



KS3 Science

Elements and Compounds

Question Paper

Time available: 32 minutes

Marks available: 47 marks

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1.

(a) The table below shows information about five elements.

element	melting point (°C)	boiling point (°C)	conducts electricity	colour
A	-7	59	no	brown
B	-218	-183	no	colourless
C	1535	2750	yes	silvery
D	113	445	no	yellow
E	1083	2567	yes	orange

(i) Which **two** of these elements are likely to be metals?

Write the letters.

..... and

1 mark

(ii) Which element in the table is liquid at room temperature?

Write the letter.

.....

1 mark

(b) What is the chemical symbol for copper?

Tick the correct box.

Cr Cu C Co Ca

1 mark

(c) How many atoms of iron and oxygen are there shown in the formulas for FeO and Fe₂O₃?

Complete the table below.

compound	number of atoms of iron	number of atoms of oxygen
FeO		
Fe ₂ O ₃		

2 marks
maximum 5 marks

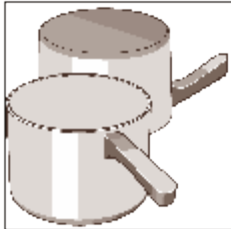
2.

(a) The drawings below show three objects made from copper.

Draw a line from each object to the reason for using copper for that object.
Draw only **three** lines.

object made from copper

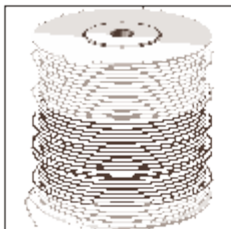
reason for using copper



base of a saucepan



coin



wires in a cable

It does **not** rust.

It is a good conductor of electricity.

It is a good conductor of heat.

It is **not** magnetic.

3 marks

(b) Brass is a mixture of copper and zinc. Some keys are made from brass



Why is brass more suitable than copper for a **key**?

Tick the **two** correct boxes.

Brass does **not** bend as easily as copper.

Brass is a paler colour than copper.

Brass is harder than copper.

Brass is **not** as shiny as copper.

Brass is **not** such a good conductor of electricity as copper.

Brass is **not** such a good conductor of heat as copper.

2 marks

(c) Zinc melts at 420°C.

Copper melts at 1085°C.

A scientist heated a mixture of pieces of zinc and pieces of copper to 600°C in a dish.

What would be in the dish at 600°C?

liquid zinc and liquid copper

liquid zinc and solid copper

solid zinc and liquid copper

solid zinc and solid copper

1 mark
maximum 6 marks

3. The drawings show six objects made from different materials.



iron nail



steel paper-clip



silver earrings



gold ring



copper bracelet



aluminium can

not to scale

(a) Fill the gaps in the sentences below.

The objects are made from materials that are all types of

1 mark

All the materials are good conductors of electricity and

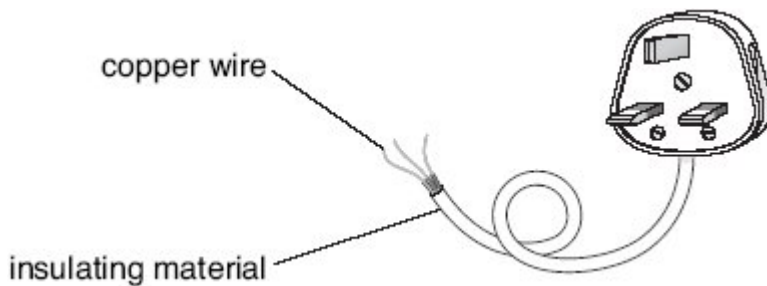
1 mark

(b) From the drawings above give **one** object that could rust.

.....

1 mark

(c) The drawing below shows part of an electric cable and a plug.



(i) What material could be put around the wires to insulate them?

.....









1 mark

(ii) Why is this insulating material needed?

.....

.....

- (d) Which pair of objects is attracted to a magnet?
Tick the correct box.

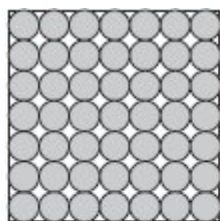
 iron nail and  copper bracelet	 iron nail and  steel paper-clip	 steel paper-clip and  aluminium can	 gold ring and  silver earrings
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1 mark
maximum 6 marks

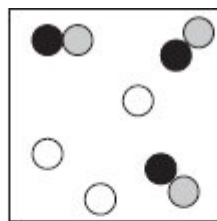
4.

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

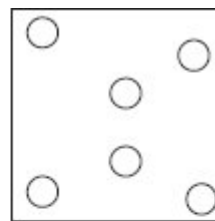
Each of the circles ,  and  represents an atom of a different element.



