



## Year 8 Atoms & Elements, Heating & Cooling HW Questions

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36 minutes



48 marks

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Q1.

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

Q2. (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

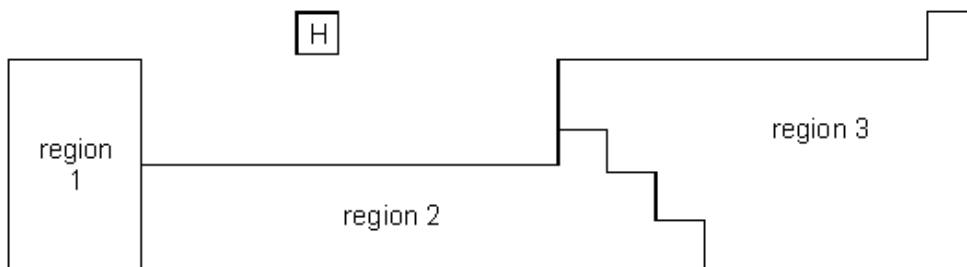
(c) How many atoms of iron and oxygen are there shown in the formulas for FeO and Fe<sub>2</sub>O<sub>3</sub>?

Complete the table below.

compound	number of atoms of iron	number of atoms of oxygen
FeO		
Fe <sub>2</sub> O <sub>3</sub>		

2 marks  
maximum 5 marks

**Q3.** The diagram shows an outline of part of the Periodic Table of Elements.



(a) What is the name of the element with the symbol H?

.....

1 mark

(b) In which regions of the Periodic Table are the following types of element found?

(i) non-metals (such as oxygen and chlorine);

region .....

1 mark

(ii) very reactive metals (such as sodium and potassium);

region .....

1 mark

(iii) less reactive metals (such as copper and zinc).

Region .....

1 mark

(c) Why is copper sulphate **not** found in the Periodic Table?

.....  
 .....

1 mark

(d) An iron nail is placed into some blue copper sulphate solution.  
 A reaction takes place between the iron and the copper sulphate.

(i) Complete the word equation for the reaction.

iron + copper sulphate → ..... + .....

1 mark

(ii) Describe **one** change you would see on the surface of the nail.

.....  
 .....

1 mark

Maximum 7 marks

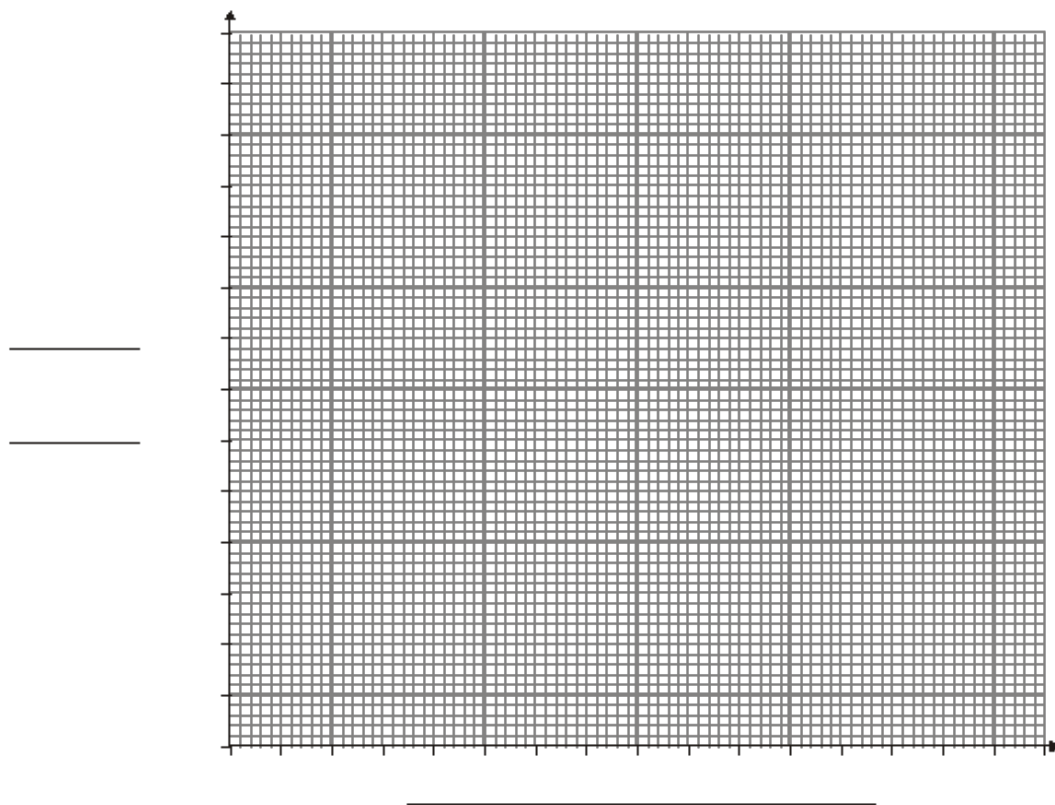
**Q4.** Six groups of pupils burned magnesium in air. The magnesium reacted with oxygen to form magnesium oxide.

