

Cambridge International Examinations

Cambridge Ordinary Level

CANDIDATE NAME					
CENTRE NUMBER			CANDIDATE NUMBER		

8 2 1 2 4 7 0 1 8 8

ENVIRONMENTAL MANAGEMENT

5014/21

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.

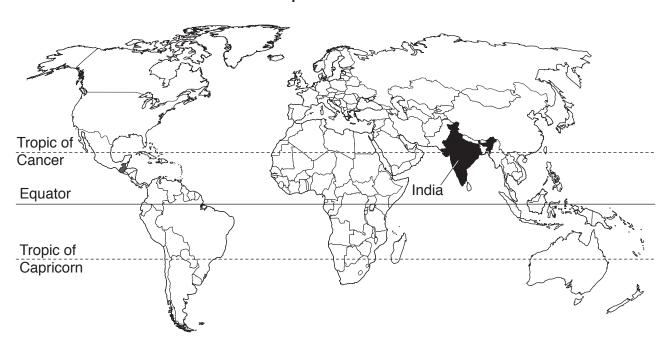
You may use the source data to draw diagrams and graphs or to do calculations to illustrate your answers.

At the end of the examination, fasten all your work securely together.

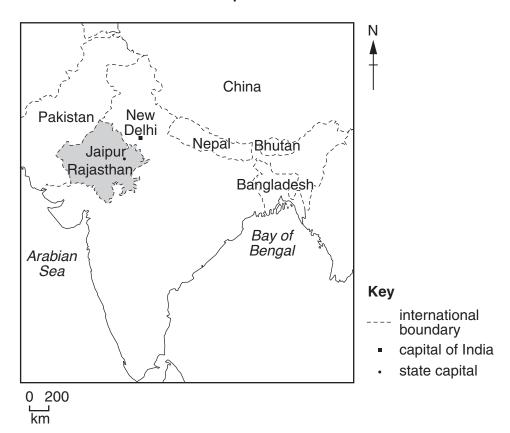
The number of marks is given in brackets [] at the end of each question or part question.



map of the world



map of India



area of India: 3.3 million km²

population: 1252 million

children per woman: 2.48

life expectancy: 68 years

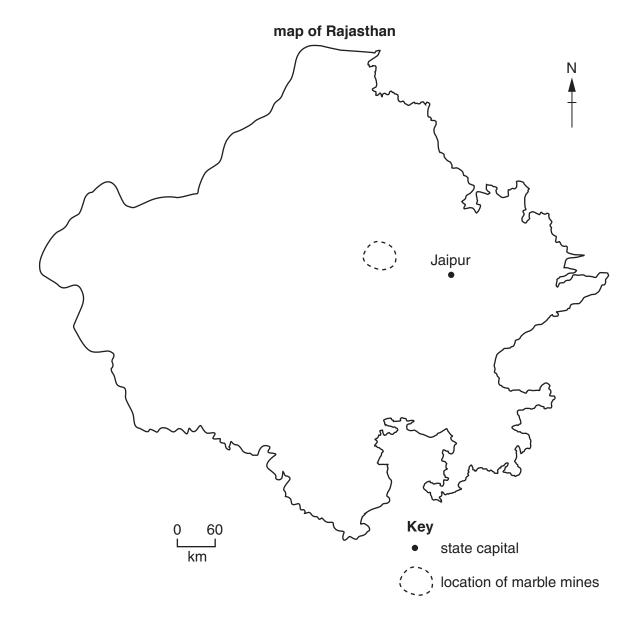
currency: Indian Rupee (60 INR = 1 USD)

languages: Hindi, many other languages

climate: tropical monsoon, arid in north west

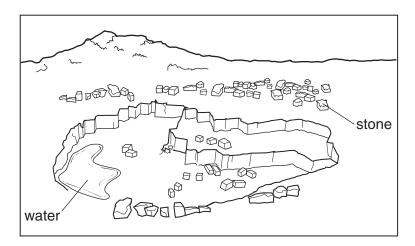
terrain: mountains in the north, Ganges valley, plateau in south

main exports: petroleum products, precious stones, machinery, iron and steel, chemicals, vehicles, clothing



1 Rajasthan has the largest area of any state in India and a population of 85 million.

Most of the population are farmers and live in small villages. Natural resources include marble, granite, sandstone, copper, zinc and oil. There are thousands of small quarries and mines from which stone is extracted. An example is shown in the diagram below.



