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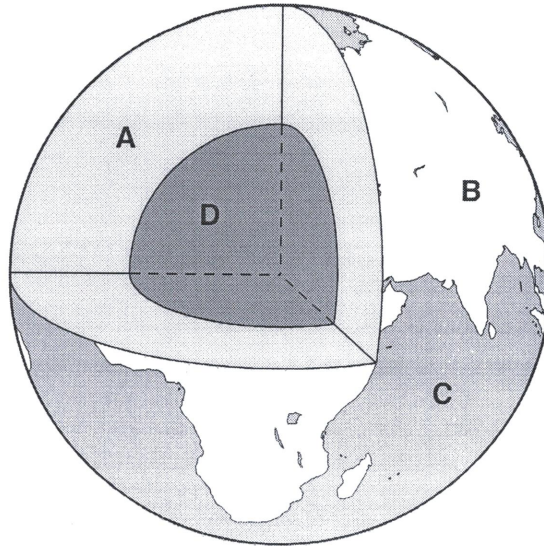
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ENVIRONMENT MANAGEMENT

TOPIC-Formation of Rocks

1 The diagram shows the structure of the Earth.



(a) Complete the table using letters **A** to **D** from the diagram.

feature	letter
continental crust
core
mantle
oceanic crust

[3]

(b) Explain why living near plate boundaries is hazardous for people.

.....

 [4]

(c) Rocks used for buildings and roads come from the Earth's crust.

Suggest **three** benefits of using rocks from the local area for buildings and roads.

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..... [3]

- 1 (a) (i) Look at the table below. Match the following rock types with their correct definition in the table.

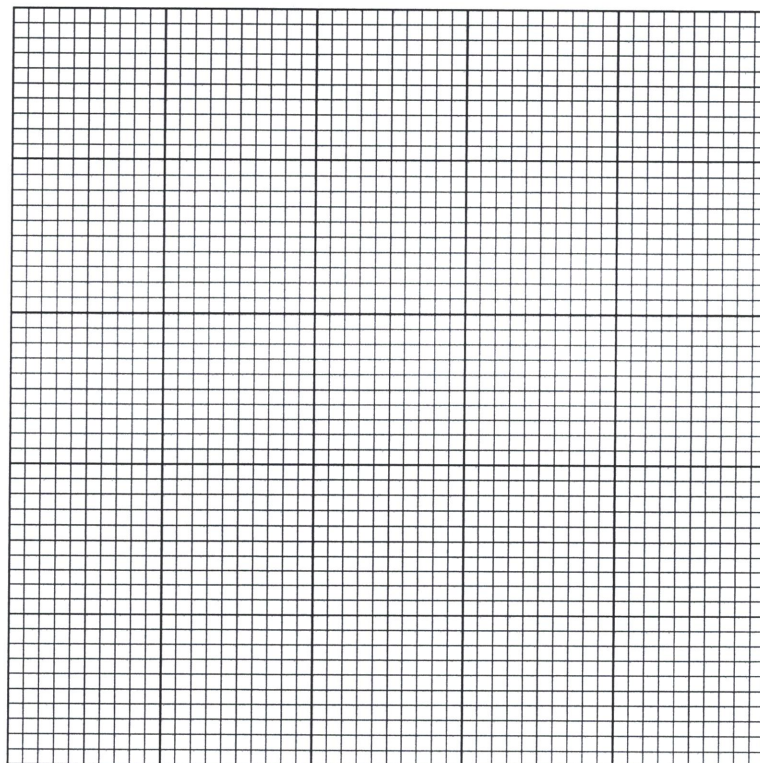
**igneous
metamorphic
sedimentary**

definition	type of rock
Rocks usually formed in shallow seas and often formed from eroded rock. They occur in layers.
Rocks changed by heat and pressure.
Rocks formed from the cooling of molten material.

[2]

- (ii) Look at the table below, which shows how limestone from a quarry is used in industry. Draw a bar graph on the grid using the information in the table. Label your axes.

limestone use	total limestone quarried/%
road construction	30
cement	25
steelworks	45



[4]

(iii) Describe how rocks such as limestone are extracted and processed.

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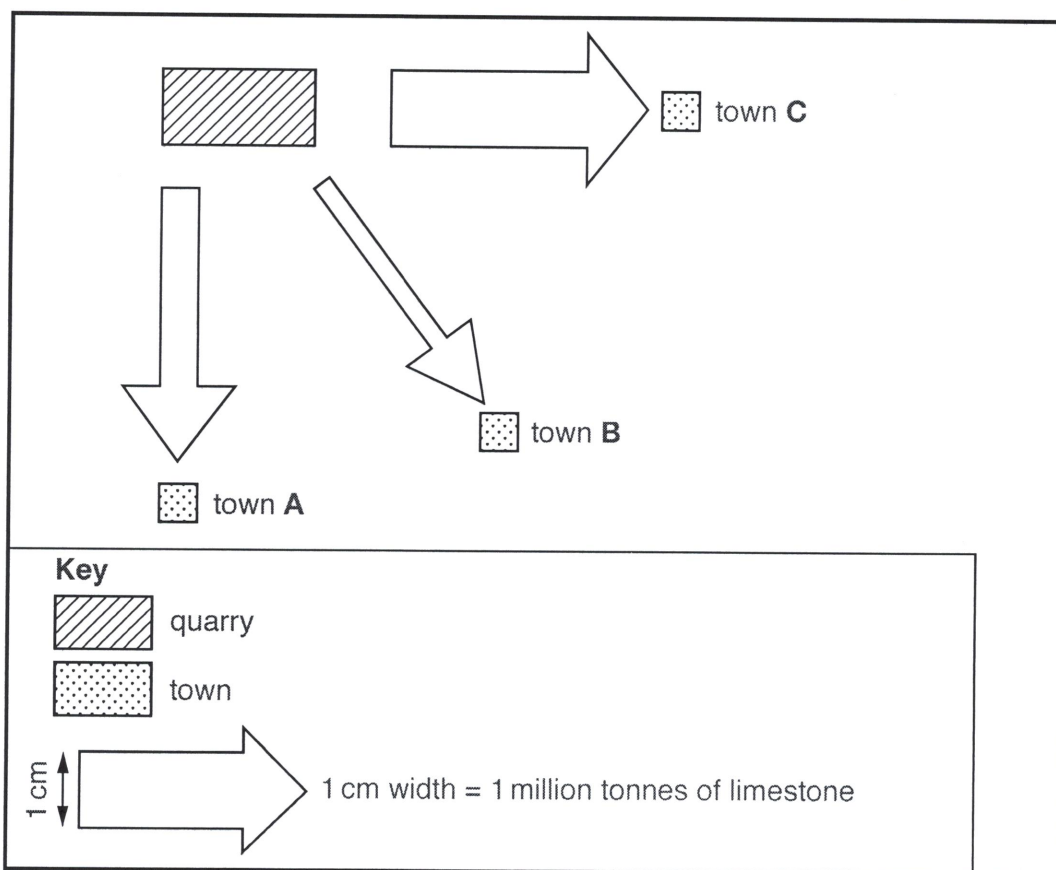
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..... [3]

(b) Look at the map, which shows the location of a quarry, the towns around the quarry and how much limestone they use. The width of the arrows shows the amount of limestone transported. 1 cm width on the arrow is equal to 1 million tonnes of limestone transported.



