UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

1598084244

ENVIRONMENTAL MANAGEMENT **0680/41**

Alternative to Coursework **May/June 2011**

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.

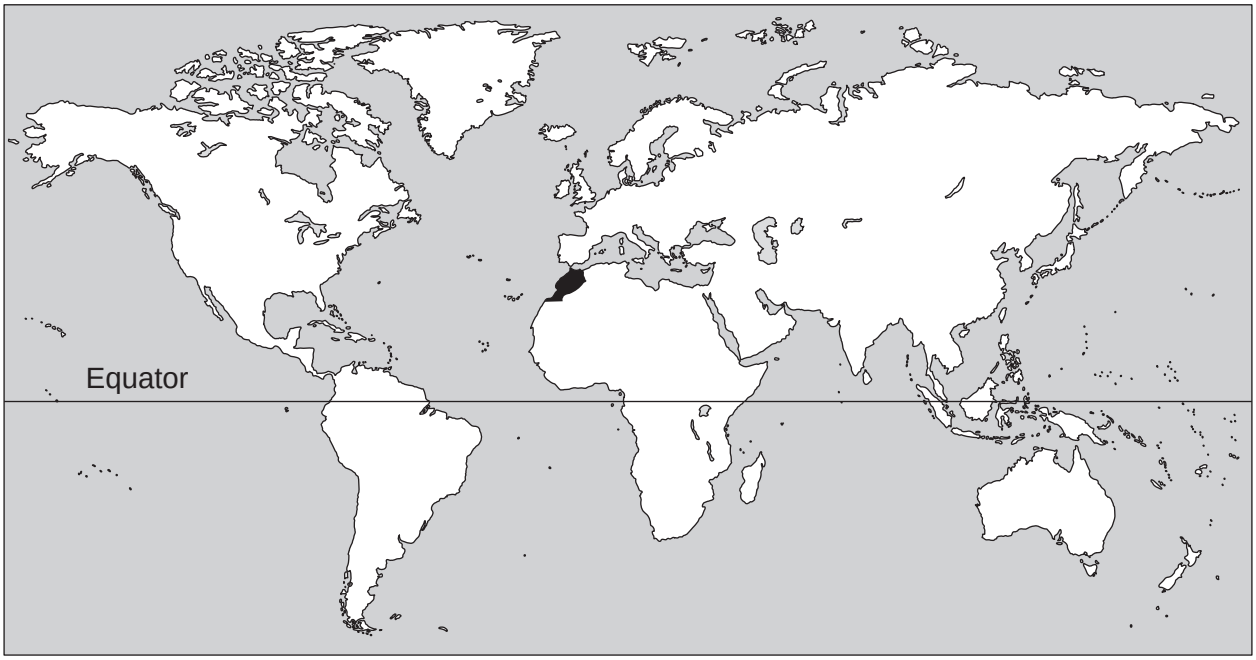
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

