O

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

0865540129

ENVIRONMENTAL MANAGEMENT **5014/12**

Paper 1 **October/November 2011**

2 hours 15 minutes

Candidates answer on the Question Paper.

Additional Materials: Ruler
Protractor
1 Insert

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.
All questions in Section A carry 10 marks.
Both questions in Section B carry 40 marks.

The Insert contains the photograph needed for Question 4.
DO NOT WRITE ON THE INSERT.
At the end of the examination, fasten all your work securely together. But keep the Insert separate from the question paper it is **not** needed by the Examiner.
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
1	
2	
3	
4	
5	
6	
Total	

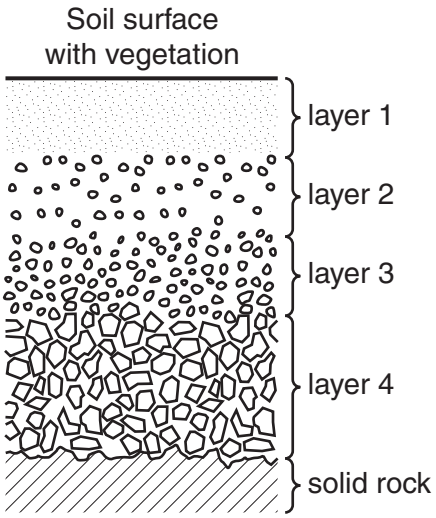
This document consists of **25** printed pages and **3** blank pages and **1** insert.

UNIVERSITY of CAMBRIDGE International Examinations

Section A

For Examiner's Use

1 **(a)** The diagram shows a soil with numbered layers of different sized mineral particles above solid rock.



(i) How does the mineral particle size change with depth?

..... [1]

(ii) In which layer are the particles least rounded?

..... [1]

(iii) What was the source of the mineral particles shown in the diagram?

..... [1]

(iv) Explain the change in particle size with depth.

.....

.....

..... [2]

(v) Describe the pore space, drainage and likely air content of a sandy soil with a coarse texture.

pore space .....

drainage .....

air content ..... [3]

(b) How can a farmer improve land where the soil is too wet for farming?

For Examiner's Use

.....

.....

..... [2]

2 **(a)** Explain why large numbers of fish live in sea areas near the coast.

For Examiner's Use

.....

.....

.....

.....

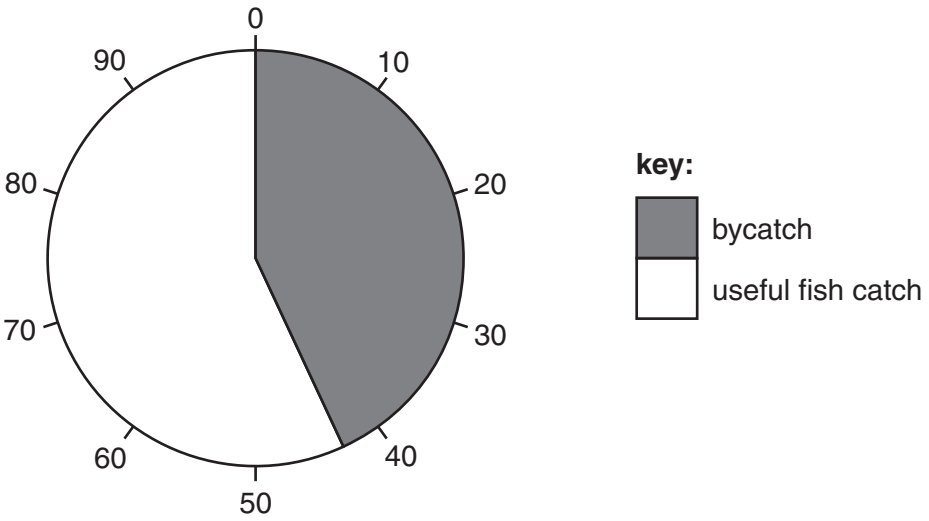
.....

.....

.....

..... [4]

(b) Look at the pie chart which shows the percentage of the World fish catch which is useful and the percentage which is bycatch (the percentage which is unused or wasted).