(i) State which town receives the most limestone from the quarry.

..... [1]

(ii) State how much limestone is transported to town A.

..... [1]

(iii) Calculate the difference in the amount of limestone transported from the quarry to towns A and C.

Space for working.

..... million tonnes [1]

4 (a) (i) Complete the following passage about rocks using words from the list below. The words may be used once, more than once or not at all.

erosion igneous pressure sediment sedimentary tectonic

Igneous and rocks can both be changed into metamorphic rocks by the action of heat and All three rock types may be uplifted and then will lead to the formation of and then, after compaction, rocks. [2]

(ii) Describe how a named rock is used in industry and farming.

name of rock
use
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.....
.....
.....
..... [3]

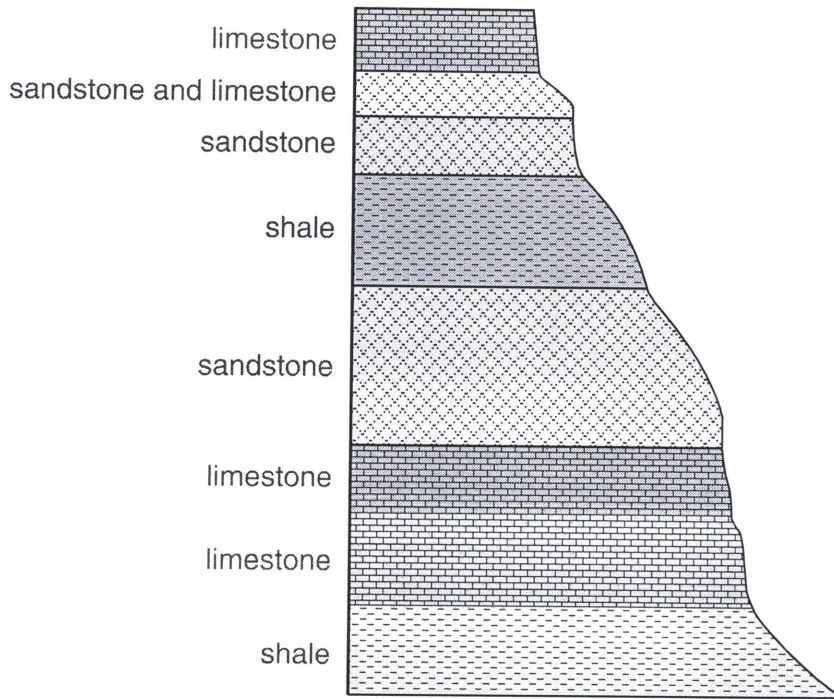
(b) (i) Describe how producing energy from coal causes environmental problems.

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.....
.....
..... [3]

(ii) Suggest ways in which an individual might help to conserve fossil fuels.

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.....
..... [2]

1 The diagram shows some of the layers of rock that form the bulk of the Grand Canyon in Arizona, USA.



(a) (i) On the diagram, mark with an **X** the oldest layer of rock shown. [1]

(ii) Put a circle around the type of rock that is shown in the diagram.

sedimentary igneous metamorphic

[1]

(iii) Choose **one** of the rocks named in the diagram and suggest an industrial use for it.

rock type

industrial use

..... [1]

(iv) One of the rock types named in the diagram has been changed, by natural processes, into marble in some other parts of the world. Explain how marble is formed.

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..... [2]

(b) (i) Describe how coal is formed.

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..... [2]

(ii) The table below shows changes in the various energy sources used in a country between 1995 and 2005.

energy source	1995 / million tonnes oil equivalent	2005 / million tonnes oil equivalent
coal	228	205
oil	156	225
natural gas	64	93
nuclear	13	16
renewables	2	25

Describe what the table shows about the changing importance of coal compared with the other energy sources between 1995 and 2005.

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..... [2]

(iii) Suggest **one** reason for the changes.

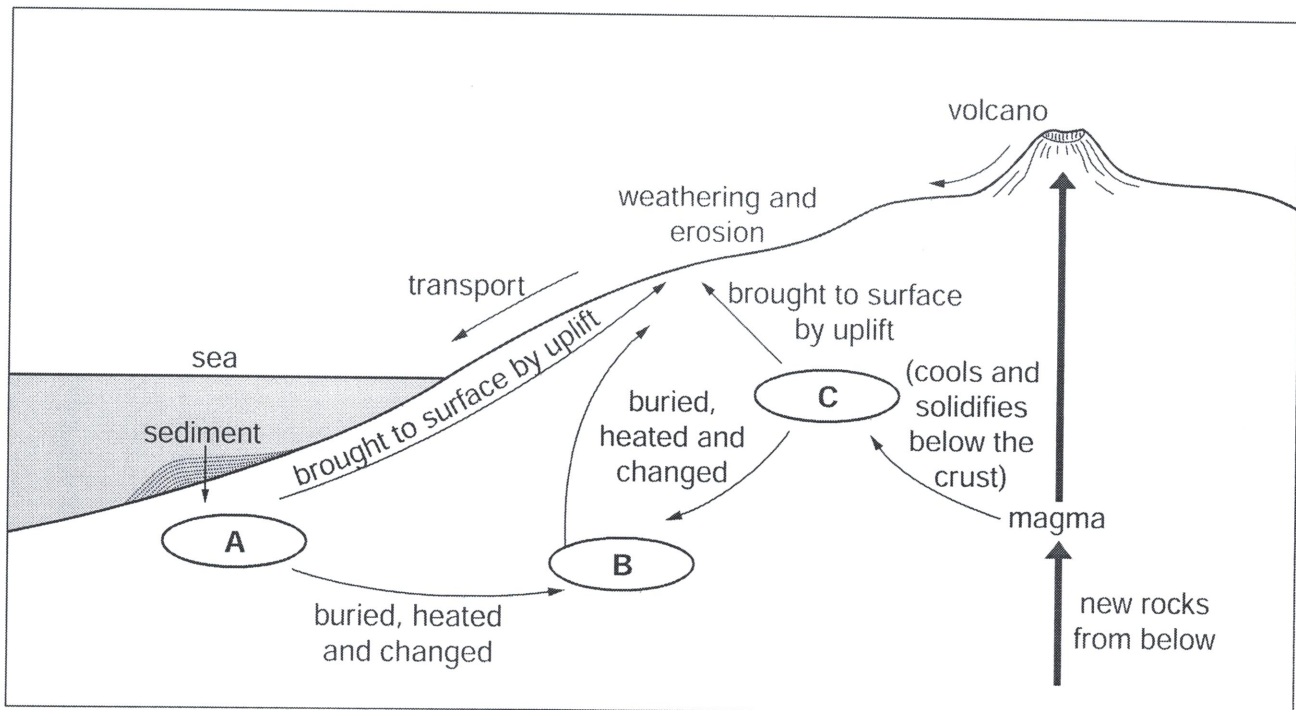
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..... [1]

