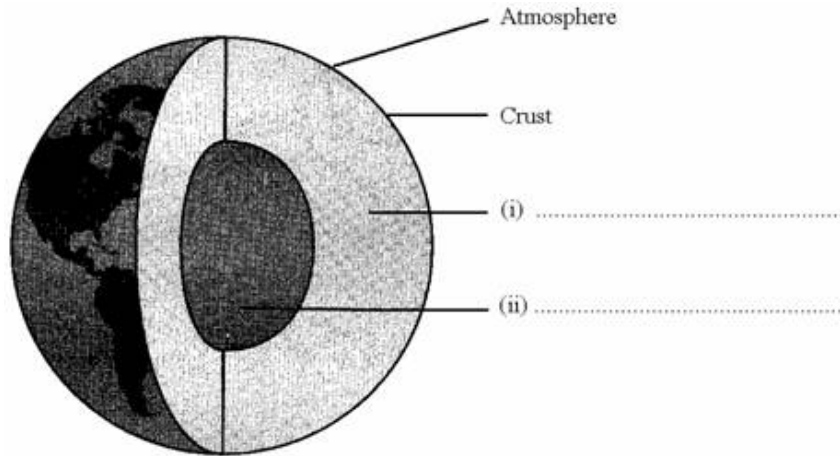


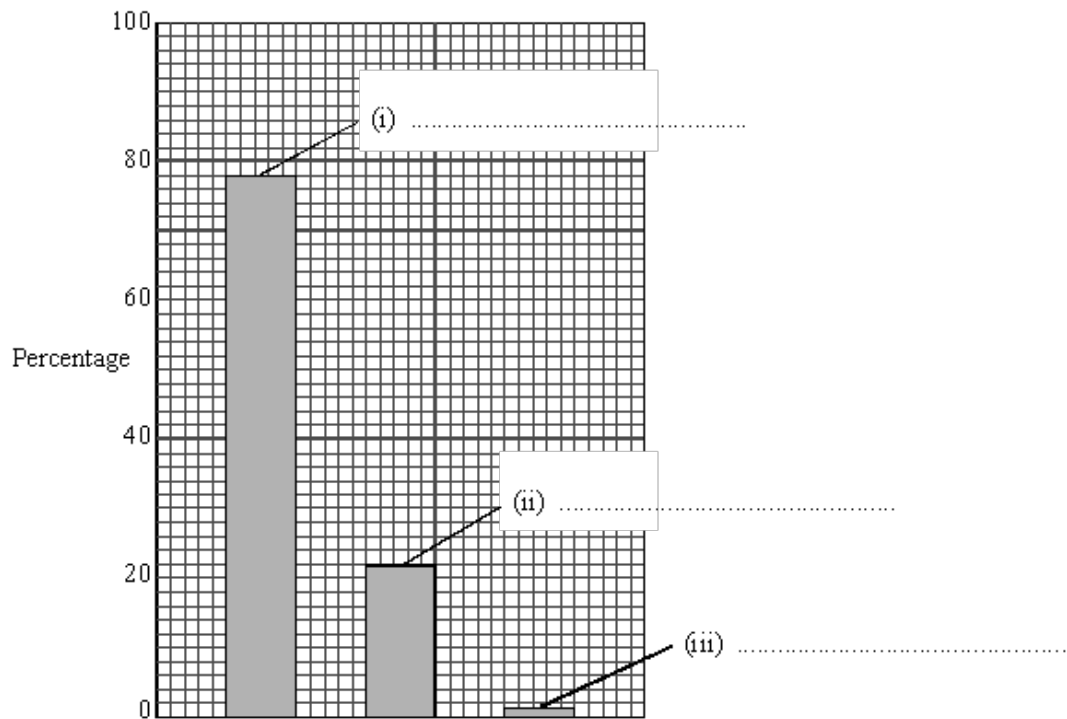
**Q1.** (a) The diagram shows the Earth's layered structure.

Name parts (i) and (ii).



(2)

(b) The bar chart shows the composition of a sample of dry air from the Earth's atmosphere. Name the **three** gases shown in the bar chart.



(3)

(c) The Earth's crust is a set of slow-moving plates. There are fold mountains at some places where the plates meet.

Give examples of **two** other types of geological features or activities which usually occur at these places.

1 .....

2 .....

(2)

(d) One carbon compound is methane. Its chemical formula is  $\text{CH}_4$ .

(i) What is the name of the element which is combined with carbon in methane?

.....

(1)

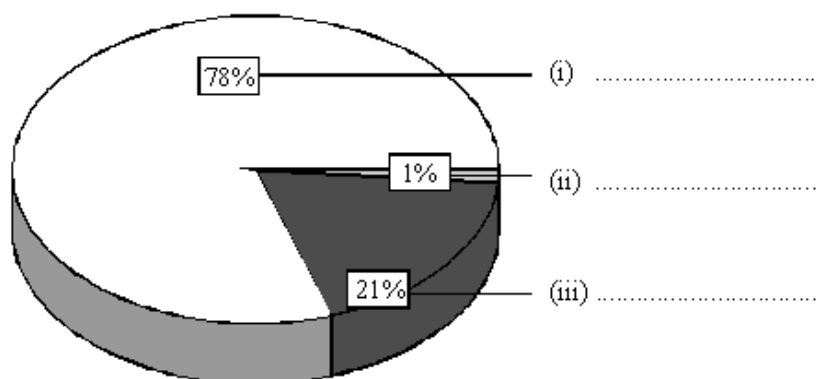
(ii) Complete the word equation for the chemical reaction which usually takes place when methane burns.

methane + .....  $\rightarrow$  carbon dioxide + water

(1)

(Total 9 marks)

**Q2.** (a) Air is a mixture of gases. The pie chart shows the percentages, by volume, of the main gases in dry air. Complete the chart by adding the names of these **three** gases.



(3)

(b) Complete each of the **four** spaces in the sentences by choosing the best word from the box.

|                  |                   |                   |                    |
|------------------|-------------------|-------------------|--------------------|
| <b>condenses</b> | <b>condensing</b> | <b>evaporates</b> | <b>evaporating</b> |
| <b>melts</b>     | <b>sea</b>        | <b>trees</b>      | <b>vapour</b>      |

The air in the atmosphere above this country always contains .....

Most of this is the result of water ..... from the surface of the

..... . Some of it ..... to form millions of tiny

drops of water in clouds.

(4)

- (c) Thousands of millions of years ago the Earth's early atmosphere was formed. Complete the following sentence.

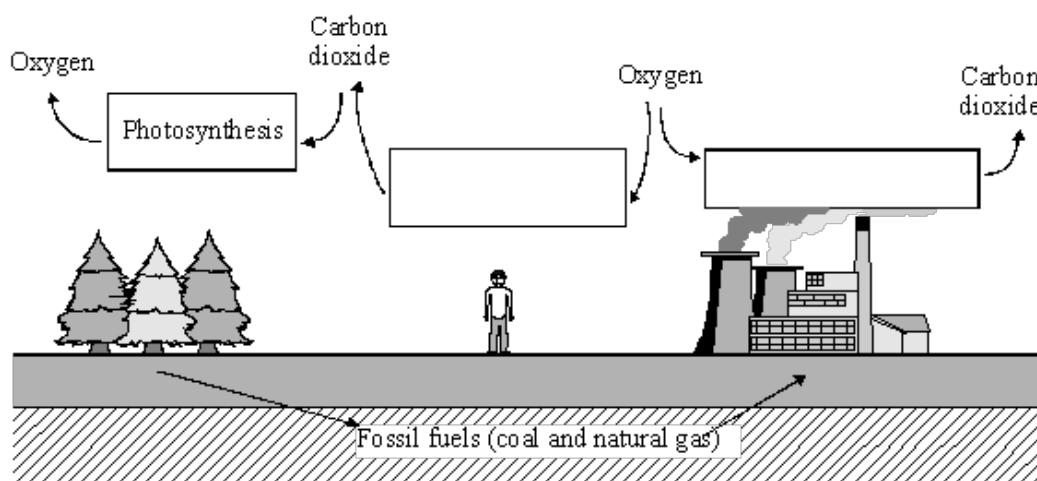
The carbon dioxide in this early atmosphere probably came from .....

