UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

9622620387

ENVIRONMENTAL MANAGEMENT **0680/41**

Alternative to Coursework **May/June 2012**

1 hour 30 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.

Answer **all** questions.
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.

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1	
2	
3	
Total	

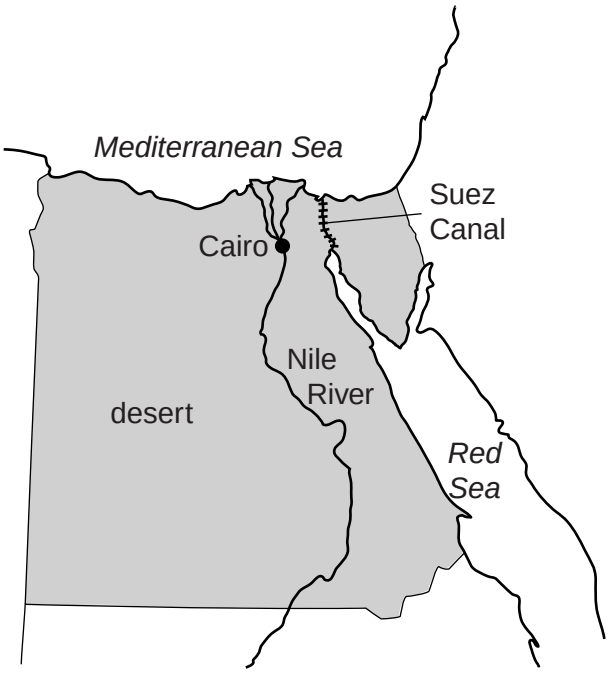
This document consists of **15** printed pages and **1** blank page.

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World map



Map of Egypt



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Area of Egypt: just over 1 million sq km

Population: about 80 million

Children per woman: 3.01

Life expectancy: 72.4 years

Currency: Egyptian pounds (5.6 = 1US$)

Languages: Arabic, English, French

Climate: Desert; hot, dry summers and warm winters

Terrain: Vast desert plateau divided by the Nile Valley and Delta

Main exports: crude oil and petroleum products, raw cotton, textile goods, metal products, chemicals, processed food.

Most economic activity takes place around the Nile Valley. The economy continues to grow due to exports of manufactured goods and tourism. Cairo is the main industrial and business centre. The Suez Canal that links the Red Sea to the Mediterranean Sea provides revenue for the country. Despite rapid economic growth, living conditions for the average Egyptian remain poor. 25% of the population live in Cairo, the capital city.

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[Turn over

Answer **all** the questions.

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1 Cairo has expanded greatly in the last 10 years as large numbers of people have migrated from rural villages. Many people have to live in squatter settlements with inadequate services.

(a) Suggest **one** reason why people migrate from rural villages to Cairo.

.....[1]

(b) A health survey of young children was carried out in both a squatter settlement area of Cairo and a settlement in a rural area. Some of the results are shown below.

Young children with illnesses (% in each settlement)

health problems	Cairo settlement	rural settlement
intestinal parasites	97	89
acute respiratory infections	42	14
diarrhoea	43	9

(i) State the health problem for which there was the greatest and smallest difference between the two settlements.

Greatest difference .....

Smallest difference ..... [2]

(ii) Suggest reasons why the survey found that acute respiratory infections and diarrhoea were more common among young children living in the Cairo settlement than in the rural settlement.

.....

.....[2]

(iii) The survey also found that some young children suffered from malnutrition and stunted growth (small height for age). A medical researcher wanted to find out if conditions for young children had improved in the last five years. He started to prepare the questionnaire on page 5 opposite for a new survey.

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1. Location of settlement: Cairo ☐ rural ☐

2. How long have you lived here?

   0–6 months ☐ 1 year ☐ more than 1 year ☐

3. Your age: ☐ years ☐ months Your height: ☐ cm

4. .....

   .....

5. .....

   .....

6. .....

   .....

Complete the questionnaire to find out more about children's health. [4]

(c) The medical researcher has three different plans that could be used to carry out his new survey.

Plan A Go to the centre of settlements. Have a time limit of three hours. Complete the questionnaire for as many children as possible.

Plan B Walk along a transect line through each settlement and complete the questionnaire for children from every third house.

Plan C Select thirty households at random using a base map and a table of random numbers. Ask the children from these households and complete the questionnaire.