[Total: 10]

6 (a) Look at the diagram below showing the three main types of rock found on Earth: igneous, sedimentary and metamorphic.

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(i) Match the letters in the diagram with the rock types below.

igneous

sedimentary

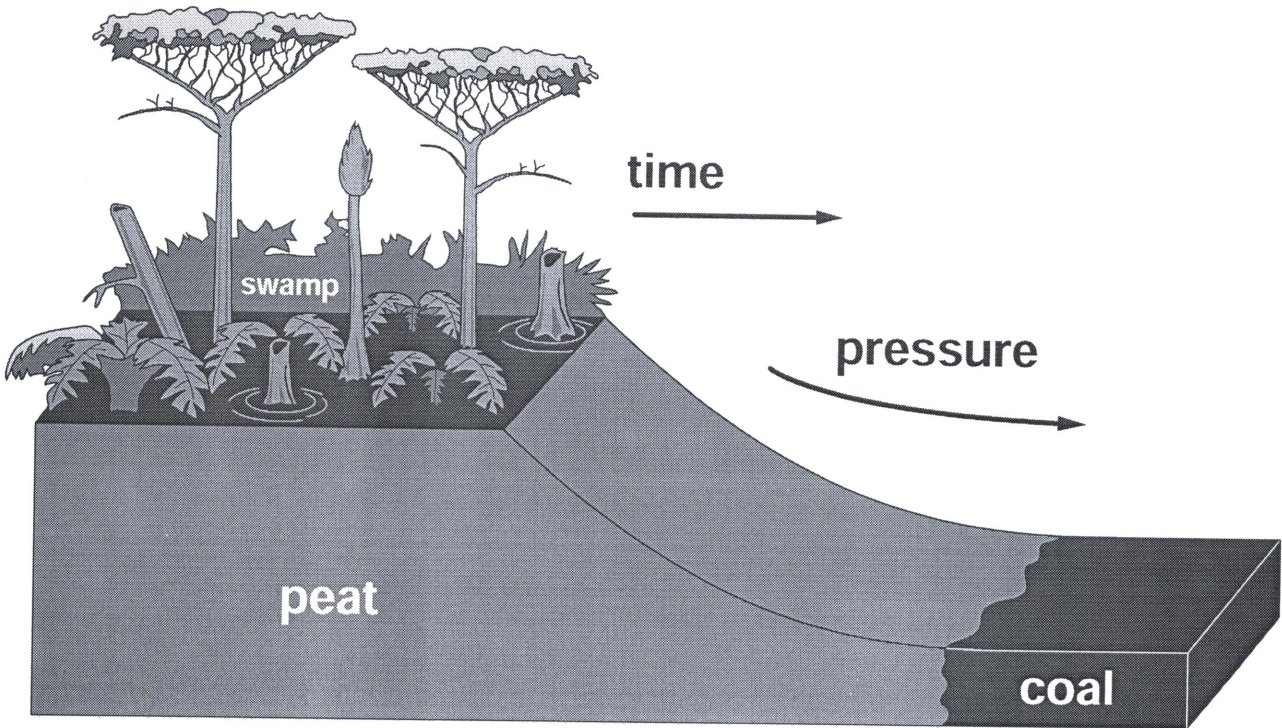
metamorphic

[3]

(ii) In the diagram above, which process accounts for the formation of soil?

..... [1]

1 Look at the diagram below which shows the formation of coal from trees.



(a) (i) How many years ago did the trees that formed coal live?

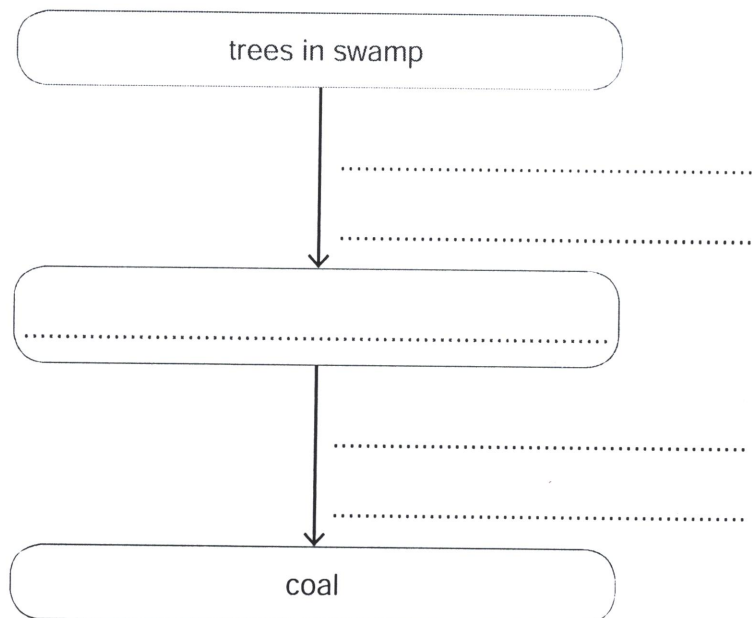
Choose one:

- A Hundreds of years
- B Thousands of years
- C Millions of years

Letter

[1]

(ii) Use information from the diagram above to complete the chart below to show the formation of coal from trees in a swamp.



[3]

(b) (i) Explain why coal mining is dangerous for miners and damages the environment.

dangerous for miners

.....

