



KS3 Science

Geological Changes

Question Paper

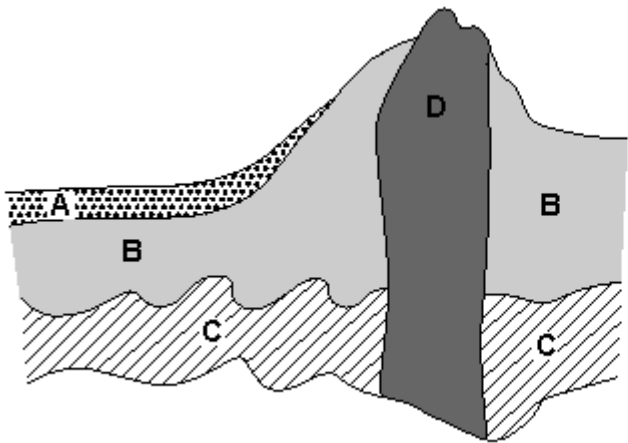
Time available: 38 minutes





Marks available: 50 marks

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1.

The diagram shows rocks in a mountain range.



| Key | |
|---|-------------------|
|  | sand and mud |
|  | sedimentary rocks |
|  | metamorphic rocks |
|  | igneous rocks |

(a) Choose the correct letter from the diagram to best match the descriptions below. You may write each letter more than once.

(i) rock changed by heat and pressure

.....

(ii) rock formed by magma cooling and solidifying

.....

(iii) the oldest rock shown in the diagram

.....

(iv) region where eroded materials are deposited

.....

(v) region not being affected by erosion

.....

3 marks

(b) Rainwater can damage rocks by physical and chemical weathering.

(i) Give one way rainwater causes **physical** weathering.
Give the name and describe the process in the table below.

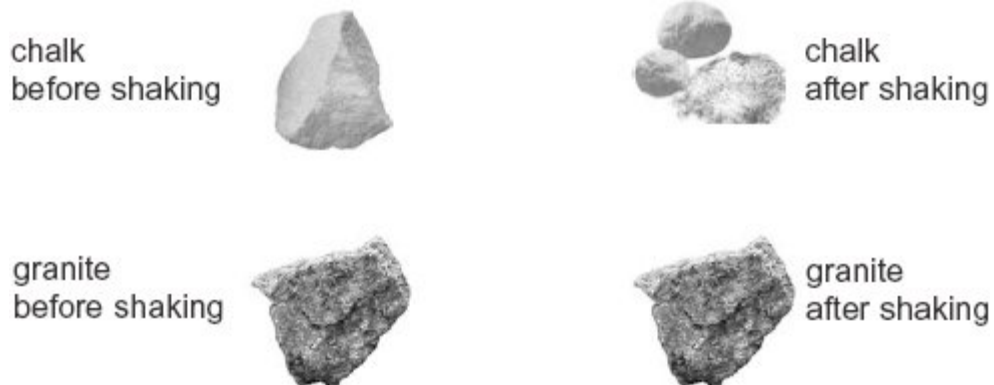
(ii) Give one way rainwater causes **chemical** weathering.
Give the name and describe the process in the table below.

| | name | description of process |
|----------------------------|------|------------------------|
| physical weathering | | |
| chemical weathering | | |

4 marks
maximum 7 marks

2.

Raj put a piece of chalk in one container and a piece of granite in another container.
He shook both containers for two minutes.
The photographs below show what happened.



(a) (i) Give **two** ways the **chalk** had changed.

1.

1 mark

2.

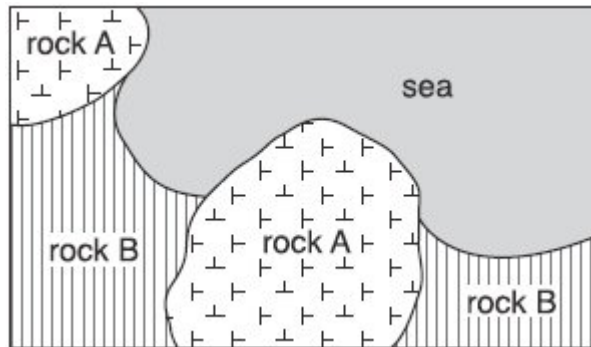
1 mark

(ii) Suggest why the **granite** did **not** change.

