UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

ENVIRONMENTAL MANAGEMENT **0680/21**

Paper 2 **May/June 2012**

1 hour 45 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 **both** questions.

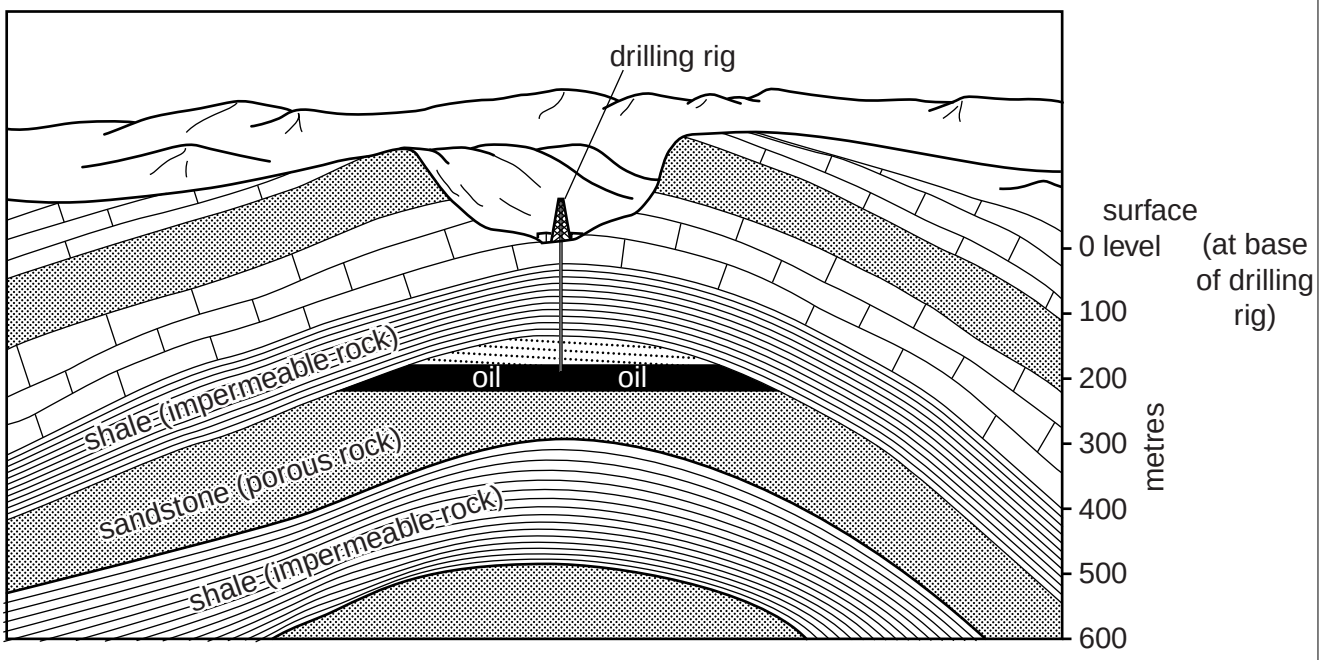
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
1	
2	
Total	

This document consists of **17** printed pages and **3** blank pages.

For Examiner's Use

1 **(a)** Look at the diagram showing an oil well. Wells like this are common in major oil producing areas of the world such as the Middle East.



(i) On the diagram, label the place where gas is most likely to be present. [1]

(ii) How long is the underground pipe reaching down to the oil?

.....[1]

(iii) Look at the type and arrangement of the rocks. Explain why oil has been trapped here.