.....

damages the environment

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..... [4]

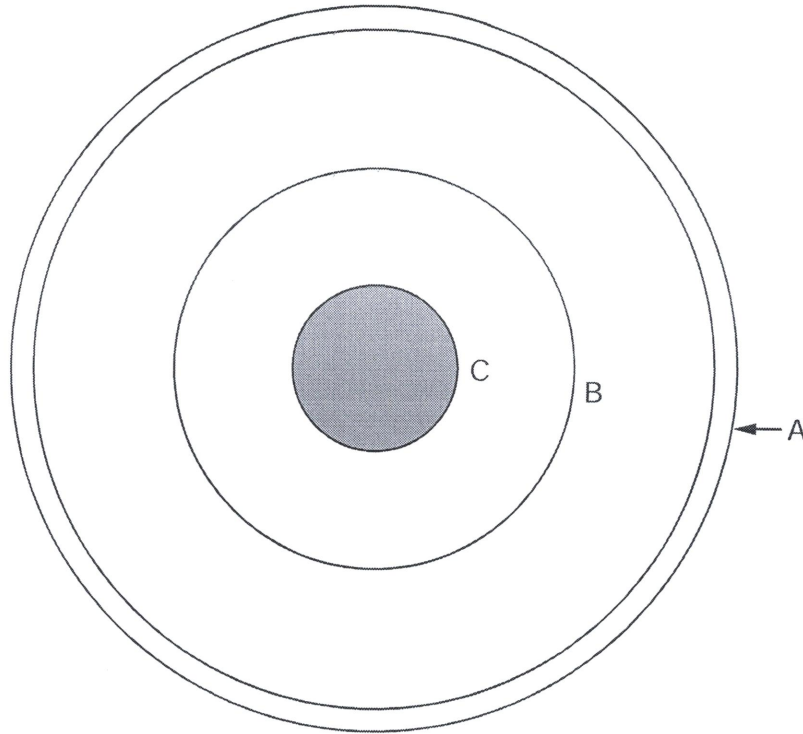
(ii) Name **two** alternative sources of energy that do not cause the same environmental problems as those caused by coal.

1

2 [2]

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3 (a) (i) The diagram shows a section through the Earth.



Name the layers labelled **A**, **B** and **C** on the diagram.

- A
- B
- C

[3]

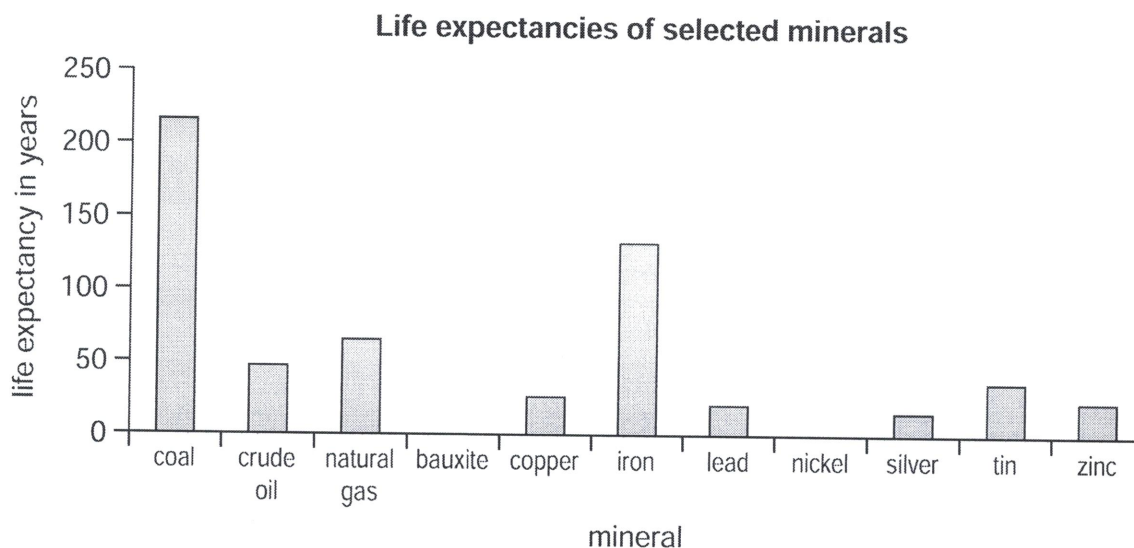
(ii) The earth consists of many kinds of rock, but they can be divided into three types. Complete the table.

type		sedimentary	metamorphic
how formed	by cooling and solidification of molten rock		by heat and pressure
example	granite		

[4]

- (b) The rocks of the Earth contain reserves of many minerals, such as iron, coal and bauxite. The graph shows the 'life expectancy' of some minerals (how long they will last at present rates of use).

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- (i) The life expectancy for bauxite is 202 years and for nickel 41 years.

Complete the graph for nickel and bauxite.

[2]

- (ii) Name the mineral which is likely to run out first.

..... [1]

2 (a) Rocks and minerals have many uses for people. Here is a list of nine useful rocks and minerals.

- bauxite
- coal
- diamonds
- iron ore
- lead
- limestone
- oil (petroleum)
- phosphates
- uranium

(i) From the list, choose the rock or mineral for each of the uses named below.

use	rock / mineral
concrete and cement	.....
plastics and synthetic fibres	.....
steel girders	.....
nuclear power	..... [2]

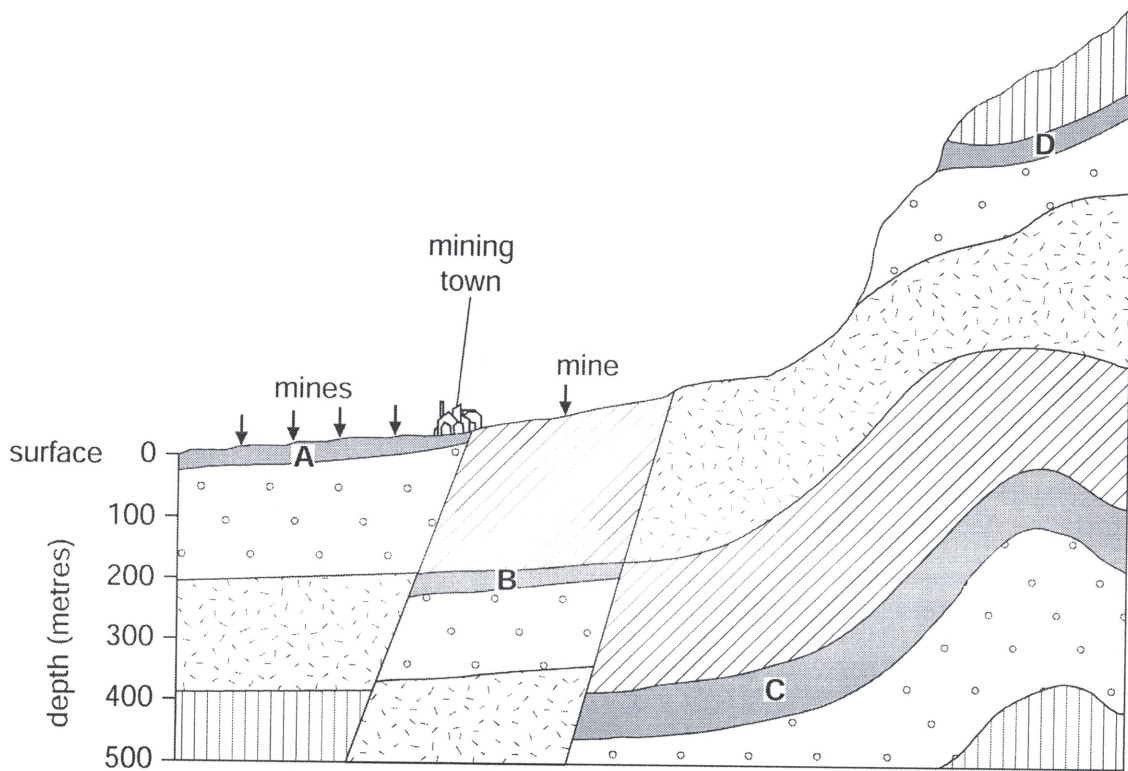
(ii) Choose any two of the other five rocks and minerals in the list, which were not used in answering part (i). Give a use for each of them.

