Name_____ **Teacher**_____

Aldenham School

Science Department

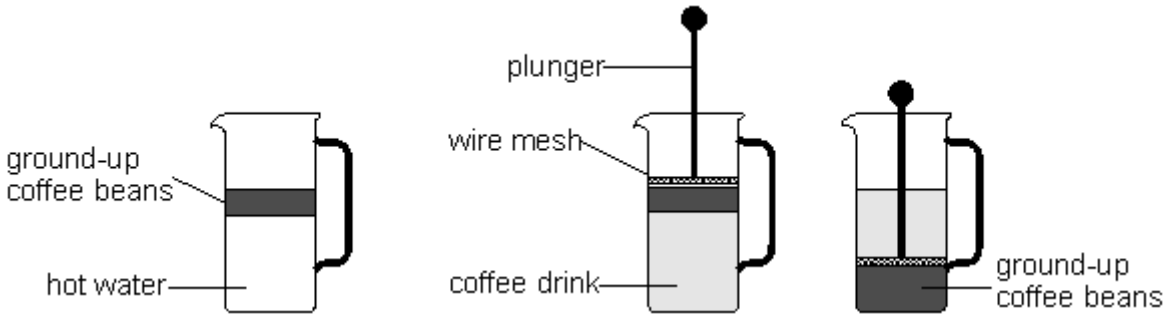
13+ Exam - Chemistry

SAMPLE PAPER

20 Minutes

30 Marks

Q1. Russell put ground-up coffee beans in a coffee maker and added hot water.



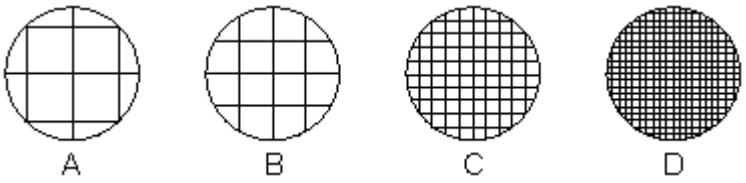
He pushed the plunger down.
This separated the coffee drink from the ground-up coffee beans.

(a) How could Russell see that some coffee had dissolved in the water?

.....

1 mark

(b) The end of the plunger is a circle of wire mesh.

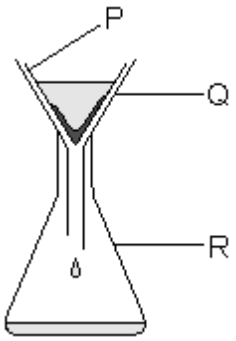


(i) Which mesh would be best to separate the coffee drink from all the ground-up coffee beans? Write the letter.

.....

1 mark

(ii) This method of making coffee uses a type of filter.
The apparatus used for filtration in a school laboratory is drawn below.

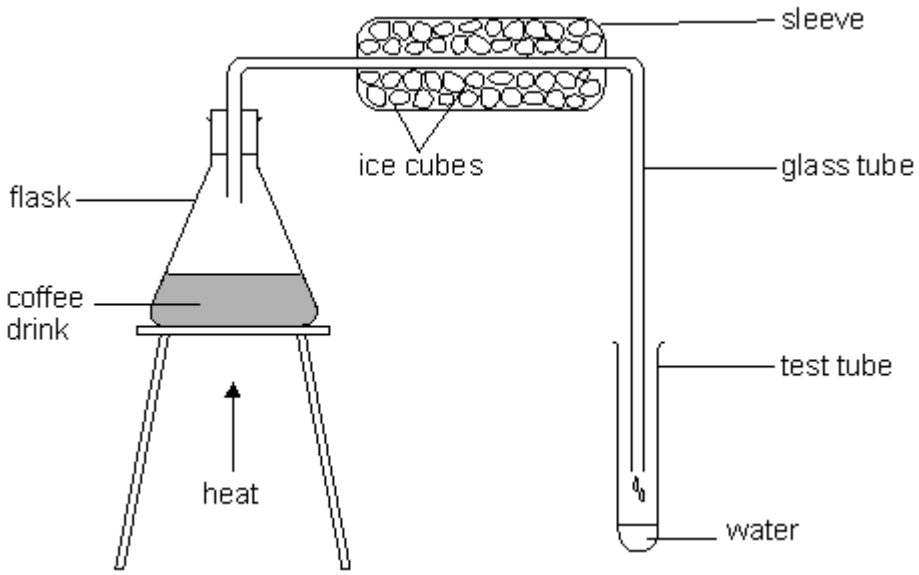


Which part of the apparatus above works in the same way as the wire mesh?
Write the letter.