.....

(1)

(Total 8 marks)

- Q3.** In the carbon cycle the amounts of carbon dioxide and oxygen in the air are changed by several processes.



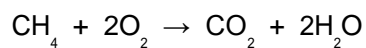
- (a) The names of some processes are given in the box below.

|                |               |                |
|----------------|---------------|----------------|
| combustion     | decomposition | neutralisation |
| photosynthesis |               | respiration    |

Choose the correct process for each box in the diagram. The first one has been done for you.

(2)

- (b) Fossil fuels, such as natural gas, react with oxygen.



..... + oxygen → carbon dioxide + .....

Complete the word equation for this reaction

(2)

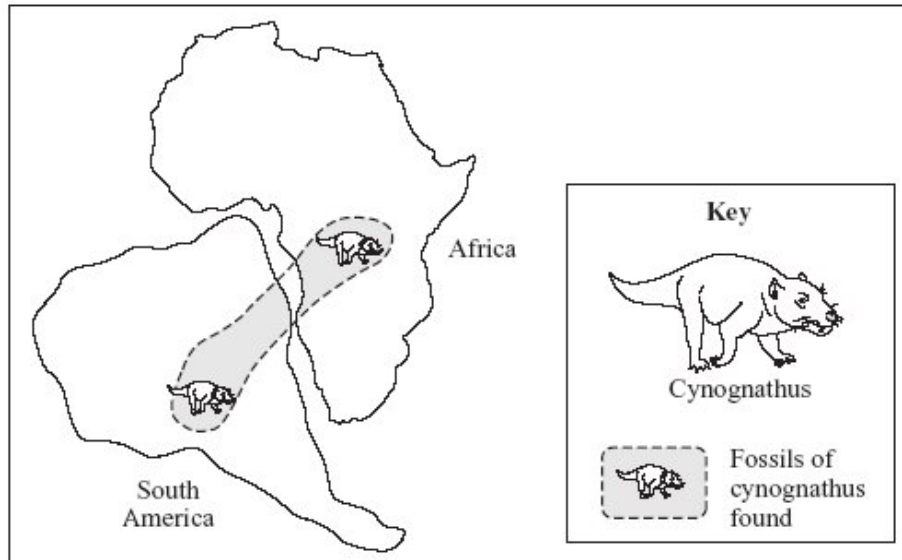
(c) What problem is caused by the formation of large amounts of carbon dioxide?

.....

.....

(1)  
(Total 5 marks)

**Q4.** (a) Scientists think that South America and Africa were once joined together. The diagram gives evidence for this idea.



Which **two** of the following statements give evidence that Africa and South America were once joined together?

Tick (✓) the box next to each of your choices.

There are active volcanoes in Africa and South America.

☐

Fossils of cynognathus are found in Africa and South America.

☐

The shapes of the west coast of Africa and the east coast of South America almost fit together.

☐

There are deserts in Africa and South America.

☐

Earthquakes occur in Africa and South America.

☐

(2)

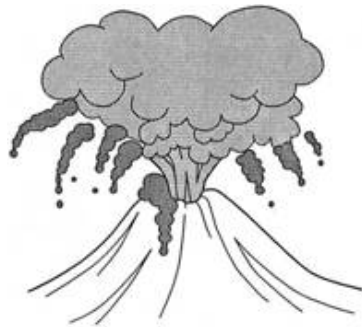
- (b) Complete these sentences by choosing the correct words from the box. Each word may be used once or not at all.

|             |          |            |           |
|-------------|----------|------------|-----------|
| continental | crust    | earthquake | evolution |
| mantle      | mountain | tectonic   |           |

The theory of ..... drift can explain how Africa and South America moved apart and why both have mountain ranges. Many scientists did not agree with the theory. They thought that mountains were formed because the Earth had cooled down, making the ..... shrink. Many years later other scientists found that the Earth's lithosphere was broken into a number of large pieces. These pieces, called ..... plates, are moving apart very slowly.

(3)  
(Total 5 marks)

- Q5.** (a) During the first billion years of the Earth's existence, there were many active volcanoes. The volcanoes released the gases that formed the early atmosphere.



Describe how volcanoes caused the oceans to be formed.

.....

.....

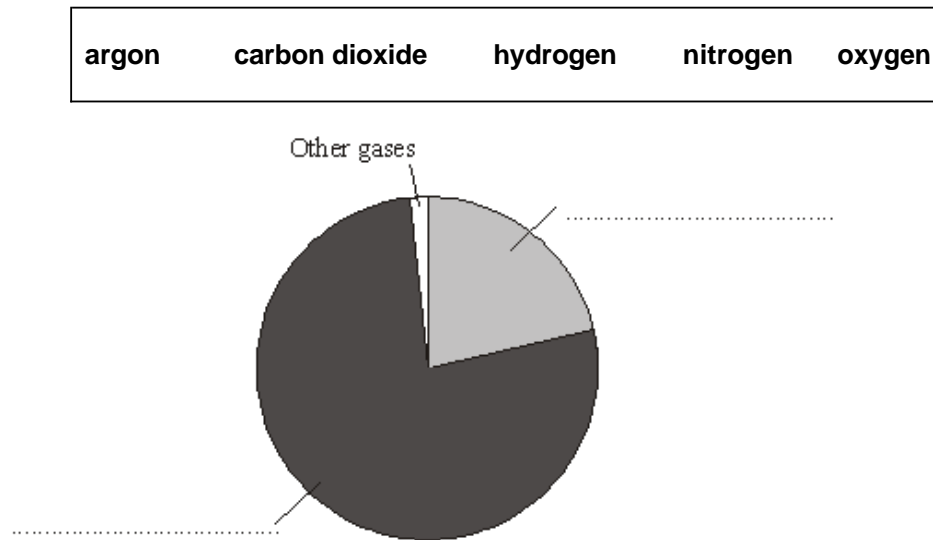
.....

.....

(2)

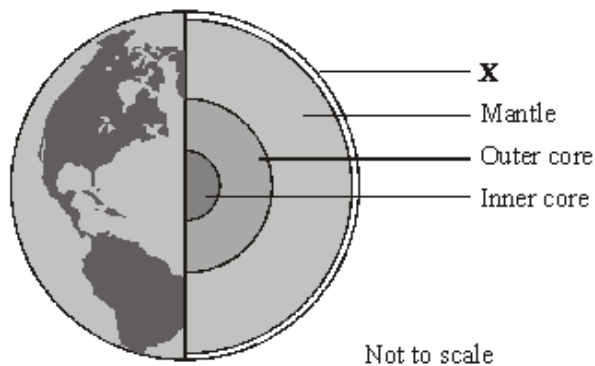
- (b) The atmosphere on Earth today is very different from the early atmosphere.

The pie chart shows the amounts of different gases in the air today. Choose gases from the box to label the pie chart.



(2)  
(Total 4 marks)

- Q6.** (a) The diagram gives information about some of the layers that make up the Earth.



- (i) What name is given to the outer layer of the Earth labelled **X**?

.....  
 .....

(1)

- (ii) What is the difference between the inner core and the outer core?

.....  
 .....

(2)

- (b) Which of the following is used to detect the waves produced by an earthquake?

Draw a ring around your answer.

**barograph**

**seismograph**

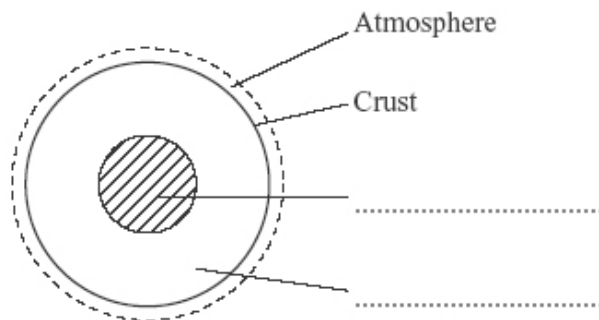
**tachograph**

(1)

(Total 4 marks)

**Q7.** The Earth is shaped like a ball and is surrounded by an atmosphere.

- (a) The diagram shows the layered structure of the Earth.