What percentage of the total World catch is bycatch?

..... % [1]

(c) The table shows the weight of the total catch and of the bycatch for four fishing areas.

For Examiner's Use

area	**total catch** (million metric tonnes)	**bycatch** (million metric tonnes)
North East Atlantic	13.5	2.7
Mediterranean and Black Sea	1.5	0.3
Caribbean	0.4	0.25
Africa	10.0	7.0

(i) What percentage of Africa's total catch is bycatch?

..... % [1]

(ii) How does Africa's bycatch percentage differ from all the other areas in the table?

..... [1]

(d) Suggest why many people are very concerned about high bycatch levels.

.....

.....

.....

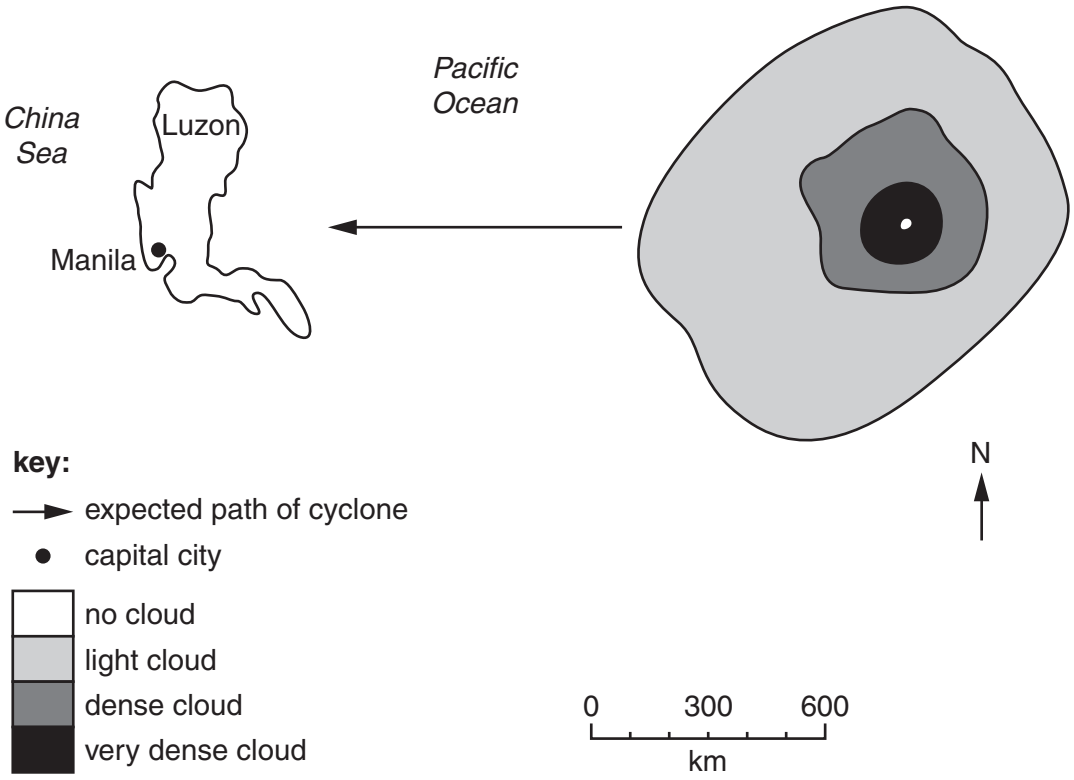
.....

.....

..... [3]

3 **(a)** The map shows a cyclone in the Pacific Ocean approaching Luzon, the most populated island in the Philippines.

For Examiner's Use



(i) In which compass direction was the cyclone expected to travel?

..... [1]

(ii) How many kilometres is the leading edge of the cloud from the nearest coast of Luzon?

..... km [1]

(iii) Describe the cloud pattern of the cyclone.

.....

.....

..... [2]

(iv) Describe and explain the amount of pressure in the centre of a cyclone.

.....

.....

.....

..... [2]

(b) Suggest what weather warnings and advice would have been issued to the people of Luzon by weather forecasters as the cyclone approached.