.....

1 mark

(b) A map of a coastline is drawn below. Waves crash against the rocks.



Which rock is chalk and which rock is granite?
Give the letters from the map.

chalk granite

1 mark

(c) The photograph below shows the remains of an animal found in chalk rock.



(i) What are the remains of living things found in rock called?

.....

1 mark

(ii) Look carefully at the animal remains in the photograph.

Which animal could it be related to?

Tick the correct box.

| | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| snail | starfish | ladybird | slug |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Give a reason for your answer.

.....

1 mark

(d) Granite is formed underground from very hot melted rock.

(i) Animal remains are **not** found in granite.
Give the reason for this.

.....
.....

1 mark

(ii) What is hot melted rock called when it is **underground**?
Tick the correct box.

| | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| sand | magma | lava | mud |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

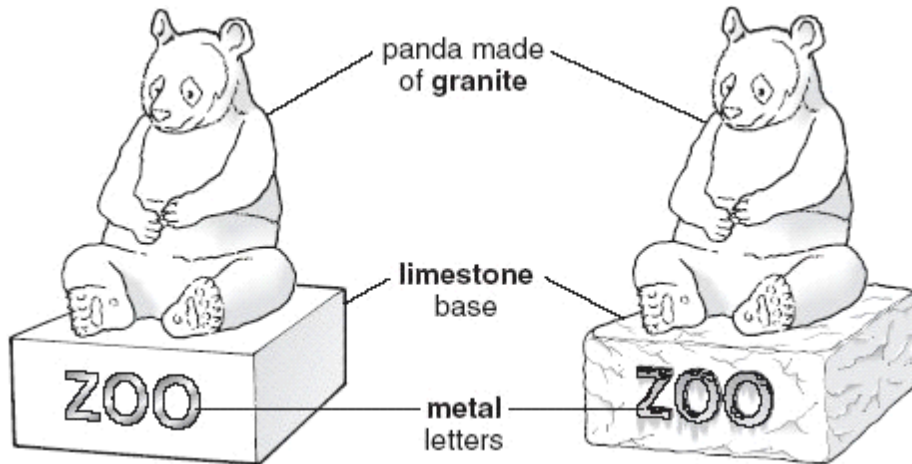
1 mark
maximum 8 marks

3.

A statue outside a zoo was made from two types of rock.

The panda was made of granite.
The base was made of limestone.

The drawings show the statue as it was in 1936 and in 2006.



(a) The surface of the limestone base has changed over the years.

(i) Which process caused this change?
Tick the correct box.

| | | | |
|-------------|--------------------------|------------|--------------------------|
| evaporating | <input type="checkbox"/> | melting | <input type="checkbox"/> |
| reflecting | <input type="checkbox"/> | weathering | <input type="checkbox"/> |

1 mark

(ii) The surface of the panda made of granite has **not** changed.

Suggest why granite does **not** change in the same way as limestone.

.....
.....

1 mark

(b) Acid rain can be formed when fossil fuels burn.

(i) Give the name of **one** fossil fuel.

.....

1 mark

(ii) What is true about all fossil fuels?

Tick the correct box.

All fossil fuels are a source of energy.

All fossil fuels are black.

All fossil fuels are liquid.

All fossil fuels take less than 50 years to form.

1 mark

(iii) Acid rain has changed the surface of the metal letters on the statue.

Which word describes the effect of acid rain on a metal?

