

- 5 On 14th April 2010 the volcano Eyjafjallajökull erupted in Iceland, creating an ash cloud which was dangerous for aircraft and led to the closure of many airports for about ten days.

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◁ L6WRFNSKRWR 7KLQNVWRFN

A large number of gases were released into the atmosphere from the volcano. These volcanic gases included carbon dioxide, hydrogen, hydrogen chloride and water vapour.

- (a) Complete the table below to give the formula, one use and two physical properties of carbon dioxide and hydrogen gas.

Gas	Formula	Use	Physical properties
carbon dioxide			1. 2.
hydrogen			1. 2.

[4]

[4]

(b) Complete the table below to describe the tests used to identify carbon dioxide, hydrogen, hydrogen chloride and water in the laboratory and state the result of a positive test.

Gas	Test	Result of positive test	
carbon dioxide			[2]
hydrogen			[2]
hydrogen chloride			[4]
water			[3]

(c) Sulphur dioxide is also emitted when a volcano erupts. It is a pollutant gas which reacts with water in the air to form acid rain.

(i) Write a balanced symbol equation for the reaction of sulphur dioxide with water.

_____ [2]

(ii) State **two** harmful effects of acid rain on the environment.

1. _____

2. _____

_____ [2]

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(d) Sulphur dioxide can be produced in the laboratory by burning sulphur .

(i) Describe the appearance of sulphur.

_____ [2]

(ii) Write a balanced symbol equation for the burning of sulphur in air.

_____ [2]

(iii) What is observed when sulphur burns in air?

_____ [3]

Quality of written communication [2]

(iv) State **one** use of sulphur dioxide.

_____ [1]

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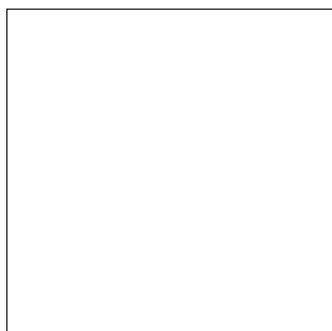
6 Substances may be classified according to their physical state.

(a) In the boxes below draw the arrangement of particles in a solid and in a gas.

The particles should have the approximate size shown on the right.



SOLID



GAS



Particle size

[2]

(b) The table below shows the melting points and boiling points of a range of substances found in the laboratory.

Substance	Melting point ($^{\circ}\text{C}$)	Boiling point ($^{\circ}\text{C}$)
sodium chloride	808	1465
oxygen	-218	-182
sulphur	114	444
carbon	3550	4827
water	0	100
carbon dioxide	-78	-57

Questions (b)(i)–(b)(vi) refer to the substances in the table above.

(i) Name the substance which melts at the lowest temperature.

_____ [1]

(ii) Name the **element** which is a solid at room temperature (20°C) but a liquid at 400°C .

_____ [1]

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(iii) Write the formula of the substance which is a liquid at room temperature (20 °C).

_____ [1]

(iv) Which substance is a liquid over the greatest temperature range?

_____ [1]

(v) What is the physical state of oxygen at –200 °C?

_____ [1]

(vi) At what temperature does sulphur change from a liquid into a solid?

_____ [1]

(c) Solid carbon dioxide undergoes sublimation.

(i) What name is given to solid carbon dioxide?

_____ [1]

(ii) Explain fully what is meant by sublimation.

_____ [2]

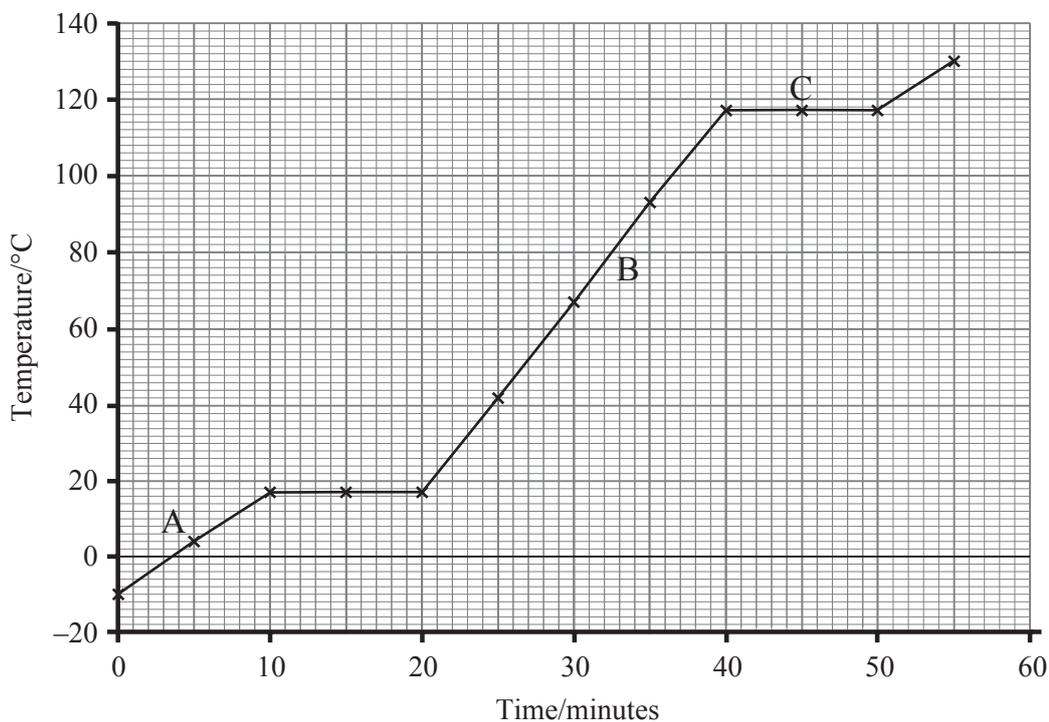
(iii) Name one **element** which undergoes sublimation.

_____ [1]

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- (d) Ethanoic acid is an organic acid present in vinegar. In an experiment some crystals of ethanoic acid, at a temperature of -10°C , were heated and their temperature recorded every five minutes. The results are plotted on the graph below.



- (i) What is the melting point of ethanoic acid?

_____ [1]

- (ii) Which physical state will be observed at A and B on the graph?

A _____

B _____ [2]

- (iii) Name the process occurring at C on the graph.

_____ [1]

THIS IS THE END OF THE QUESTION PAPER

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