For Examiner's Use

weather warnings .....

.....

.....

advice .....

.....

.....

.....

..... [4]

For Examiner's Use

4 **(a)** Look at the photograph (Insert).

(i) The natural vegetation of the area is shown in the foreground of the photograph. Describe the natural vegetation and how it differs from the planted forest in the background which has replaced it.

.....

.....

.....

.....

.....

..... [3]

(ii) One area on the photograph has been cleared of coniferous forest for timber. Explain why this could lead to a poorer soil environment.

.....

.....

.....

.....

.....

..... [3]

(b) Describe methods of managing forests more sustainably.

For Examiner's Use

.....

.....

.....

.....

.....

.....

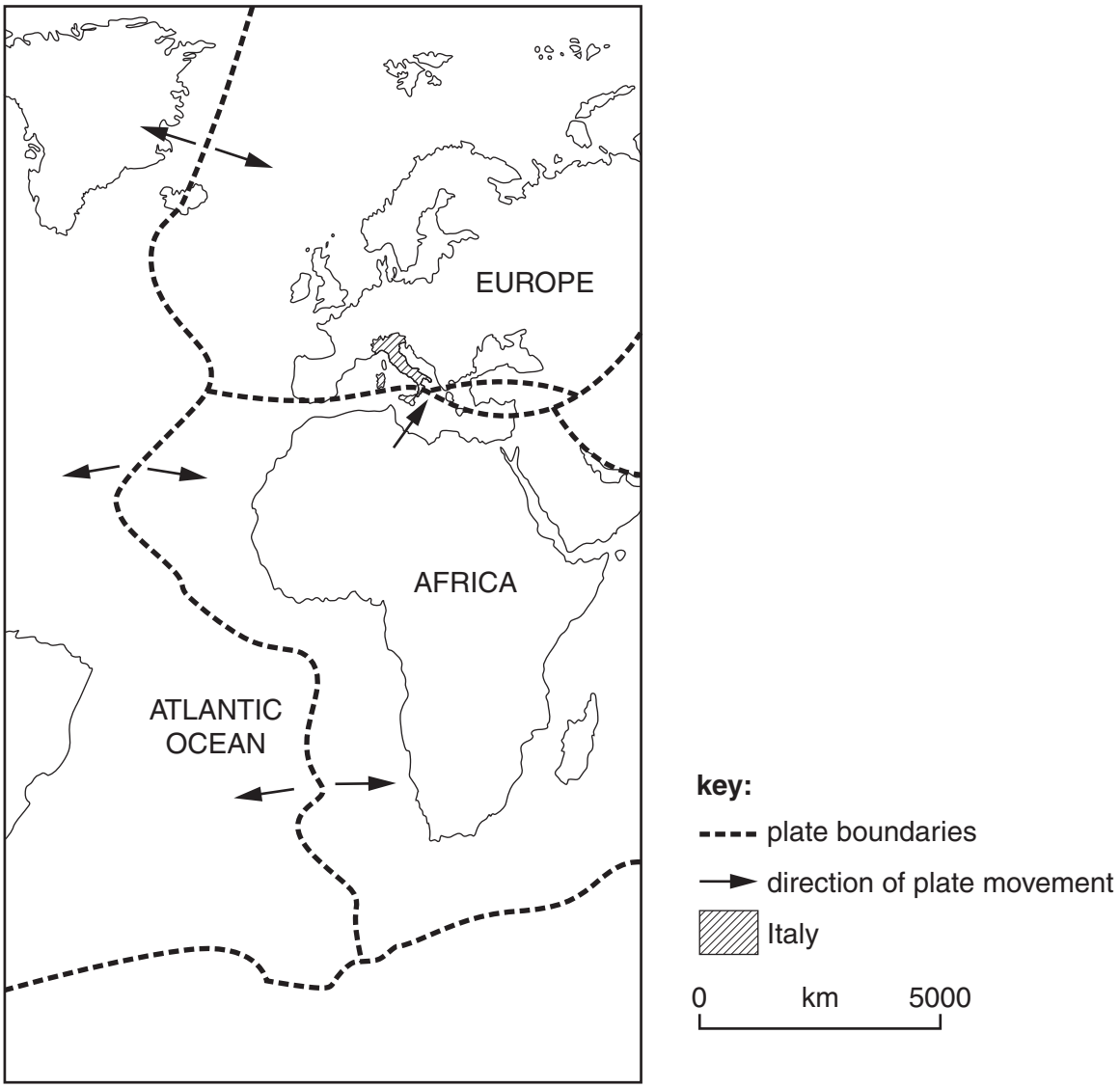
.....