Tick the correct box.

corrosion

friction

magnetism

vibration

1 mark

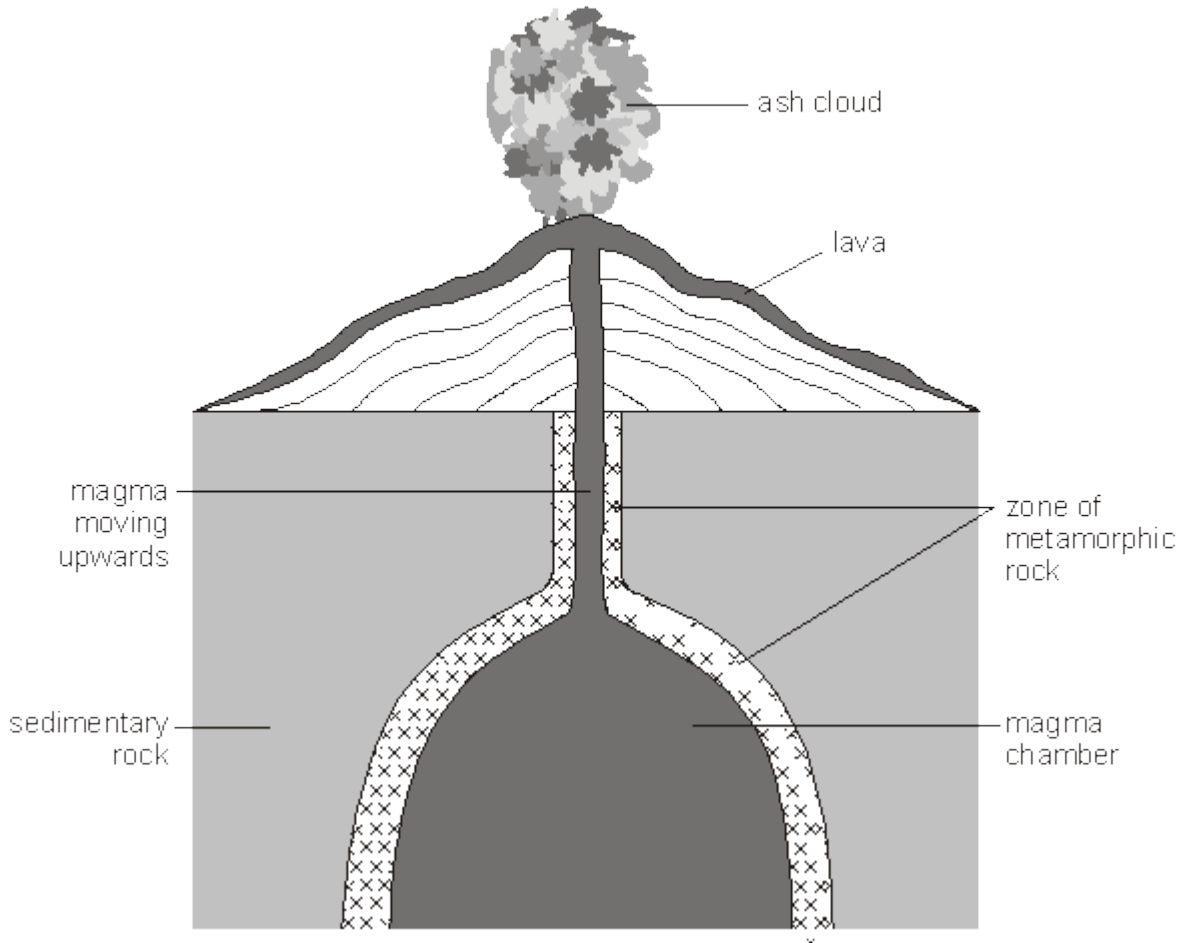
(iv) What could the zoo owner put on the metal letters to protect them from acid rain?

.....

1 mark

maximum 6 marks

4. The diagram below shows a section through a volcano. Magma is moving up from a magma chamber. Some of the magma erupts to form lava. The liquid lava cools and becomes solid rock.



- (a) Explain why magma deep underground stays liquid longer than lava on the surface.

.....

1 mark

- (b) As the magma cools underground, it solidifies and crystals are formed.
- (i) In what way will these crystals be different from the crystals formed when lava solidifies above ground?

.....

1 mark

- (ii) Give the reason for your answer.

.....

1 mark

(c) A zone of rock surrounding the magma has become a metamorphic rock.

(i) What conditions would cause this to happen?

.....
.....