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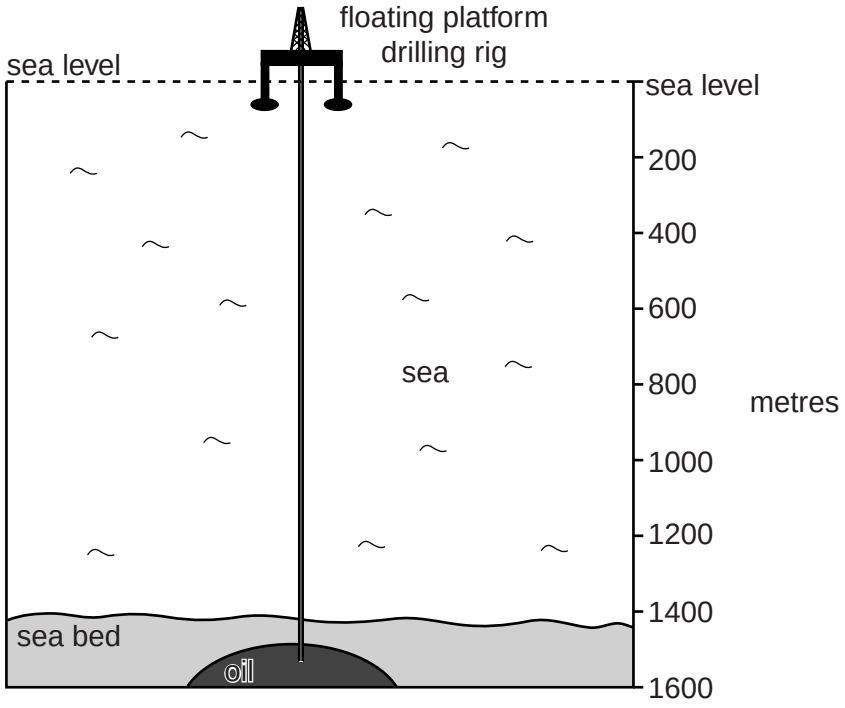
(iv) The diagram below shows another oil well. Wells like this are used to obtain oil from below the sea in locations such as the Gulf of Mexico.



How deep is the oil deposit below sea level?

.....[1]

(v) Why is there always a risk of oil spills from wells like this?

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(b) The costs of drilling for oil vary greatly between different areas of the world and different types of locations.

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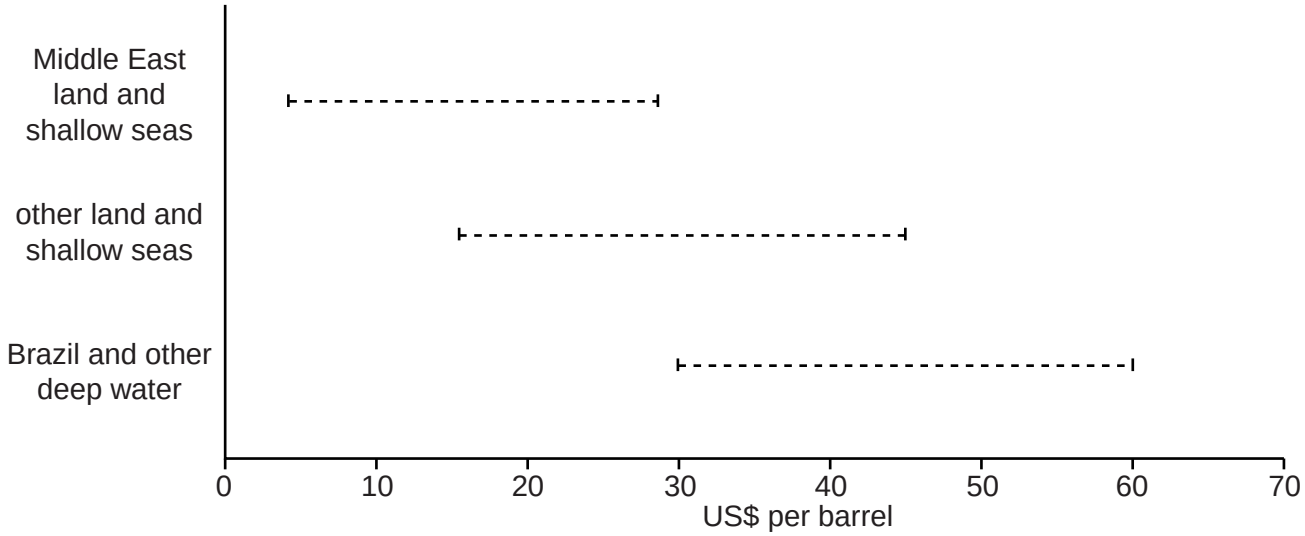
Range of costs for obtaining oil (US$ per barrel)



(i) Describe what the graph shows about the costs of oil production in the Middle East compared with other locations.

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.....[2]

(ii) Suggest reasons why the costs of oil production are higher in some locations than in others.