.....

1 mark

(c) Russell wanted to separate the water from the coffee drink.
He set up the apparatus shown below.



(i) Why did Russell put ice cubes around the glass tube?

.....

1 mark

(ii) Choose words from the box below to fill the gaps in the following sentences.

an acid	**a gas**	**a liquid**	**a solid**
condensation	**crystallisation**	**evaporation**	**filtration**

Russell heats the water. Water in the drink changes from

..... into ..... .

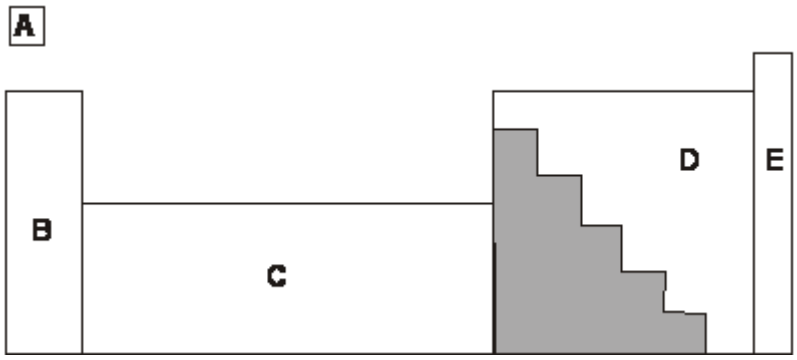
This change of state is called ..... .

Water vapour changes into liquid. This change of state is called

..... .

4 marks

Q2. (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.

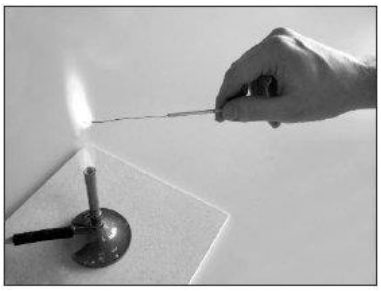
1. .....

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. ☐

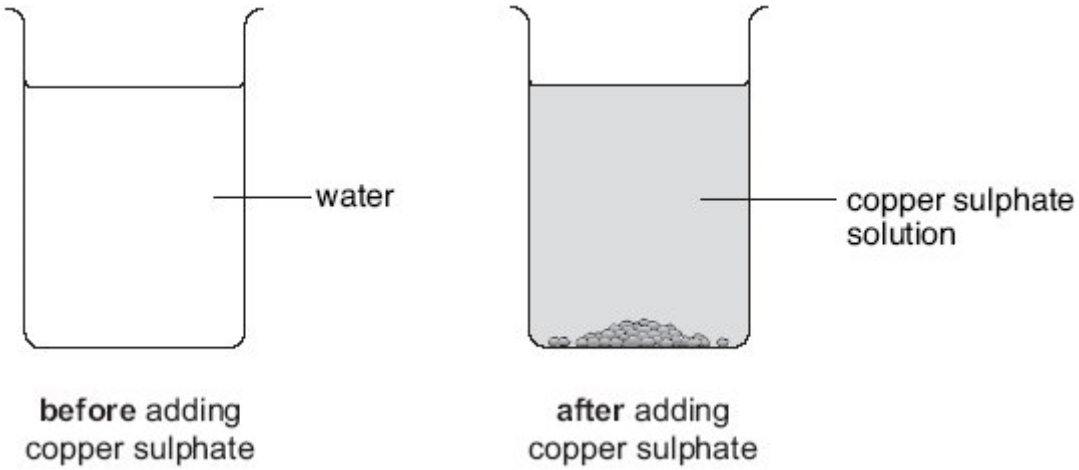
The change only happens at a high temperature. ☐

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

Q3. (a) Ruth added some blue copper sulphate crystals to a beaker of water.



(i) How could Ruth **see** that some of the copper sulphate crystals had dissolved in the water?

.....

.....