(i) Suggest why **Plan A** may not collect reliable data.

.....

.....[1]

(ii) Suggest why **Plan C** is likely to be better than **Plan B**.

.....

.....

.....[2]

(iii) Can **Plan C** be used to compare different squatter settlements in Cairo? Explain your answer.

.....

.....

.....[2]

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(d) Another researcher gathered data from three different settlements. Some of the factors which might affect differences in quality of life between squatter settlements are shown in the tables.

Household Facilities (% of households in each settlement)

facility	settlement 1	settlement 2	settlement 3
electricity supply	85	91	90
piped water	86	88	91
well water	99	100	100
sewage removal	84	90	87
use of soap for washing hands	12	21	48

Daily Diet (% of households in each settlement)

food type	settlement 1	settlement 2	settlement 3
rice	100	100	100
meat	35	28	30
green vegetables	10	24	12

(i) Which **two** factors differ most between the settlements?

.....[1]

(ii) The medical researcher expected to find fewer children with stunted growth in **settlement 2**. Suggest why.

.....

.....[1]

(iii) She found that the incidence of diarrhoea was 30% lower in **settlement 3**. Suggest reasons for this improved health.

.....

.....

.....[2]

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(e) Describe **two** ways the city authorities could improve the health of settlement dwellers.

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1. .....

Reason .....

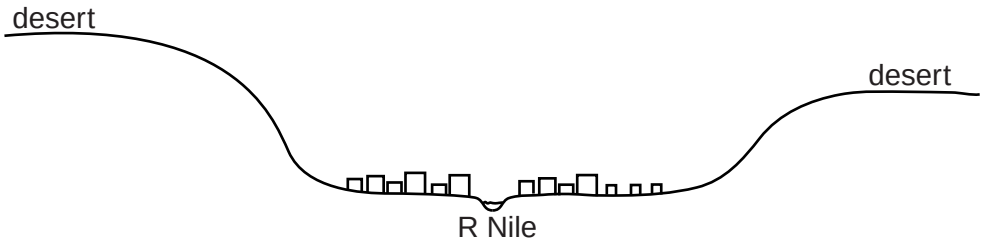
2. .....

Reason .....[3]

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2 **(a)** People living in Cairo experience a 'black cloud' of increased air pollution during September and October. The prevailing winds are not strong at this time of year. Cairo is located in the Nile Valley. Its location is shown in the cross-section.

Cross section through Cairo



(i) How does the location of Cairo increase the risk of air pollution?

.....

..... [1]

(ii) Why is the concentration of air pollutants in Cairo at its worst in September and October?

.....

..... [1]

(iii) Cairo is in a high pressure zone. How does this further increase the risk of air pollution?

.....

..... [1]

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(b) Without using expensive equipment a scientist wanted to find out more about the increase in black carbon particles. He placed squares of sticky tape on a hard piece of board with the sticky side of the tape exposed to the air. The scientist ran a trial using the following method.

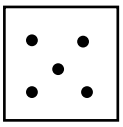
- All air samples were exposed for 24 hours
- All the tapes and boards were the same size
- The air samples were fixed two metres from the ground
- A hand magnifying lens was used to count the black particles

(i) Explain why all the samples were exposed for 24 hours.

.....

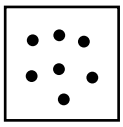
.....[2]

sample P



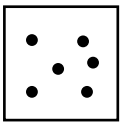
..... particles

sample Q



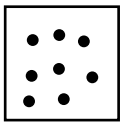
..... particles

sample R



..... particles

sample S



..... particles

(ii) Complete the diagram, by counting the number of particles on each sample. [1]

(iii) Calculate the average number of black particles from the four air samples.

.....[1]

(c) Next, the scientist decided to compare the air quality between the squatter settlement area and a business district in Cairo using the same method. He organised five sampling stations in each district and recorded samples on six different days for each area. The results are shown in the table.

Average number of carbon particles per sample per day

month	business district	squatter settlement area
January	9	8
February	11	10
March	8	9

(i) Suggest why the scientist used five different sampling stations in each area of the city.

.....[1]

(ii) Does the data show that the squatter settlement area has poorer air quality than the business district? Explain how the data supports your answer.