rock / mineral	use
1

2
 [2]

(b) Look at the diagram which shows rock formations in a mining area.

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key: mineral bearing layer of rock

(i) Name the type of mining used to take minerals out of rock layer **A**.

.....[1]

(ii) Describe the methods of mining used to take minerals out of rock layer **B**.

.....

[3]

(iii) Explain why four mines are being used to take the minerals out of rock layer **A**, compared with only one for rock layer **B**.

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..... [3]

(iv) All mining causes environmental problems. Would you expect the environmental problems to be greater from mining rock layer **A** or **B**? Explain your answer.

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..... [2]

(v) When mining finishes at **A** and **B**, the mining company will need to look at rock layers **C** and **D**. Describe how the problems for mining layers **C** and **D** are likely to be greater than they were for **A** and **B**.

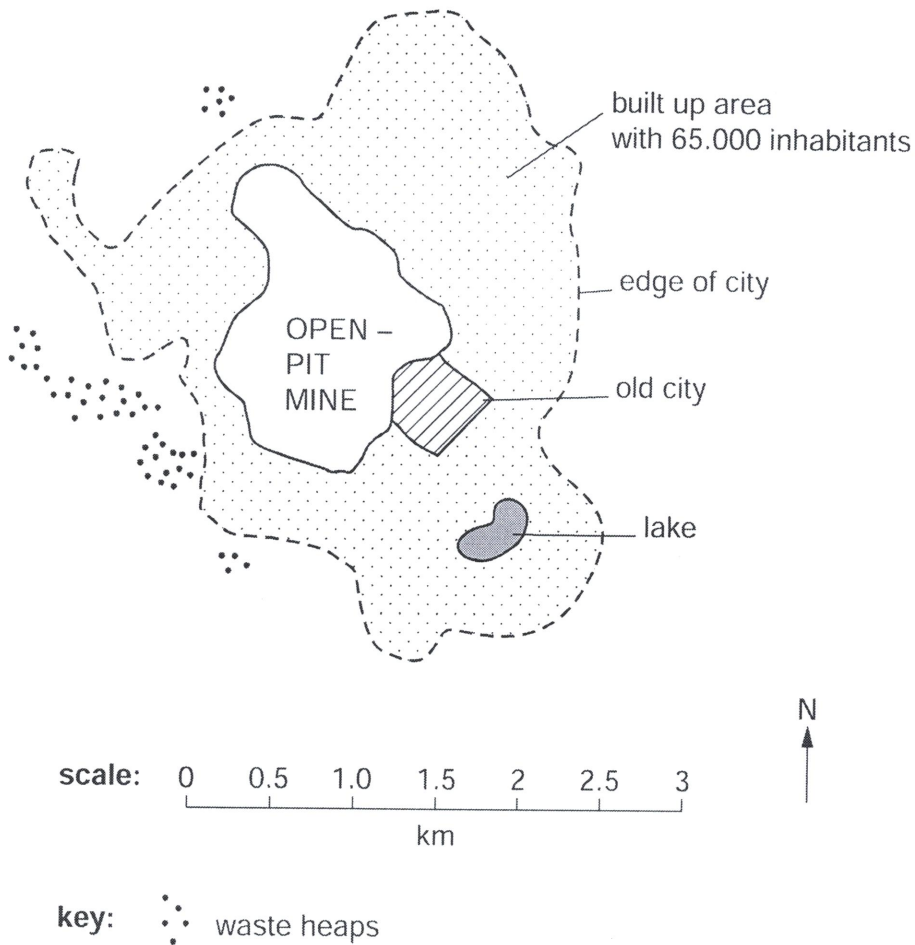
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..... [3]

(vi) Which rock layer would you expect them to mine first, **C** or **D**? Explain your answer.

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..... [2]

- (c) Cerro de Pasco is a mining town in the Andes of Peru. At a height of 4,380 metres above sea level, mining is the only reason for the existence of the town. Silver, lead and zinc have been mined here for over 400 years from a large open pit mine in the centre of town. The town clings to the edges of the 380 metre deep pit, as the map below shows. The mine produces 60,000 tonnes of lead and 150,000 tonnes of zinc a year and reserves are plentiful. The streets of poor houses, with their corrugated iron roofs black with mining dust, suddenly stop at the edge of the pit. Houses near the edge of the pit show many cracks.

Cerro de Pasco



- (i) Look at the map and its scale. Describe how it shows the large size of the mine.

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..... [2]

(ii) Describe the location of the mine.

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..... [2]

(iii) Suggest a reason for the large number of cracks reported in the houses near the edge of the pit.

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..... [1]

(iv) Where does the waste from the mine go?

..... [1]

(v) A health report in 2007 showed that over 90% of children and 80% of women of child-bearing age had high blood levels of toxic substances like lead. Diseases of lungs and heart were found to be common in older residents. Explain how the mining here can cause great health problems like these for the inhabitants of Cerro de Pasco.

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..... [4]

- (d) The mining company wants to increase the size of the open pit to mine in the area under the old city. This will involve the destruction of the main church, historical buildings and many houses.

There are two plans.