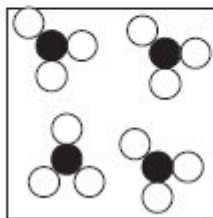
A



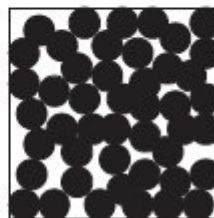
B



C



D



E

Give the letter of the diagram which represents:

- (i) a mixture of gases;

.....

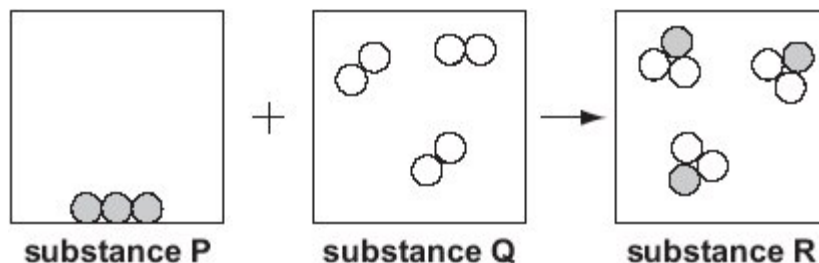
1 mark

(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

(ii) Substance P is carbon.

Suggest what substances Q and R could be.

substance Q

substance R

1 mark

(iii) How does the diagram show that mass has been conserved in this reaction?

.....
.....

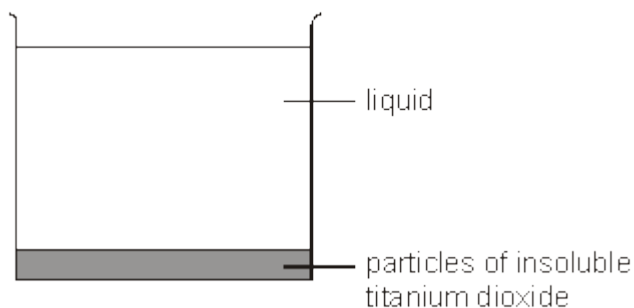
1 mark

maximum 5 marks

5.

(a) Samantha opened a tin of white paint. The paint consisted of a liquid and particles of titanium dioxide that are insoluble in the liquid.

The paint had separated into two layers, as shown below.



(i) What type of substance is the paint?

Tick the correct box.

a compound

an element

a mixture

1 mark

(ii) What type of substance is titanium dioxide?

Tick the correct box.

a compound

an element

a mixture

1 mark

(iii) Why did the particles of insoluble titanium dioxide sink to the bottom?

.....
.....

1 mark

(b) Samantha stirred the paint and used it to paint a window frame.
She got some of the paint on the glass.



Samantha could **not** get the paint off the glass with water.
When she used a different liquid called white spirit the paint came off.

Why could she remove the paint with white spirit but **not** with water?

.....
.....

1 mark
maximum 4 marks

6.

(a) The drawings below show that different elements are used for different objects. Draw a line from each element to the reason for using that element. Draw only **four** lines.

element used

reason for using the element



copper
for the base
of a
saucepan

It is lighter than air.




gold
for a ring

It is a good conductor of heat.



helium
in a balloon

It is a good conductor of electricity.



mercury
in a
thermometer

It stays shiny because it does **not** react with oxygen.

It is a liquid at room temperature.

4 marks

- (b) Which of the four elements is **not** a metal?
Tick the correct box.

copper

gold

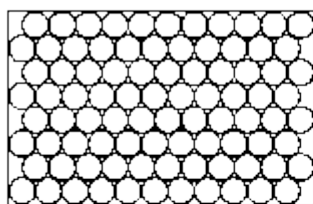
helium

mercury

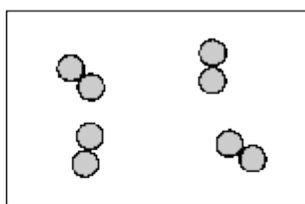
1 mark
maximum 5 marks

7.

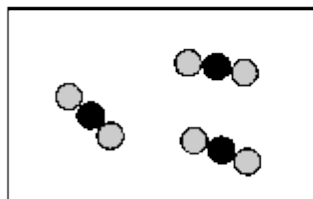
The diagrams represent the arrangement of atoms or molecules in four different substances, A, B, C and D.