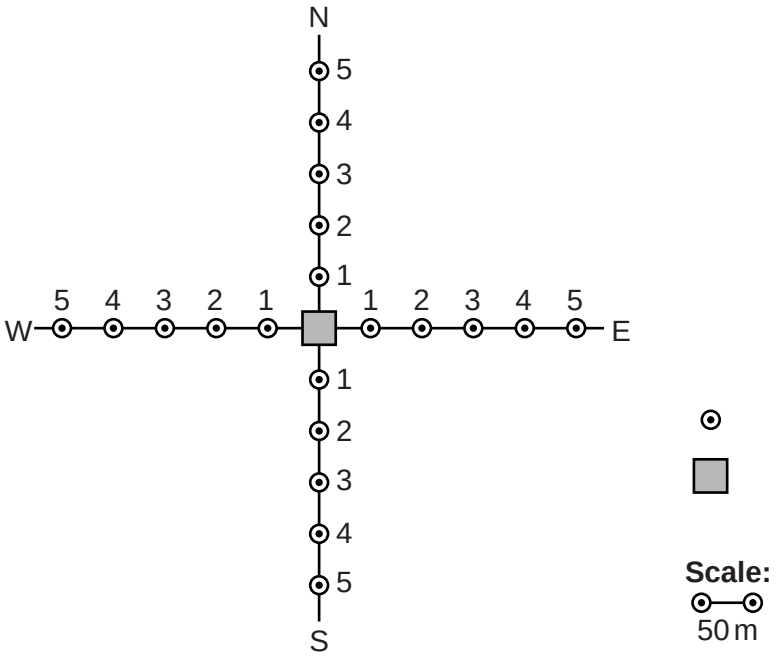
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.....[2]

(iii) Many factories have been built as the city has expanded. These include cement making, lead and copper smelting, reprocessing plastics, and tanneries making leather. They all release particles into the air. Some people living in a settlement around a cement factory complained of dry throats, coughing and painful breathing. The scientist used the same air sampling method to investigate their complaints. Air sampling points were set up as shown in the diagram.

Location of air sampling points



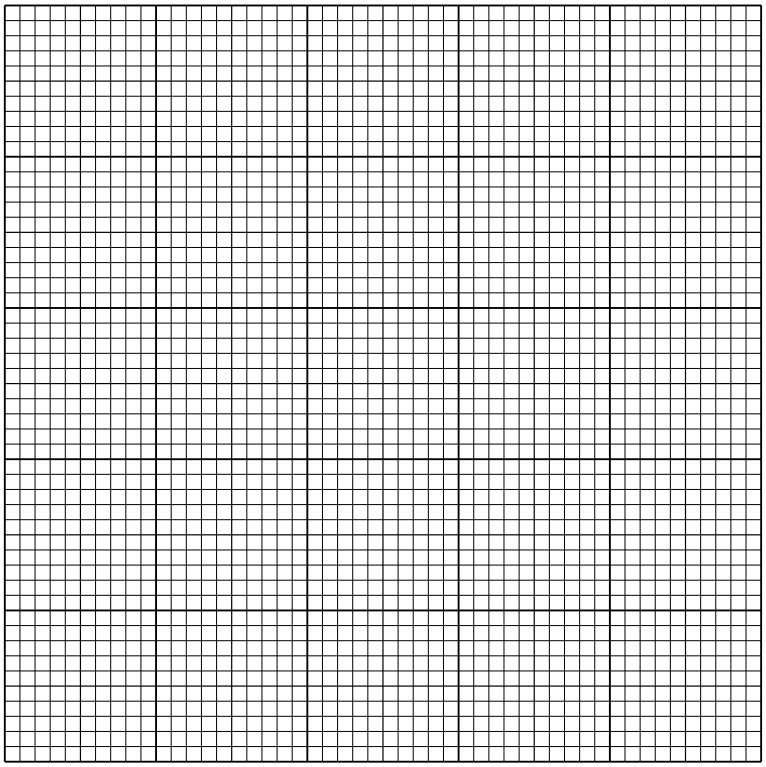
The results are shown in the table.

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Average number of cement dust particles per sample per day

air sampling point	N	S	E	W
1	22	25	20	21
2	24	32	28	26
3	22	42	35	32
4	19	54	36	35
5	20	55	34	36

Plot a graph to show the results of the North and South data only.



[4]

(iv) Describe the pattern for the results of North and South.