..... [4]

Section B

For Examiner's Use

5 **(a)** Look at the map which shows major plate boundaries in the Atlantic Ocean, Europe and Africa.



(i) On the map, shade or colour in the course of the constructive plate boundary. [1]

(ii) In which part of Africa is the earthquake risk highest? Explain your answer.

.....

.....

.....

.....

..... [3]

(iii) State what happens at a constructive plate boundary.

For Examiner's Use

.....

.....

.....

..... [2]

(b) The map gives more information about tectonic activity in Italy.

key:

- major plate boundary
- fault lines (large cracks)
- ● cities
- ▲ Mt. Vesuvius volcano
- × location of strong earthquakes since 1908

(i) From the map, state the evidence which shows that the earthquake risk is high in many areas of Italy.

.....

.....

.....

.....

..... [3]

(ii) Describe how earthquakes can cause great loss of life both immediately after the main earthquake shock, and in the following days and weeks.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(c) The most recent of the strong earthquakes marked on the map of Italy was centred in the city of L'Aquila.

(i) Why was the earthquake risk near L'Aquila particularly high?

.....

..... [1]

(ii) Summary information about this earthquake is given in the box below.

For Examiner's Use

L'Aquila earthquake

Date and time	April 6th 2009: 03.32 hrs local time
Strength	Richter Scale 6.3
Effects	* 294 dead; 1200 injured * estimated 30,000 left homeless * 15,000 buildings destroyed or damaged beyond repair * churches and houses in the old centre were most badly damaged * insurance companies estimated their losses at US$ 4bn.
Responses	* A massive search and rescue effort involving 1700 rescuers and aid workers. Civil Protection staff brought in sniffer dogs and heavy lifting gear. The Air Force delivered blood plasma and flew out the wounded. * Within two days, 31 tented cities with chemical toilets were giving shelter to 18,000 homeless people. Train sleeper carriages were brought and parked in railway sidings. Bus companies from other areas sent 70 coaches to transport people to go to stay with relatives and friends in other areas of Italy. * An emergency fund of US$ 40 million was set up by the Government.

Where was the damage to buildings greatest? Suggest a reason why the buildings here were so badly damaged.

.....

.....

..... [2]

(iii) Give reasons why sniffer dogs and chemical toilets were used in rescue and relief efforts.

sniffer dogs

.....

.....

chemical toilets

.....

..... [2]

[Turn over

(iv) Italy is a developed country. Were the effects of the earthquake and peoples' responses to it more like those of a developed or developing country?

For Examiner's Use

With the help of the information given, explain as fully as you can.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(d) Many survivors of the L'Aquila earthquake were angry about the amount of damage to their homes. Look at some of the comments they made.

For Examiner's Use

A 'Why did modern buildings like the city's newest hospital collapse? Please ask the builders why they used sub-standard concrete and iron.'

B 'We felt tremors for weeks, and they were getting stronger. Last week a severe jolt led to schools being closed for two days, but the Authorities said that it was just normal tectonic activity.'

C 'Weeks ago a geologist put a message on the Internet that there would soon be an earthquake in L'Aquila, based on his measurements of fault movements. The Authorities accused him of spreading fear and forced him to remove it, saying that earthquakes cannot be predicted.'

D 'You know, here in Italy we have earthquakes, we have laws to make all buildings earthquake proof, but we also forget about them. It is not in our culture to build in an appropriate way in earthquake-prone areas.'

E 'In California, an earthquake like this would not have killed a single person.'

