Properties of transition metals – GCSE Chemistry

1. No.4

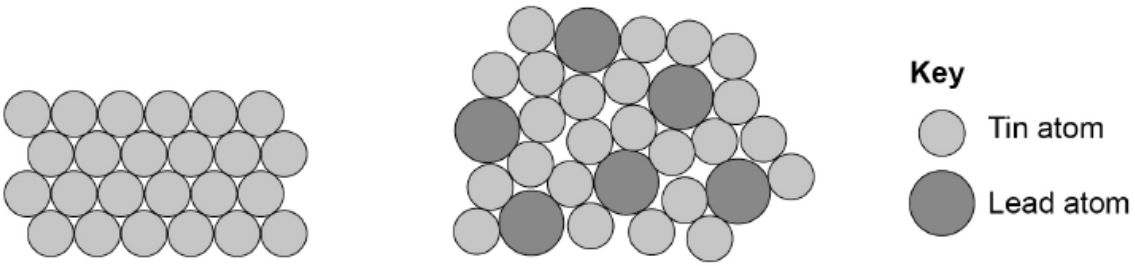
0 4 This question is about alloys.

Solders are alloys of tin and lead.

Different solders have different percentages of tin and lead.

Figure 4 shows the arrangement of atoms in pure tin and in a solder.

Figure 4



Pure tin **Solder**

0 4 . 1 The solder in **Figure 4** has 6 lead atoms for every 24 tin atoms.

Determine the percentage of atoms that are lead atoms in the solder in **Figure 4**.

[3 marks]

Percentage of lead atoms = _____ %

0 4 . 2 Explain why solder is harder than pure tin.

Complete the sentences.

Use **Figure 4**.

[2 marks]

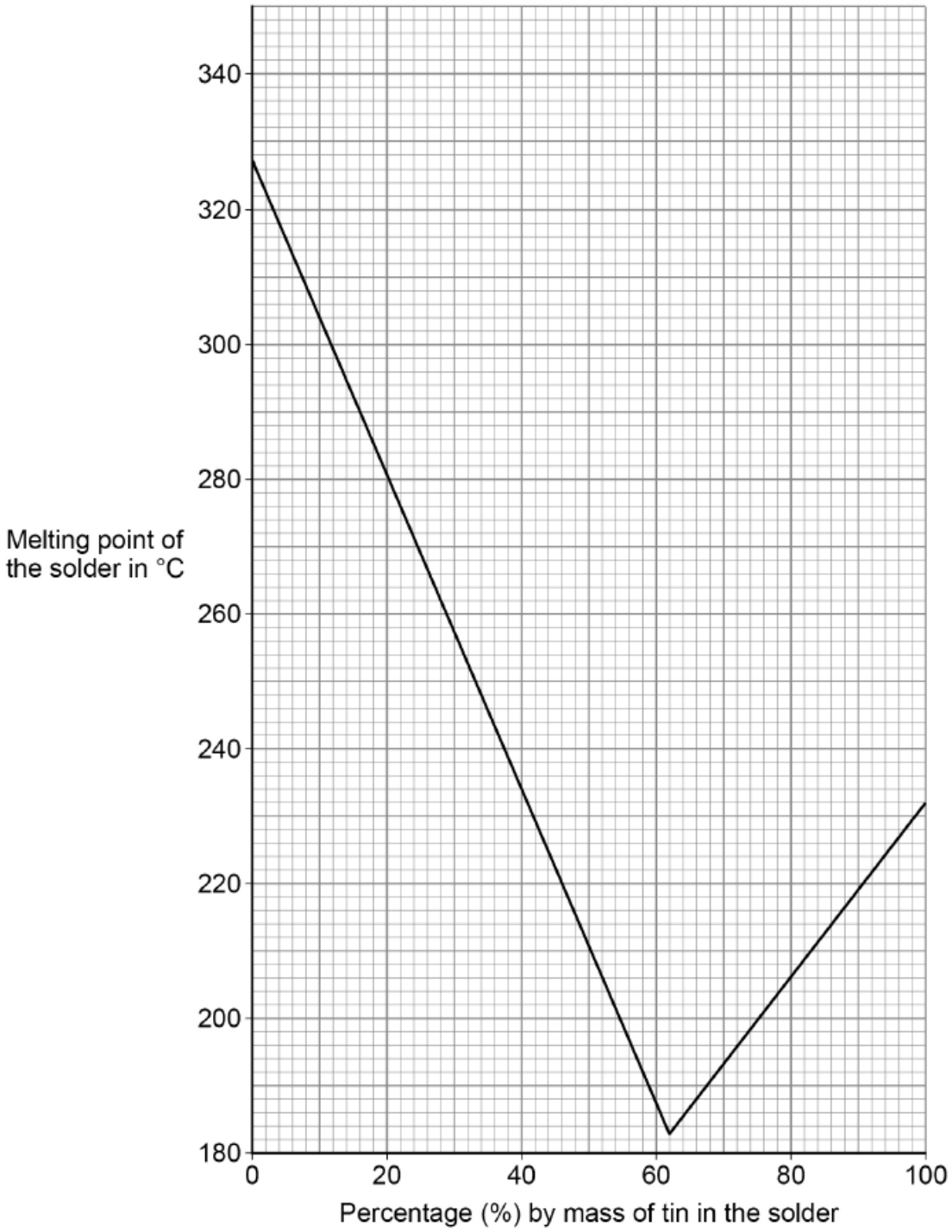
In solder the layers are distorted.