They recorded the mass of magnesium used and the mass of magnesium oxide formed. Their results are shown in the table.

group	mass of magnesium (g)	mass of magnesium oxide (g)
A	3.2	5.2
B	3.8	6.5
C	4.2	7.0
D	4.9	8.6
E	5.4	8.0
F	6.1	10.7

(a) Use their results to draw a graph below.

- Decide the scale for each axis.
- Label the axes.
- Plot the points.
- Draw a line of best fit.



4 marks

(b) (i) Which group's results do **not** fit the general pattern?  
Give the letter.

1 mark

(ii) How should the class deal with this 'odd' result?

.....  
.....

1 mark

(c) Use the graph to predict the mass of magnesium oxide that will be formed by burning 7.0 g of magnesium.

..... 9

1 mark

(d) The results show the relationship between the mass of magnesium and the mass of magnesium oxide formed.

What conclusion could you draw about this relationship?

.....  
.....  
.....  
.....

1 mark  
maximum 8 marks

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The porous pot shown in diagrams 1 and 2 lets gas molecules pass through the walls. In diagram 2 a beaker containing hydrogen is placed over the porous pot. The water levels in the U-tube quickly change.

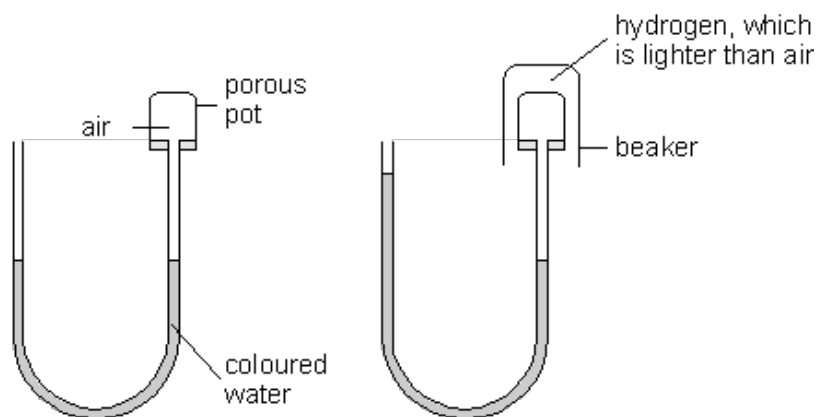


diagram 1

diagram 2

Four statements about the movement of gas molecules are given below.

- A – no molecules are moving into or moving out of the porous pot
- B – same number of gas molecules are moving into the porous pot as are moving out
- C – more gas molecules are moving into the porous pot than are moving out
- D – fewer gas molecules are moving into the porous pot than are moving out

(a) Which statement, A, B, C or D, applies to:

(i) Diagram 1? ..... 1 mark

(ii) Diagram 2 just after the beaker is put in position?..... 1 mark

(b) What does the experiment suggest about the average speed of hydrogen molecules compared with the average speed of molecules in the air?