(i) Describe the methods used to reduce the risk of buildings collapsing and killing people in places such as California.

.....

.....

.....

.....

..... [3]

(ii) Give reasons why damage to buildings still happens in earthquakes, even in a developed country such as Italy.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(iii) Were the Authorities in Italy correct when they said that earthquakes cannot be predicted? Explain your answer.

.....

.....

.....

..... [2]

(e) In the south of Italy, just 11 km east of Naples, is the volcano Vesuvius (look back to the map of Italy for its location). The most famous eruption was almost 2000 years ago in year 79 when it destroyed the Roman cities of Pompeii and Herculaneum, killing about 16,000 people. Today, there are up to 20 towns around Naples, with a total population of over half a million people, who are living in the area at risk from another big eruption.

* The good news – volcanoes often give warning signs before erupting

* The bad news – predicting when an eruption will occur and how big it will be is not an exact science

(i) Large numbers of people live in some areas close to active volcanoes, such as around the volcano Vesuvius. Suggest reasons for this.

.....

.....

.....

.....

.....

..... [3]

For Examiner's Use

(ii) Give an example of a warning sign which suggests a volcano might be about to erupt.

.....

..... [1]

(f) Choices facing the Authorities in Naples and the area around it

What to do if Vesuvius gives warning signs of a possible eruption

A	**B**
Evacuate half a million people in advance – perhaps for days, if not for weeks	Leave people to try to escape when the big eruption happens

(i) What are the disadvantages of each of policies **A** and **B**?

.....

.....

.....

.....

.....

(ii) Is one policy better than the other? Explain what you think.

.....

.....

.....

.....

..... [5]

[Total: 40 marks]

6 **(a)** Information about world average water use is given below.

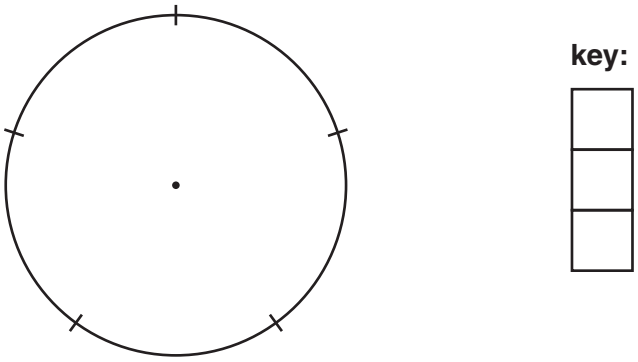
For Examiner's Use

Water use – world averages

water use by sector (percentages)			**water use per head per year** (cubic metres)
domestic 8	industry 22	agriculture 70	626

(i) Show the values for water use by sector on a pie graph.

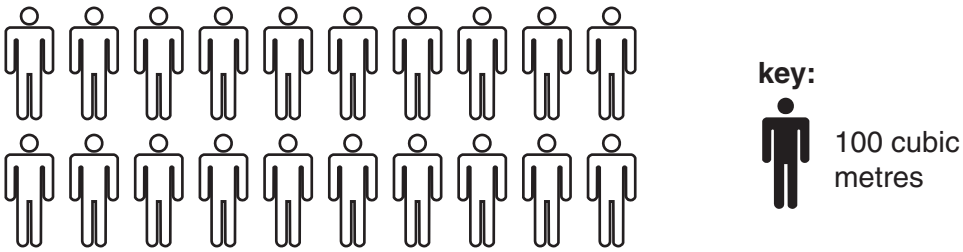
World average water use, % by sector



[3]

(ii) Show the value for water use per head on the pictograph.

World average water use, per head per year



[1]

(b) World averages like these hide differences in water use between different continents.

For Examiner's Use

Water use in five continents

mainly developing countries water use				mainly developed countries water use			
continents	**domestic %**	**industry %**	**agriculture %**	**continents**	**domestic %**	**industry %**	**agriculture %**
Africa	7	5	88	Europe	14	55	31
Asia	6	9	85	North America	13	47	40
Central & South America	12	16	72				

(i) Use the values to describe the main differences in water use between countries in developing and developed continents.