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2	
3	
Total	

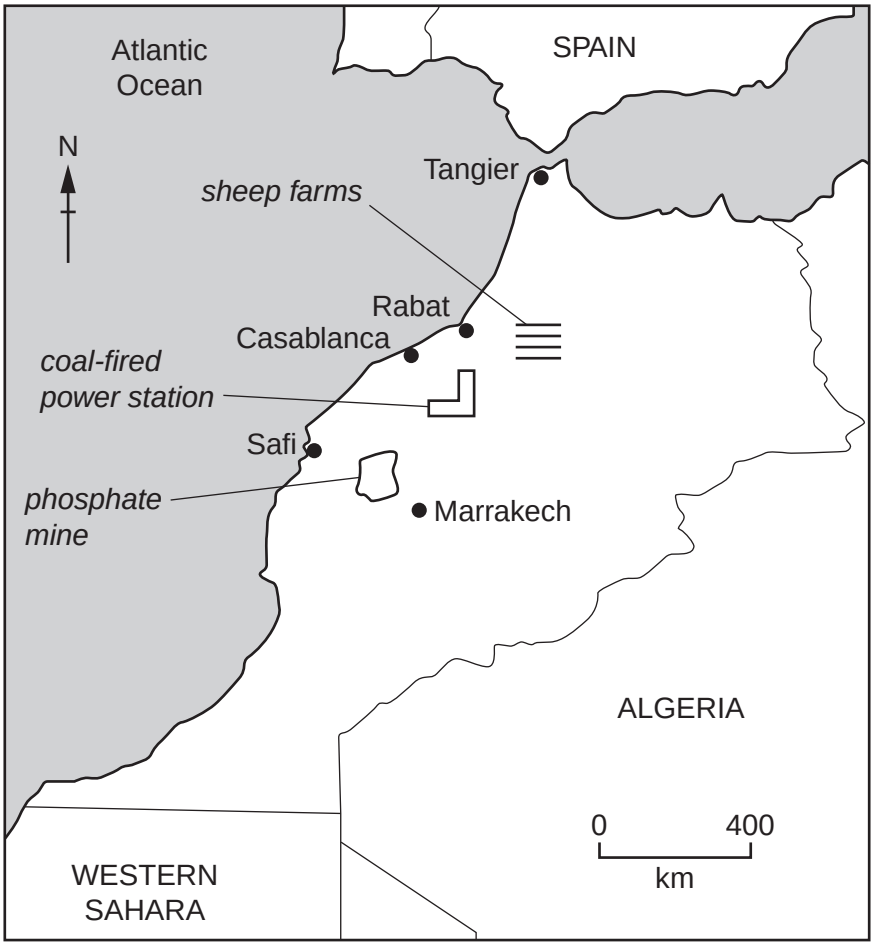
This document consists of **14** printed pages and **2** blank pages.

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Map of the World showing Morocco shaded



Map of Morocco



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Area of Morocco: 446 550 sq km
Population: 35 million
Children per woman: 2.51
Life expectancy at birth: 72 years
Currency: Moroccan dirhams (MAD 7.0 = 1US$)
Languages: Arabic, Berber dialects, French
Climate: warm, wet winters and hot, dry summers, becoming semi-arid in the interior
Terrain: northern coast and interior are mountainous with large areas of bordering plateaus, steep valleys and rich coastal plains
Main exports: clothing, electrical components, chemicals, phosphate rock, fertilisers, petroleum products, citrus fruits, vegetables, fish

Morocco has been developing a diverse economy for twenty years. However, unemployment can still reach 20% in urban areas. More than 40% of the population work in agriculture and 20% in industry. The country is trying to develop tourism but only has just enough water and electricity supply for its current needs.

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[Turn over

1 Morocco has many small farms. Sheep farming is an important part of the agricultural economy. Most sheep are fed on poor pasture and the flocks of sheep are moved from one pasture to another to prevent overgrazing. In most years the output from sheep farming is low.

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(a) (i) Explain how overgrazing can lead to desertification.

.....

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.....

.....[3]

(ii) Two breeds of sheep, the Sardi and the Timahdit, have been kept on farms for many years. An agricultural researcher wanted to find out which breed of sheep was most productive. Two farms next to each other were selected. On each farm a flock of 50 sheep was monitored for one year. These were the results after one year.

total output	**Sardi flock of 50 sheep**	**Timahdit flock of 50 sheep**
milk (litres)	2000	1600
meat (kg)	580	690
number of lambs	35	31
wool (kg)	30	35

Explain why the researcher selected farms that were next to each other.

.....

.....[2]

(iii) Why did the researcher study two flocks with the same number of sheep?

.....

.....[1]

(iv) Suggest **one** other factor the scientist would have kept the same for both farms.

.....[1]

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(v) Some farmers chose to keep Sardi sheep and others to keep Timahdit sheep. Use information from the table to explain why.

.....

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..... [2]

(b) The researcher suggested planting a pasture of a self-seeding plant called Medicago. A different flock of 40 sheep was divided into two groups. One group was grazed on traditional poor pasture and the other on new Medicago pasture. These are the results at the end of one year.

total output in a year (kg)	**poor pasture**	**Medicago pasture**
live weight of lambs	360	432
live weight of ewes *	610	793
dry forage harvested for the dry season	750	125

* ewes are adult females

(i) Calculate the % increase in live weight of lambs and ewes.

lambs .....

ewes ..... [2]

(ii) How could the harvested pasture be used to increase farming output?

.....[1]

(iii) The farmers were pleased with the trial and wanted more Medicago pastures.

Explain why changing their pasture would not require much work.

.....

