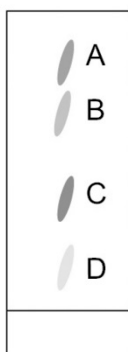


Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

- 1 a The diagram shows how chromatography can be used to separate the different inks found in a pen.



- i Which dot represents the most soluble ink? Tick *one* box.

- ☐ A
- ☐ B
- ☐ C
- ☐ D

(1)

- ii Chromatography can be used to separate soluble mixtures.

Name a technique that would separate an insoluble compound from water.

\_\_\_\_\_

(1)

- b Draw a line to match each term with its definition.

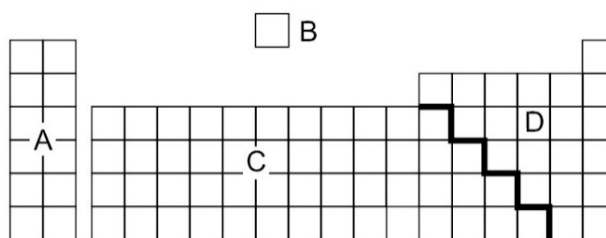
Term	Definition
suspension	formed when an insoluble substance is added to a liquid
solvent	formed when a substance dissolves in liquid
solute	a liquid that can dissolve another substance
solution	the solid that is dissolved in a liquid

(2)

(Total for Question 1 = 4 marks)

- 2 a i The diagram shows 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 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 2 = 5 marks)

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

- a The following reaction is an example.

magnesium + hydrochloric acid → magnesium chloride + hydrogen

- i Name the salt in this reaction.

- ☐ A magnesium
- ☐ B magnesium chloride
- ☐ C hydrochloric acid
- ☐ D hydrogen

(1)

- ii Hydrogen is a gas that can be identified using a simple test.

Describe the gas test for hydrogen.

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(2)

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

After the reaction, the final mass was 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)

- c Zinc is higher up the reactivity series than copper.

Explain what will happen if zinc is added to copper sulfate solution.

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(2)

(Total for Question 3 = 7 marks)

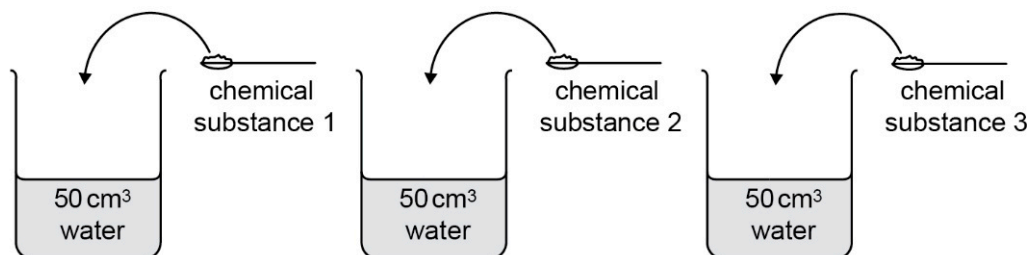
- 4 In an investigation, a chemist adds different masses of magnesium powder to a copper sulfate solution.

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)

- c This is the word equation for the thermite reaction.

iron oxide + aluminium → aluminium oxide + iron

To initiate the reaction heat energy must be supplied, usually via a fuse of burning magnesium.

Explain why heat energy is needed to initiate the reaction. Use your knowledge of activation energy in your answer.

(2)

(Total for Question 4 = 6 marks)

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

- a Describe how sedimentary rocks are formed.

(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 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 5 = 9 marks)

- 6 a Ethanoic acid is a weak acid, and baking powder is a weak alkali.

- i Which row of the table correctly identifies the colour of universal indicator in the different acids and alkalis? Tick *one* box.

Ethanoic acid	Sulfuric acid	Baking powder	Sodium hydroxide	Answer
red	blue	purple	orange	<input type="checkbox"/> A
blue	orange	red	purple	<input type="checkbox"/> B
orange	red	blue	purple	<input type="checkbox"/> C
purple	red	blue	orange	<input type="checkbox"/> D

(1)

- ii Name another method that scientists use to determine the pH of solutions.

(1)

- b The table shows the pH of four different solutions.

Solution	pH
A	7
B	9
C	1
D	4

- i Which solution is a strong acid? Tick *one* box.

- ☐ A
- ☐ B
- ☐ C
- ☐ D

(1)

- ii A farmer measures the pH of his soil and finds it is too acidic for his crops to grow.

Look at the pH of the solutions A–D in the table above.

Give the reason why the farmer should add solution B to his fields.

(1)

(Total for Question 6 = 4 marks)

**7 a** Duralumin is an alloy of aluminium used to make aeroplanes.

**i** Give a definition for the term 'alloy'.

\_\_\_\_\_  
(1)

**ii** Explain how an alloy is different from a compound.

\_\_\_\_\_  
\_\_\_\_\_  
(2)

**b** Give a reason why metals are made into alloys.

\_\_\_\_\_  
(1)

**c** Explain why alloys of aluminium are harder than pure aluminium.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
(2)

(Total for Question 7 = 6 marks)

**8** The periodic table is a way of displaying all the known elements.

The elements are arranged in periods (rows) and columns (groups).

A Russian chemist called Mendeleev compiled the first periodic table.

**a** Describe how Mendeleev worked out how to order the elements in his periodic table.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
(2)

**b** How did Mendeleev use his periodic table to make predictions?

\_\_\_\_\_  
\_\_\_\_\_  
(1)

(Total for Question 8 = 3 marks)

- 9 a Limestone contains calcium carbonate,  $\text{CaCO}_3$ .

A scientist has four different samples of limestone which contains different amounts of calcium carbonate. The scientist wants to compare the amount of calcium carbonate in the rocks.

She reacts the same mass of the rocks with the same volume of hydrochloric acid. This table shows the amount of gas collected for each sample of rock.

Sample	Volume of gas ( $\text{cm}^3$ )
A	10
B	17
C	8
D	18

The scientist concludes that sample C contains the least calcium carbonate. She uses a gas syringe to measure the amount of gas given off.

- i Write down *two* other variables relating to the acid that the scientist should control.

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(1)

- ii Describe how the scientist could obtain more evidence to support her conclusion.

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(1)

- iii Give a reason why the evidence in the table supports the scientist's conclusion.

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(1)

- b When  $\text{CaCO}_3$  reacts with hydrochloric acid,  $\text{HCl}$ , it forms the salt  $\text{CaCl}_2$ . Water and carbon dioxide are also products of the reaction.

Write a balanced symbol equation for the reaction.

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(3)

(Total for Question 9 = 6 marks)

- 10 Explain what happens as the air inside a hot air balloon is heated.

Use the particle model in your explanation.

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(6)

(Total for Question 10 = 6 marks)

TOTAL FOR TEST = 60 MARKS