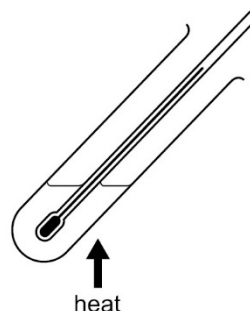


Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

1 Billy wants to see whether adding salt to water changed the boiling point of the water.

a He used the apparatus shown in the diagram.



i Name the apparatus used to heat the water.

- ☐ A water bath
- ☐ B Bunsen burner
- ☐ C thermometer
- ☐ D thermistor

(1)

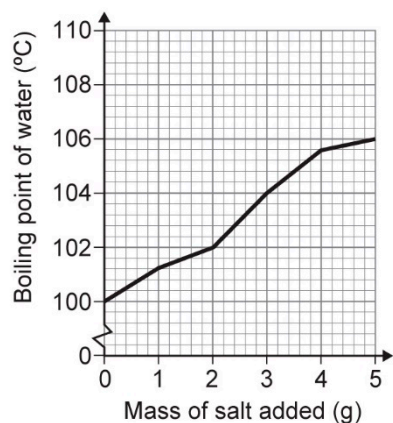
ii What apparatus could be used to hold the boiling tube? Tick *one* box.

- ☐ A clamp and stand
- ☐ B gauze and tripod
- ☐ C clamp and gauze
- ☐ D tripod and beaker

(1)

b Billy added different masses of salt to equal quantities of water and measures the boiling point each time.

The graph shows his results.



- i Give a conclusion Billy can make from his results.

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(1)

- ii Estimate the boiling temperature of the water if 2.5 g of salt is added.

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(1)

- c A salt water solution is a mixture.

Draw a line to match each term with its definition.

**Term****Definition**

mixture

contains only one type of atom

element

two substances that can be separated

compound

the simplest particle of matter

atom

two or more elements chemically bonded together

(2)

(Total for Question 1 = 6 marks)

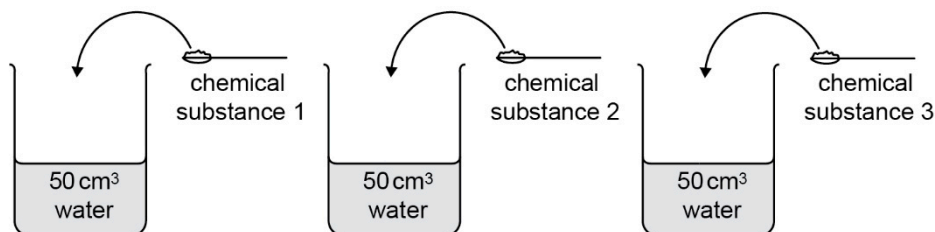
- 2 A scientist is investigating chemical substances that could be used in hand warmers.

She wants to find out which chemical substance releases the most thermal energy when it is added to water.

She records the starting temperature of the water in each of three beakers.

She adds the first chemical substance to one of the beakers and stirs until it has all dissolved. At that point she records the temperature of the solution in the beaker.

She repeats this procedure using the same quantity of the other two chemical substances.



- a Name *one* variable that has been controlled in the investigation.

(1)

The table below shows the results for each substance.

Substance	Start temperature (°C)	End temperature (°C)	Temperature change (°C)
1	20	29	9
2	18	24	6
3	19	26	

- b Calculate the temperature change for chemical substance 3.

(1)

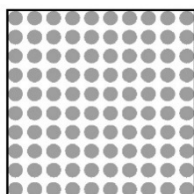
- c State which chemical substance released the most thermal energy and explain how you know.

(2)

(Total for Question 2 = 4 marks)

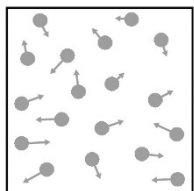
- 3 a Scientists use particle diagrams to represent different states of matter.

- i Draw *one* line between each particle diagram and its state of matter.  
ii Draw *one* line between each state of matter and its description.

**Diagram****State of matter****Description**

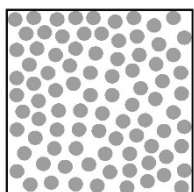
solid

Particles are far apart and free to move.



liquid

Particles vibrate but cannot move past each other.



gas

Particles are in contact but can move past each other.

(4)

**b** Most metals are solids at room temperature.

**i** Describe two properties of solids.

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(2)

**ii** Name the process that turns a solid into a liquid.

☐ A condensation

☐ B melting

☐ C boiling

☐ D solidification

(1)

**c** Write a plan that you could use to determine whether a solid substance is a metal.

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(2)

(Total for Question 3 = 9 marks)

**4 a** A chemist adds a few drops of universal indicator to a beaker containing a clear, colourless liquid with a pH of 1.

Use words from the box to complete the sentence that describes the result.

red	green	purple
alkali	acidic	neutral

The indicator turned \_\_\_\_\_ in the liquid with a pH of 1, showing that it was a \_\_\_\_\_ solution.

(2)

- b** A bottle of hydrochloric acid has the label shown in the diagram.



Give *one* safety precaution that should be taken when handling hydrochloric acid.

(1)

- c** The venom in a wasp sting is believed to be alkaline.

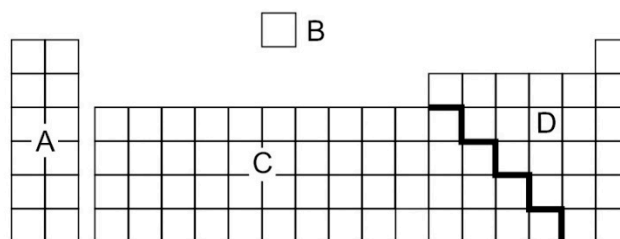
Give *one* reason why dabbing vinegar on a wasp sting might reduce the pain.