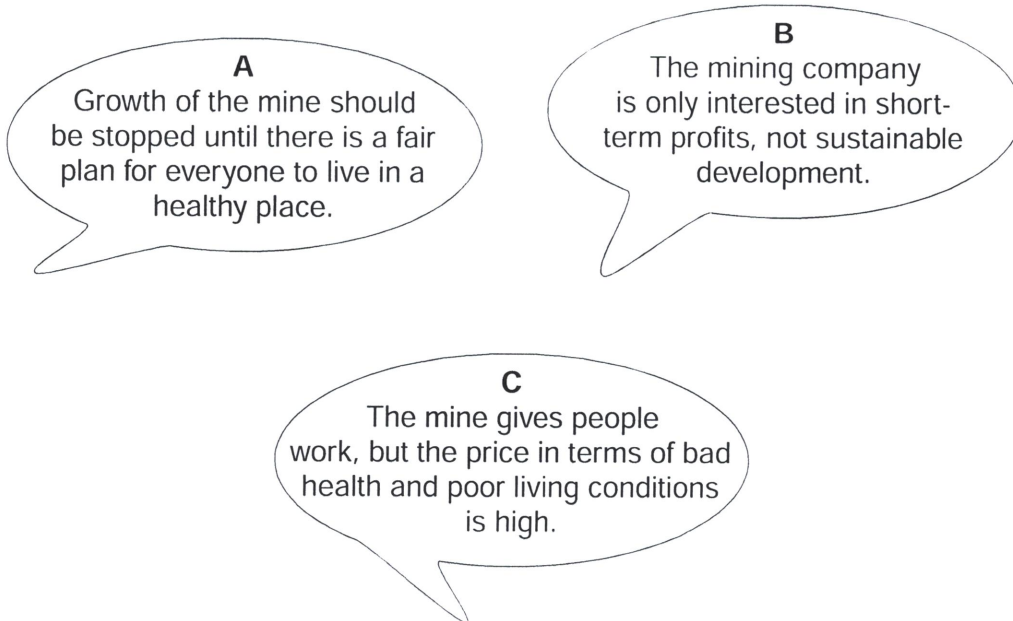
Plan 1 The big move

- Build a new town for 70,000 people 35 km away, along the main road
- Cost estimates range from US\$500 million to US\$3500 billion; who will pay?
- Expected time for doing this 10–15 years

Plan 2 Local resettlement by the mining company

- Build a new church, public buildings and houses not far from the mine
- Cost estimates are US\$5-10 million
- Expected time for doing this 2–3 years

Views of residents



- (i) What are the advantages of Plan 1 compared with Plan 2?

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(ii) How likely is it that Plan 1 will ever be put into effect? Explain your view.

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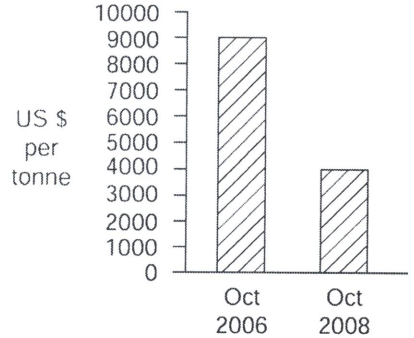
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..... [5]

(e) Some countries depend upon mineral exports for most of their income. One example is Zambia, a poor landlocked country in Africa.

<p>Zambia – the country</p> <p>population: 11 million income per head: US\$750 birth rate: 42 per 1000</p>	<p>Zambia – minerals</p> <p>Africa's largest copper producer exports: copper 85% of total platinum 10% of total 1 in 10 paid jobs in mining</p>	<p>World copper price – the London Metal Exchange</p>  <table border="1"> <caption>World copper price data</caption> <thead> <tr> <th>Month</th> <th>Price (US \$ per tonne)</th> </tr> </thead> <tbody> <tr> <td>Oct 2006</td> <td>9000</td> </tr> <tr> <td>Oct 2008</td> <td>4000</td> </tr> </tbody> </table>	Month	Price (US \$ per tonne)	Oct 2006	9000	Oct 2008	4000
Month	Price (US \$ per tonne)							
Oct 2006	9000							
Oct 2008	4000							

(i) How big was the difference in the copper price between October 2006 and 2008?

..... [1]

(ii) A market stall holder in Chingola, the main town in Zambia's copper belt, said 'Everyone in town gets worried when copper prices fall in London'.

Describe the likely effects of the big drop in copper price between 2006 and 2008 on local people living in Zambia's copper belt.

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..... [4]

(iii) The main cause of the drop in world copper price was the recession in developed world countries. Why would a producer of copper (used in electrical wiring) and platinum (used in catalytic converters), located more than 12,000km away like Zambia, be so badly affected?

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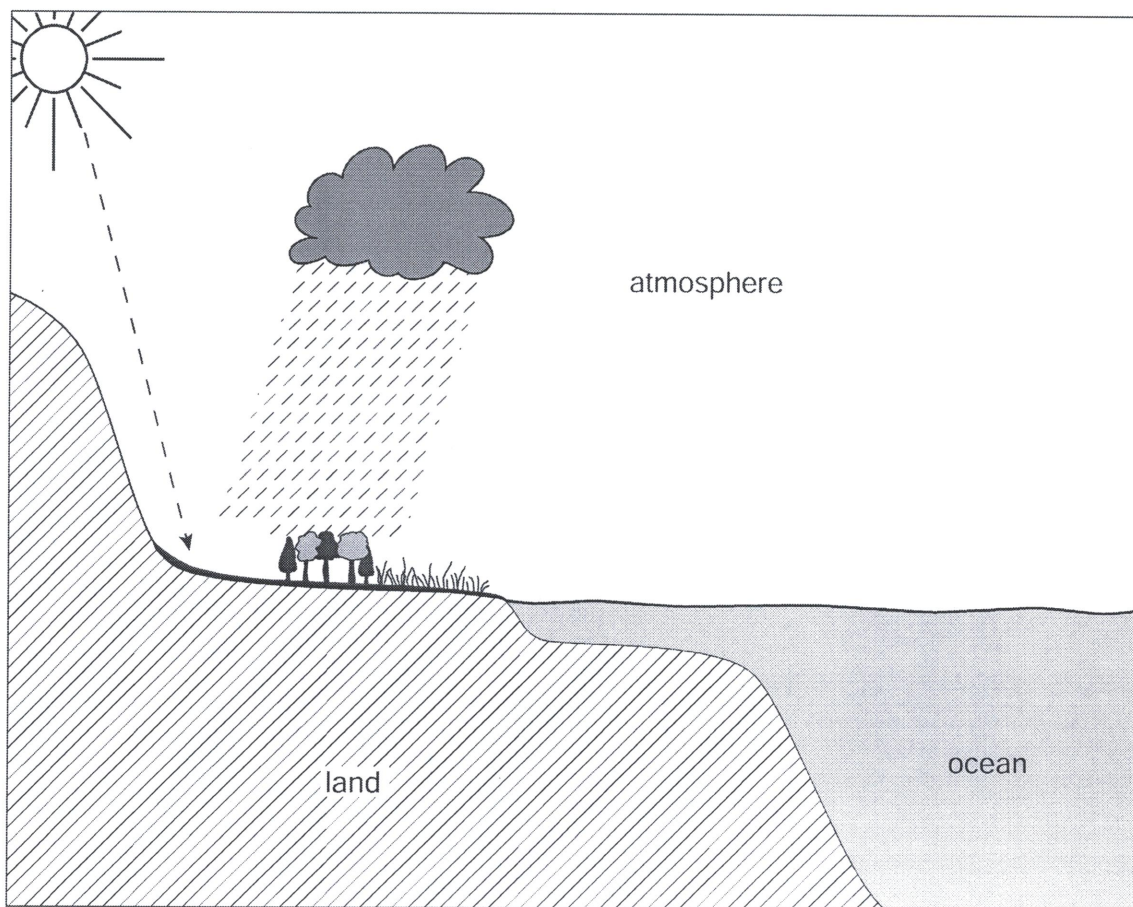
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[Total: 40 marks]

