry plants need a regular water supply to grow and produce ripe fruit.

Using information from the table, state the six months when irrigation will be needed.

.....[1]

(iv) Name a method of irrigation that could be used to grow strawberry plants without wasting water.

.....[1]

(v) Many crops are given too much water by irrigation.

Describe the damage that over-watering can do to fertile soils.

.....

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.....[3]

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(vi) Suggest **two** other problems for farmers of growing the same crops in large fields year after year.

1 .....

.....

2 .....

.....
[2]

(e) Many of the farm workers live, with their families, near the strawberry fields. They live in simple shelters made of poles, plastic sheeting and cardboard. They cook food over open wood fires.

(i) Suggest **two** risks to the health of these families as a result of cooking over open wood fires.

1 .....

.....

2 .....

.....
[2]

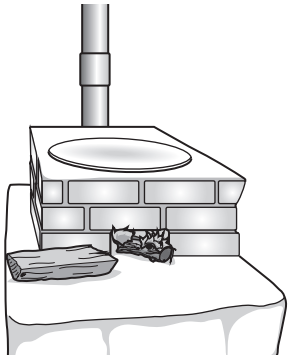
(ii) In 2016 about 28 million people in Mexico still used wood as a fuel for cooking.

Calculate the percentage of the population in Mexico that cooked in this way in 2016.

Show your working.

.....% [2]

(iii) To reduce the use of wood, a more efficient stove has been developed that uses half the fuel of an open fire and produces less smoke. Food is cooked on a hot plate above the fire.



Many families did not want to use the new stove even though it uses less fuel and produces less smoke.

Suggest **two** reasons why they did **not** want to change.

1 .....

.....

2 .....

.....
[2]

(iv) Some families were given the new stove to use. They found it was easier to use, keep clean and also used less fuel.

Suggest **two** ways the government could encourage more families to use the new stove.

1 .....

.....

2 .....

.....
[2]

(v) Suggest how the use of this new stove could reduce the impact on the environment compared with burning wood on an open fire.

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.....[3]

2 **(a)** The lakes in the state of Michoacan are an important source of fish. Fishermen catch a small fish called charal from Lake Patzcuaro in Michoacan state.

Each local fisherman uses a small boat and a hand–held fishing net to catch charal from the lake.

(i) Suggest **two** reasons why local people think that this lake will always provide charal fish.

1 .....

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2 .....

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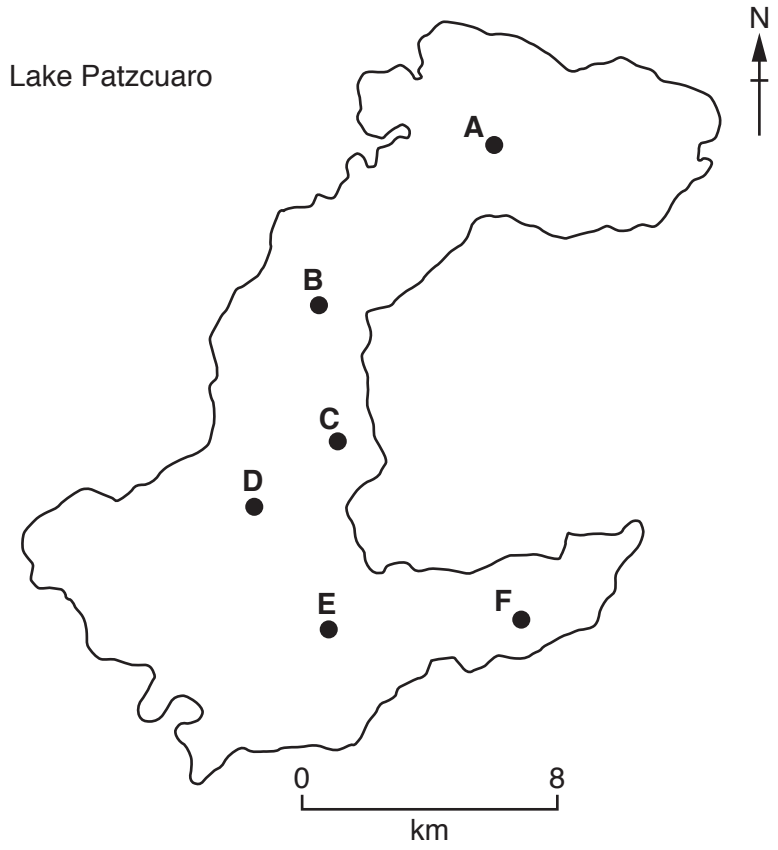
[2]

(ii) A scientist decided to take a sample of fish from Lake Patzcuaro at each of the six sites, **A** to **F**, shown on the map.



Suggest a method the scientist could use to collect the samples of fish so that they could be compared in a fair way.

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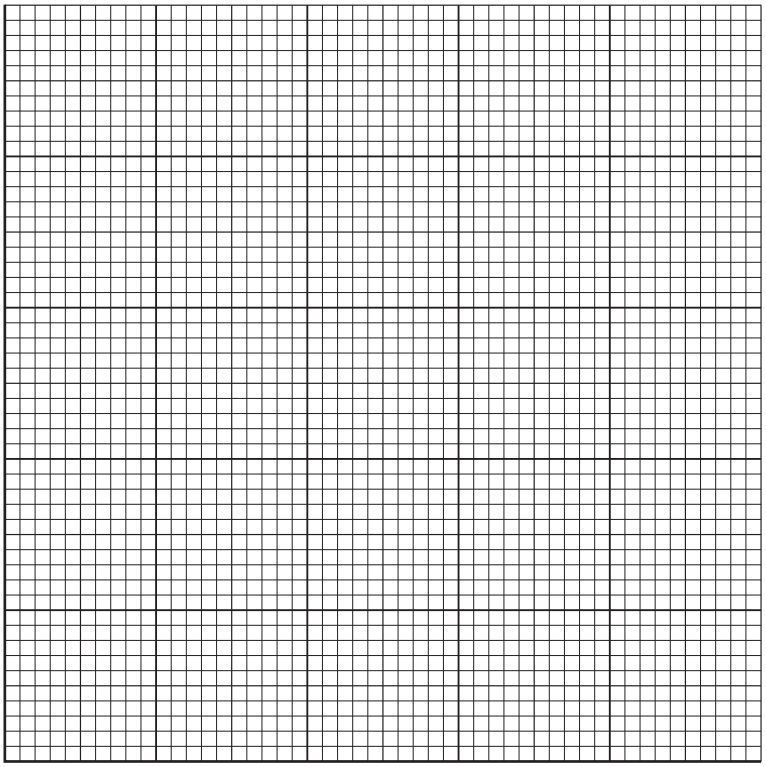
.....[4]

(iii) The sampling method caught charal and other species of fish. The scientist recorded the following results.

sample site	**A**	**B**	**C**	**D**	**E**	**F**
number of charal fish	40	37	28	43	33	10
number of different fish species	5	6	5	7	6	2

Plot a bar graph of the number of charal fish at each sample site.



[4]

(iv) Suggest **one** sample site that may be polluted with raw sewage. Give a reason for your answer.

sample site .....

reason .....

.....

[1]

(v) Describe the impact raw sewage can have on a lake ecosystem.

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.....[5]

(b) Suggest strategies that will allow the development of tourism around a lake without damaging the lake ecosystem.

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.....[4]

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