1 mark

(ii) How could Ruth make the copper sulphate crystals dissolve more quickly?

.....

1 mark

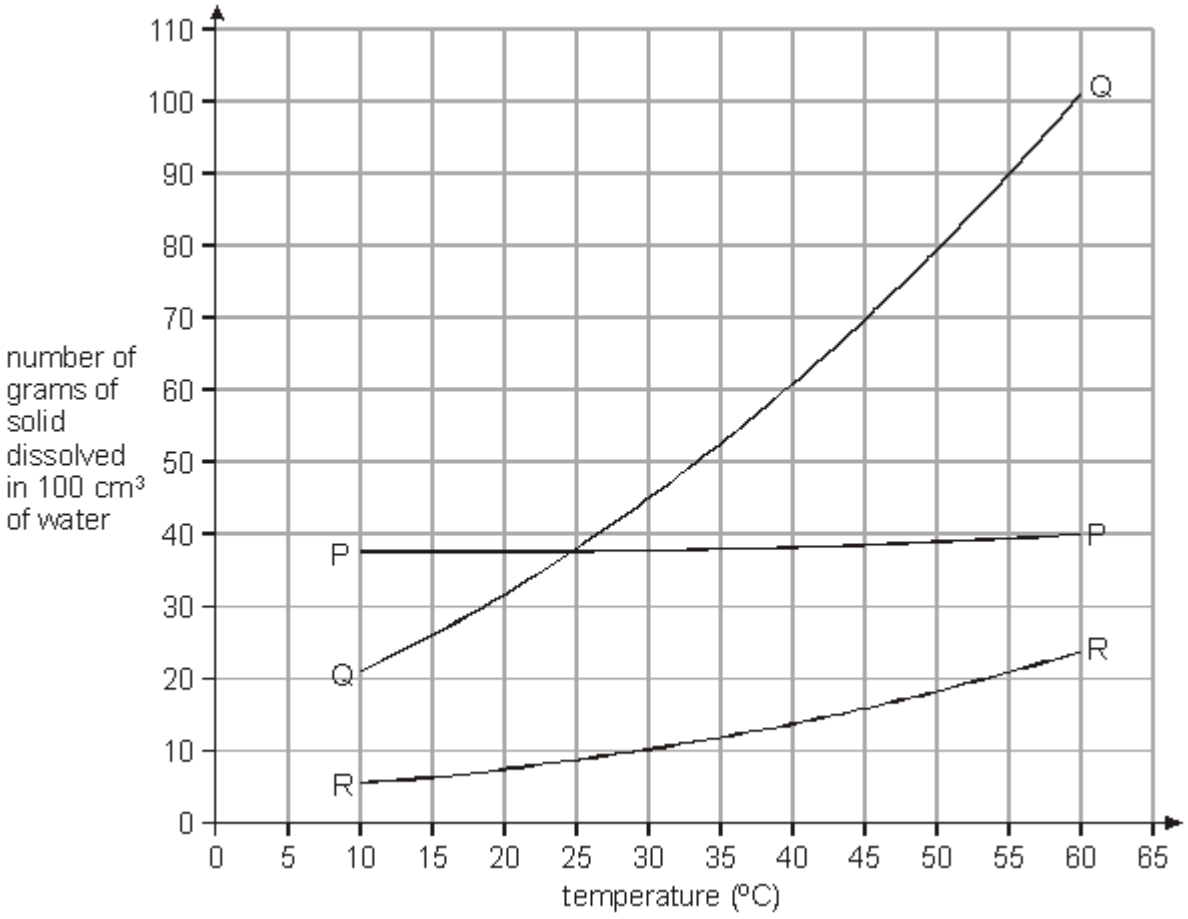
(b) Ruth poured some of the copper sulphate solution into a dish.
She left it in a warm room for five days.

All the water evaporated from the solution in the dish.
What was left in the dish?

.....

1 mark

(c) Ruth did an experiment to see how much of three solids, P, Q and R, will dissolve in water at different temperatures.
She plotted her results on graph paper as shown below.



Use the graph above to answer the questions below.

(i) At 30°C how many grams of solid R dissolved in the water?

..... g

1 mark

(ii) At 60°C which solid dissolved the most in water? Give the letter.

.....