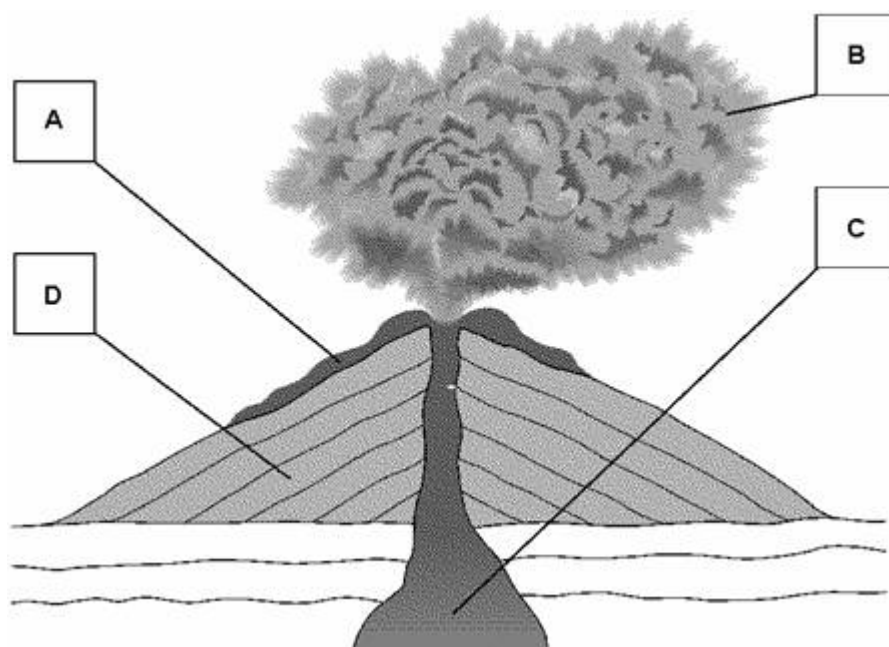
1 mark

(ii) Give the name of the metamorphic rock which is formed from limestone in this way.

.....

1 mark
maximum 5 marks

5. The diagram shows a volcano erupting.



not to scale

(a) Look at the diagram. Give the letter which labels:

(i) magma;

.....

1 mark

(ii) liquid lava;

.....

1 mark

(iii) old solid rock.

.....

1 mark

- (b) When magma and lava cool, they form a hard crystalline rock.
What is the name of this type of rock?
Tick the correct box.

igneous rock

metamorphic rock

sedimentary rock

1 mark

- (c) The changes listed below take place when a volcano erupts.
Which **one** of these changes could be reversed?
Tick the correct box.

Old rock is heated to form a different rock.

Sulphur burns to form sulphur dioxide.

Water is heated to form water vapour.

1 mark

- (d) Ash from a volcano dropped into a lake. All the fish in the lake were killed and buried under the ash in the mud at the bottom of the lake.

The photograph below shows the remains of a fish millions of years later.



- (i) The photograph shows the body parts which supported the fish.
Give the name of these body parts.

.....

1 mark

- (ii) Give the name for animal **and** plant remains that are found in a rock after millions of years.
-

1 mark
Maximum 7 marks

6.

- (a) The table gives the names of three different rocks and how they are classified.

| name of rock | class of rock |
|--------------|---------------|
| granite | igneous |
| marble | metamorphic |
| shale | sedimentary |

In the table below, draw lines to connect the name of each rock to the description of how the rock was formed and then to the correct description of features of the rock.

| how the rock was formed | name of rock | features of the rock |
|---|--------------|---|
| layers of mud and tiny dead animals compressed and turned into rock | granite | large interlocking crystals |
| magma cooling slowly underground in the Earth's crust | marble | crumbly, layered, containing fossils |
| limestone changed by heat and pressure | shale | hard, shiny, white with veins of colour, fizzes with acid |

3 marks

(b) The diagram shows a section through a limestone cliff.

