



UNITED LEARNING

YEAR 9

SCIENCE

END OF YEAR CHEMISTRY ASSESSMENT 2023

TIME ALLOWED: 40 MINUTES

Student Name	
Class	

Total Mark

/40

QUESTION 1 – SUBSTANCES (3 marks)

1.1 What is the name for a substance containing two or more elements chemically joined?

Tick the correct box.

Element	<input type="checkbox"/>	Mixture	<input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>
Compound	<input type="checkbox"/>	Molecule	<input type="checkbox"/>	

1.2 What is the name for a substance containing only one type of atom?

Tick the correct box.

Element	<input type="checkbox"/>	Mixture	<input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>
Compound	<input type="checkbox"/>	Molecule	<input type="checkbox"/>	

1.3 What is the name for a **particle** containing two or more atoms chemically joined?

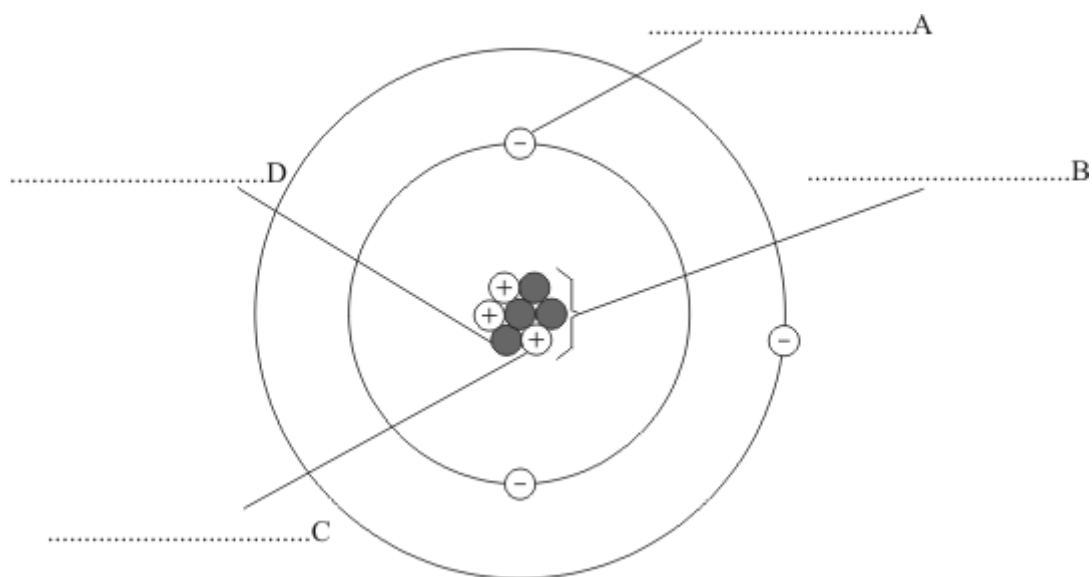
Tick the correct box.

Proton	<input type="checkbox"/>	Nucleus	<input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>
Compound	<input type="checkbox"/>	Molecule	<input type="checkbox"/>	



QUESTION 2 ATOMIC STRUCTURE (7 marks)

The diagram shows an atom.



2.1 On the diagram, write the names of structures **A**, **B**, **C** and **D**.

4

2.2 To which Group of the periodic table does this atom belong?

Give **one** reason for your answer.

2

2.3 Use the periodic table to name the element which is made up of this type of atom.

1



QUESTION 3 – REACTIONS OF ACIDS (6 marks)

A student added an acid to a carbonate.

- 3.1 Complete the general word equation for the reaction of an acid with a carbonate

acid + metal carbonate → salt + _____ + _____

2

- 3.2 The student added hydrochloric acid to magnesium carbonate.

Give the name of the salt produced.

1

- 3.3 When the acid was added to the alkali the beaker became warm.

Name the type of reaction that releases heat.

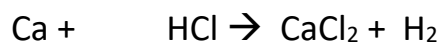
1

- 3.4 The student then added hydrochloric acid to calcium.

Calcium chloride and hydrogen gas were produced.

Below is the symbol equation for this reaction.

Balance the symbol equation.



1



3.5 40 g of calcium reacted with 73 g of hydrochloric acid in the reaction above.

111 g of calcium chloride was produced.

How many grams of hydrogen was produced?

1

Turn over for the next question



TURN OVER ►

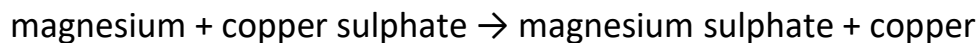
QUESTION 4 – REACTIVITY (9 marks)

Part of the reactivity series of metals is shown below.

most reactive	potassium
	sodium
	magnesium
	aluminium
	iron
	lead
least reactive	copper

A teacher added a piece of magnesium to a solution of copper sulphate.

The word equation for the reaction is shown below.



4.1 Why is this called a displacement reaction?

1



4.2 Look at each pair of chemicals in the table below.

Use the reactivity series to predict whether a displacement reaction would take place.

Write **yes** or **no** in the second column and give the reason for your decision.

