Name_____

Aldenham School

Science Department

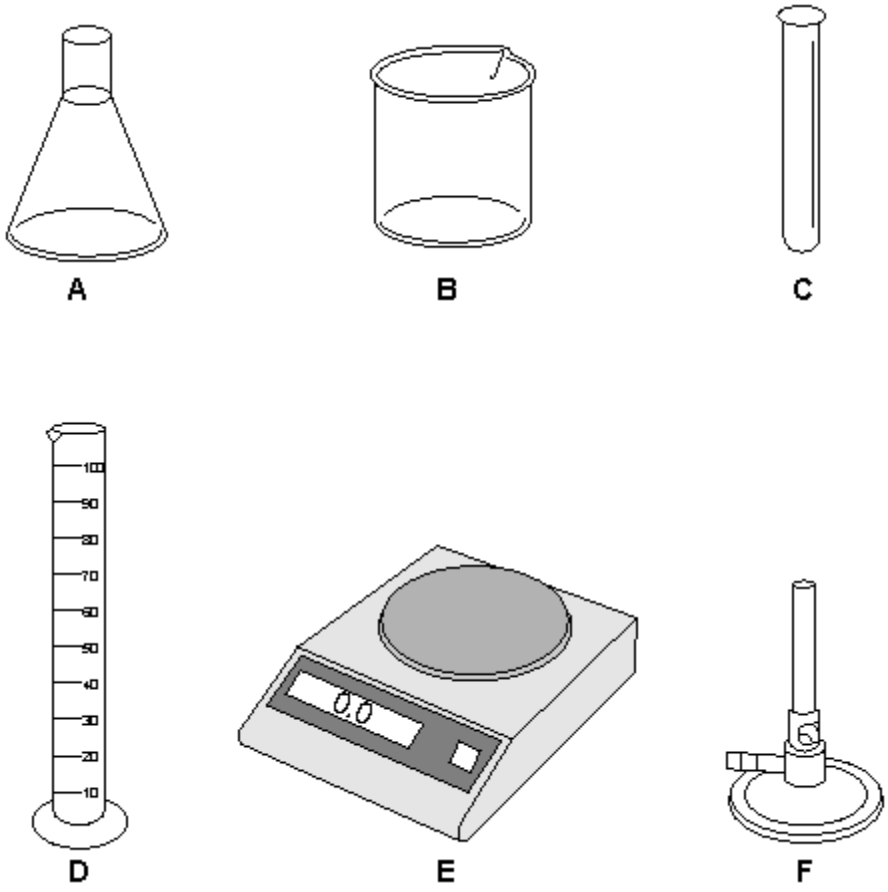
13+ Exam - Chemistry

SAMPLE PAPER

20 Minutes

25 Marks

Q1. The diagram below shows six pieces of equipment.



(a) Linda investigates how quickly sugar dissolves in water.

(i) Which piece of equipment does she use to weigh 5 g of sugar?
Tick the correct box.

A	B	C	D	E	F
☐	☐	☐	☐	☐	☐

1 mark

(ii) Which piece of equipment does she use to measure out 90 cm^3 of water?
Tick the correct box.

A	B	C	D	E	F
☐	☐	☐	☐	☐	☐

1 mark

(b) Linda heats the water in a beaker.

(i) Which piece of equipment shown is a beaker?
Tick the correct box.

A	B	C	D	E	F
☐	☐	☐	☐	☐	☐

1 mark

(ii) Which piece of equipment shown is used to heat water?
Tick the correct box.

A	B	C	D	E	F
☐	☐	☐	☐	☐	☐

1 mark

Q2. Susie cooked sausages on a barbecue.



(a) Fat and water in the sausages changed state.

Draw **one** line from each statement to the correct change of state.
Draw only **two** lines.

statement	**change of state**
	liquid to gas
fat melted	gas to liquid
	liquid to solid
water evaporated	solid to liquid
	solid to gas

2 marks

(b) Susie uses charcoal as the fuel for the barbecue.

(i) Which statement is true about all fuels?
Tick the correct box.

All fuels are sources of energy.	☐	All fuels are black.	☐
All fuels are made from wood.	☐	All fuels are solid.	☐

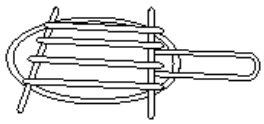
1 mark

(ii) Which gas in the air is needed for fuels to burn?
Tick the correct box.

water vapour	☐	oxygen	☐
nitrogen	☐	carbon dioxide	☐

1 mark

(c) The metal grill of the barbecue is made of steel.