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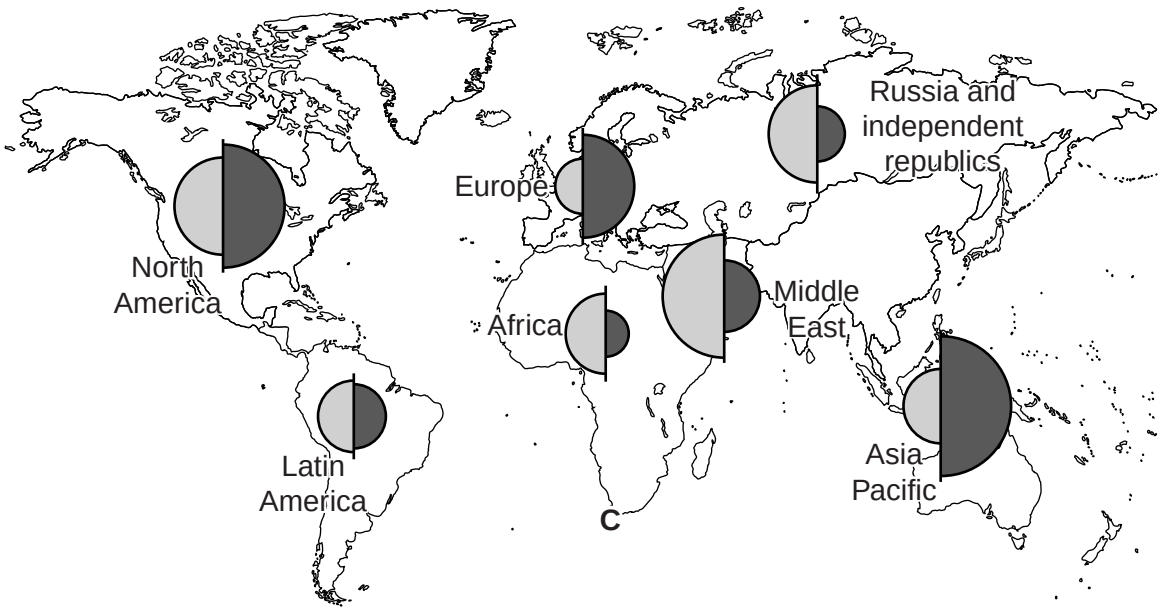
(c) Look at the map of world oil production and consumption in 2009.

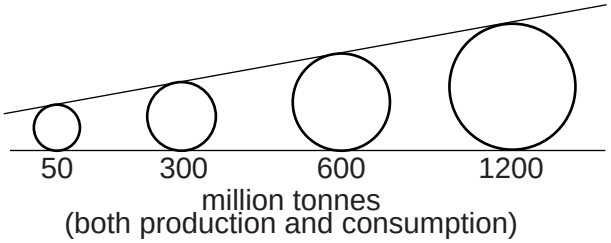
For Examiner's Use

World oil production and consumption 2009 (million tonnes)



Key:

production consumption



(i) Which are the world's largest oil producing and consuming regions?

largest production .....

largest consumption ..... [1]

(ii) List the seven world regions according to whether they are oil exporters or importers.

exporters	**importers**
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.....	.....
.....	.....
.....	..... [2]

(iii) Why is world trade in oil so great?

For Examiner's Use

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.....[3]

(iv) Many large supertankers carrying up to 500 000 tonnes of crude oil follow the Cape route around South Africa (marked **C** on the world map). Explain why this is one of the world's busiest tanker routes.

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.....[2]

(d) Every year the coast of South Africa is battered by strong winter storms. Since the year 1500, over 2000 ships have been wrecked off these rocky coasts. Sea birds such as the African penguin are in constant danger of spills from oil tankers.
Read this newspaper report about the African penguin.

African penguins in peril

Only 180 000 remain today compared with 1.45 million in 1910. They are now an endangered species. They are comical creatures at high risk from spills. This is because they are sociable birds breeding in large colonies, mainly on islands. They cannot fly, so they need to swim long distances to feed.

Oil is deadly for sea birds. Oiled feathers lose their waterproofing. The birds become cold and too weak to fish. In a spill, many of the fish on which they feed hide under the surface oil.

The good news is that the penguin's short wings and feathers make them easier to clean than other sea birds. Penguins are easy to round up in large groups and catch. They can be hand fed with fish. They are cleaned using warm water, detergents, a tooth brush and a special solution made from cooking oil. They survive well being handled by people, because they have robust bodies, strong bones and food reserves.

The other good news is that penguin survival rates are improving.