(a) The eight largest cities in the state are shown in the table.

city	population/millions
Jaipur	3.1
Jodhpur	1.2
Kota	1.0
Bikaner	0.7
Ajmer	0.6
Bhilwara	0.4
Alwar	0.4
Bharatpur	0.3
total	

(i)	Complete the table.	[1]

(ii) Calculate the percentage of the 85 million people of Rajasthan that live in these cities.
Space for working.

 %	[1]

(b) Some businesses in the cities trade in stone to supply other states in India and to export to other countries. White marble is a valuable form of stone. Labourers migrate from farming villages to work in the mines. Most of the work is done by hand. When the mines flood, work stops for at least three months.

Look at the rainfall data for a location near a mine.

month	J	F	М	А	М	J	J	А	S	0	N	D
average rainfall/mm	5	3	4	3	11	93	239	232	105	18	16	2

(i)	State in which three months work is most likely to stop in the mine.
	[1]
(ii)	Suggest the impact on labourers when mining has to stop.
	[1]
(iii)	People living near a mine suffer more disease when the mine is flooded than when it is not flooded. Suggest why.
	[3]
(iv)	This mining of marble causes noise and dust pollution. Suggest how noise and dust pollution can affect the environment near the mine.
	[4]

(c) Read these quotes from two miners.

We work ten hours a day, six days a week. Our employer only gives us water to drink. Many miners
cannot continue working for
more than a few years as their lungs
become damaged. They are not paid
compensation when they can no
longer work.

(i)	Suggest three other items employers should give to miners.
	ıcı
(ii)	Suggest why the miners are not paid compensation.
	[2]
	es are abandoned when all the marble has been removed. scribe what can be done to restore the land when a mine reaches the end of its working
	[4]

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(d)

(e) A student carried out a visual survey of three piles of waste from a marble mine.



waste pile one

No plants on pile. Plants only seen 10 m from the edge of the pile. Dust comes from pile when wind blows.



waste pile two

No dust released when wind blows. Some plants on one side of pile. A few plants $5\,\mathrm{m}$ from pile.



waste pile three

Some plants on all sides of the pile. No dust released when wind blows. Some plants at the base of the pile.

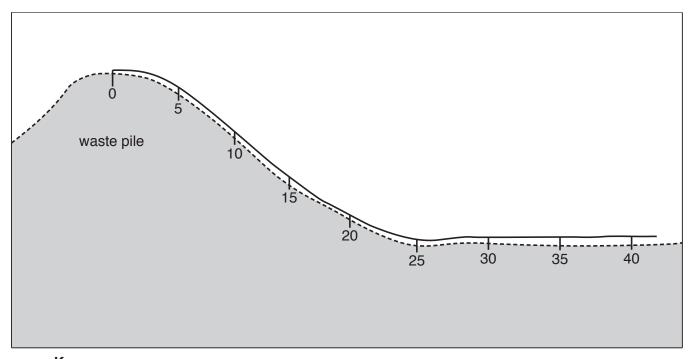
Using this information, state which is the newest and which is the oldest pile.

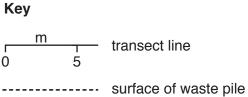
newest

oldest

[2]

(f) The student decided to carry out a more detailed survey to record the plants found along a transect starting at the top of a waste pile. They surveyed at 5 m intervals using a 0.25 m² quadrat. The student also measured pH and surface temperature at 5 m intervals.

