

Multiple Choice Answers

Q19: C

Q20: B

Multiple Choice Answers

Q19: D

Q20: B

Multiple Choice Answers

Q18: C

2(a)(i)	M1 nuclear charge increases (across period) AND similar shielding M2 greater / stronger attraction to nucleus						
2(a)(ii)	M1 Al loses (3) electrons / Al is 3+, and P gains (3) electrons / P is 3– M2 Al (3+) has (one) fewer shell (than P(3–))						
2(b)(i)	M1	(+)1	(+)2	(+)3	(+)4	(+)5	(+)6
	M2	12-14	8-10	—	—	0-4	0-4
2(b)(ii)	they are insoluble						
2(c)(i)	$\text{Na}_2\text{O} + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{O}$						
2(c)(ii)	$\text{Al}_2\text{O}_3 + 2\text{NaOH} \rightarrow 2\text{NaAlO}_2 + \text{H}_2\text{O}$						
2(d)(i)	(thermal stability) increases (down the group)						
2(d)(ii)	NO_2 AND O_2						

1(a)	$\text{Mg}(\text{NO}_3)_2 \rightarrow \text{MgO} + 2\text{NO}_2 + \frac{1}{2}\text{O}_2$ OR $2\text{Mg}(\text{NO}_3)_2 \rightarrow 2\text{MgO} + 4\text{NO}_2 + \text{O}_2$
1(b)	M1: $\text{Mg}(\text{NO}_3)_2$ / magnesium nitrate AND magnesium ion / Mg^{2+} AND is smaller / has higher charge density M2: nitrate ion / anion is more distorted / polarised
1(c)(i)	magnesium sulfate and water / MgSO_4 and H_2O
1(c)(ii)	M1: magnesium sulfate / A has a more exothermic ΔH_{lat} and ΔH_{hyd} M2: difference in ΔH_{hyd} is greater M3: magnesium sulfate / A has a more exothermic ΔH_{sol}

1(a)(i)	$\text{Sr}(\text{HCO}_3)_2 \rightarrow \text{SrCO}_3 + \text{CO}_2 + \text{H}_2\text{O}$
1(a)(ii)	M1: radius of cation / M^{2+} increases OR charge density of cation / M^{2+} decreases M2: less polarisation / less distortion of the anion / carbonate ion
1(b)	M1: least soluble $\text{CaF}_2 < \text{SrF}_2 < \text{BaF}_2$ most soluble M2: ΔH_{latt} and ΔH_{hyd} both become less exothermic / less negative M3: ΔH_{hyd} changes less / becomes less exothermic by a smaller extent OR ΔH_{latt} changes more / becomes less exothermic by a larger extent M4: ΔH_{sol} becomes more exothermic / more negative
1(c)(i)	enthalpy change when one mole of gaseous ions dissolve in water to form a solution
1(c)(ii)	M1: ionic radii AND ionic charge M2: (ionic) radii increase / charge density decreases AND ΔH_{hyd} decreases/less exothermic AND less attraction between water molecules and (gaseous) ions OR as ionic charge increases / charge density increases AND ΔH_{hyd} increases/more exothermic AND more attraction between water molecules and (gaseous) ions
1(d)	M1: use of -2957 / -1926 / -505 AND $2 \times (-505)$ M2: correct signs and evaluation ΔH_{sol} of $\text{MgF}_2(\text{s}) = -1926 + (2 \times -505) - (-2957) = (+)21 \text{ kJ mol}^{-1}$
1(e)(i)	M1: $K_{\text{sp}} = [\text{Hg}_2^{2+}] [\text{F}^-]^2$ M2: units = $\text{mol}^3 \text{ dm}^{-9}$
1(e)(ii)	$K_{\text{sp}} = 2^2 \times (9.20 \times 10^{-3})^3 = 3.11 \times 10^{-6} \text{ min } 2\text{sf}$