Tanker Apollo disaster off Cape Town in 1994 10 000 penguins affected 5 000 cleaned and saved	Tanker Treasure oil spill off Cape Town in 2000 40 000 penguins affected 36 000 cleaned and saved

(i) How many times greater were African penguin numbers in 1910 than today?
Circle one answer.

5 times 8 times 10 times 14 times [1]

(ii) Choose **two** reasons from the newspaper report to explain why the African penguin is at high risk from oil spills. Explain why the risk to penguins is greater than for many other sea birds.

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..... [3]

(iii) State the percentage survival rates for the penguins after each of the two tanker disasters in 1994 and 2000.

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1994 ..... % 2000 ..... % [1]

(iv) Suggest reasons to explain the improvement in survival rates over time.

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.....[3]

(e) Look at the data about the world's largest marine oil spills.

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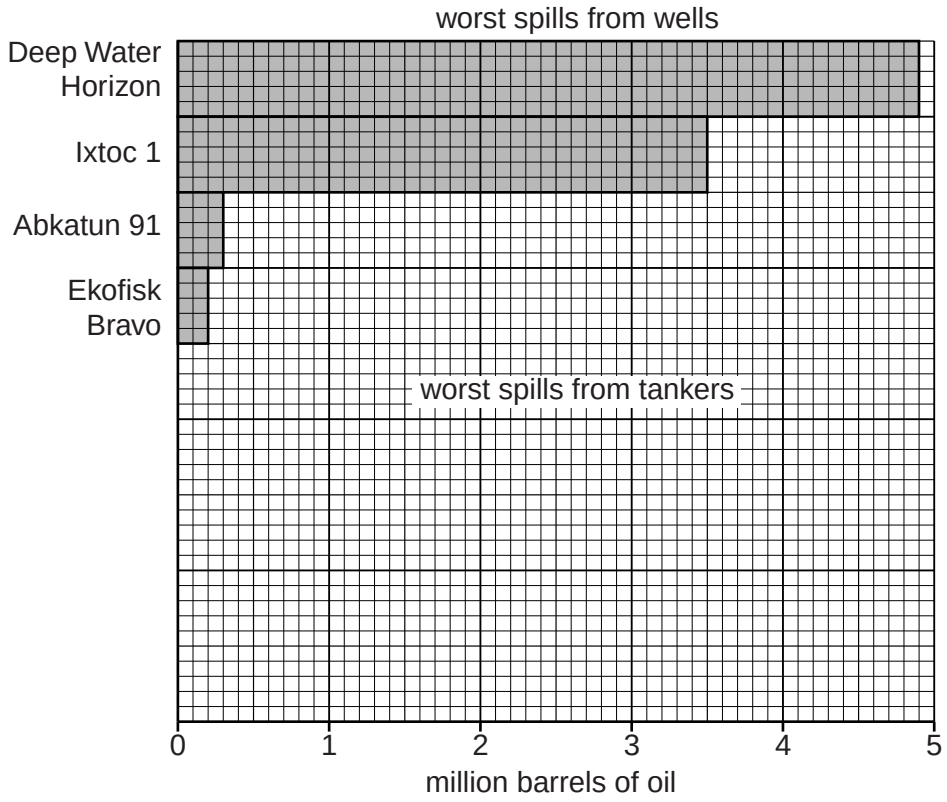
Worst four oil spills in the sea from wells and tankers

	rank	date	name	location	amount (million barrels)
A wells	**1**	2010	Deep Water Horizon	USA: Gulf of Mexico	4.9
	2	1979	Ixtoc 1	Mexico: Gulf of Mexico	3.5
	3	1986	Abkatun 91	Mexico: Gulf of Mexico	0.3
	4	1977	Ekofisk Bravo	Norway: North Sea	0.2
B tankers	**1**	1983	Castillo de Beliver	South Africa	1.9
	2	1978	Amoco Cadiz	France	1.6
	3	1988	Odyssey	Canada	1.1
	4	1979	Atlantic Empress	Trinidad and Tobago	1.0

(i) Complete the bar graph by plotting the four worst oil spills from tankers.



[2]

(ii) Suggest reasons why the size of some of the oil spills from wells is much larger than from tankers.

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.....[2]

(f) Listed below are some of the international measures taken, to try to prevent and reduce the effects of marine oil spills from tankers.