Choose words from the box to complete the labels on the diagram.

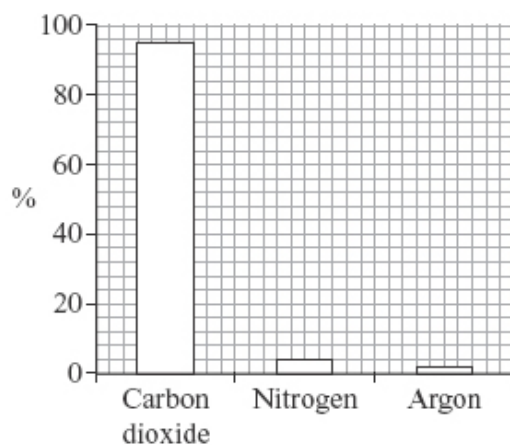
**core      mantle      plate**

(2)

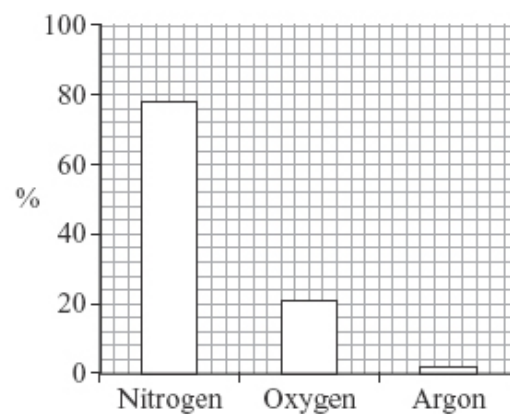
- (b) Some theories suggest that the Earth's early atmosphere was like the atmosphere of Mars today.

The bar charts show the three most common gases in each atmosphere today.

The atmosphere of Mars today



The atmosphere of Earth today



- (i) Use the bar charts to complete the sentence by writing in the correct gases.

In the atmosphere of Mars today there is mainly ..... and no  
.....

(2)

- (ii) Use the bar charts to complete the sentence by writing in the correct number.

These theories suggest that there was about ..... % nitrogen in  
the Earth's early atmosphere.

(1)

- (iii) The atmosphere of the Earth today has much more nitrogen than in the early  
atmosphere. Denitrifying bacteria released most of this nitrogen into the atmosphere.

There are other differences between the Earth's early atmosphere and the  
atmosphere of the Earth today.

Use the bar charts to describe and explain **two** of these other differences.

.....

.....

.....

.....

.....

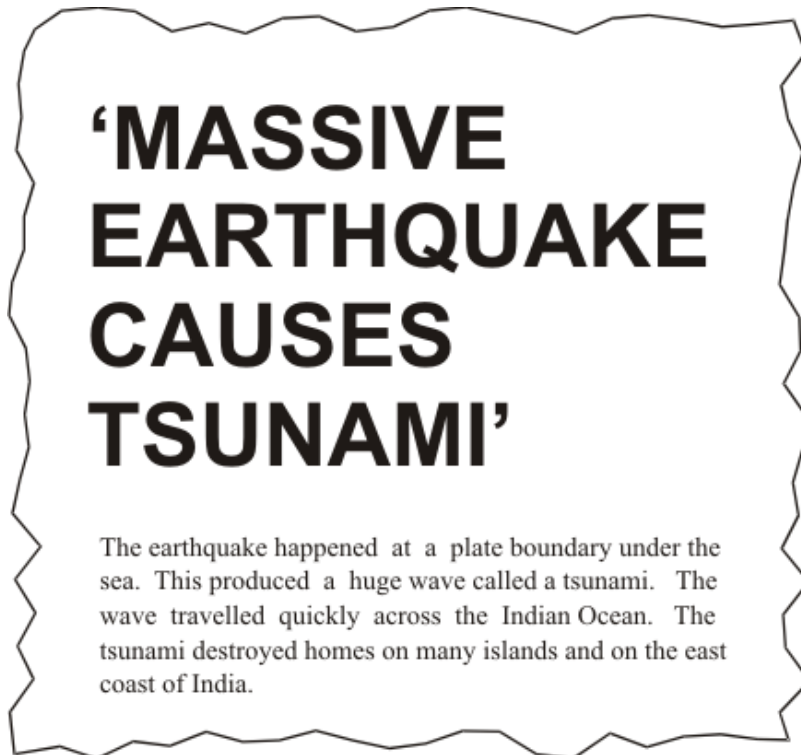
.....

(3)

(Total 8 marks)



**Q8.** A headline from 27 December 2004 read:



- (a) Use words from the box to complete the sentences about earthquakes.

|                   |                    |                 |                 |
|-------------------|--------------------|-----------------|-----------------|
| <b>convection</b> | <b>radioactive</b> | <b>tectonic</b> | <b>volcanic</b> |
|-------------------|--------------------|-----------------|-----------------|

The earthquake was caused by the movement of two of the Earth's  
..... plates.

The energy for this movement comes from the heat released by natural  
..... processes.

(2)

- (b) It was estimated that 300 000 people died as a result of the tsunami in 2004.

Some newspapers criticised scientists for not predicting the tsunami, because if people had been warned they could have moved to safety.

- (i) Suggest why we can only estimate that 300 000 people died as a result of the tsunami.

.....  
.....  
.....  
.....

(2)

- (ii) Explain why scientists could not have predicted the tsunami.

.....

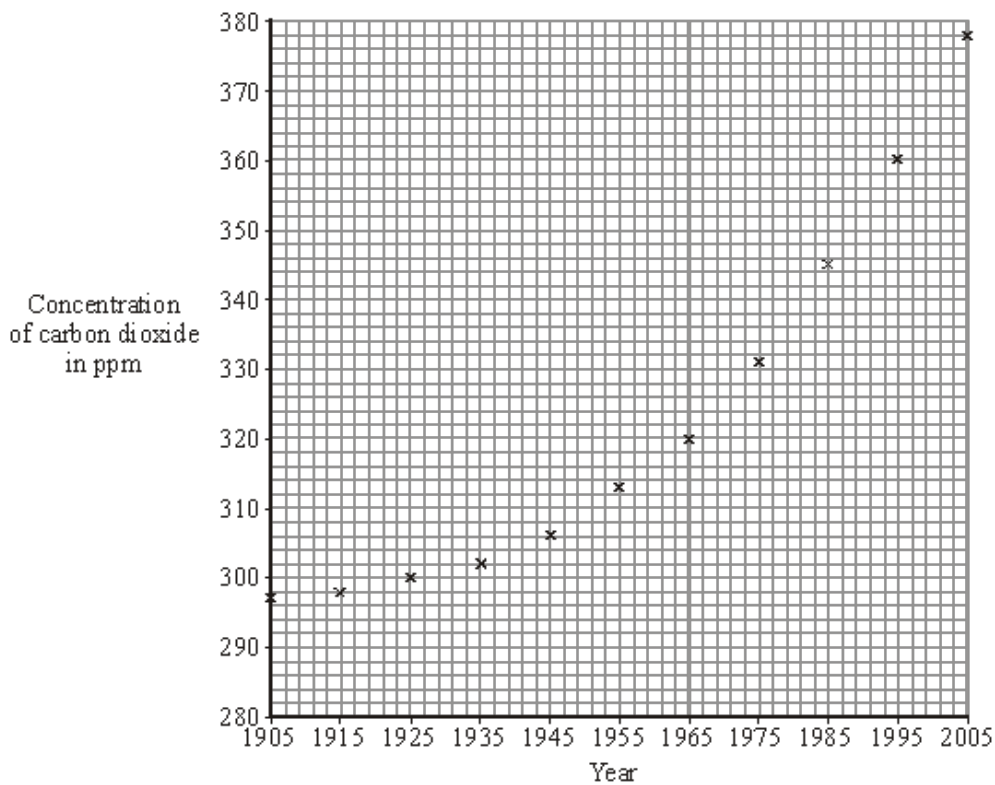
.....

.....

.....

(2)  
(Total 6 marks)

- Q9.** Global warming is thought to be happening because of the increased burning of fossil fuels. The concentration of carbon dioxide in the air from 1905 to 2005 has been calculated.



- (a) Draw a line of best fit for these points.

