

A1. (2018)

04.5	32 (g)	allow 31–33 (g)	1	AO2 5.3.1.3
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<p>04.6</p> <p>$\frac{32}{5.2} \times 24$</p> <p>148 (g)</p> <p>or</p> <p>uses graph eg 12 dm³ gives 74 (g) (1)</p> <p>(then factors up so that 24 dm³ gives) 148 (g) (1)</p>	<p>an answer of 148 (g) scores 2 marks</p> <p>allow ecf from question 04.5</p> <p>allow a range 143–153 (g)</p> <p>allow a range 143–153 (g)</p>	<p>AO3 5.3.1.3</p> <p>1</p> <p>1</p>
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04.7		mark mistakes and calculation independently	AO3 5.3.1.3
	(mistakes) increase in mass = 3 (not 4)	allow mistakes in either order	1
	inserted numbers inversely into formula	allow numbers wrong way round	1
	(calculation)	an answer of 250 scores the 2 calculation marks	1
	$\text{gradient} = \frac{750}{3}$	allow $\frac{1000}{4}$	
	250 (cm ³ per g)	if no calculation marks awarded allow $\frac{750}{3}$ or 187.5 or $\frac{3}{750}$ or 0.004 for 1 mark	1

05.3		an answer of 3.94 (g) scores 3 marks		AO2 5.3.1.3
	$\frac{3.76 + 3.98 + 4.09}{3}$ or $\frac{11.83}{3}$		1	
	= 3.943(33333333333333333333)		1	
	= 3.94 (g)	allow a correctly written answer to 3 significant figures from an incorrectly calculated mean	1	

A4. (2020)

08	Level 3: The method would lead to the production of a valid outcome. The key steps are identified and logically sequenced.	5–6	AO3
	Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the method is not fully logically sequenced.	3–4	5.3.1.3 5.4.2.2
	Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.	1–2	
	No relevant content	0	
Indicative content: <ul style="list-style-type: none"> weigh test tube add metal carbonate weigh test tube and metal carbonate heat allow to cool weigh test tube and metal oxide repeat (heat, cool and weigh) until no change in mass determine mass of metal carbonate used determine mass of carbon dioxide produced repeat with different metal carbonate(s) <p>an alternative method can be based on any mass of metal carbonates and at end divide by this mass to find mass carbon dioxide per gram metal carbonate</p> <p>level 3 change in mass is determined for at least one other carbonate</p>			

A5. (2021)

01.7	$\frac{0.97 + 0.91 + 0.95}{3}$ or $\frac{2.83}{3}$	allow for 1 mark	1	AO3
	= 0.943333 (g)	$\frac{0.97 + 0.91 + 0.50 + 0.95}{4}$ or $\frac{3.33}{4}$	1	AO2
		= 0.8325 (g)		AO2
	= 0.94 (g)	allow an answer correctly rounded to 2 significant figures using values from the table	1	5.3.1.3

A6. (2021)

05.4	(increase in temperature =) 50 (°C)		1	AO2 5.4.3.1 5.4.3.4
	increase in mass = 6 (g)	allow a value in the range 5.8 – 6 (g)	1	RPA9
	(gradient =) $\frac{50}{6}$	allow correct use of incorrectly determined value(s) for temperature and/or mass	1	
	= 8.33 (°C per g)		1	

A7. (2023)

02.4	(temperature increase =) $\frac{0.40}{1.2} \times 9.0$		1	AO2 5.4.1.2 5.5.1.1 RPA10
	= 3.0 (°C)		1	

A8. (2024)

06.3	(% copper = $100 - 13.5 =$ 86.5 (%))		1	AO2 5.2.2.7
	(mass of copper =) $\frac{86.5}{100} \times 5.25$	allow correct use of an incorrectly determined percentage of copper	1	
	= 4.54125 (g)		1	
	= 4.54 (g)	allow an answer correctly rounded to 3 significant figures from an incorrect calculation which uses the values in the question	1	
	OR			
	(mass of zinc =) $\frac{13.5}{100} \times 5.25$ (1)			
	= 0.70875 (g) (1)			
	(mass of copper = $5.25 - 0.70875$) = 4.54125 (g) (1)	allow correct use of an incorrectly determined mass of zinc		
	= 4.54 (g) (1)	allow an answer correctly rounded to 3 significant figures from an incorrect calculation which uses the values in the question		