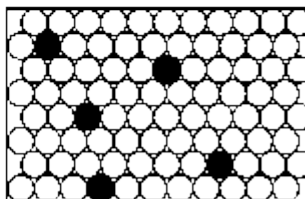
A



B



C



D

not to scale

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

- (a) (i) Which substance is a compound?

... ..

1 mark

- (ii) Which substance is a mixture?

... ..

1 mark

(iii) Which **two** substances are elements?

..... and

1 mark

(iv) Which **two** substances could be good thermal conductors?

..... and

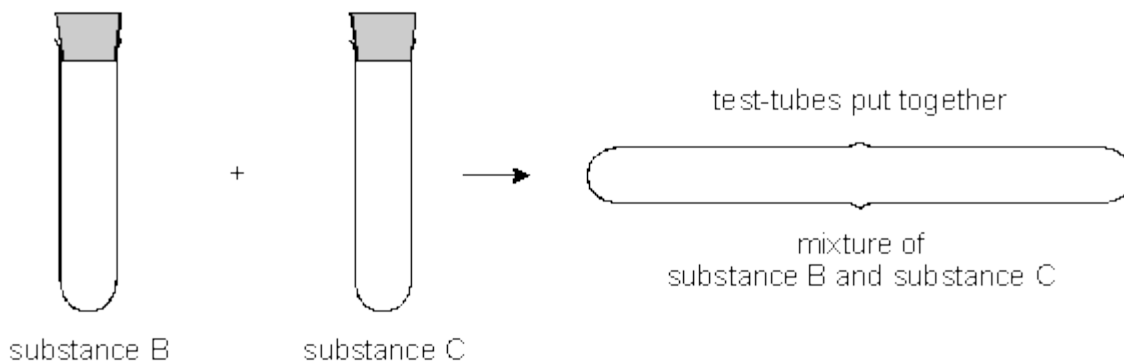
1 mark

(v) Which substance could be carbon dioxide?

.....

1 mark

(b) The following experiment was set up. Test-tubes containing substances B and C were placed together as shown. The substances did **not** react. They were left for five minutes.

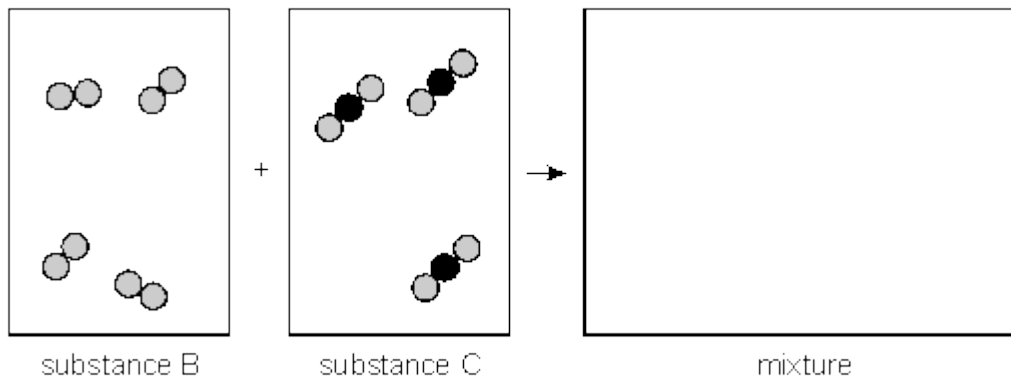


(i) How many molecules are there in the mixture compared to the total number in substances B and C?

.....

1 mark

(ii) Complete the diagram which is a model of this experiment.



1 mark
Maximum 7 marks

8.

Gold, iron and magnesium are elements which conduct electricity.

Sulphur and phosphorus are elements which do **not** conduct electricity.

When iron and sulphur are heated together, they react to form a new substance called iron sulphide.

(a) From the substances named above, give:

(i) the name of a metal;

.....

1 mark

(ii) the name of an element which is a non-metal;

.....

1 mark

(iii) the name of an element which will rust;

.....

1 mark

(iv) the name of a compound.

.....

1 mark

(b) When magnesium and sulphur are heated together, they react.
Write the name of the compound which is formed when magnesium reacts with sulphur.

.....

1 mark

Maximum 5 marks

9.

The table shows the chemical formulae of six minerals which occur naturally.

name of mineral	chemical formula
saltpetre	KNO_3
calcite	CaCO_3
gold	Au
graphite	C
barytes	BaSO_4
corundum	Al_2O_3

From the table give the name of **one** mineral which is:

(i) a non-metallic element.

1 mark

(ii) a carbonate.

1 mark

(iii) a compound containing potassium.

1 mark

(iv) an electrical conductor at room temperature.

1 mark

Maximum 4 marks