(1)

- (b) (i) What was the concentration of carbon dioxide in 1955?

..... ppm

(1)

- (ii) In what year did the concentration of carbon dioxide reach 350 ppm?

.....

(1)

- (c) Use the graph to describe, in as much detail as you can, what happened to the concentration of carbon dioxide from 1905 to 2005.

.....

.....

.....

.....

(2)  
(Total 5 marks)

**Q10.** Billions of years ago, the Earth's early atmosphere was probably like the atmosphere of Venus today.

The table shows a comparison of the atmospheres of the Earth and Venus today.

| Name of gas                        | Percentage composition of atmosphere |             |
|------------------------------------|--------------------------------------|-------------|
|                                    | Earth today                          | Venus today |
| Nitrogen                           | 78                                   | 3.5         |
| Oxygen                             | 21                                   | a trace     |
| Argon                              | 0.97                                 | a trace     |
| Carbon dioxide                     | 0.03                                 | 96.5        |
|                                    |                                      |             |
| <b>Average surface temperature</b> | 20 °C                                | 460 °C      |

- (a) Use the names of gases from the table to complete the sentences.

(i) In the Earth's atmosphere today, the main gas is ..... (1)

(ii) In the Earth's atmosphere billions of years ago, the main gas was  
..... (1)

- (b) (i) Scientists do **not** know the accurate composition of the Earth's early atmosphere. Suggest why.

.....

.....

(1)

- (ii) Use information from the table to answer this question.

Water vapour is present in the atmospheres of the Earth and Venus today.  
The Earth's surface is mainly covered by water.

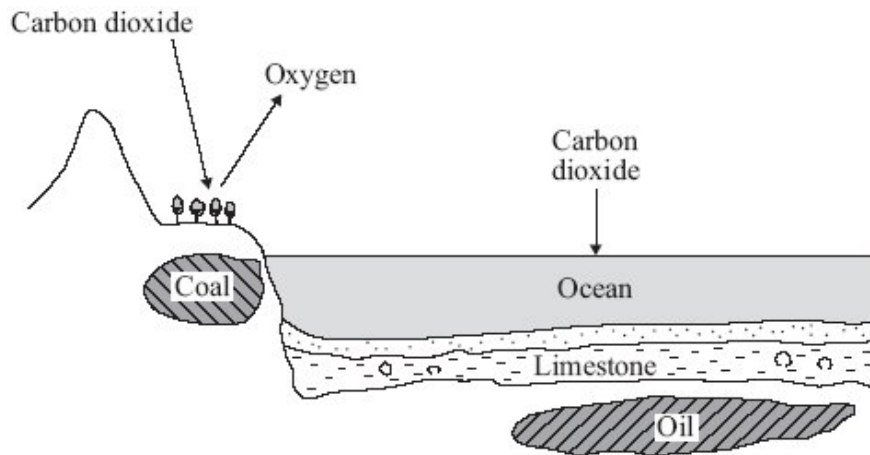
Suggest why there is no water on the surface of Venus.

.....

.....

(1)

- (c) The diagram shows how carbon dioxide is removed from the Earth's atmosphere.



Describe what happened to the carbon dioxide in the Earth's early atmosphere.  
Use the diagram to help you.

.....

.....

.....

.....

.....

.....

.....

(3)

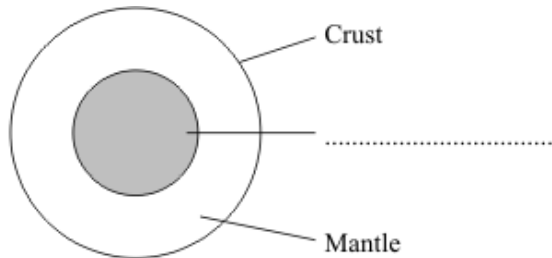
(Total 7 marks)

**Q11.** Earthquakes are common in certain places on Earth.

(a) The diagram shows the layered structure of the Earth.

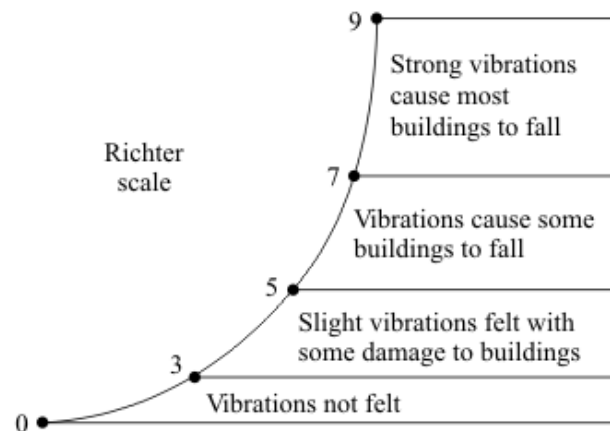
Choose one word from the box to complete the label on the diagram.

|            |      |       |
|------------|------|-------|
| atmosphere | core | plate |
|------------|------|-------|

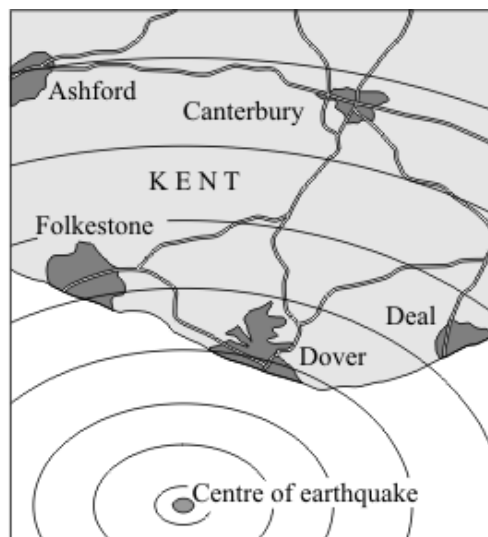


(1)

(b) In 1935 C.F. Richter designed a scale for comparing the size of earthquakes.



A newspaper reported that an earthquake off the coast of Kent had caused plaster to come down from ceilings, house tiles to loosen and church bells to ring.



- (i) Earthquakes happen often in the UK.

Suggest why most of these earthquakes are **not** reported in the newspapers.

.....  
.....

(1)

- (ii) Draw a ring around the number which best shows the size of the earthquake in Kent.

1                      4                      6                      8

(1)

- (iii) State what causes earthquakes.

.....  
.....

(1)

- (iv) Why were people living in Kent **not** warned about this earthquake?

.....  
.....

(1)

(Total 5 marks)

**Q12.** Billions of years ago, the Earth's early atmosphere was probably like the atmosphere of Venus today.

The table shows the temperature and the percentage composition of the atmospheres of the Earth and Venus today.

| Name of gas                        | Percentage (%) composition of atmosphere |             |
|------------------------------------|--|-------------|
|                                    | Earth today                              | Venus today |
| Nitrogen                           | 78                                       | 3.5         |
| Oxygen                             | 20.6                                     | a trace     |
| Argon                              | 0.97                                     | a trace     |
| Carbon dioxide                     | 0.03                                     | 96.5        |
| Water vapour                       | 0.4                                      | a trace     |
| <b>Average surface temperature</b> | 20°C                                     | 460°C       |

- (a) Use information from the table to help you to answer each part.

- (i) In the Earth's atmosphere today, the main gas is .....

(1)

(ii) In the Earth's atmosphere billions of years ago  
the main gas was .....

(1)

(iii) The Earth's surface is mainly covered with water.

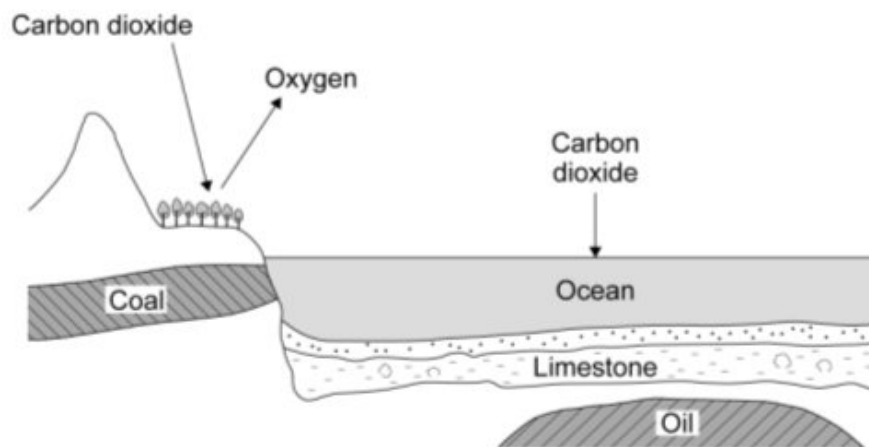
There is no water on the surface of Venus.

