Question number	Answer	Accept	Reject	Marks
1 (a)	(giant) ionic		any other answer	1
(b)	IGNORE three-dimensional / lattice M1 and M3 can be scored from labelled diagrams			
	sodium:			
	M1 – positive ions/cations/Na ⁺ and (delocalised/sea of) electrons IGNORE metal ions	Sodium / metal ions	atoms/molecu les	1
	M2 – (electrostatic) forces/attraction between positive ions/cations/Na ⁺ and		nuclei	1
	(delocalised) electrons IGNORE references to metallic bonding		intermolecular forces	1
	sodium chloride:			1
	M3 – positive and negative ions/cations and anions / Na ⁺ and Cl (ions)	oppositely charged ions	atoms/molecu les nuclei	1
	 M4 – <u>electrostatic</u> forces/attraction between (oppositely charged/positive and negative) ions / cations and anions / Na⁺ and Cl⁻ IGNORE references to ionic bonding 	chlorine ions if stated as being negative	intermolecular forces reference to covalent loses M4	1
	comparison:			
	M5 - forces in Na are weak <u>er</u> (than forces in NaCl) can be awarded even if an incorrect description of the forces has been given.	less energy required to overcome forces in Na		
	[standalone]	bonds / lattice for forces		
		ORA		

Question number	Answer	Accept	Reject	Marks
1 (c)	M1 - $n(Na) = \frac{0.138}{23}$ or 0.006			1
	M2 - $n(H_2) = \frac{1}{2} \times M1$ or 0.003			1
	M3 - vol. $H_2 = 24\ 000\ x\ M2$ or 72 (cm ³)	0.072 <u>dm³</u>		1
	[Mark consequentially. $n(Na)$ and $n(H_2)$ need not be evaluated.]			
	correct final answer on its own without working scores 3			

Question number	Answer	Accept	Reject	Mar ks
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 - white precipitate / solid / suspension			1
(ii)	M3 dependent on M2			
	Reason – it fizzed / a gas was evolved OR sodium hydroxide would not fizz /	sodium hydroxide is soluble		1
	produce a gas IGNORE incorrect identification of gas			1
	X = <u>sodium</u> carbonate / <u>sodium</u> hydrogencarbonate			
(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)		Ignore name and formula of compound	1
(i)	Na / sodium / Mg / magnesium	Accept aluminium If both name and formula	
(ii)	Si / silicon / P / phosphorus / S / sulfur / Cl / chlorine	given both must be correct	1
		If both name and formula given both must be correct	
(b) (i)	[Mg] ²⁺ [:ċi:] ⁻ [ːċi:] ⁻	Allow electrons on brackets	3
	M1 correct electronic configuration for magnesium ion and correct charge on ion	Allow any combination of dots and crosses Allow 0 or 8 electrons in	
	M2 correct electronic configuration for both chloride ions	outer shell	
	M3 correct charges on both chloride ions		
(ii)	M1 electrostatic attraction/forces between ions	M3 indep	2
	M2 of opposite charge		
		accept positive	

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

M	11 mol Al = 20/3 (= 6.67)		
(9 0 3	 M2 mass AI = (answer to M1 x 27) = 180 (g) DR M1 3 faradays give 1 mol OR 27 g / 30 faradays give 10 mol OR 270 g M2 20 faradays gives 180 (g) 	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	