

(Using moles to calculate masses)

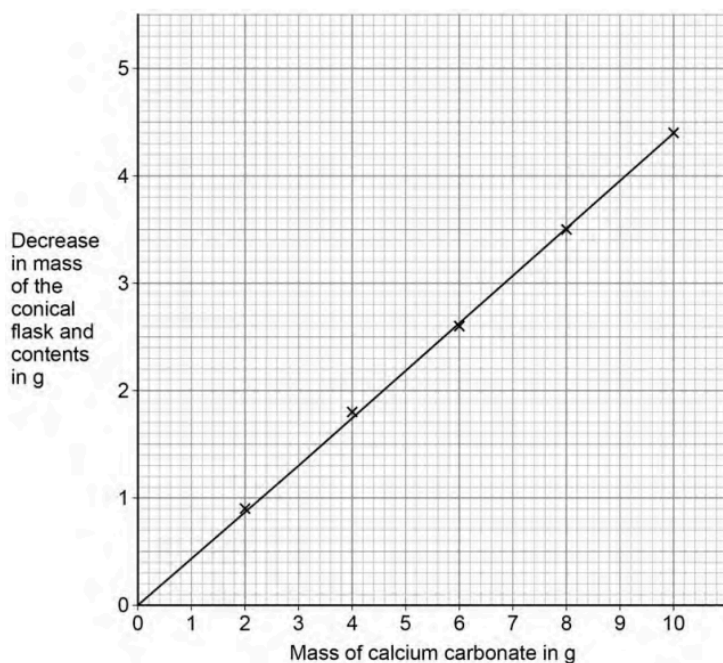
Q1. a) (2019)

A teacher demonstrated the investigation.

The teacher used different masses of calcium carbonate.

Figure 8 shows the teacher's results.

Figure 8



What type of variable is the mass of calcium carbonate?

[1 mark]

Tick (✓) **one** box.

Control

☐

Dependent

☐

Independent

☐

Q1. b) (2019)

Complete the sentence.

[1 mark]

As the mass of calcium carbonate used increases, the decrease in mass of the conical flask and contents _____.

Q1. c) (2019)

What is the decrease in mass of the conical flask and contents when a 3 g sample of calcium carbonate is used?

[1 mark]

Decrease in mass = _____ g

Q2.a) (2019)

Aluminium is extracted from aluminium oxide.

38% of a rock sample is aluminium oxide.

Calculate the mass of aluminium oxide in 40 kg of the rock sample.

[2 marks]

Mass of aluminium oxide = _____ kg

Q2.b) (2019)

The formula of aluminium oxide is Al_2O_3

Calculate the relative formula mass (M_r) of aluminium oxide.

Relative atomic masses (A_r): O = 16 Al = 27

[2 marks]

Relative formula mass (M_r) = _____

Q2.c) (2019)

60.0 kg of aluminium oxide produces a maximum of 31.8 kg of aluminium.

In an extraction process only 28.4 kg of aluminium is produced from 60.0 kg of aluminium oxide.

Calculate the percentage yield.

Give your answer to 3 significant figures.

Use the equation:

$$\text{percentage yield} = \frac{\text{mass of product actually made}}{\text{maximum theoretical mass of product}} \times 100$$

[3 marks]

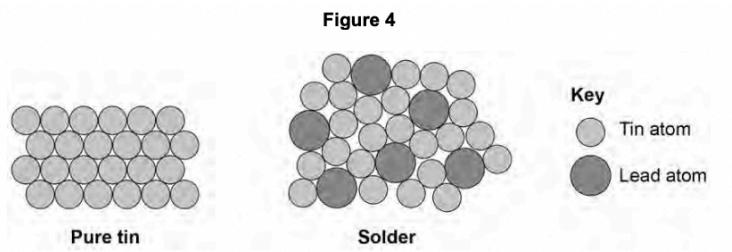
Q3.a) (2023)

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.



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 = _____ %

Q3.b) (2023)

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 _____.