.....[1]

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[Turn over

(c) The climate for this farming region is shown in the table.

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month	average maximum temperature (°C)	average rainfall (mm)	average number of wet days per month
January	18	25	7
February	20	28	5
March	23	33	6
April	26	31	6
May	29	15	2
June	33	8	1
July	38	2	1
August	38	4	1
September	33	10	3
October	28	23	4
November	23	32	3
December	19	31	7
	Total		

(i) Complete the table to show the total rainfall. [1]

(ii) Which are the driest and wettest months?

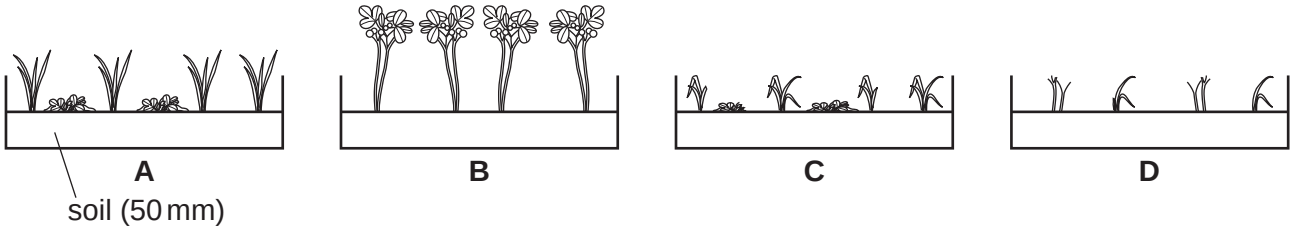
driest month .....

wettest month ..... [1]

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Some farmers were worried that the new Medicago pasture might not grow well in drought years. To find out how the two pastures respond to drought the researcher carried out a trial as shown below.

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key:

A and **B**: wet soil
C and **D**: dry soil
A and **C**: traditional pasture
B and **D**: Medicago pasture

(iii) What do the results of this trial show?

.....

..... [1]

(iv) How could the researcher have obtained more reliable results from the trial?

.....

..... [1]

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(d) On average, farmers in Morocco expect drought conditions once in every five years. To improve output on sloping land terraces have been built. These small terraced fields have a first crop of barley harvested in June followed by a second crop of wheat harvested in October. The sheep are taken from the pasture to graze in the mountains between May and October.

The researcher suggested three development plans to improve output from small farms.

Plan A Plant Medicago on all the pastures. Buy more sheep and keep them on the pasture all year. Grow barley and wheat on terraced fields.

Plan B Plant Medicago on half the pastures. Move sheep to highland grazing between May and October. Grow barley and wheat on terraced fields.

Plan C Plant Medicago on half the pastures. Move sheep to highland grazing between May and October. Grow beans, tomatoes, barley and wheat on terraced fields.

(i) Suggest one reason why Plan **A** would not improve farm output.

.....[1]

(ii) Why might Plan **B** have advantages in drought and non-drought years.

.....

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.....[2]

(iii) Suggest reasons why a farmer chose to carry out Plan **C**.

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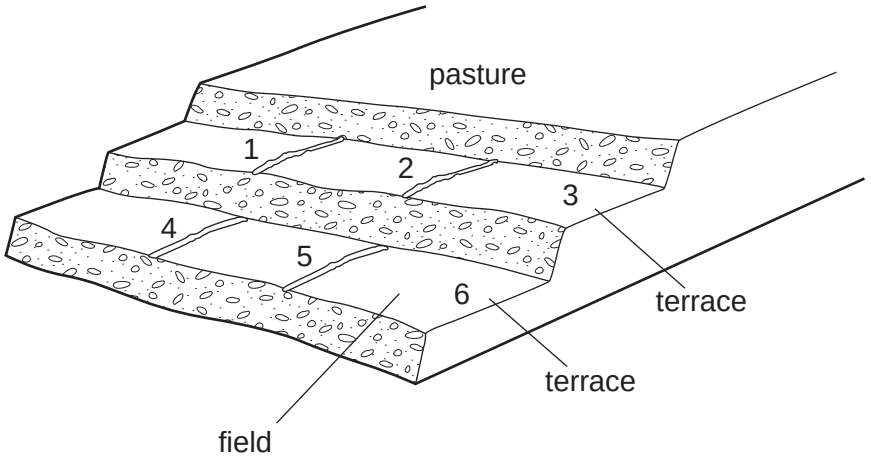
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..... [2]

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(e) (i) Describe how a farmer could carry out Plan **C** over two or more years to increase output. The farm layout is shown below.