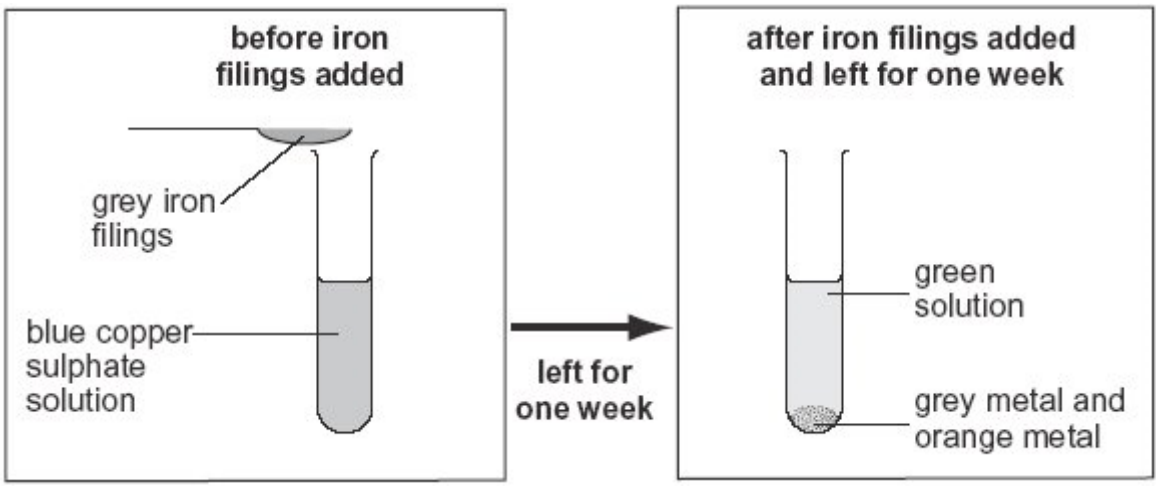
1 mark

(iii) Which **two** solids were equally soluble at 25°C? Give the letters.

..... and .....

1 mark

Q4. Joanne added iron filings to copper sulphate solution.
She observed the reaction after one week.



(a) What evidence in the diagrams shows that a chemical reaction has taken place?

.....

1 mark

(b) The reaction between iron and copper sulphate is a **displacement** reaction.

(i) Give the name of the orange metal visible after one week.

.....

1 mark

(ii) What is the name of the compound formed in this reaction?

.....

1 mark

(iii) Joanne poured the green solution into another test tube. She added some copper pieces to the solution.

Will a displacement reaction occur?

yes ☐ no ☐

Explain your answer.

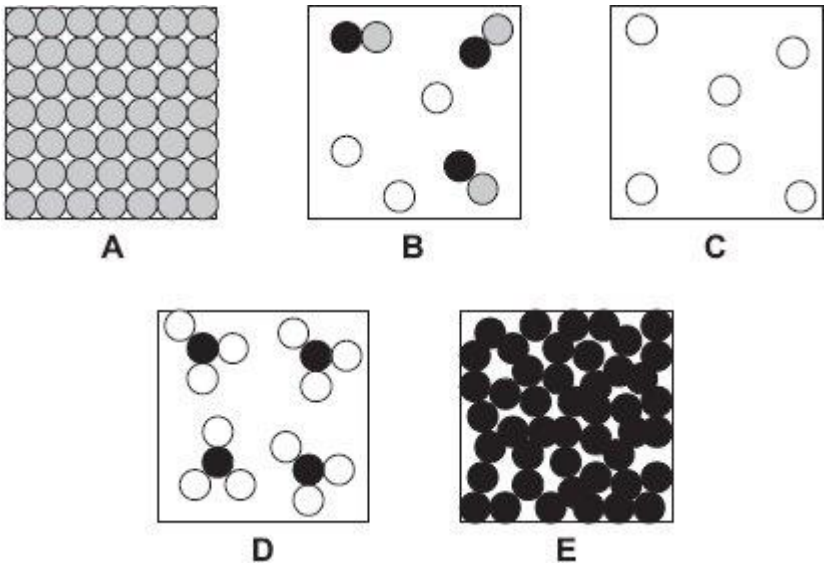
.....

.....

