	Which state symbol describes these bubbles?	
	A aq B	
	g C D	
	S	
	Your answer	[1]
2	Magnesium reacts with oxygen to make magnesium oxide.	
	magnesium + oxygen \rightarrow magnesium oxide	
	Which type of reaction is shown by the	
	equation? A Displacement	
	B Electrolysis GVIEW Dade 3	
	Neutralisation D	
	Oxidation	
	Your answer	[1]
3	Which gas turns limewater cloudy?	
	A Carbon dioxide	
	B Chlorine C	
	Hydrogen D	
	Oxygen	
	Your answer	[1]

Section A

You should spend a maximum of 20 minutes on this section.

Write your answer to each question in the box provided.

1 When iron reacts with dilute hydrochloric acid, bubbles of hydrogen are produced.

Which state symbol describes these bubbles?

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- **12** This question is about diamond and graphite.
- (a) The diagram shows the structure of diamond.



(i) Which element is diamond made from?

		[1]
(ii)	What is the maximum number of covalent bonds that each atom in diamond can form?	[1]
	cale.cu	[,]
(iii)	The atoms in diamond have a diameter of 0.000 00004	
	m. What is the diameter of the ator sur standard form?	
	Tick (3) one eview page 9	
	$1.54 \times 10^{-13} \text{ m}$	
	$1.54 \times 10^{-10} \text{ m}$	
	$1.54 \times 10^{-3} \mathrm{m}$	141

(b) The student also investigates how adding salt to ice changes the melting point of the ice.

The table shows their results.

Mass of salt (g)	Melting point (°C)
1	- 2
2	- 4
3	- 6
4	- 8

(i) The student draws a bar chart of the results.

Draw a bar on the bar chart for the results when 4 g of salt are added to the ice.



[1]

(ii) Describe how changing the mass of salt changes the melting point.

 	[1]

(iii) The student thinks the results show that pure ice will have a melting point of 0 °C. Explain why the student is correct.

......[1]



		(ii)	Increasing the amount of salt decreases the melting	1	3.1a	Answer must be a comparison e.g., just melting
			point / ORA			point decreases scores no mark
						DO NOT ALLOW the idea of just changing the
						amount of salt
		(iii)	Idea that pure ice contains no salt / idea that increasing	~ 11	3.1 b	
			salt by 1 g decreases melting point by 2 °C			
totesal v						

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J250/03

Question		n	Answer	Marks	AO element	Guidance
14	(a)		C 🗸	1	3.2b	
	(b)		A and C \checkmark	1	3.2b	
	(c)		Two ovals / dots / circles drawn at the same levels C those for B and D \checkmark	T	3.2b	IGNORE any dots drawn on the baseline
	(d)	re	First check answer on the interaction of the line of t	3	2 x 2.2	ALLOW an answer from 0.755 up to calculator value 0.755102040 If no working shown this answer scores 2 marks
			= 0.76 (to 2 significant figures) 🗸		1.2	ALLOW ECF for 2 sig fig mark

J250/03

Question	Answer	Marks	AO element	Guidance
17 (a)	Idea that lithium is on the left (of the Periodic Table) / metals are on the left and oxygen is on the right (of the Periodic Table) / non-metals are on the right Or Lithium is in Group 1 (which are metals) and oxygen in Group 6 (which are non-metals)	1 0.\	1.1	IGNORE lithium forms positive ions and oxygen forms negative ions ALLOW oxygen is in group 16 instead of group 6
(b)	$\begin{array}{c} \textbf{4}\text{Li}+\text{O}_2 \rightarrow \textbf{2}\text{Li}_2\text{O} \\ \textbf{4}(\text{Li}) \textbf{e} \textbf{N} \\ \textbf{0}(\text{Li}_2\text{O}) \textbf{P} \textbf{3} \textbf{9} \textbf{9} \\ \textbf{0} \textbf{1} \textbf{1} \textbf{1} \\ \textbf{1} \textbf{1} \textbf{1} \textbf{1} \\ \textbf{1} \textbf{1} \textbf{1} \textbf{1} \\ \textbf{1} \textbf{1} \textbf{1} \\ \textbf{1} \textbf{1} \textbf{1} \\ \textbf{1} \textbf{1} \textbf{1} \\ \textbf{1} \textbf{1} \textbf{1} \textbf{1} \\ \textbf{1} \textbf{1} \textbf{1} \\ \textbf{1} \textbf{1} \textbf{1} \textbf{1} \\ \textbf{1} \textbf{1} \textbf{1} \textbf{1} \\ \textbf{1} \textbf{1} \textbf{1} \textbf{1} \textbf{1} \\ \textbf{1} \textbf{1} \textbf{1} \textbf{1} \textbf{1} \textbf{1} \\ \textbf{1} \textbf$	2	1.1 2.2	ALLOW any correct multiples
(c)	2,1	1	2.1	ALLOW diagram ALLOW sentences describing the electron arrangement
(d)	It loses (electrons) \checkmark (It loses) 1 / an electron \checkmark	2	2 x 2.1	DO NOT ALLOW shares for this marking point (CON) ALLOW the idea that lithium 'gives its electron to oxygen' for 2 marks
(e)	Idea that both are in Group 1 / both are in the same group / both have 1 electron in their outer energy level / \checkmark both lose 1 electron / both form 1+ ions	1	3.1b	
(f)	Atoms with the same atomic number but different mass numbers Or Atoms with the same number of protons but different numbers of neutrons	2	2 x 1.1	ALLOW answers based upon lithium e.g., both isotopes have 3 protons but ⁶ Li has 3 neutrons and ⁷ Li has 4 neutrons ALLOW atoms of the same element as AW to same atomic number IGNORE electrons