Hydrogen molecules ..... 1 mark

(c) The beaker is removed from around the porous pot.

(i) How does the water level in the left hand part of the U-tube change?  
 ..... 1 mark

(ii) Explain your answer in terms of the movement of molecules.  
 .....  
 ..... 1 mark

(d) Air contains oxygen, nitrogen, argon, some water vapour, and a little carbon dioxide.

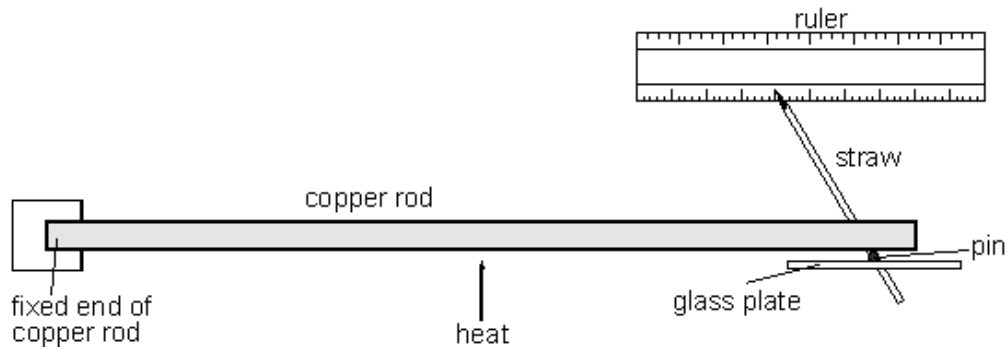
Complete each row in the following table by ticking one box and by stating the number of atoms in one molecule of the substance.

The first row has been done for you.

substance	it is an element	it is a compound	it is a mixture	number of atoms in one molecule
nitrogen	✓			2
carbon dioxide				
oxygen				

4 marks  
Maximum 9 marks

**Q6.** Sarah wanted to find out how the length of a copper rod changes when it is heated. She fixed one end of the rod and allowed the other end to roll on a pin which had been put on a glass plate. A drinking straw, attached to the pin, showed the movement of the end of the rod.



(a) (i) What happens to the motion of the copper atoms in the rod as it is heated?

.....  
 .....