North .....

South .....[2]

(v) What could be the reason why points to the South collected the most cement dust particles?

.....[1]

(d) The cement company later fitted electrostatic precipitators to the chimney. These were able to collect most of the dust. The dust can be treated and mixed with cement. To pay for the precipitators the cement company wanted to increase the price per 1000 kg from 420 to 441 Egyptian pounds.

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(i) Calculate the % increase in price.

.....[2]

(ii) Calculate what would be the **new** price of a 50 kg bag of cement.

.....[1]

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3 In Cairo, the 'black cloud' has appeared each autumn since 1999. The main sources of carbon particles have been identified:

- 23% vehicle exhausts
- 23% factory gases
- 6% garbage burning
- 40% rice stubble burning

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(a) (i) How could the problem of air pollution from vehicles be reduced?

.....

.....

..... [2]

(ii) The city authorities decided against making garbage burning illegal or setting limits to factory emissions. Suggest reasons why.

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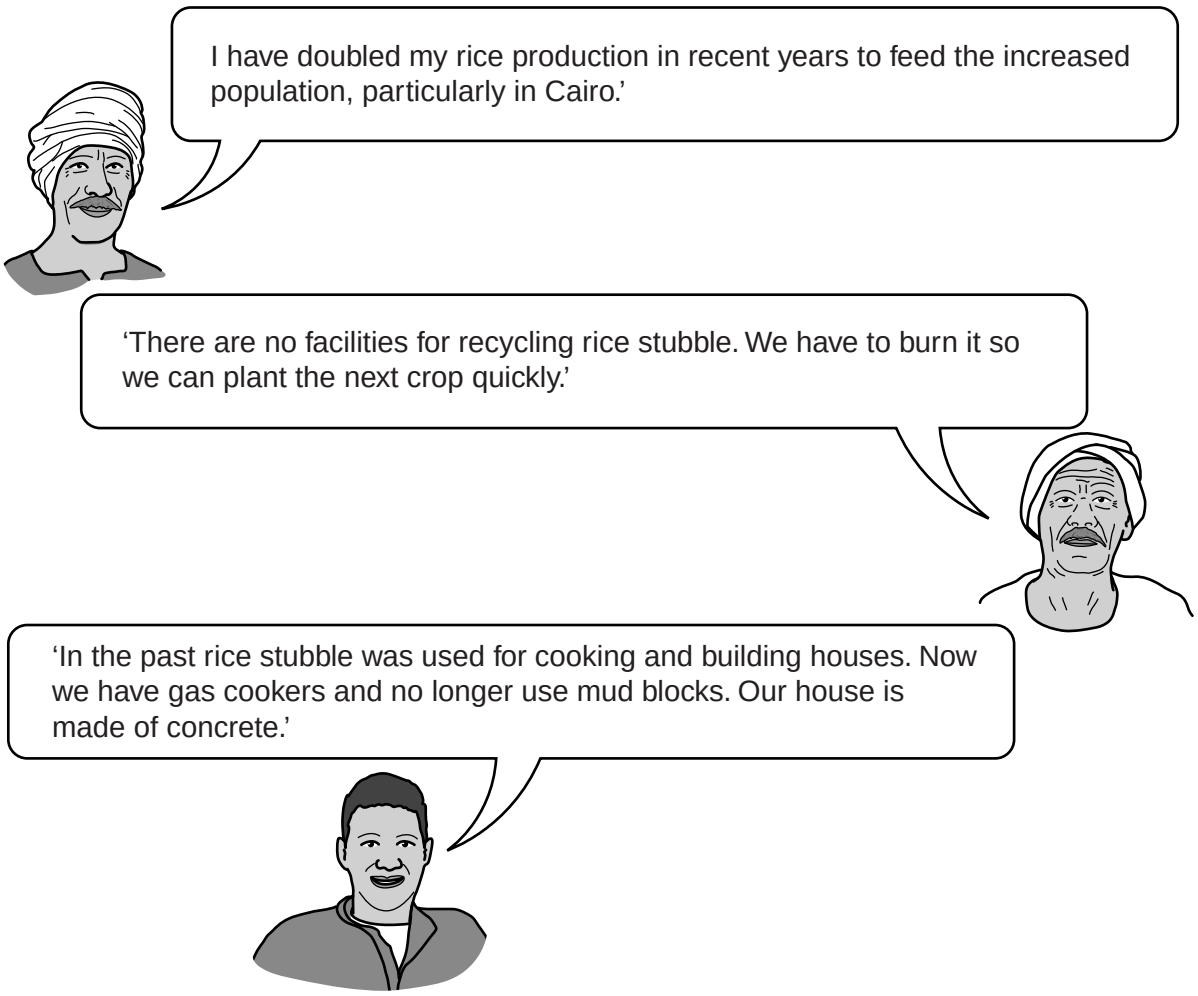
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..... [3]