(1)

(Total for Question 4 = 4 marks)

- 5 a i** This is an outline of the periodic table. Which letter shows the location of the non-metals in the periodic table? Tick *one* box.

- ☐ A
- ☐ B
- ☐ C
- ☐ D



(1)

- ii** The boxes below show the chemical symbols for two metals.

State the name of each metal.

Al

Na

(2)

- b** Iron is a metal that can be burnt in oxygen to form iron oxide.

- i** Complete the word equation for the reaction.

iron + \_\_\_\_\_ → \_\_\_\_\_

(1)

- ii A chemist burns 0.8 g of iron in oxygen.

The iron reacts to form 1.1 g of iron oxide.

Calculate the mass of oxygen that reacted with the iron.

- ☐ A 0.3 g
- ☐ B 0.4 g
- ☐ C 1.9 g
- ☐ D 1.8 g

(1)

(Total for Question 5 = 5 marks)

- 6 When copper carbonate is heated it will decompose.

copper carbonate  $\rightarrow$  copper oxide + carbon dioxide

- a Give a definition for the term decomposition.

(1)

- b Sunita times how long it takes for three different metal carbonates to decompose.

These are her results.

*copper carbonate - 40 seconds*

*zinc carbonate - 1 min 20 seconds*

*lead carbonate - 240 seconds*

- i What was the decomposition time for zinc carbonate in seconds?

- ☐ A 80 seconds
- ☐ B 100 seconds
- ☐ C 120 seconds
- ☐ D 70 seconds

(1)

- ii State which metal carbonate is easiest to decompose using heat and explain how you know.

(2)

(Total for Question 6 = 4 marks)

7 When metals react with acid they form a salt and hydrogen.

a The following reaction is an example.

magnesium + hydrochloric acid  $\rightarrow$  magnesium chloride + hydrogen

i The reaction releases heat energy. Give the term used to describe a reaction which releases heat energy.

- ☐ A endothermic
- ☐ B decomposition
- ☐ C exothermic
- ☐ D catalyst

(1)

ii Explain how a reaction can release heat energy.

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(2)

b In a reaction, 3 g of zinc is added to hydrochloric acid with a mass of 120 g.

After the reaction, the final mass is 121.5 g.

i Write the word equation for the reaction of the zinc metal with hydrochloric acid.

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(2)

ii Calculate the mass of gas released during the reaction.

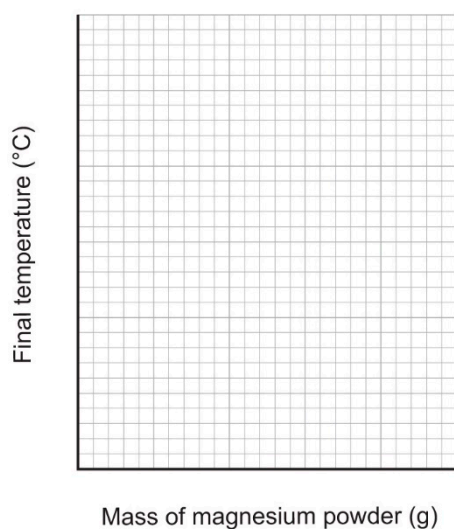
mass = \_\_\_\_\_ g  
(2)

(Total for Question 7 = 7 marks)

- 8 In an investigation, a chemist adds different masses of magnesium powder to a copper sulfate solution. She records the final temperature of the solution after each reaction. Her results are shown in the table.

Mass of magnesium powder (g)	Final temperature (°C)
0	19
0.5	21
1.0	24
1.5	26
2.0	26

- a Draw a line graph to show the results.



(3)

- b When the chemist adds 2.0 g of magnesium to the copper sulfate solution, the temperature does not increase further.

Give a reason for this.

(1)

(Total for Question 8 = 4 marks)

- 9 A geologist tests some sedimentary rocks to see how porous they are.

- a Describe how sedimentary rocks are formed.

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(3)



- b** The geologist measures the mass of each rock. Then he puts each rock into some water.

After 10 minutes he takes the rocks out, dries them and measures their masses again.

He then puts the rocks back into water for another 10 minutes before measuring their masses again.

- i** Give a reason why the masses of the rocks are only slightly greater after the second 10 minutes.

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(1)

- ii** Describe how the geologist could make sure his results are as accurate as possible.

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(2)

- c** The geologist also wants to investigate whether the density of the rock affects how porous it is.

To calculate the density of the rock, he needs to measure its volume.

To find the volume of each rock, he places it in a measuring cylinder containing 50 cm<sup>3</sup> of water.

- i** Describe how the geologist uses this method to measure the volume of each piece of rock.

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(2)

- ii** Density can be calculated using the following equation.

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

Calculate the density in g/cm<sup>3</sup> of a rock that has a mass of 8.1 g and a volume of 3.0 cm<sup>3</sup>.

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(2)

- d** The geologist's results show that denser rocks are less porous.

Give a reason why denser rocks are less porous.

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(1)

(Total for Question 9 = 11 marks)

**10** Rock salt is a mixture of sand particles and salt.

Explain how a pure sample of salt can be obtained from rock salt in a laboratory.

[illegible]

(6)

(Total for Question 10 = 6 marks)

TOTAL FOR TEST = 60 MARKS