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- since 1993 all new tankers must have double hulls
- old tankers when 25 years old must be upgraded to these standards
- the polluter pays for the clean-up costs of any oil spills
- ships are forbidden from cleaning out their tanks at sea

Explain how these measures can help to

(i) prevent more oil spills from happening;

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(ii) increase the speed of the clean-up once an oil spill has happened.

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(g) Do you think it will ever be possible to prevent more marine oil spills from happening in the future? Explain your view.

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[Total: 40 marks]

2 **(a)** Look at the graph of world population growth.

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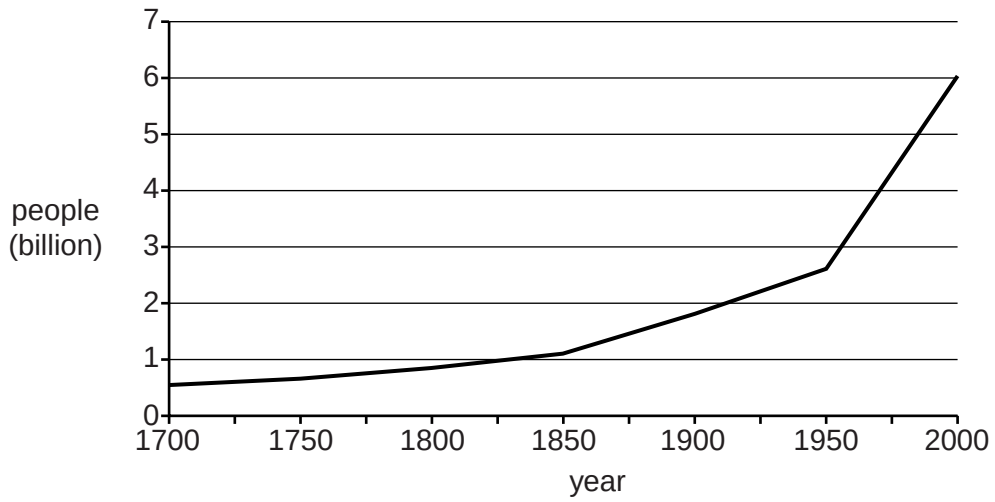
World population growth (1700–2000)



(i) What was the total world population in 2000?

.....[1]

(ii) Describe how the rate of world population growth changed before and after 1950.

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.....[2]

(iii) How may times greater was the total world population in 2000 than in 1800 (approximately)?
Circle one answer.

6 times 7 times 8 times 9 times [1]

(b) As long ago as 1798 an English economist, Thomas Malthus, was predicting a gloomy future for the human race. He expected population to grow faster than food supply. The graph below shows what Malthus thought would happen after 1800.

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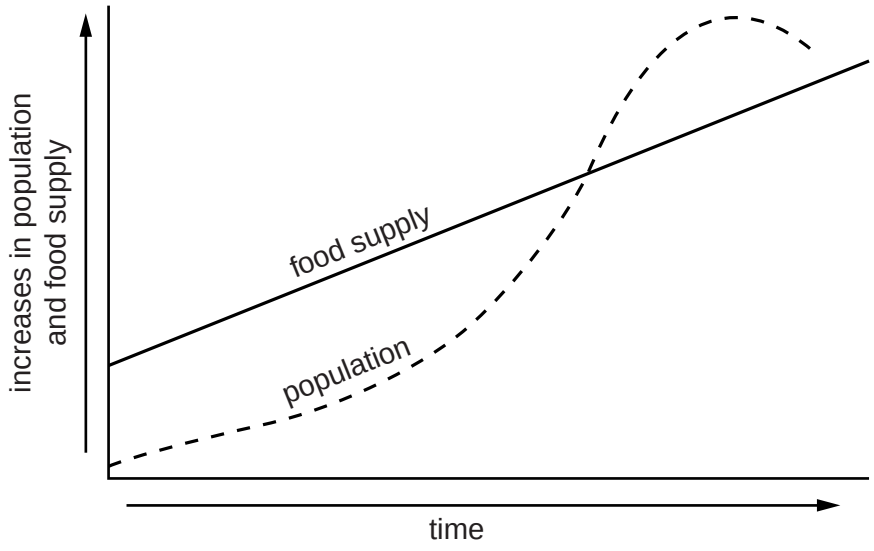
What Malthus thought would happen over time



Key: ☐ food surplus ☐ food shortage

(i) On the graph, shade in the areas where food surpluses and food shortages are shown.
Complete the key for shading used. [2]

(ii) Describe the different trends shown, for food supply and population.