1 mark

Q5. (a) The diagrams below show the arrangement of atoms or molecules in five different substances A, B, C, D and E.

Each of the circles ○, ○ and ● represents an atom of a different element.



Give the letter of the diagram which represents:

(i) a mixture of gases;

.....

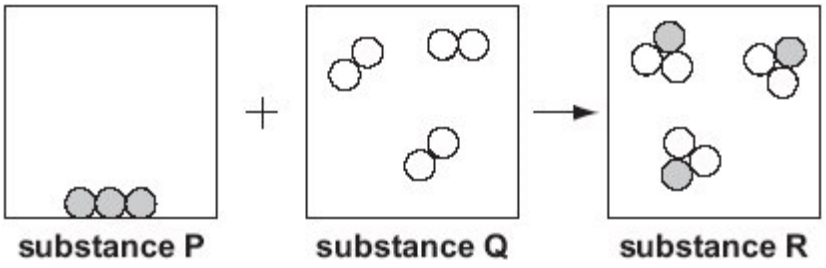
1 mark

(ii) a single compound.

.....

1 mark

(b) The diagram below shows a model of a chemical reaction between two substances.



(i) How can you tell from the diagram that a chemical reaction took place between substance P and substance Q?

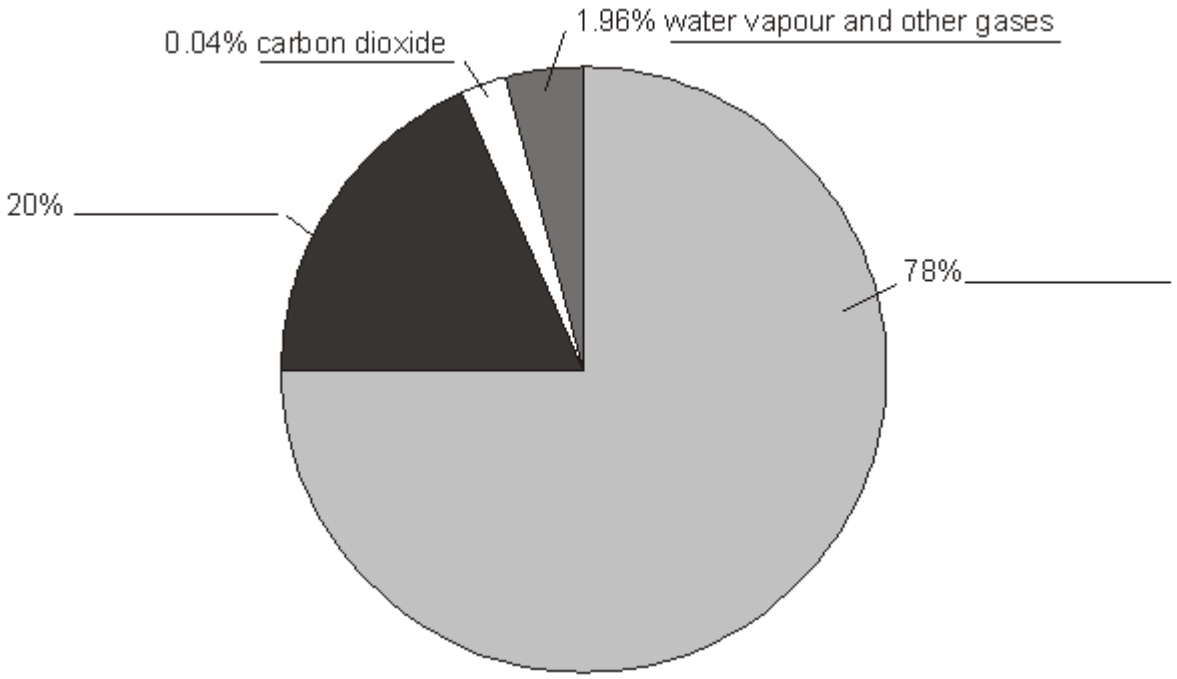
.....

.....

1 mark

Q6. (a) Air is a mixture of gases. The pie chart represents the percentages of different gases in air.

On the line by each section of the pie chart, write the name of the correct gas. Two have been done for you.



not to scale

2 marks

(b) On a cold day, droplets of water form on a cold window.

Explain how these droplets form.

.....

.....

.....

2 marks