1 mark

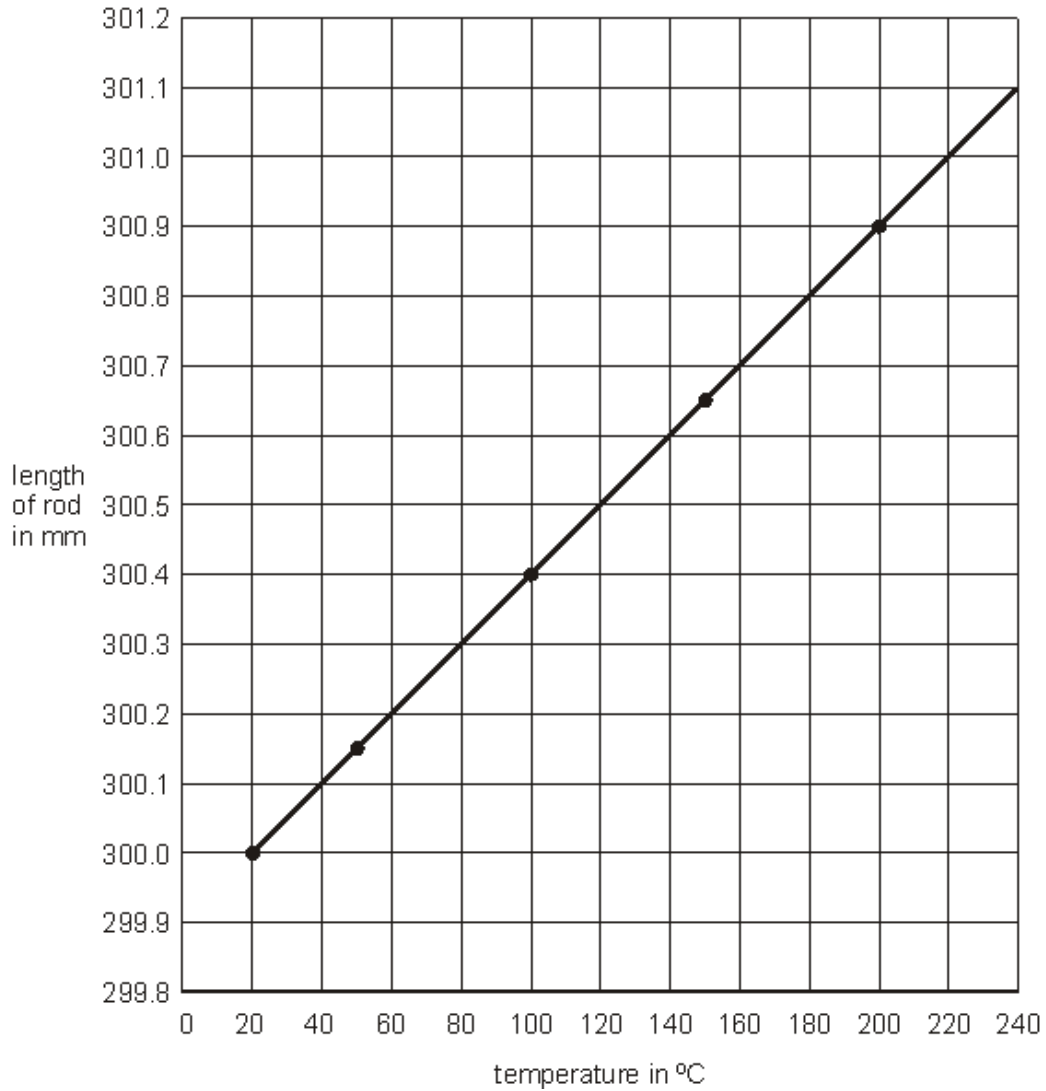
(ii) What happens to the average distance between the atoms of copper when the rod is heated?

.....  
 .....

1 mark



- (b) The graph shows the length of a copper rod at different temperatures. The rod was 300.0 mm long at room temperature.



- (i) At what temperature has the rod increased its length by 1.0 mm?

..... °C

1 mark

- (ii) The rod was 300.0 mm long at room temperature. What will its length become if it is placed in melting ice at 0°C?

..... mm

1 mark

Maximum 4 marks

- Q7.** (a) In an iron rod the particles vibrate. If one end of an iron rod is heated, the vibrating particles transfer energy to neighbouring particles which are **not** vibrating so violently. What is this process called?

.....

1 mark

(b) An electric immersion heater is put at the bottom of a large tank of water.

The water next to the heater becomes warm.

(i) What will happen to the warmed water next to the heater?  
Give a reason for your answer.

.....  
.....  
.....

2 marks

(ii) Why can heat **not** be transferred in this way in an iron rod?

.....  
.....

1 mark

(c) In a liquid, some of the particles have enough kinetic energy to escape from the surface.  
This process happens even when the liquid is well below its boiling point.

(i) What is this process called? .....

1 mark

(ii) How will this affect the temperature of the liquid left in the container?

.....

1 mark

Maximum 6 marks

**Q8.** Amena described her idea about the evaporation of water.



Amena

- (a) Write a plan for an investigation you could carry out in the school laboratory to test Amena's idea.  
Assume you have access to all the usual laboratory equipment.

In your plan you must write:

- the one factor you would change as you carry out your investigation (the independent variable)
- the effect you would observe or measure as you carry out your investigation (the dependent variable)
- one factor you would keep the same to help make your test fair.

.....

.....

.....

.....

.....

.....

.....

.....

.....

3 marks

- (b) In the box below, draw and label a table that you could use to record your results.

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1 mark  
maximum 4 marks