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..... [1]

(iii) Malthus thought that the human race would soon suffer from widespread hunger and famine, eventually leading to many deaths. Looking at the graph, what led Malthus to think this?

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..... [2]

(iv) In the 200 years since the time of Malthus the food output per hectare from good farmland has greatly increased. This was due to the ability of humans to improve technology, well beyond anything that Malthus could have imagined over 200 years ago.

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Four of these improvements in agricultural technology are listed below.

- plant breeding
- irrigation
- chemical fertilisers
- mechanisation

Choose any three of these. Explain how each of them has allowed farmers to increase food output per hectare of cropland.

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2 .....

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..... [6]

(c) World population continues to grow. Look at the data for world population in 2010.

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World fertility rate (children per woman) 2.6	Replacement rate for population (without any increase or decrease) 2.1

Global population increase 80 million people per year

Total world population 2010 6.76 billion	World population estimate for 2050 9.2 billion

How does this data show that the world's already large population will continue to grow over the next 40 years? Explain as clearly as you can.

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(d) Read the views on family size of people living in the rural areas of Rajasthan, one of India's poorer states.

Driver
'We have 3 sons and 8 daughters. Both me and my wife are happy with this many children. I have never used family planning.'

Shoemaker and repairer
'We have 8 children, two of whom are blind. We have never heard of family planning and no health workers have ever come to our village to give advice on it.'

Farmer
'I have 9 sons and 2 daughters. To be a big person in the village, a big family is needed. Family planning workers have told me to stop, but my wife enjoys having a big family as well.'

(i) What is the average family size (number of children) of these three Indian families?

.....[1]

(ii) State **two** different reasons that these people gave for having large families.

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For Examiner's Use

(iii) Give **other** reasons to explain the continuing growth of world population.

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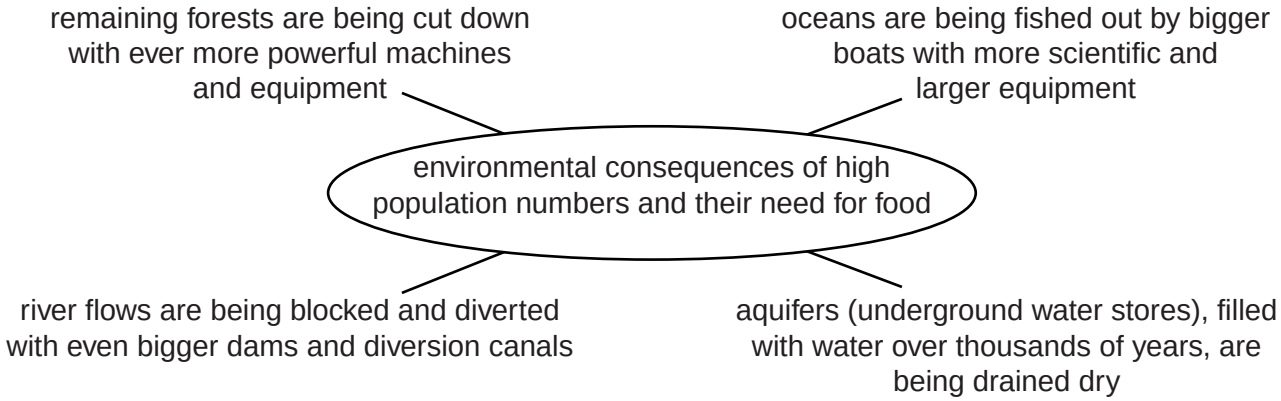
(e) Population growth comes at a cost for the Earth's natural resources and for the environment.
Look at the spider diagram.



(i) Improved technology has allowed more food to be produced to feed the world's growing population. Describe how the information in the diagram shows this.

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(ii) Why are the human actions and activities mentioned in the diagram unsustainable in the long-term? Explain as fully as you can.

For Examiner's Use

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(iii) Choose any two of the actions and activities named in the diagram.
Describe how each one can be done in a more sustainable way, taking more account of the needs of future generations of people.

1 .....

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2 .....

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.....[4]

(f) Could the gloomy view of Malthus in 1798 that the human race will suffer from widespread hunger, famine and deaths come true within the next 40 years – more than 200 years after he made his prediction?

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What do you think? Explain your views about this.

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[Total: 40 marks]

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