.....

.....

.....

.....

..... [3]

(ii) Using values from the table, state the evidence for the importance of water for agricultural use in continents which have mainly developing countries.

.....

..... [1]

(iii) Suggest reasons for the great importance of water use for agriculture in the developing world continents.

.....

.....

.....

.....

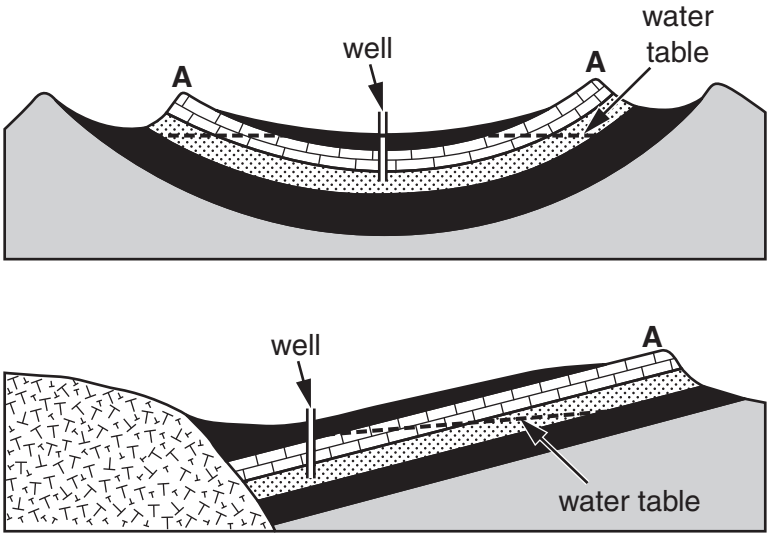
.....

..... [3]

(c) Farmers in all continents make use of underground water supplies. Two examples of underground water stores are shown in the diagrams below.

For Examiner's Use

Artesian basins



key:

Impermeable rocks

Clay

Granite

Underground water store

Permeable rocks

Limestone

Sandstone

(i) The water table is the level below which the rocks are saturated with water (full of water). On both diagrams, shade in the areas of rocks where underground water is stored. Complete the key. [2]

(ii) Describe how in both diagrams the layout of the rocks leads to the formation of underground water stores.

.....

.....

.....

.....

.....

.....

..... [4]

(iii) Explain why the rock outcrops marked **A** are essential for the formation of these underground water stores and for continued water use by farmers.

For Examiner's Use

.....

.....

.....

..... [2]

(iv) Are the two wells marked on the diagrams located in the best positions for farmers to obtain water from these underground stores? Explain as fully as you can.

.....

.....

.....