2

Pairs of chemicals	Does a displacement reaction take place? yes or no	Reason
iron + sodium chloride		
magnesium + lead nitrate		

Question 4 continues on the next page.



TURN OVER ►

The reactivity series of metals is shown again below.

most reactive	potassium
	sodium
	magnesium
	aluminium
	iron
	lead
least reactive	copper

The teacher wanted to find out where zinc should be placed in the reactivity series.

4.3 What tests should she do to find the correct position of zinc in the reactivity series?

1

4.4 How would the teacher use her test results to decide where to put zinc in the reactivity series?

1



4.5 In many houses the hot water pipes are made from copper and the boiler is made from iron.

Which of these metals will corrode first? Explain your answer.

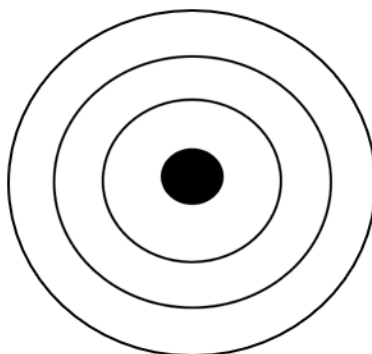
1

4.6 Electrons play an important role in reactions.

On the diagram below draw the **electron structure** of aluminum

Use your periodic table to help you.

3



Turn over for the next question



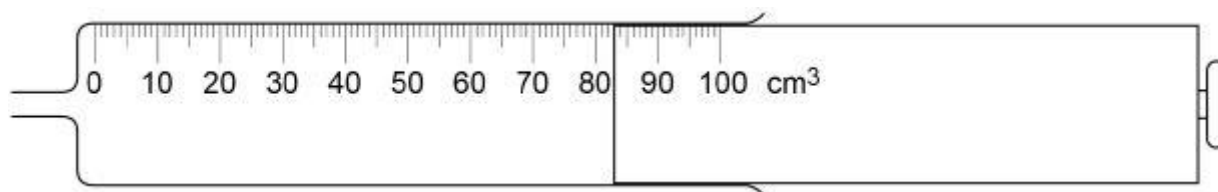
QUESTION 5 – INVESTIGATING RATE OF REACTION (15 marks)

A student investigated how concentration affects the rate of reaction between magnesium and hydrochloric acid.

This is the method used.

1. Place hydrochloric acid in a conical flask.
2. Add magnesium powder.
3. Collect the gas produced in a gas syringe.
4. Measure the volume of gas every 40 seconds for 160 seconds.
5. Repeat steps 1-4 three more times.
6. Repeat steps 1-5 with hydrochloric acid of a higher concentration.

The diagram below shows a gas syringe.



5.1 What is the volume of gas in the syringe?

Volume = _____ cm³

1



5.2 Which **two** variables should the student keep the same to give valid results?

Tick **two** boxes.

Concentration of hydrochloric acid

Mass of magnesium powder

Temperature of hydrochloric acid

Time for reaction to end

Volume of gas collected

2

Question 5 continues on the next page.



The table below shows the student's results for the experiment with hydrochloric acid of a lower concentration.

Time in seconds	Volume of gas collected in cm ³				
	Test 1	Test 2	Test 3	Test 4	Mean
0	0	0	0	0	0
40	46	30	47	49	X
80	78	83	83	82	82
120	98	94	96	95	96
160	100	100	100	100	100

5.3 Calculate mean value **X** in the table above.

Do **not** include the anomalous result in your calculation.

Give your answer to 2 significant figures.