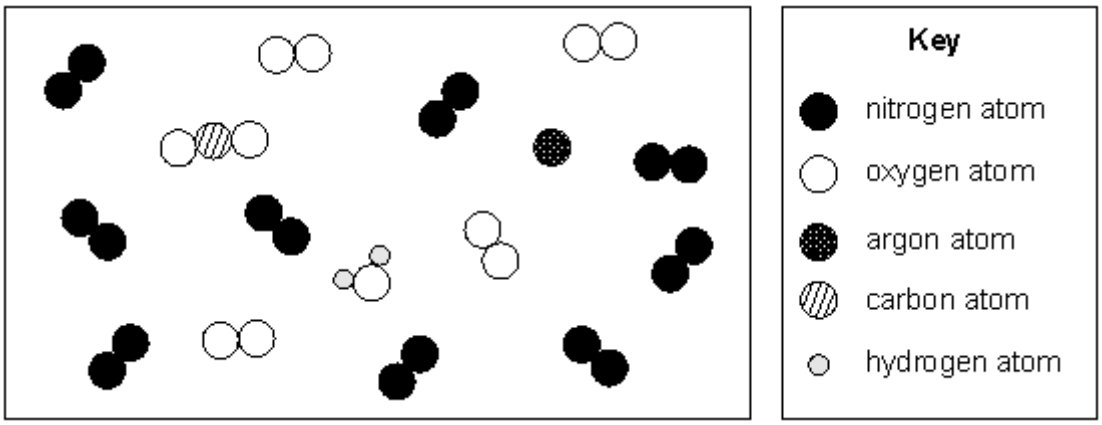
Six properties of steel are given below.

Which properties are needed for the metal grill?
Tick **two** correct boxes.

It conducts electricity.	☐	It is rigid.	☐
It has a very high melting point.	☐	It is magnetic.	☐
It is shiny.	☐	It rusts.	☐

2 marks

Q3. The diagram below represents the particles found in air.



(a) Complete the following table. Use the diagram and key above to help you.

name	symbol	chemical formula
argon		Ar
nitrogen		
oxygen		O_2
		

3 marks

(b) Air is a **gas** at room temperature.
What evidence in the diagram above shows this?

.....

1 mark

(c) A sample of air in a balloon is cooled.
Complete the sentences below using words from the box.
You may use each word more than once.

Increases	decreases	stay the same

When the air is cooled, the volume of the air ..... and

the mass of the air ..... .

When the air is cooled, the density of the air ..... .

1 mark

(d) In 1902, the scientist Carl von Linde cooled air to produce **liquid oxygen**.

The table below shows the melting points and boiling points of four substances that are found in air.

substance	**melting point (°C)**	**boiling point (°C)**
argon	–189	–186
oxygen	–218	–183
nitrogen	–210	–196
water	0	100

Before Linde, scientists tried to produce **liquid air** by cooling it to –190°C.
Give a reason why liquid air was not produced.

.....

.....

1 mark

Q4

Galena is an ore of lead. Deposits of galena often contain all of the minerals listed in the table below.

mineral	formula
galena	PbS
calcite	$CaCO_3$
fluorite	CaF_2
zinc blende	ZnS

(a) Give the chemical names of galena and fluorite.

Galena ……

fluorite ……

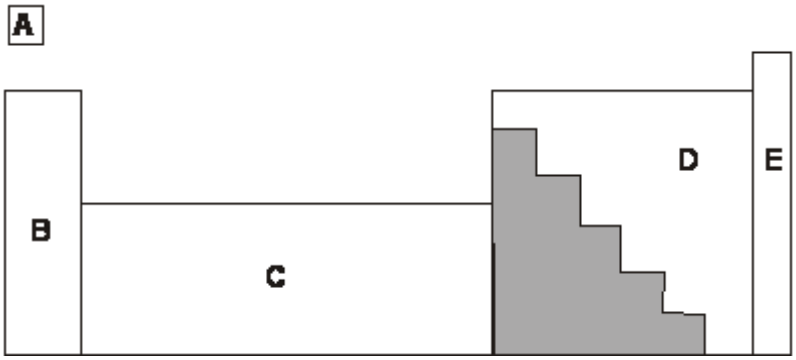
2 marks

(ii) The lead oxide is then heated with carbon in a displacement reaction in furnace. Write a word equation for the reaction.

……

2 mark

Q5. (a) The diagram below shows part of the periodic table of elements.



The shaded area contains **only** metal elements.

Two other areas also contain **only** metal elements.

Which areas contain only metal elements?
Tick the **two** correct boxes.

A ☐ B ☐ C ☐ D ☐ E ☐

1 mark

(b) Copper is a metal.

At room temperature copper is a strong solid.
Give **two** other properties of copper that show it is a metal.

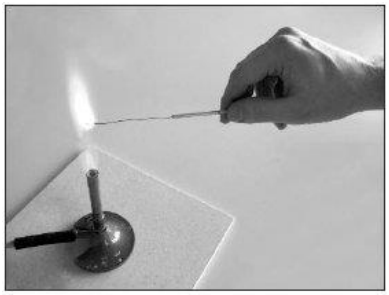
1. .....

1 mark

2. .....

1 mark

(c) When copper metal is heated it reacts with a gas in air.



What is the chemical name of the **product** formed when copper reacts with a gas in air?

.....

1 mark

(d) Which statement below describes what happens in a **chemical change** but **not** in a physical change?

Tick the correct box.

The product is a solid. ☐

The change only happens at a high temperature. ☐

The atoms have combined in a different way to make a new substance. ☐

The types of atoms at the start are the same as in the end product. ☐

1 mark