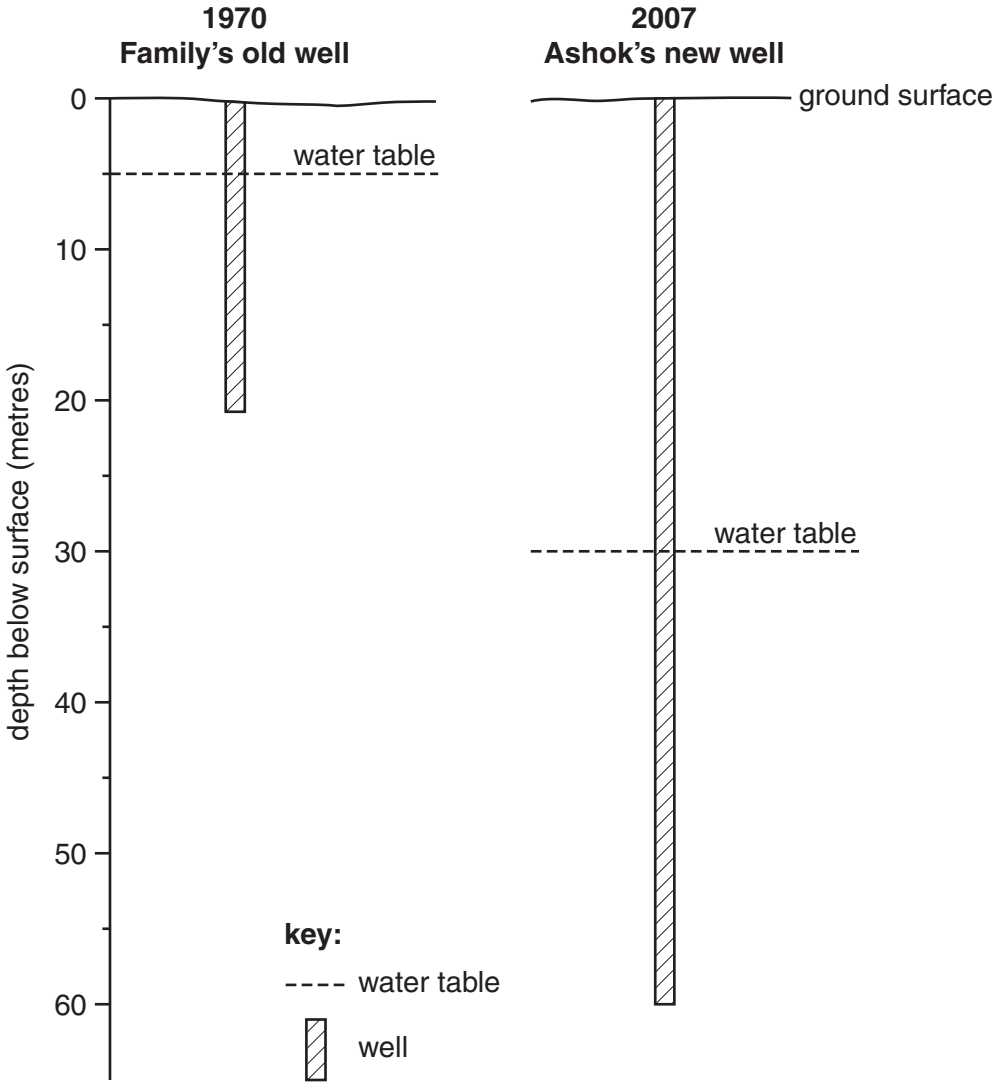
.....

..... [3]

(d) Look at the information about water supply on a farm in northern India.

For Examiner's Use

Ashok is a vegetable farmer in the Punjab with one hectare of land. It is a family farm. During his lifetime he has seen many changes. One of these is water supply for the farm and family. In 2007 Ashok invested Rs 100,000 (about US$ 2000) building a new bore well and installing a diesel pump. Many rice farmers near Ashok are doing the same.



(i) By how many metres has the level of the water table dropped between 1970 and 2007?

..... [1]

(ii) Why has the cost of obtaining underground water increased greatly for Ashok and other farmers in this area?

.....

.....

.....

..... [2]

(iii) Is this an example of sustainable or unsustainable use of underground water supplies? Explain your answer.

.....

.....

.....

..... [2]

(e) In summer 2009 the monsoon rains in many parts of India were poor, well below average. Water levels in many reservoirs fell to 11 per cent of total storage capacity, compared with expected water levels of about 26 per cent at this time of year.

One way of increasing water storage in countries such as India is by building new dams.

(i) State the physical conditions needed for building a large dam and reservoir.

.....

.....

.....

.....

.....

..... [3]

(ii) Often people living in the area are not in favour of new large dams being built. Explain why.

.....

.....

.....

.....

.....

..... [3]

(iii) Look at the information about population and water resources in India.

Population	**River run-off**	**Renewable water resources per head**	**Water use**	**Employment**
1,100 million 14% of total world population Natural increase 15.3 per 1000	4% of world total water flow	1800 cubic metres World average 6900 cubic metres	93% for agriculture	Two thirds of India's population depends on farming

Some experts are predicting that India will face a major water crisis by 2025. How strongly does the information support this prediction?

.....

.....

.....

.....

.....

..... [3]

(iv) Describe what farmers can do to reduce water use while trying to maintain levels of food output from their farms.

For Examiner's Use

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 40 marks]

BLANK PAGE

BLANK PAGE

BLANK PAGE