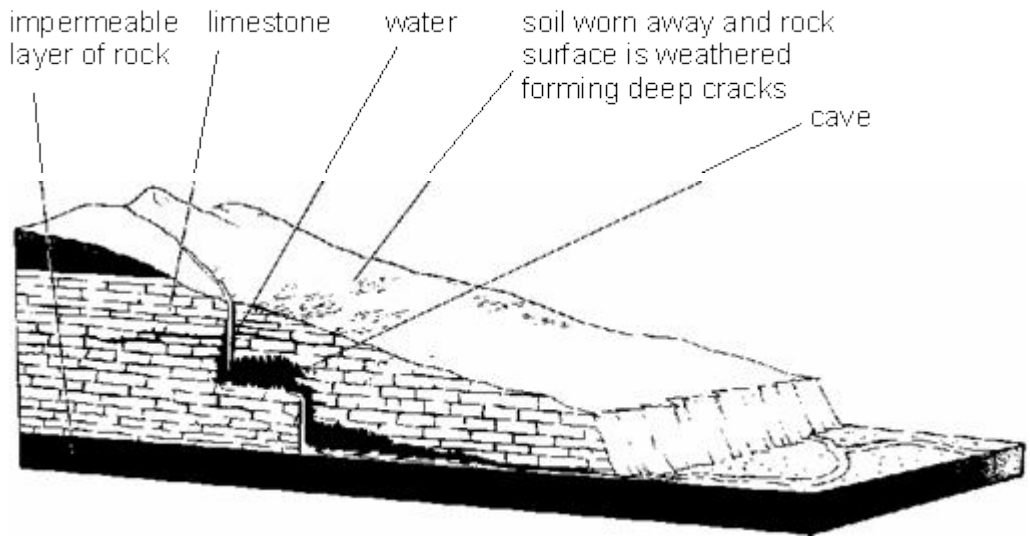


Diagram: Mary Jones, Geoff Jones, David

Acaster,

Cambridge Coordinated Science: *Chemistry*, 1993

(i) There are caves in the limestone.

Explain how **chemical** weathering causes caves to form in limestone.

.....

.....

.....

.....

2 marks

(ii) Limestone is a porous rock. Water can enter the spaces in limestone.

Describe how this causes **physical** weathering of the limestone.

.....

.....

.....

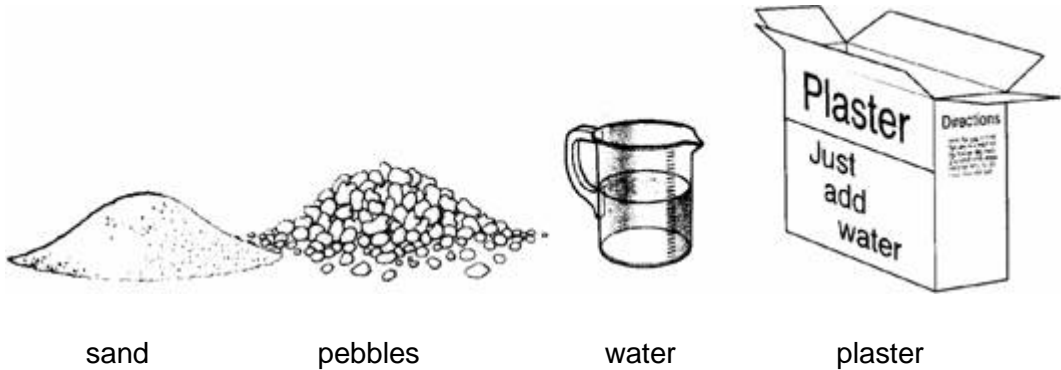
2 marks

Maximum 7 marks

7.

(a) Joseph and Meena did some experiments to show how new rocks can be formed.

(i) Joseph used the following materials.



Joseph mixed these materials and left the mixture to go hard. The solid looked like this.



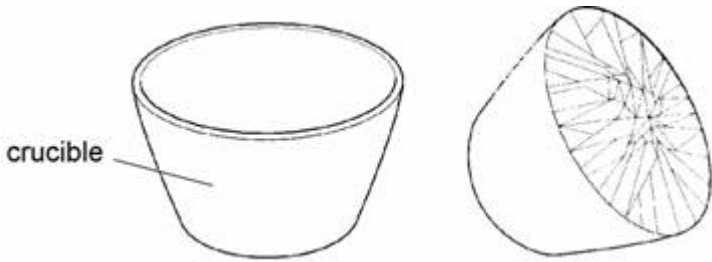
Rocks are grouped into three types: **igneous**, **metamorphic** and **sedimentary**.