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.....

.....

.....[4]

(ii) Explain how terracing can help to maintain soil fertility and prevent soil erosion.

maintain soil fertility.....

.....

.....

prevent soil erosion .....

.....

.....[4]

2 Mining is a very important industry in Morocco. The table shows a summary of mining activity in 2010.

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mineral	tonnes mined	value per tonne (US$)
antimony	500	5500
cobalt	1500	66000
copper	4500	6600
iron ore	4400	134
lead	45000	2420
manganese	11000	1760
phosphate	2800000	430
silver	50700	39600
zinc	72000	2640

(a) (i) Which mineral has the highest tonnage?

.....[1]

(ii) What was the total value of cobalt mined in 2010?

Show your working.

..... US $ [1]

(b) Some minerals can harm the health of people working in the mining industry. The health risks are shown in the table.

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	level of risk for three different minerals		
health problem	**cobalt**	**lead**	**zinc**
skin irritant	low	none	none
lung diseases	low	low	none
blood poisoning	none	low	none
harm to unborn children	low	low	none
increased risk of cancer	low	low	low

(i) Using this data, explain which minerals pose the greatest risk to miners.

.....

.....

.....

.....[4]

(ii) These minerals are heavy metals. Heavy metals can spill into the sea when being loaded into ships for export.

Draw arrows to show the feeding relationship in this food chain. [1]

algae small fish large fish

(iii) Which organisms would have the lowest and highest concentrations of heavy metals? Explain your answer.

lowest .....

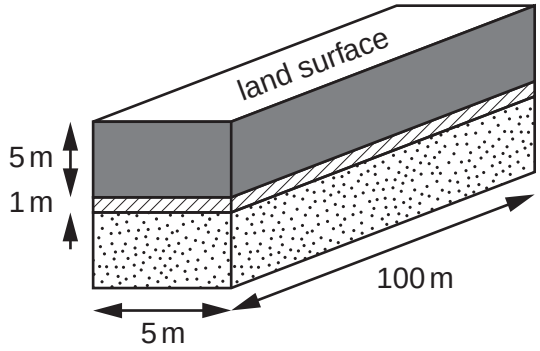
highest .....

explanation.....

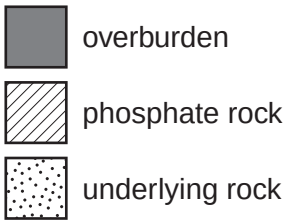
..... [3]

(c) Phosphate mining is very important to the economy of Morocco. Open-cast mining is used to extract phosphate rocks. The area of an open-cast mine is shown below.

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not to scale



(i) How many times greater is the amount of overburden which needs to be removed compared with the amount of phosphate rock mined from this area?

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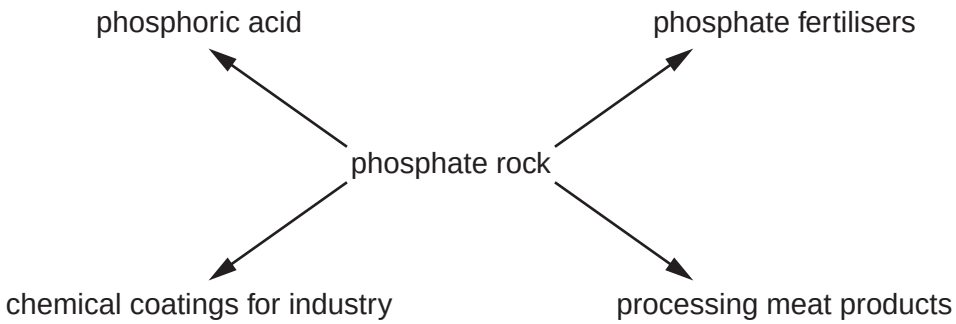
..... [1]

(ii) How many cubic metres of phosphate can be extracted from this area?

.....

..... [1]

(iii) The phosphate rock is used in many different ways.



Suggest **one** advantage to the economy of Morocco resulting from processing phosphate rock in this way.

