

C2

Higher Tier

Q.1	Mark	Answer	Accept	Neutral answer	Do not accept
a	1	prevent the metals from reacting with air/oxygen/moisture			
b i	1	screen/tongs/small piece of lithium/large volume of water – any one			laboratory coat
ii	1	lithium hydroxide (1) hydrogen (1)	LiOH (1) H ₂ (1)	H	
iii	1	lithium (1)	Li		
iv	2	burns/lilac flame spits (more) melts moves faster fizzes more – any two for 2 marks	disappears quicker	dissolves quicker	

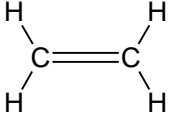
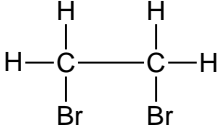
Q.2	Mark	
	6	<p>Indicative content: Description – heating the mixture in the flask to produce hot vapours. In the condenser the water enters at the lower end of the condenser and leaves at the higher point. The hot vapours from the flask then enter the condenser where they then cool, condense and runs down into the beaker as liquid. Explanation – since the boiling point of ethanol is lower than that of water the vapours will initially contain mainly ethanol and will therefore enter the condenser/beaker first.</p> <p>5-6 marks The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3-4 marks The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1-2 marks The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks The candidate does not make any attempt or give a relevant answer worthy of credit.</p>

Q.3	Mark	Answer	Accept	Neutral answer	Do not accept
a	1	sodium	Na		
b	3	Na + Cl ₂ (1) NaCl (1) correct balancing (1)	consequential marking		
c	2	add silver nitrate solution (1) white precipitate/solid formed (1)			

Q.4	Mark	Answer	Accept	Neutral answer	Do not accept
a	1	9			
b	1	6 and 2 – both needed			
c i	1	B	oxide/O ²⁻	oxygen/O	
ii	1	2-	O ²⁻		
d	1	D	neon/Ne		
e	2	D and E – both needed (1) same number of protons but a different number of neutrons / same element but a different number of neutrons (1)			

Q5	Mark	Answer	Accept	Neutral answer	Do not accept
a i	1	ionic			
ii	2	melt/dissolve (in water) (1) allow the ions to move (1)			
b	2	4 electrons between C and both O atoms (1) 8 electrons around both O atoms (1)			
c	3	simple and giant covalent (1) weak bonds between carbon dioxide molecules (1) strong bonds throughout diamond (1)			

Q.6	Mark	Answer	Accept	Neutral answer	Do not accept
a	1	smooth curve by eye starting at 290 and becoming flat at 287.6			
b	1	release/loss of gas			
c	1	prevent the loss of water vapour/moisture			
d	2	curve to the left of graph (1) levelling off at 287.6 (1)			
e	2	2.4 (1) amount of carbon dioxide released depends on the mass of calcium carbonate since the acid is in excess (1)			

Q7	Mark	Answer	Accept	Neutral answer	Do not accept
a	2	bromine becoming colourless/it decolourises (1) addition (1)			
b	2	 (1)  (1)			
c	1	ethane	C ₂ H ₆		

Q.8	Mark	
	6	<p>Indicative content: Hard water does not lather easily with soap whereas soft water does. Calcium or magnesium compounds dissolved in water makes it hard. Hardness in water can be removed by boiling/distillation, adding washing soda and by passing through an ion-exchange column or a detailed account of one method.</p> <p>5-6 marks The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3-4 marks The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1-2 marks The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks The candidate does not make any attempt or give a relevant answer worthy of credit.</p>

Q9	Mark	Answer	Accept	Neutral answer	Do not accept
a	3	mass of oxygen = 0.16 mass of magnesium = 0.48 (1) Mg O $\frac{0.48}{24} \quad \frac{0.16}{16} \quad (1)$ 0.02 0.01 Mg ₂ O (1)			
b	2	some magnesium had not reacted (1) some product lost during the burning (1)	lid not opened enough white smoke given off Mg reacted with nitrogen Mg might have oxidised before expt		
c	3	$M_r(\text{MgO}) = 24 + 16 = 40 \quad (1)$ 2(24) g Mg 2(40)g MgO (1) 48.....80 0.480.8 (1) or 2 mols of Mg gives 2 mols of MgO (1) 0.020.02 Mass of MgO = 0.02 × 40 = 0.8 (1) - correct answer 3 marks			