

Question number	Answer	Accept	Reject	Marks
1 (c)	<p>M1 - $n(\text{Na}) = \frac{0.138}{23}$ or 0.006</p> <p>M2 - $n(\text{H}_2) = \frac{1}{2} \times \text{M1}$ or 0.003</p> <p>M3 - vol. $\text{H}_2 = 24\,000 \times \text{M2}$ or 72 (cm^3)</p> <p>[Mark consequentially. $n(\text{Na})$ and $n(\text{H}_2)$ need not be evaluated.]</p> <p>correct final answer on its own without working scores 3</p>	0.072 <u>dm</u> ³		<p>1</p> <p>1</p> <p>1</p>

Question number	Answer	Accept	Reject	Marks
1 (d)	(i) M1 - (add dilute) <u>nitric</u> acid	addition of silver nitrate before nitric acid for both M1 and M2		1
	M2 - (add aqueous) silver nitrate	correct formulae throughout		1
	M3 - <u>white</u> precipitate / solid / suspension			1
	M3 dependent on M2			
	(ii) Reason – it fizzed / a gas was evolved OR sodium hydroxide would not fizz / produce a gas IGNORE incorrect identification of gas X = <u>sodium</u> carbonate / <u>sodium</u> hydrogencarbonate	sodium hydroxide is soluble		1
				1
(e)	M1 - 8 electrons around Na	any combination of dots and crosses 0 electrons		1
	M2 - 8 electrons around Cl. IGNORE inner shells even if incorrect IGNORE starting diagrams showing atoms either with or without arrow to show movement of electron			1
	M3 - correct charge on <u>both</u> Na and Cl [standalone]			1
(f)	M1 - potassium is more reactive than sodium	reactivity increases down Group 1 ORA		1
	M2 - (but) bromine is less reactive than chlorine	reactivity decreases down Group 7 ORA	-ide endings	1
			Total	19

Question number	Answer	Notes	Marks
2 (a)	<p>(i) Na / sodium / Mg / magnesium</p> <p>(ii) Si / silicon / P / phosphorus / S / sulfur / Cl / chlorine</p>	<p>Ignore name and formula of compound</p> <p>Accept aluminium</p> <p>If both name and formula given both must be correct</p> <p>If both name and formula given both must be correct</p>	<p>1</p> <p>1</p>
(b) (i)	<p>$[Mg]^{2+} [:\ddot{Cl}:]^- [:\ddot{Cl}:]^-$</p> <p>M1 correct electronic configuration for magnesium ion and correct charge on ion</p> <p>M2 correct electronic configuration for both chloride ions</p> <p>M3 correct charges on both chloride ions</p>	<p>Allow electrons on brackets</p> <p>Allow any combination of dots and crosses</p> <p>Allow 0 or 8 electrons in outer shell</p>	<p>3</p>
(ii)	<p>M1 electrostatic attraction/forces between ions</p> <p>M2 of opposite charge</p>	<p>M3 indep</p> <p>accept positive</p>	<p>2</p>

(iii)	<p>M1 attraction (between ions) is strong</p> <p>M2 lots of ions (in structure) / giant structure / lattice / lots of/many bonds</p> <p>M3 (therefore) lot of (thermal/heat) <u>energy</u> required to overcome attraction / to break down the lattice</p>	<p>and negative ions accept cations and anions M2 dep on M1 Accept attraction/forces between oppositely charged ions for 1 mark only Reject references to atoms/molecules/IMF for M1 and M2</p> <p>Accept strong (ionic) bonding/strong (ionic) bonds</p> <p>Accept lot of (thermal/heat) <u>energy</u> required to break (ionic) bonds</p> <p>If any reference to attraction between atoms/molecules/electrons scores 0/3 If any reference to covalent bonding/covalent structure/IMF scores 0/3</p>	3
(c)		Correct answer with or without working scores 2 marks	2

	<p>M1 mol Al = $20/3$ (= 6.67)</p> <p>M2 mass Al = (answer to M1 x 27) = 180 (g)</p> <p>OR</p> <p>M1 3 faradays give 1 mol OR 27 g / 30 faradays give 10 mol OR 270 g</p> <p>M2 20 faradays gives 180 (g)</p>	<p>M2 CQ on M1 eg 540 scores 1 mark 6.67 gives 180(.09) scores 2 marks 6.7 gives 180.9 = 181 scores 2 marks 6.66 gives 179.82 scores M2 only Accept any number of sig fig except 1</p>	
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