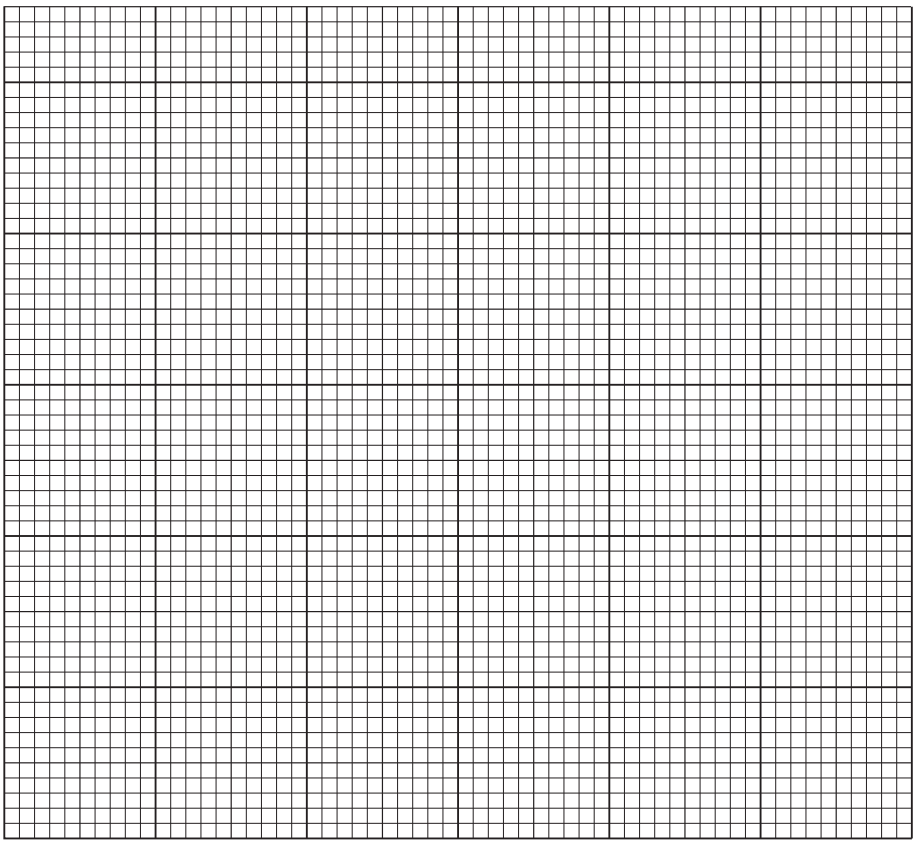
..... [1]

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(iv) An agricultural researcher wanted to find out how much phosphate fertiliser is ideal for growing barley. The researcher planted barley at the same density on six experimental plots and added different amounts of fertiliser to each plot. The output is shown in the table.

phosphate fertiliser added (kg per 100 m^2)	0	6	12	18	27	36
barley output (kg)	110	150	180	210	210	210

Plot a graph of the data.



[4]

(v) Describe the pattern shown by the data

between 0 and12 kg of fertiliser

.....

between 18 and 36 kg of fertiliser.

.....[2]

(vi) What quantity of fertiliser would you advise farmers to use for growing barley? Give a reason for your answer.

.....

..... [1]

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3 The Moroccan population has increased in the last twenty years. There have been shortages of electricity and frequent power cuts. A coal fired power station, 130 km from Casablanca, has been enlarged to supply one third of the country's electricity.

- This power station burns 4 million tonnes of coal a year
- Morocco produces no coal of its own
- The power station has a working life of thirty years
- Waste called fly ash has to be stored
- Fly ash can be used in cement manufacture
- There are several cement plants in Morocco producing 15 million tonnes each year, some of which is exported

(a) Explain why building a cement plant near this power station would be a sensible development.

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..... [2]

(b) Describe an environmental problem caused by burning coal to generate electricity.

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..... [2]

(c) The government is beginning to generate electricity from solar panels located in the desert in the south of the country. Suggest two advantages of generating electricity in this way.

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..... [2]

(d) Morocco produces some oil and natural gas but still has to import these from other countries. Describe an energy plan for the future that will allow a reliable supply of electricity for Morocco that people can afford.

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..... [4]

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