This is because the atoms of tin and lead have different _____.

Therefore the layers cannot easily _____.

Figure 5 shows how the melting point of the solder changes with the percentage by mass of tin in the solder.

Figure 5



0 4 . 3 Describe what happens to the melting point of the solder as the percentage by mass of tin increases.

Use data from **Figure 5**.

[3 marks]

0 4 . 4 What is the melting point of pure tin?

Use **Figure 5**.

[1 mark]

Melting point of pure tin = _____ °C

0 4 . 5 What happens to the atoms in pure tin as the tin melts?

[1 mark]

Tick (✓) **one** box.

- The atoms gain energy and their arrangement becomes less ordered. ☐
- The atoms gain energy and their arrangement becomes more ordered. ☐
- The atoms lose energy and their arrangement becomes less ordered. ☐
- The atoms lose energy and their arrangement becomes more ordered. ☐

2. No.6

0 6 This question is about metals.

0 6 . 1 Platinum is used to make jewellery.

Suggest **one** reason why platinum is used to make jewellery.

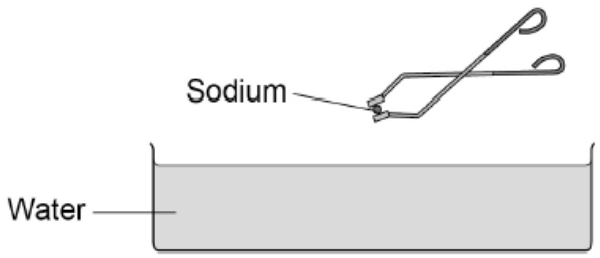
[1 mark]

_____

_____

0 6 . 2 **Figure 7** shows a piece of sodium being added to water.

Figure 7



Give **two** observations that could be seen when sodium is added to water.

[2 marks]

1 _____

_____

2 _____

_____

0 6 . 3 Copper is a transition element.

Sodium is a Group 1 element.

What are **two** differences between copper and sodium?

[2 marks]

Tick (✓) **two** boxes.

Copper has a lower melting point. ☐

Copper is harder. ☐

Copper is less dense. ☐

Copper is less reactive. ☐

Copper is less strong. ☐

0 6 . 4 The metals aluminium and copper can be used to make pans for cooking.

Table 2 shows information about the two metals.

The higher the value for thermal conductivity, the better the metal conducts thermal energy.

Table 2

	Aluminium	**Copper**
Thermal conductivity in arbitrary units	250	400
Density in g/cm^3	2.7	8.9
Cost of metal per kg in £	1.50	7.00

Evaluate the use of pans made of aluminium and of copper.

Use **Table 2**.

[4 marks]

3. No.6

0 6 This question is about uses of metals in electrical wires.

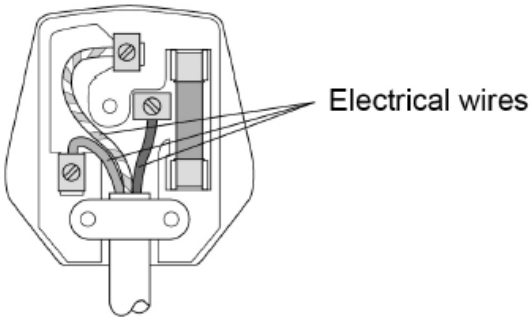
Electrical wires can be made from:

- aluminium
- copper
- silver.

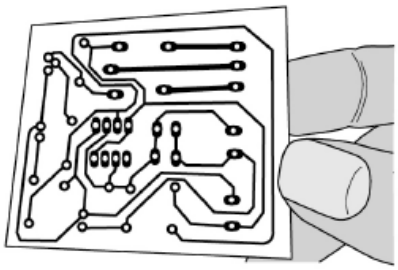
Figure 6 shows three uses of electrical wires.

Figure 6

Overhead power cables



Wiring in homes



Printed circuit boards

Table 5 shows information about the metals.

The higher the value for electrical conductivity, the better the metal is at conducting electricity.

Table 5

	Aluminium	Copper	Silver
Electrical conductivity in arbitrary units	37.7	59.6	63.0
Density in g/cm^3	2.7	9.0	10.5
Cost of metal per kg in £	1.50	7.00	640.00

0 6 . 1 Evaluate the use of aluminium, copper and silver for the types of electrical wires shown in **Figure 6**.

Use **Table 5**.

[4 marks]

0 6 . 2 Describe how metals conduct electricity.

[3 marks]

0 6 . 3 Electrical wires are usually made of pure metals and **not** alloys. This is because pure metals are better electrical conductors.

Suggest why alloys do **not** conduct electricity as well as pure metals.

Answer in terms of structure and bonding.

[2 marks]