Suggest why.

.....  
.....  
.....  
.....

(2)

(b) The diagram shows part of the Earth and ways that carbon dioxide can be removed from the Earth's atmosphere.



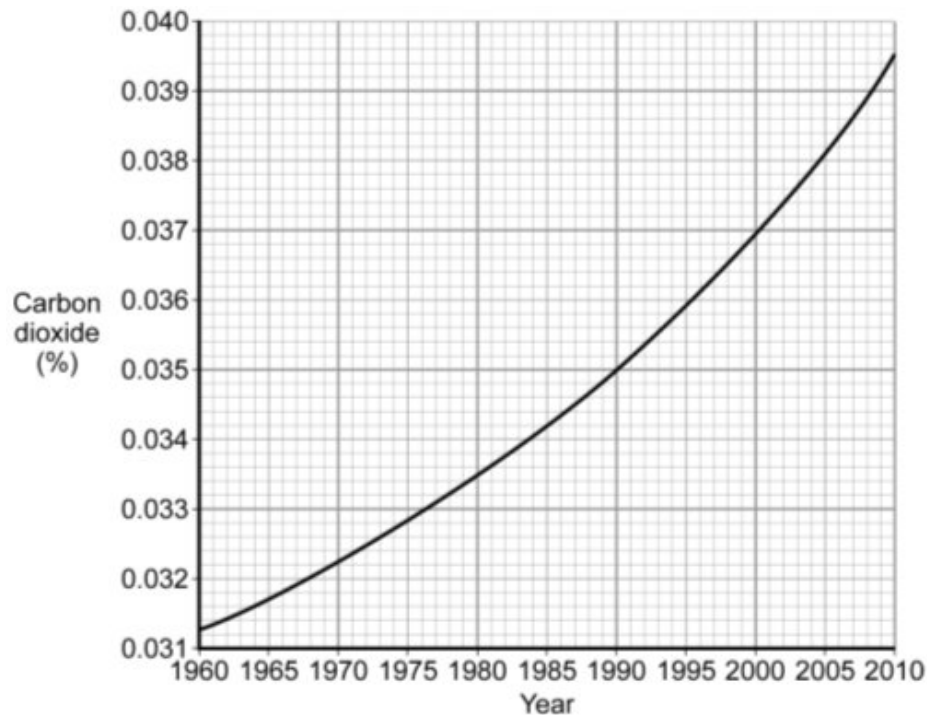
Give **three** ways that carbon dioxide can be removed from the Earth's atmosphere.

.....  
.....  
.....  
.....  
.....  
.....  
.....

(3)

- (c) In the Earth's atmosphere the percentage of carbon dioxide has remained at about 0.03% for many thousands of years.

The graph shows the percentage of carbon dioxide in the Earth's atmosphere over the last 50 years.



- (i) What was the percentage of carbon dioxide in the Earth's atmosphere in 1965?

.....  
..... %

(1)

- (ii) What change has happened to the percentage of carbon dioxide in the Earth's atmosphere over the last 50 years?

.....

(1)

- (iii) Suggest **one** reason for this change.

.....  
.....

(1)

(Total 10 marks)



- Q13.** In 1980 Mount St Helens suddenly exploded. This volcanic eruption was so violent that it blew off the top of the mountain. Ash particles and volcanic gases spread throughout the Earth's atmosphere.



By Mike Doukas (USGS Cascades Volcano Observatory)  
[Public domain], via Wikimedia Commons

- (a) Mount St Helens is on a boundary between two of the Earth's tectonic plates.

Draw a ring around the correct word to complete the sentences.

- (i) The Earth's tectonic plates are made up of the upper part of the mantle

and the

|             |
|-------------|
| atmosphere. |
| core.       |
| crust.      |

(1)

- (ii) The movement of the Earth's tectonic plates is caused by convection currents within the mantle. These convection currents are driven by heat released by

natural

|             |
|-------------|
| combustion  |
| radioactive |
| shrinking   |

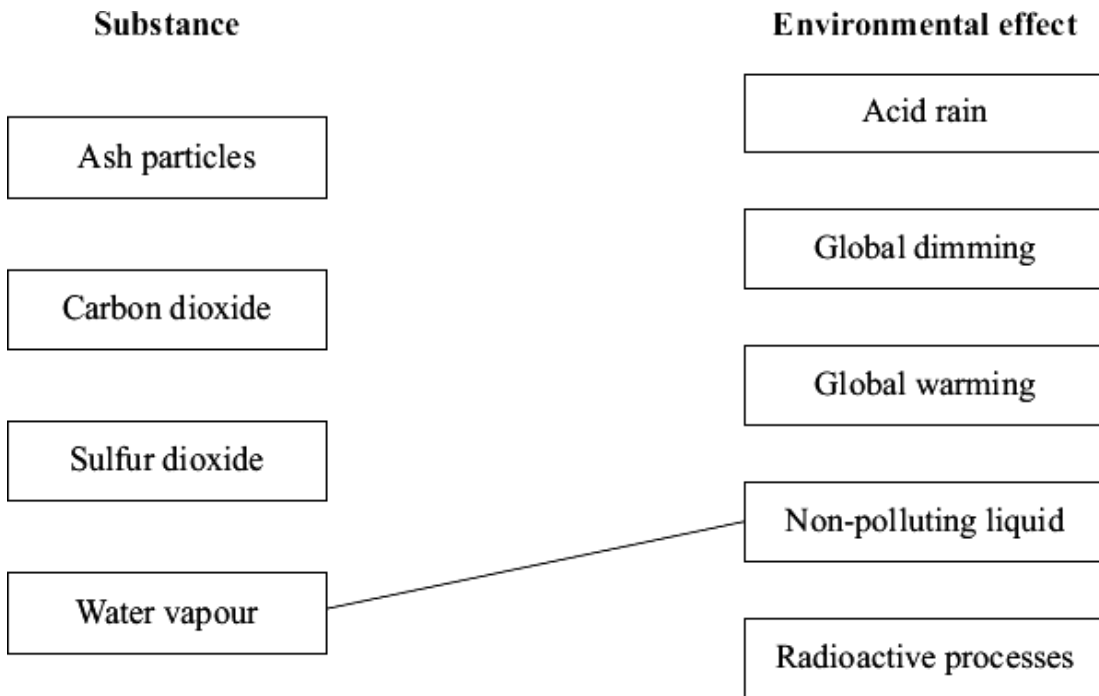
processes.

(1)

- (b) The volcano released large amounts of ash particles, carbon dioxide, sulfur dioxide and water vapour.

Draw **one** straight line from each substance to an environmental effect that it causes.

One has been done for you.



(3)

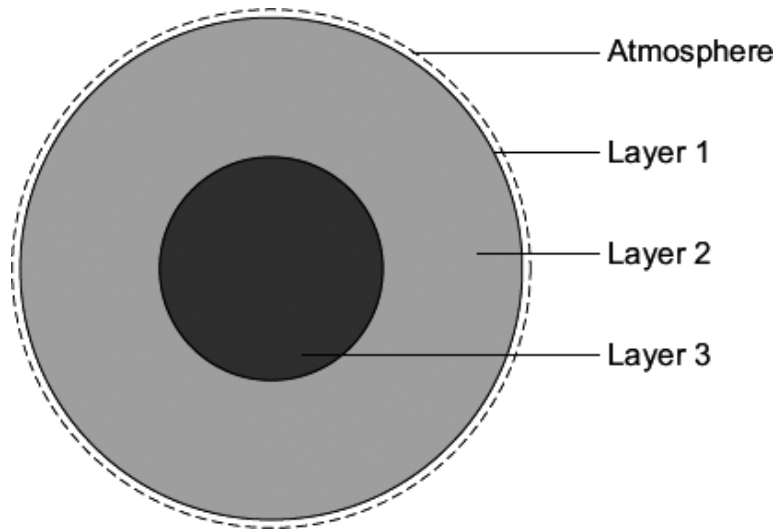
- (c) Why do volcanic eruptions and earthquakes happen?