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- 1 (a) The Earth provides people with many useful natural resources – in the atmosphere, on the land surface, under the land surface and in the oceans.

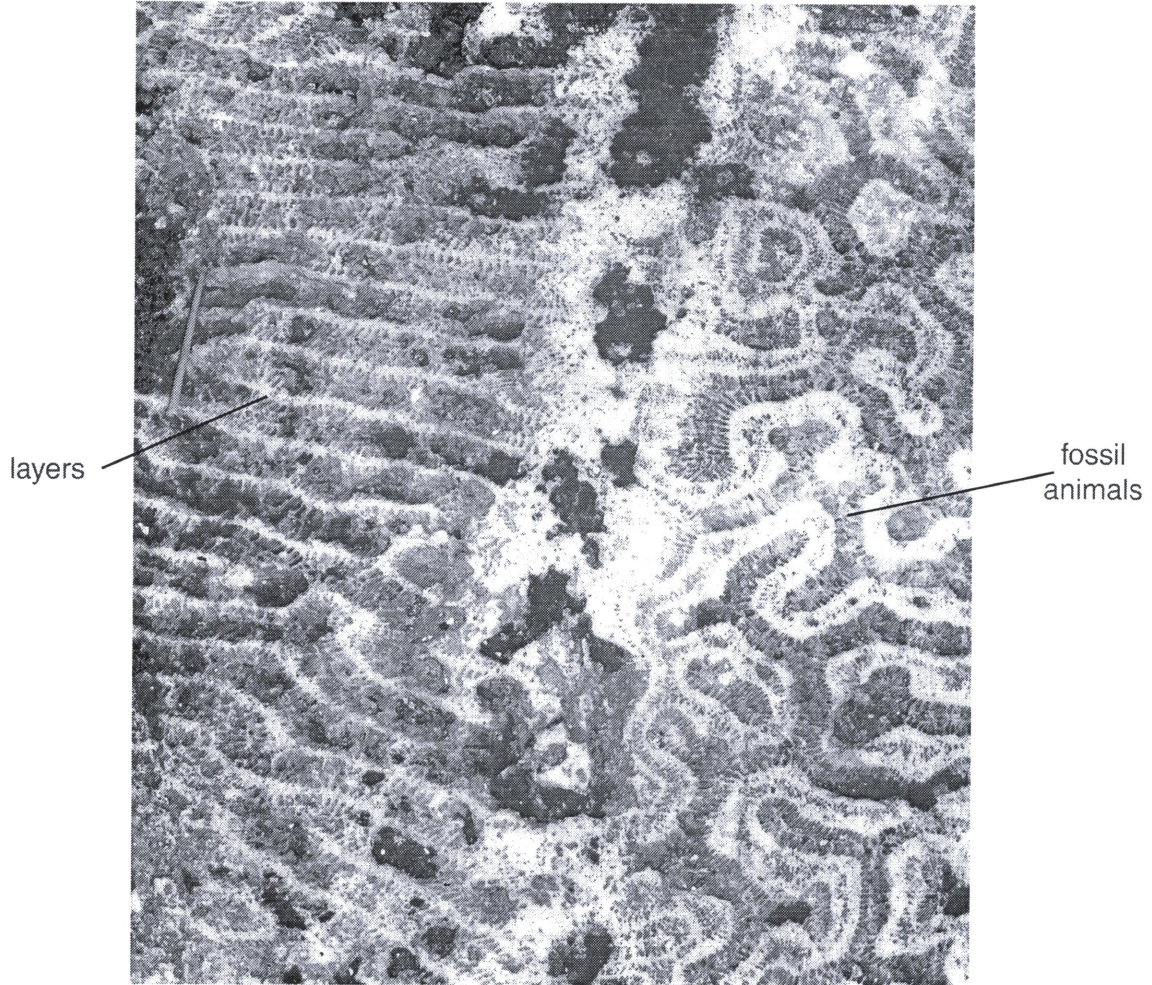


Fill in the remaining boxes by naming two different examples of useful natural resources for people from the atmosphere, land surface and oceans.

place	natural resources	
atmosphere	.....	.....
on the land surface	.....	.....
under the land surface	rocks	minerals
oceans	.....	.....

[3]

6 (a) Look at the photograph below, which shows a rock being used to surface a path.



Using information in the photograph and your own knowledge, circle **one** rock type shown in the photograph, from the list below.

metamorphic sedimentary igneous [1]

(b) (i) Describe **two** ways in which open-pit (opencast) mining is different from deep mining.

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..... [4]

(iii) Explain why water shortage is a problem in many parts of the world when there is so much fresh water on Earth.