Which of these types of rock is most like Joseph's 'rock'?

.....

1 mark

(ii) Meena took some crystals. She put them in a crucible and heated it until the crystals melted. She let the crucible cool very slowly until the contents went solid. The solid she tipped out from the crucible looked like this.



Which of the three types of rock is most like Meena's 'rock'?

.....

1 mark

(b) Rocks can be broken by weathering when:

1. Water gets into cracks in rocks.
2. The water in the cracks turns to ice and expands.
3. The rocks split into smaller pieces.

What else must happen during this part of this weathering process?
Tick **two** boxes.

The temperature stays the same.

The temperature falls below freezing point.

The temperature stays above freezing point.

Expansion forces the cracks in the rock to close.

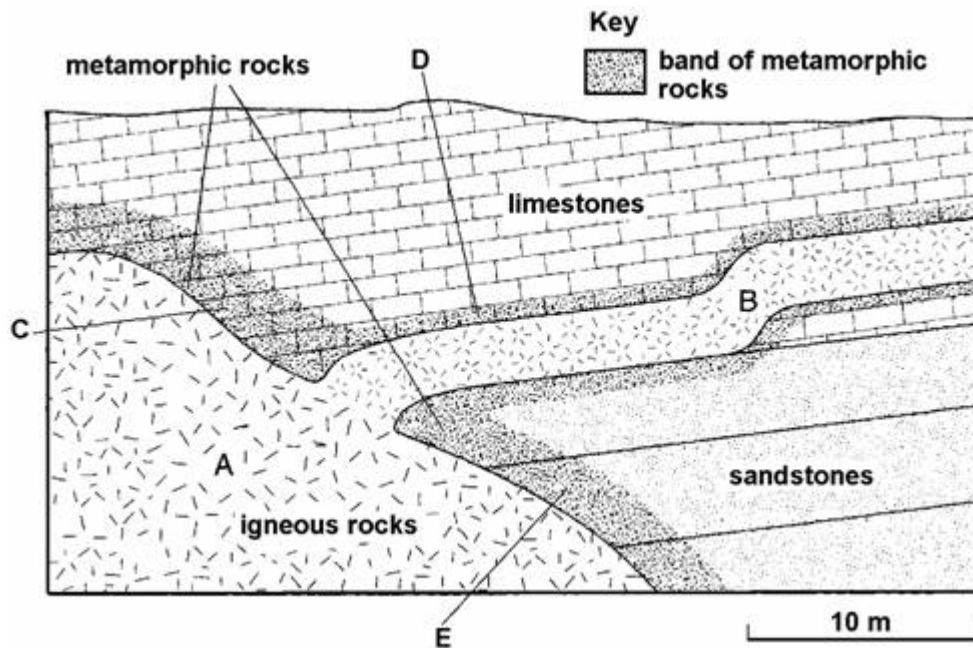
Expansion forces the cracks in the rock to open.

Expansion forces all of the water out of the cracks.

2 marks
Maximum 4 marks

8.

The diagram shows the geology of a cliff section.



- (a) A minor intrusion known as a sill is labelled B on the diagram.
Explain why the crystals in the sill, B, are smaller than those in the large intrusion labelled A.

.....
.....

1 mark

(b) Explain why the type of metamorphic rock formed at C is different from that formed at E.

.....
.....

1 mark

(c) Suggest why the band of metamorphic rocks is wider at C than at D.

.....
.....

1 mark

(d) (i) A number of geological events are given in the list.

- deposition of limestones**
- formation of metamorphic rocks**
- deposition of sandstones**
- intrusion of magma**

Use the diagram of the cliff section to help you place these four events in the correct sequence.

- 1st.
- 2nd.
- 3rd.
- 4th.

1 mark

(ii) Some of the layers of rock in the diagram are tilted. It is **not** possible to be sure when in the sequence of events the tilting occurred. Suggest when the tilting occurred and explain why you cannot be sure, using the evidence in the diagram.

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

2 marks
Maximum 6 marks