.....  
.....

(1)

(Total 6 marks)

**Q14.** The Earth is made up of several layers.



(a) Draw **one** straight line from each layer to its correct name.

|                    |                    |
|--------------------|--------------------|
|                    | <div>core</div>    |
| <div>Layer 1</div> | <div>crust</div>   |
| <div>Layer 2</div> | <div>mantle</div>  |
| <div>Layer 3</div> | <div>nucleus</div> |

(3)

- (b) The table shows the main gases in the Earth's atmosphere.

| Gas            | Percentage (%) in the atmosphere |
|----------------|----------------------------------|
| Nitrogen       | 78.0                             |
| Oxygen         | 21.0                             |
| Argon          |                                  |
| Carbon dioxide | 0.03                             |

Use information in the table to help you to complete the sentences.

- (i) Draw a ring around the correct answer to complete the sentence.

The percentage of argon in the Earth's atmosphere is

0.97

9.7

97.0

%.

(1)

- (ii) Complete the sentence.

The gas in the Earth's atmosphere that

is a compound is .....

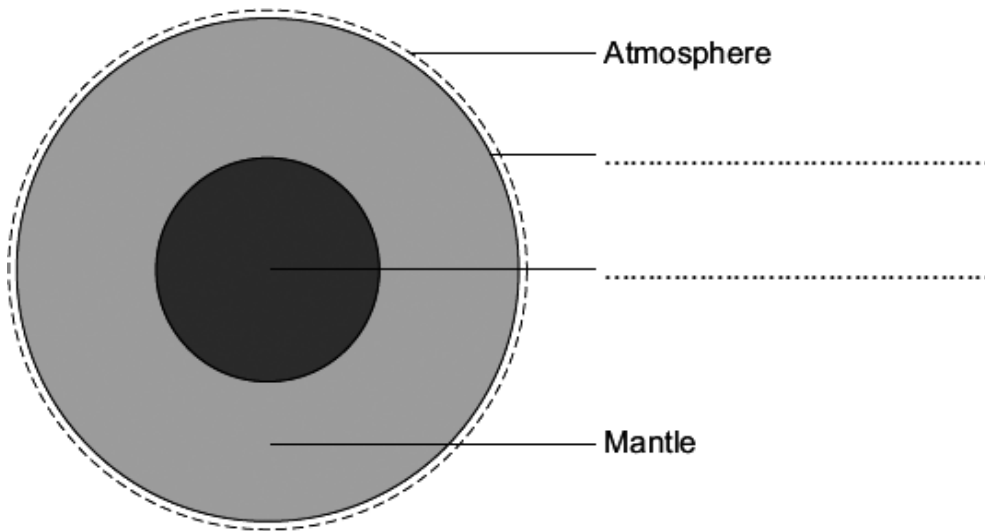
(1)

(Total 5 marks)

**Q15.** The Earth has a layered structure and is surrounded by an atmosphere.

(a) The diagram shows the layers of the Earth.

Complete the labels on the diagram.

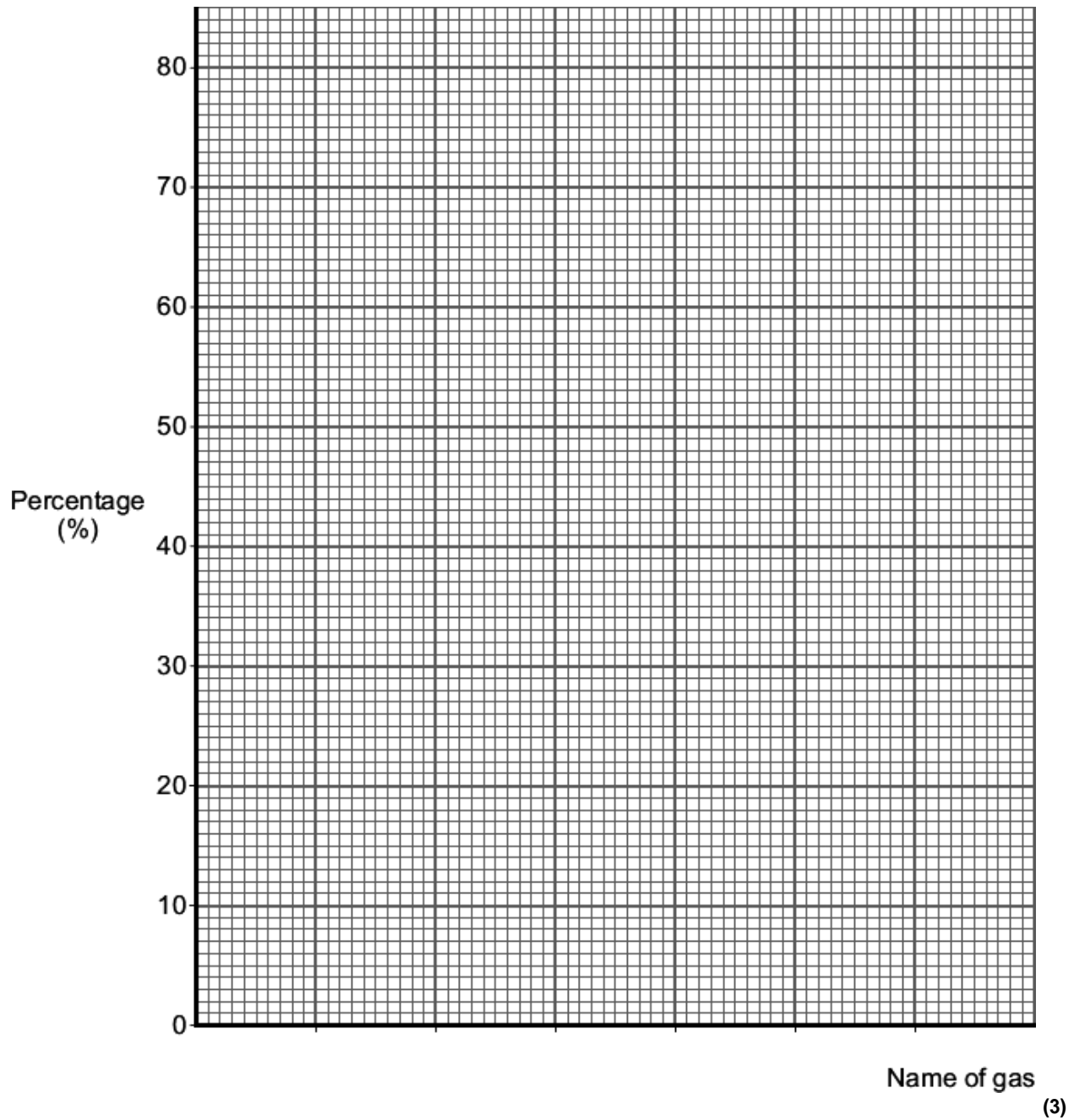


(2)

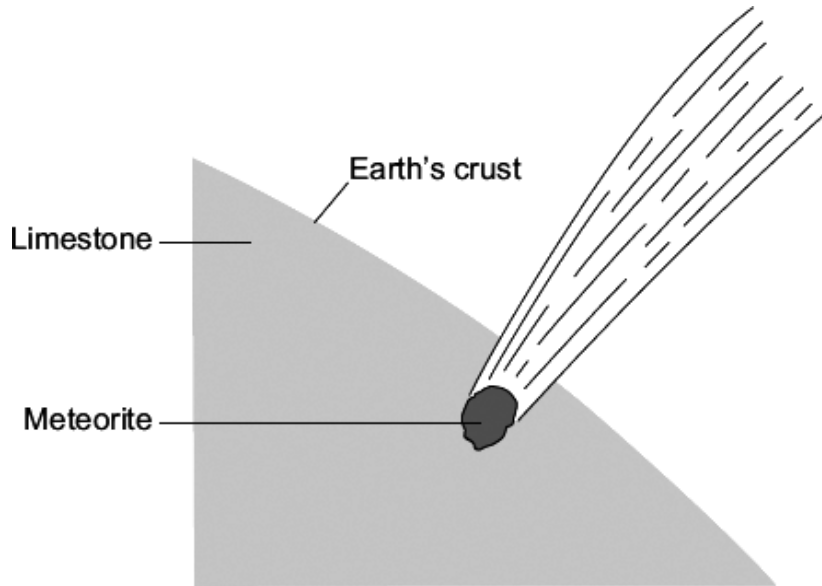
- (b) The data in the table shows the percentages of the gases in the Earth's atmosphere.

| Name of gas | Percentage (%) of gas |
|-------------|-----------------------|
| Nitrogen    | 78                    |
| Oxygen      | 21                    |
| Other gases | 1                     |

Present the data in the table on the grid below.



