

Questions are for both separate science and combined science students unless indicated in the question

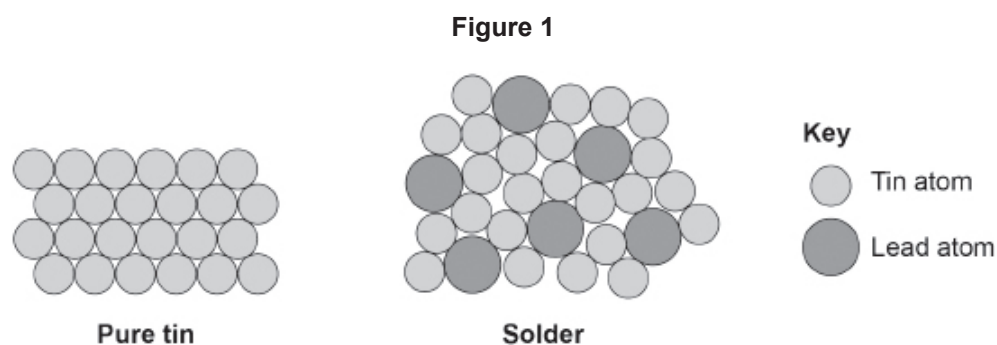
Q1.

This question is about alloys.

Solders are alloys of tin and lead.

Different solders have different percentages of tin and lead.

Figure 1 shows the arrangement of atoms in pure tin and in a solder.



- (a) The solder in **Figure 1** has 6 lead atoms for every 24 tin atoms.

Determine the percentage of atoms that are lead atoms in the solder in **Figure 1**.

Percentage of lead atoms = _____ %

(3)

- (b) Explain why solder is harder than pure tin.

Complete the sentences.

Use **Figure 1**.

In solder the layers are distorted.

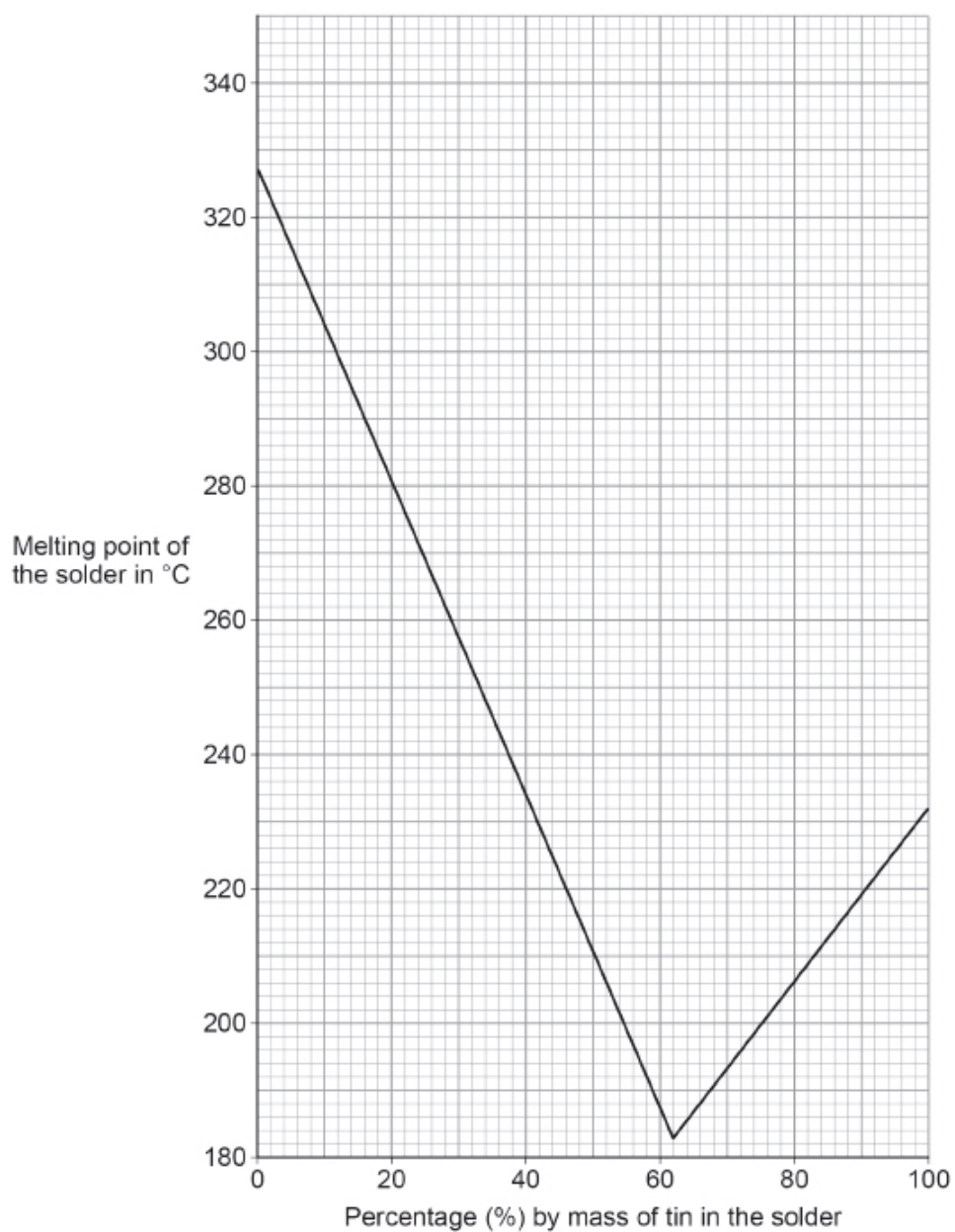
This is because the atoms of tin and lead have different _____.

Therefore the layers cannot easily _____.

(2)

Figure 2 shows how the melting point of the solder changes with the percentage by mass of tin in the solder.

Figure 2



- (c) Describe what happens to the melting point of the solder as the percentage by mass of tin increases.

Use data from **Figure 2**.

(3)

- (d) What is the melting point of pure tin?

Use **Figure 2**.

Melting point of pure tin = _____ °C

(1)

- (e) What happens to the atoms in pure tin as the tin melts?

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.

☐

(1)

(Total 10 marks)

Q2.

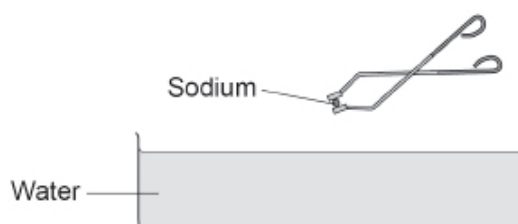
This question is about metals.

- (a) Platinum is used to make jewellery.

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

(1)

- (b) The figure below shows a piece of sodium being added to water.



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

1 _____

2 _____

(2)

(c) Copper is a transition element.

Sodium is a Group 1 element.

What are **two** differences between copper and sodium? (**chemistry only**)

Tick (✓) **two** boxes.

Copper has a lower melting point.

☐

Copper is harder.

☐

Copper is less dense.

☐

Copper is less reactive.

☐

Copper is less strong.

☐

(2)

- The table below shows information about the two metals.

	Aluminium	Copper
Thermal conductivity in arbitrary units	250	400
Density in g/cm³	2.7	8.9
Cost of metal per kg in £	1.50	7.00

Use the table.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

(Total 9 marks)