X = _____ cm³

2

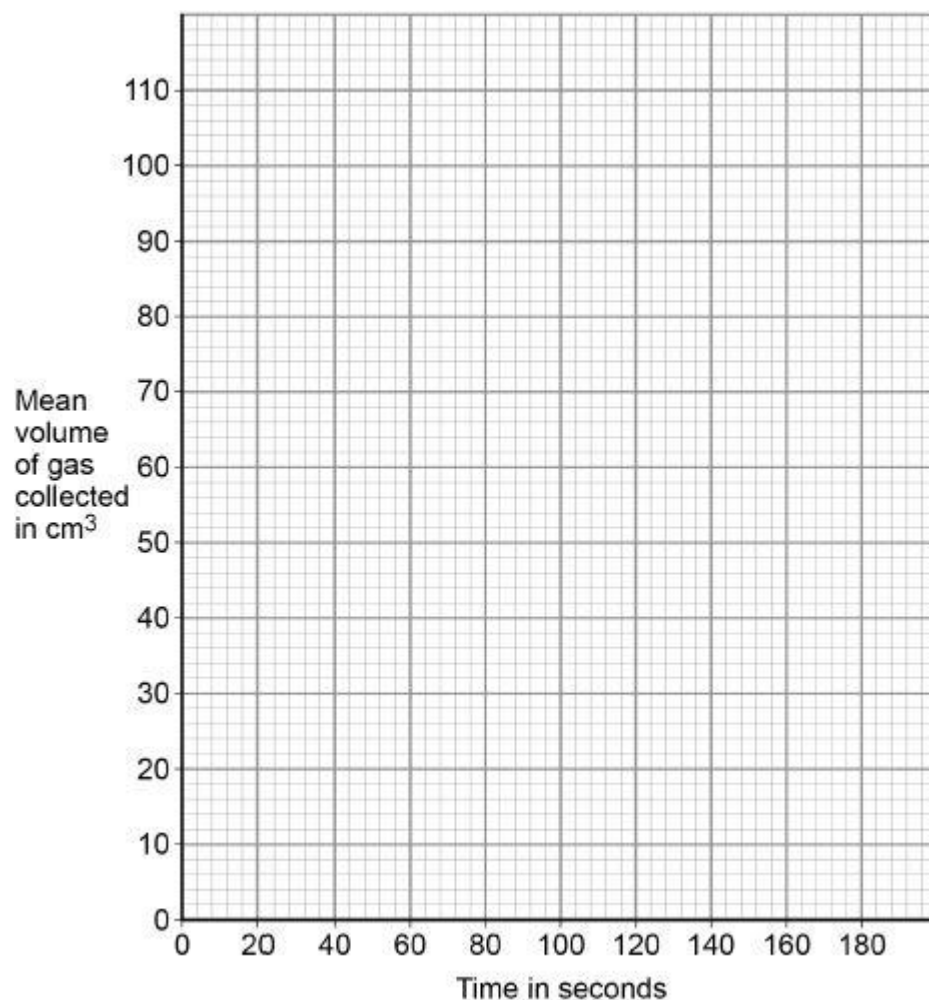


5.4 Plot the data from the table on the opposite page on the graph below.

You should include your answer to Question 5.3.

You do **not** need to draw a line of best fit.

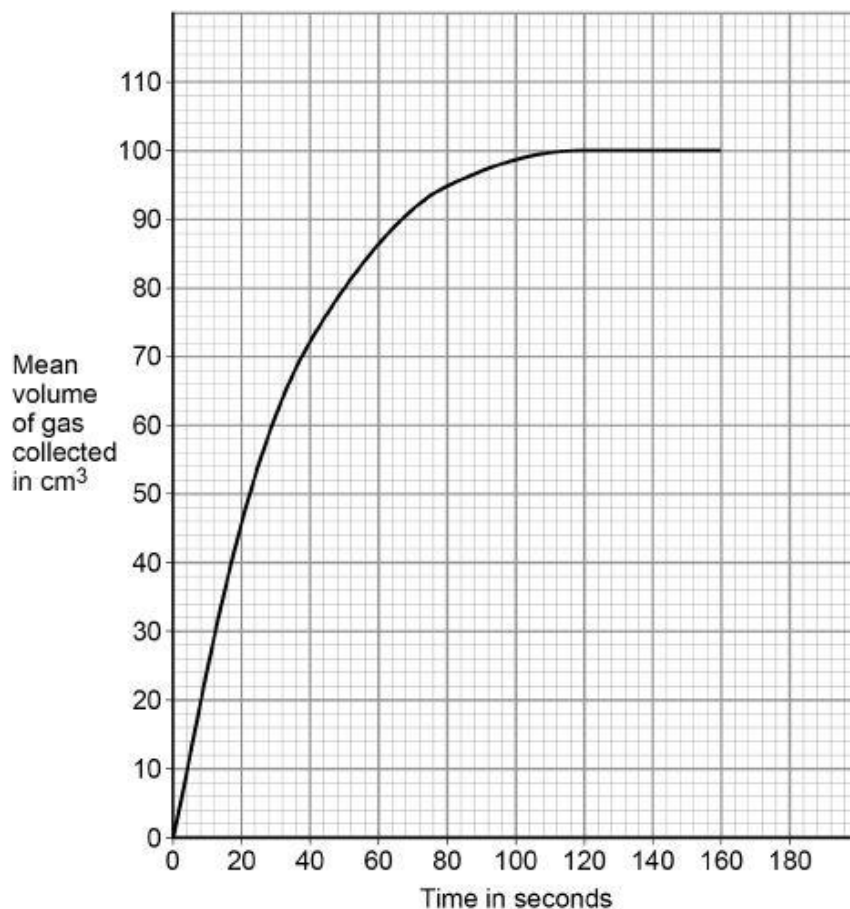
2



Question 5 continues on the next page.



The graph below shows results of the experiment with the hydrochloric acid of a higher concentration.



5.5 Describe how the **rate of reaction** changes between 0 and 160 seconds.

Use the graph above.

3



- 5.6 The student concludes that the rate of reaction is greater when the concentration of hydrochloric acid is higher.

Why is the rate of reaction greater when the concentration of hydrochloric acid is higher?

2

Tick **two** boxes.

The particles are moving faster

The particles have more energy

The surface area of magnesium is smaller

There are more particle collisions each second

There are more particles in the same volume

- 5.7 The student tests the gas produced by bubbling it through limewater.

No change is seen in the limewater.

Give **one** conclusion the student can make about the gas.

1

Question 5 continues on the next page.



5.8 The student tests the gas produced using a burning splint.

Name the gas the student is testing for.

Give the result of a positive test for this gas.

Name of gas

Result

2

END OF ASSESSMENT



TURN OVER ►

This is the end of the assessment.
There are no questions printed on this page.