- (c) Millions of years ago a large meteorite hit the Earth.  
The meteorite heated limestone in the Earth's crust to a very high temperature.  
The heat caused calcium carbonate in the limestone to release large amounts of carbon dioxide.



Draw a ring round the correct answer to complete each sentence.

- (i) Carbon dioxide was released because the calcium carbonate was

decomposed.  
evaporated.  
reduced.

(1)

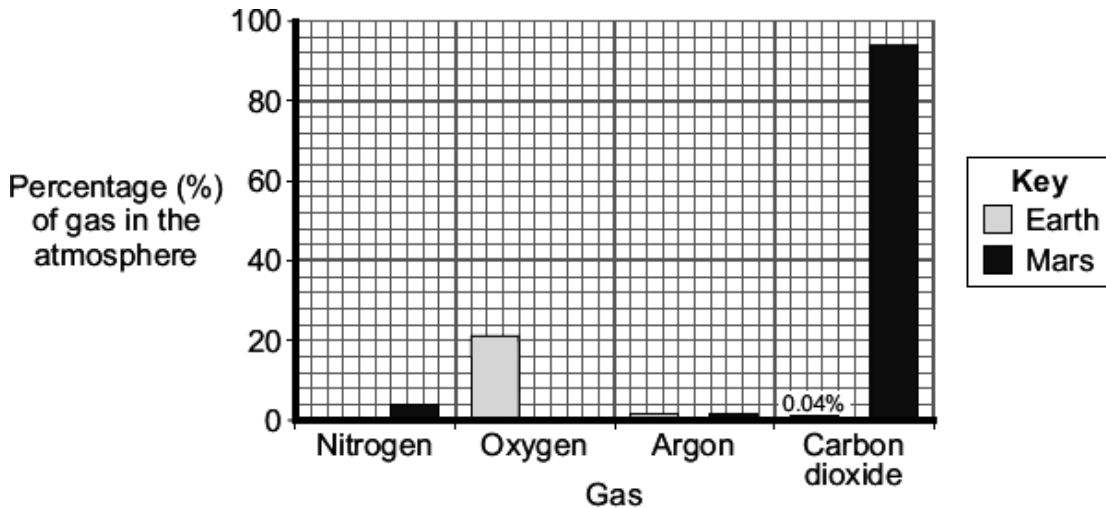
- (ii) More carbon dioxide in the Earth's atmosphere causes

acid rain.  
global dimming.  
global warming.

(1)

(Total 7 marks)

**Q16.** The bar chart shows some of the gases in the atmospheres of Earth today and Mars today.



(a) Complete the bar chart to show the percentage of nitrogen in the Earth's atmosphere today.

(1)

(b) Some scientists suggest that the Earth's early atmosphere was like the atmosphere of Mars today.

(i) There is **not** much oxygen in the atmosphere of Mars.

Suggest why.

.....  
 .....

(1)

(ii) The percentage of argon in the Earth's atmosphere today is the same as it was in the Earth's early atmosphere.

Suggest why.

.....  
 .....

(1)

(c) Compared with the percentage of carbon dioxide in the Earth's early atmosphere there is **not** much carbon dioxide in the Earth's atmosphere today.

Give **one** reason for this change.

.....  
 .....

(1)



- (d) Draw a ring around the correct answer to complete the sentence.

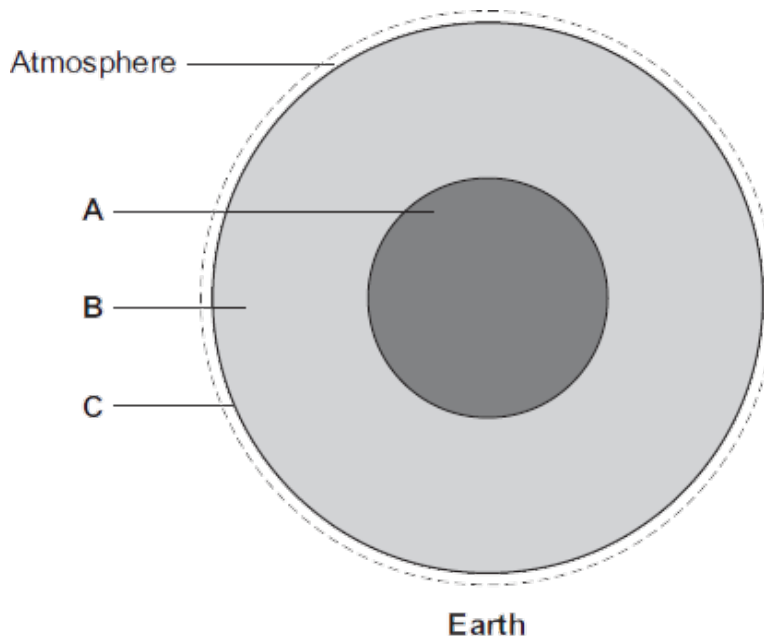
Some theories suggest that the Earth's early atmosphere was

made by

|                            |
|----------------------------|
| burning fossil fuels.      |
| the formation of oceans.   |
| the eruption of volcanoes. |

(1)  
(Total 5 marks)

- Q17.** This is a diagram of the layered structure of the Earth.



- (a) Draw a line from each layer to the correct name of the layer.

| Layer   | Name    |
|---------|---------|
| Layer A | core    |
| Layer B | crust   |
| Layer C | mantle  |
|         | nucleus |

(3)

- (b) The Earth's early atmosphere was 96% carbon dioxide.  
The atmosphere of the Earth today is 0.04% carbon dioxide.

The percentage of carbon dioxide in the Earth's atmosphere has changed.

Give **two** reasons why.

You should consider:

- the formation of surface water (oceans)
- the formation of sedimentary rocks (limestone).

.....

.....

.....

.....

(2)

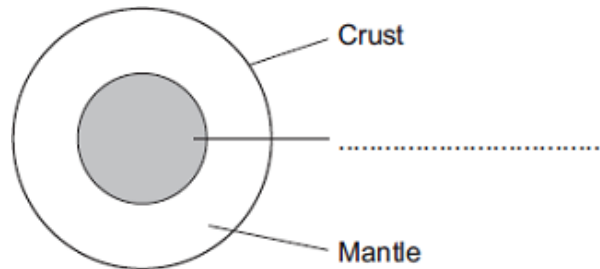
(Total 5 marks)

**Q18.** Earthquakes are common in certain places on Earth.

- (a) The diagram shows the layered structure of the Earth.