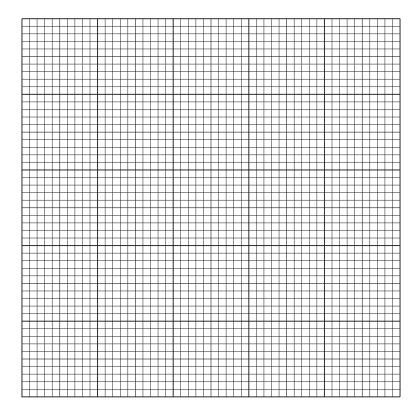




The results are shown in the table.

distance from top of waste pile /m	0	5	10	15	20	25	30	35	40
number of plants	1	2	5	8	12	13	18	17	18
number of plant species	1	1	1	2	3	3	5	4	5
рН	8.7	8.6	8.5	8.2	7.7	7.4	7.2	7.2	7.2
surface temperature/°C	25	25	26	26	25	24	23	23	24





(ii)	Describe the trend shown by the graph.
	[1]
(iii)	The student decided that waste from the mine had an effect on the plants. Using information in the table, and your own knowledge, explain the findings of this survey.

			10)	
	(iv)		se findings may not ste in Rajasthan.	be representative	of the problems caused by the
					[2]
	(v)		ther investigation the nese mines may affec		ry out in a laboratory to find out vn nearby.
			•	. •	·
					[3]
(g)	Δhc				n cutting and polishing machines
(9)	are	used, large amou			form slurry. This is pumped onto
		rby land. achine has been	made that can produc	ce building blocks.	The following raw materials can
	be ι	used to make up t	to 750 000 blocks in o	ne year.	
			raw material	mass/tonnes	
			cement	11	-
			sand	32	
			slurry	272	
			total	315	1
	(i)	Calculate the ne	rcentage by mass of	slurry in each block	- k.
	17	•		5.a.r.j iii 343ii 5100i	
		Space for working	ıy.		

..... % [2]

(ii)	Suggest advantages to block-makers and mine owners of using this machine.
	block-makers
	mine owners
	[3]

2 (a) The annual rainfall across Rajasthan varies from 100 mm to 1000 mm. The average annual rainfall is 574 mm. Some parts of Rajasthan experience drought. Many villages have built a small dam to capture surface run-off. This water refills wells and aquifers. An example is shown below.

small — dam		water Key area for livestock area for growing crops
(i)	Shade in one area suitable for livestock and one are Complete the key.	rea suitable for growing crops. [3]
(ii)	Explain your choices in part (i).	
		[2]
(iii)	Describe how wells below the small dam can provide wa	ater during drought.

(b) Read the newspaper report shown below.

This year's drought continues

The drought continues. Most villages with small dams still have enough drinking water, but livestock are now suffering. There have been many reports of less reproduction, lower milk yields, poor health and high mortality rates amongst all types of livestock.

	Suggest reasons why the government is usually reluctant to declare a drought.					
		[3]				
(c)	To find out how drought affects villages a survey of livestock is carried out regularly. A samp of villages in every district is surveyed.	ole				
	(i) Describe how the villages could be sampled for this survey.					
		[1]				
	(ii) A questionnaire is used to find out about the survival of village livestock and the productivity. Complete the questionnaire with three further questions. The first one habeen done for you.					
	1. Which animals do you keep?					
	goats sheep chickens buffalo					
	2					
	3					
	4					
		 [4]				

(iii) Some results for the survey of one village in a drought year are shown below.

animal	number before drought	number after drought	percentage decrease
goats	110	101	8.2
sheep	150	98	34.7
chickens	200	155	22.5
buffalo	35	32	

			1			
ickens		200	155	22.5		
ffalo	35	32				
	Complete th	ne table.		[1]		
	Space for w	orking.				
(iv)	Suggest reasons why some types of livestock are less affected by drought than others.					
				[3]		

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