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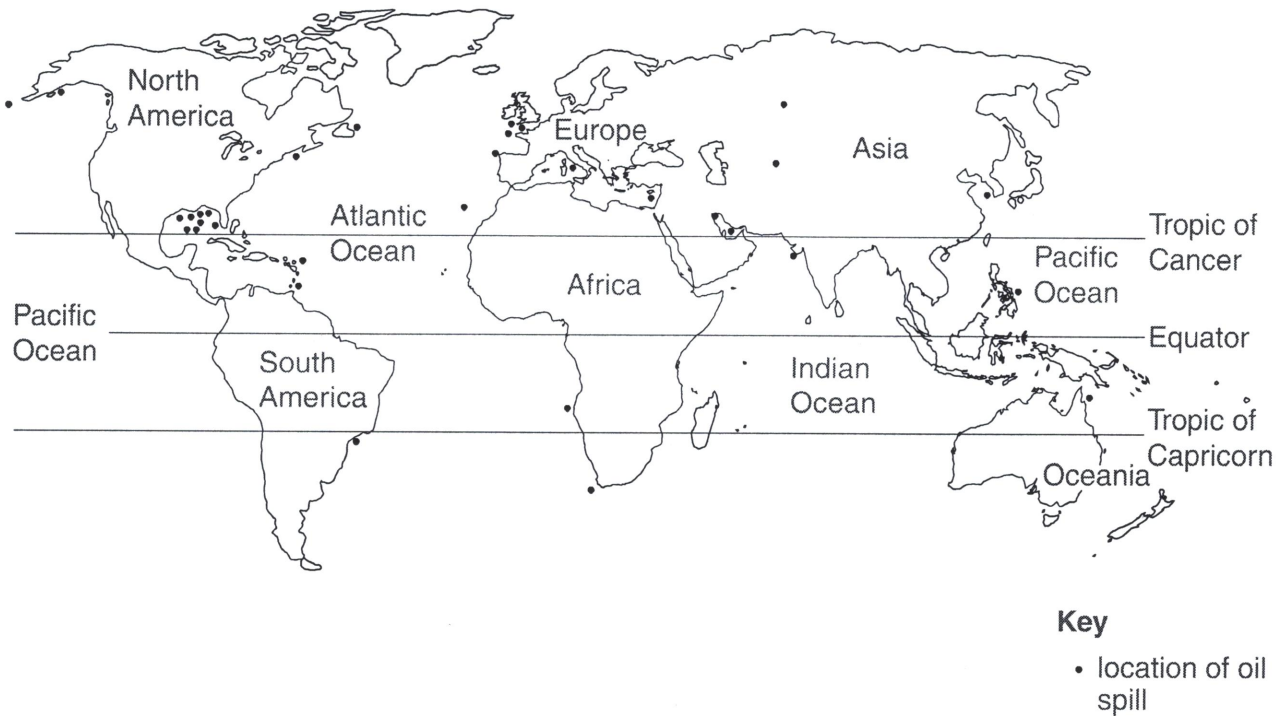
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..... [4]

(c) Look at the map which shows major oil spills in the last thirty years.

major oil spills in the last 30 years



(i) State how many major oil spills occurred on land in the last thirty years.

..... [1]

(ii) Describe the distribution of marine oil spills.

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..... [3]

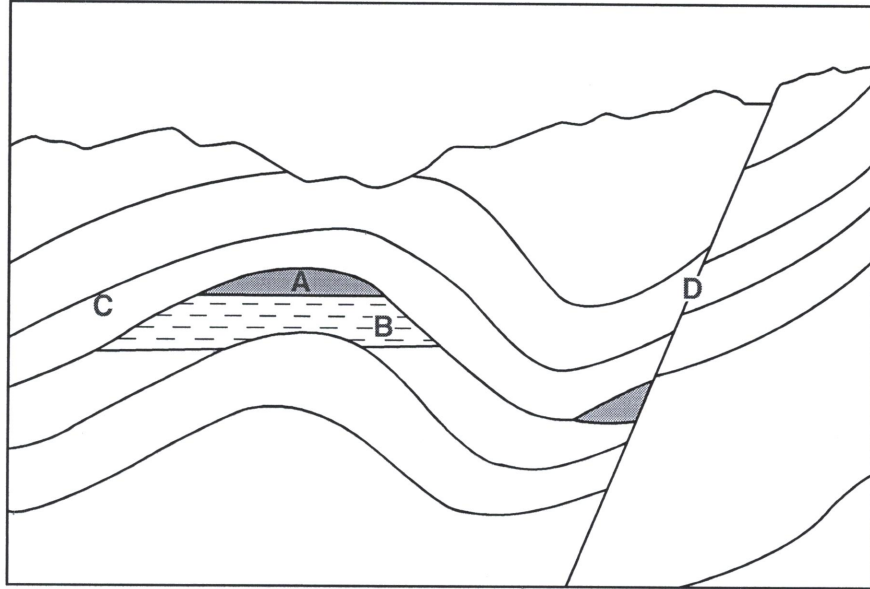
(iii) Suggest reasons why more marine oil spills have occurred in some parts of the oceans than in others.

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..... [3]

(iv) Describe the impact of a major oil spill on the marine ecosystem.

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..... [4]

(c) Look at the diagram of gas and oil traps.



(i) Match the letters **A, B, C** and **D** on the diagram to the labels. [3]

label	letter
fault
gas
layer of impermeable rock
oil

(ii) Name the type of fold at **A**.
.....[1]

(iii) Explain how gas and oil were formed.
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.....[4]

(iv) Briefly explain how seismic surveys are used to find possible gas and oil traps.

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.....[3]

(d) Look again at the map in part (b). Suggest **two** methods that could be used to transport the gas from the Kudu gas field to the Namibian coast.

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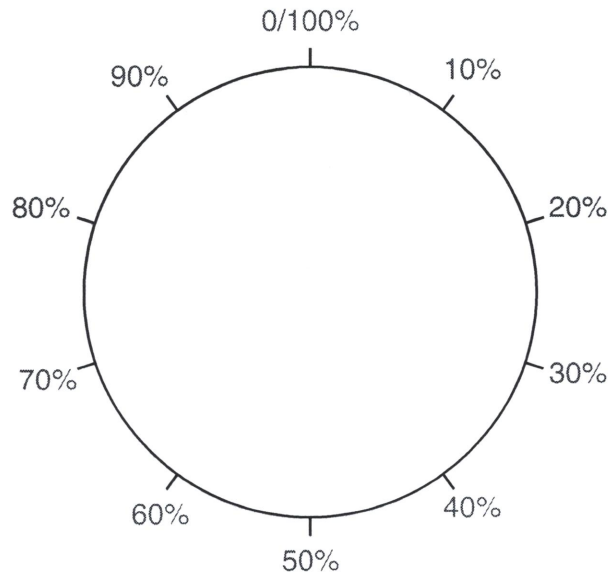
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.....[2]

(e) Look at the table which shows world energy consumption in 2012.

energy type	percentage use
oil	33
coal	30
gas	24
HEP	7
nuclear	4
renewables other than HEP	2

- (i) Draw a pie graph in the circle below to show energy type by percentage for 2012 and complete the key.



Key

- oil
- coal
- gas
- HEP
- nuclear
- renewables other than HEP

[4]

- (ii) Calculate the percentage of energy produced from fossil fuels in 2012.

Space for working.

.....% [1]

- (f) Much of Namibia is desert. However, the government of Namibia plans to generate electricity using gas rather than using solar power. Suggest reasons why.

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 [2]

- (g) 'Biomass, biogas and fuel from organic waste should be used more to solve the world's energy problems.' How far do you agree with this statement? Give reasons for your answer.

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