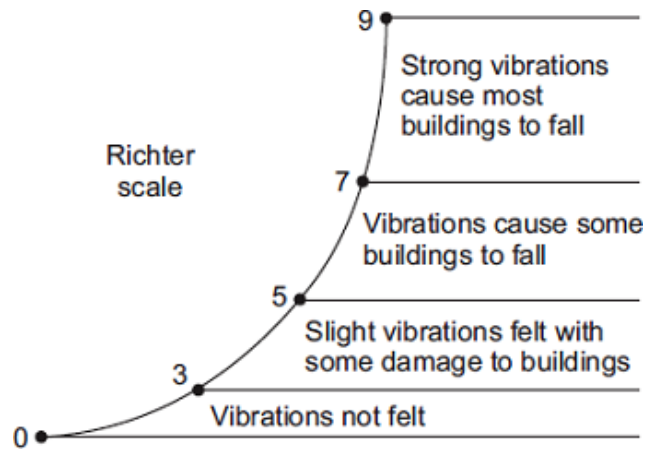
Choose **one** word from the box to complete the label on the diagram.

|            |      |       |
|------------|------|-------|
| atmosphere | core | plate |
|------------|------|-------|

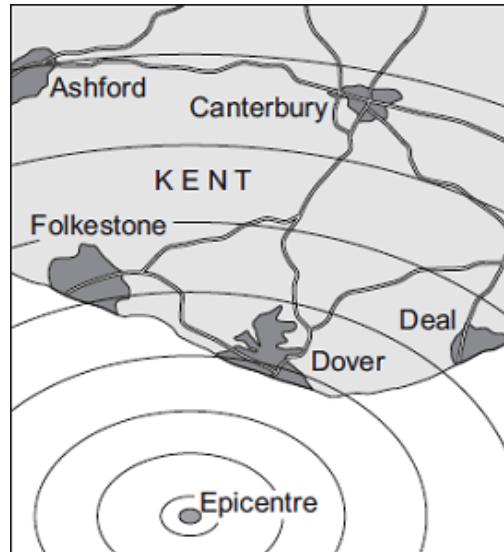


(1)

- (b) In 1935 C.F. Richter designed a scale for comparing the size of earthquakes.



A newspaper reported that an earthquake, off the coast of Kent, had caused plaster to come down from ceilings, house tiles to loosen and church bells to ring.



- (i) Earthquakes happen often in the UK.

Suggest why most of these earthquakes are **not** reported in the newspapers.

.....  
 .....

(1)

- (ii) Draw a ring around the number which best shows the size of the earthquake in Kent.

1                      4                      6                      8

(1)

- (iii) State what causes earthquakes.

.....  
 .....

(1)

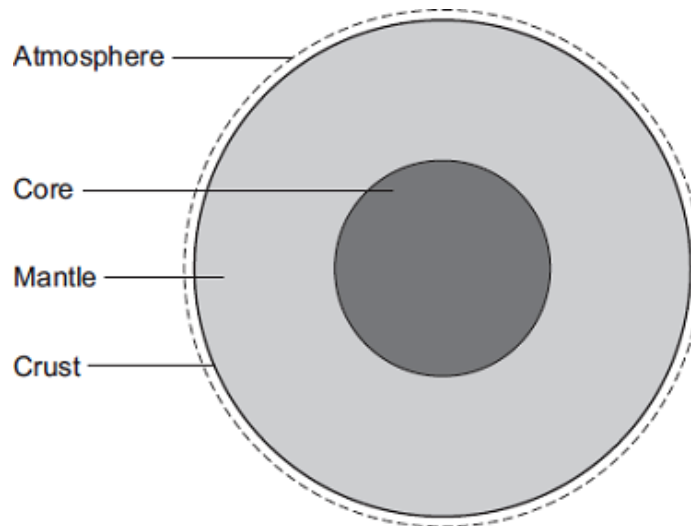
- (iv) Why were people living in Kent **not** warned about this earthquake?

.....  
 .....

(1)

(Total 5 marks)

**Q19.** The diagram shows the layers in and around the Earth.



(a) Use the diagram above to help you to answer this question.

Draw **one** line from each statement to its correct layer.

| Statement   | Layer      |
|---|------------|
| There are mountain ranges.                            | atmosphere |
| There are convection currents that cause earthquakes. | core       |
| There is a mixture of gases.                          | crust      |
|   | mantle     |

(3)

- (b) Iceland has many volcanoes.  
Scientists are monitoring a volcano in Iceland, called Katla.



There has been an increase in the number of small earthquakes (tremors) around Katla.

- (i) Draw a ring around the correct answer to complete the sentence.

Iceland has volcanoes because it

has low temperatures.

is an island.

is on a tectonic plate boundary.

(1)

- (ii) People do not know when Katla will next erupt.

Tick (✓) the correct reason why.

| Reason   | Tick (✓) |
|--|----------|
| Small earthquakes (tremors) near the volcano are happening more often.           |          |
| The last two eruptions happened a long time ago in October 1918 and in May 1860. |          |
| Scientists cannot accurately predict when volcanic eruptions will occur.         |          |

(1)

- (c) Previous eruptions of Katla produced large amounts of solid ash particles and sulfur dioxide.

Use the correct answer to complete each sentence

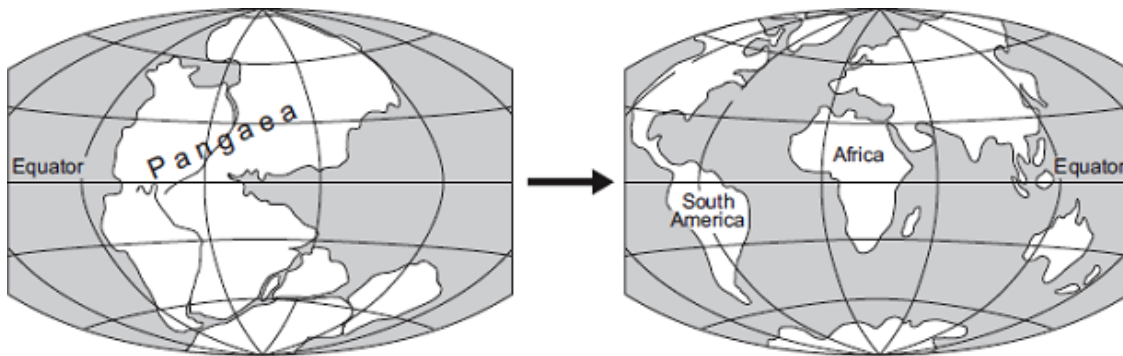
|                  |                    |                       |                       |
|------------------|--------------------|-----------------------|-----------------------|
| <b>acid rain</b> | <b>earthquakes</b> | <b>global dimming</b> | <b>global warming</b> |
|------------------|--------------------|-----------------------|-----------------------|

An environmental impact caused by solid ash particles is .....

An environmental impact caused by sulfur dioxide is .....

(2)  
(Total 7 marks)

- Q20.** In 1912 Wegener suggested his theory of continental drift.



In 1912, many scientists did not accept Wegener's theory because he could not explain:

- how Pangaea had split into continents
  - how the continents had moved apart.
- (a) Wegener used evidence to support his theory.

Give **two** pieces of evidence Wegener used.

.....

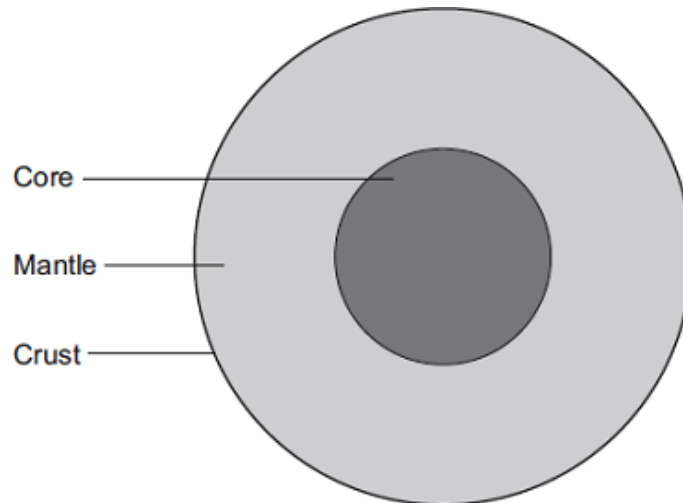
.....

.....

.....

(2)

- (b) Scientists have discovered that the Earth is made up of layers.



Complete the sentences by writing **one** word in each space.

Scientists now accept Wegener's theory because they know that the Earth's ..... and upper part of the mantle are cracked into tectonic plates.

The tectonic plates move at relative speeds of a few centimetres per year because of convection currents in the Earth's .....

These convection currents are driven by ..... released from natural radioactivity.

A volcanic eruption or an ..... can happen at the boundaries between tectonic plates.

(4)  
(Total 6 marks)