(b) The government has recently made rice stubble burning illegal. There are at least 5000 violations of this law each year. Some farmers said:

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(i) Explain why some of the farmers continue burning rice stubble.

.....

.....

.....[2]

(ii) One of the farmers has described a sustainable way of life which has disappeared. Explain this and why the modern way of life is less sustainable.

.....

.....

.....[2]

(iii) The government of Egypt is keen to encourage more rice production. Give reasons for this.

.....

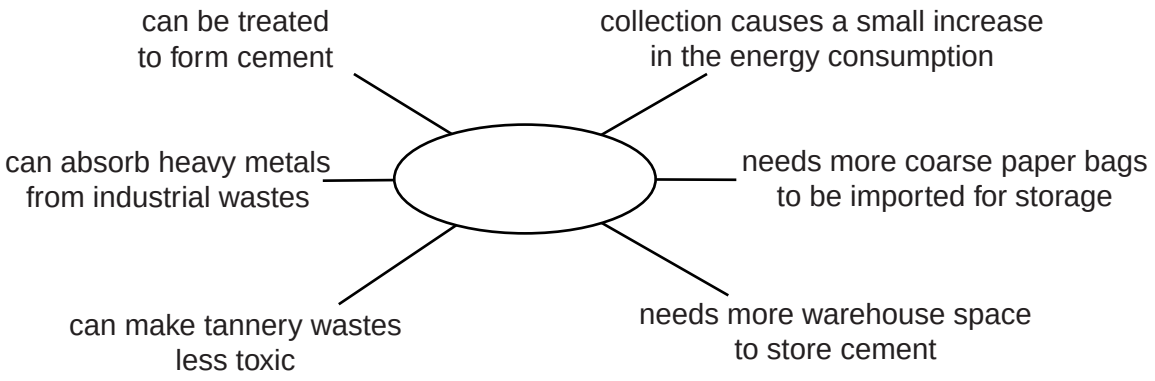
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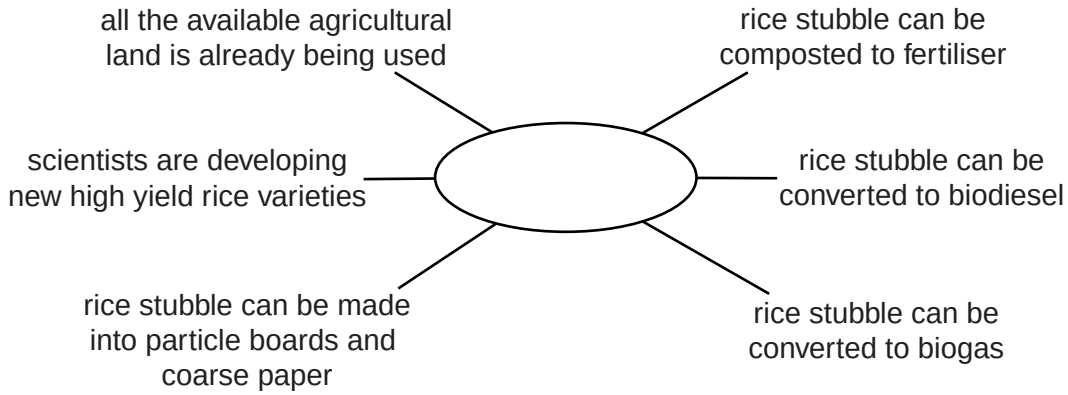
(c) Read the information in the two diagrams.

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Advantages and disadvantages of collecting cement dust



Rice production in Egypt



Provide a Development Plan for Cairo and the rice growing area south of the city using your own knowledge and the information given in the diagrams. State your proposals and give reasons for them.

allowed developments .....

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restrictions or bans .....

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..... [8]

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