Thank you everyone who contributed

REPLY to any geologistdear reddit post for any changes.

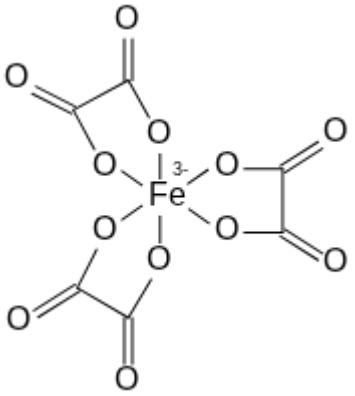
NOT PRECISE ANSWERS OBV LARGE DIFFERENCES TO MARK SCHEME ofc ECF AND METHOD MARKS EXIST

Question	Answer	Marks
Block of aluminum	p	1
Successive Ionisation energies	Z	1
Why is 2nd IE greater than 1st	Positive ions formed. e- are closer to the nucleus…..	1
MP of Si vs Aluminium	Macromolecular vs metallic Covalent vs electrostatic	3
Define Lattice Enthalpy of formation	Enthalpy change when one mole of solid ionic solid is formed from its constituent ions in the gaseous state	2
Born haber 2 eqs	Full LHS of diagram, answer highlighted: Sr^{2+} (g) + $2e^-$ + 2Br (g) ↑ Sr^{2+} (g) + $2e^-$ + Br2 (l) ↑ Sr^+ (g) + e^- + Br2 (l) ↑ Sr (g) + Br2 (l) ↑ Sr (s) + Br2 (l) ↓ SrBr2 (s) <u>Alternative answer:</u> Sr^{2+} (g) + $2e^-$ + 2Br (g) ↑ Sr^+ (g) + e^- + 2Br (g) ↑ Sr (g) + 2Br (g) ↑ Sr (g) + Br2 (l) ↑ Sr (s) + Br2 (l) ↓ SrBr2 (s)	2 **<u>Note</u>**: there is some dispute about which lines were, in fact, blank. It may have been the fourth to top + second to top, unlike 2nd and 3rd as below assume 2nd and 3rd are correct: Either way what's on the left is CORRECT, just the highlighting might be switched
^H of electron affinity of Br-	-318.5 or -319 (dp if not rounded)	3
^H of hydration of Br-	-333.5 or -334 (dp if not rounded)	3

Structure of Mg solid Why conducts electricity Why high MP	spheres of mg2+ surrounded side to side by e- (or 2e-) Delocalised e- that are free to move and carry charge Strong electrostatic between e- and mg2+ Metallic lattice structure	4 (unclear distribution) (Structure and bonding in stem of question so i think 2 marks for this)
Use of Mg(OH)2	Neutralise stomach acid / Used in medicine to treat indigestion	1
Reaction between magnesium and titanium chloride + role of magnesium	TiCl4 + 2Mg -> 2MgCl2 + Ti Mg is a reducing agent	2
State 2 conditions needed to call enthalpy “standard”	298K and 100 kPa Constant pressure	1
Temperature change (2 lines of bsf)	5.2-5.4	2
Enthalpy change per mole of solid	M = density * volume q=mc^t H = -q/n -22.8 kj per mol	4
5 MARKER AUTOCATALYSIS	Slow rate of reaction initially - High activation energy - both negative ions and so repel no Mn2+ product formed so slow - as Mn2+ conc increases, it catalyses the reaction, increasing rate of reaction (as reaction of positive ion with negative ion has lower Ea due to attraction between them.) As reaction progresses, MnO4- conc decreases, until it is used up, so	5
Why increasing dp to 3dp of solid is useless	Volume of water only given to 3sf so working to least Vol of water + Powder in excess?Temperature only to two 2sf?	1
Conc of Methanoic acid	0.078 (was this the one you had to use the pH curve for?)	2

6-Marker on enthalpy change: HCl, HNO3, H2SO4 and CH3COOHons) (+ supporting equation Ch3cooh = -55 Hcl and hno3 = -57 H2so4 = -114	H2so4, hno3, ch3cooh, hno3 Sulfuric acid diprotic, requires 2NaOH to neutralise completely (strong acid), thus double enthalpy/most exothermic Nitric + Hydrochloric acid strong monoprotic acids, only require 1 NaOH to neutralise completely Ethanoic acid weak, monoprotic acid, partially ionises in aqueous solution, Both CH3COOH and H+ ions must be neutralised. For weak acid must react with both acid and H+ ions in solution for complete neutralisation, so the O-H bonds in the acid must be first broken which is endothermic, so overall less exothermic. Breaking O-H bonds is endothermic, making O-H bonds is exothermic. O-H bonds are made during the neutralisation when water is formed. Equations: HCl + NaOH → NaCl + H2O HNO3 + NaOH → NaNO3 + H2O H2SO4 + 2NaOH → Na2SO4 + 2H2O HCOOH + NaOH → HCOONa + H2O	6 I suspect the marking sections are: 1. Similarities 2. Differences (mono vs di, strengths) 3. equations
Why not washing pH meter with distilled water between each measurement	To prevent residual water diluting solution/contamination?? More volume	1
Formula for Fe complex ion with NaOH Reagent that leads to green precipitate, that stays green even when in contact with air	Fe(H2O)4(OH)2 Na2CO3 (why is it not nh3 bro)	1 1
Iron chloride solution acts as acid when reacting with water, forming solution with pH of 3. Equation? and Explain how it can form a pH this “low”	[Fe(H2O)6]^3+ +H2O-> [Fe(h2o)5(oh)]^2+ +H3O+ (may be reversible) ive seen some with the reversible sign and some without M1: **Fe^3+/metal ion** has a high charge density M2: **Polarises** O-H in water M3: which weakens O–H bonds, releasing H+ ions (= acidic solution)	4
Back Titration with MnO4- Find Ar of M Identity of M	55.7 Fe	7

2SO2+02->SO3 Told its negative ^H Effect of decreased temp on SO3 yield	Increase in yield Equilibrium shifts right/forward reaction direction (in exothermic direction) To oppose decrease in temp	3
Water pH Why still neutral	6.92 [H+] =[OH-]	3 Thanks alexandra
buffer made by adding: - 5cm³ NaOH, 1.5mol/dm³ - 8cm³ methanoic acid, 2.0mol/dm³ Ka of methanoic acid = 1.78 * 10^-4 work out pH of buffer	3.70 (must be 2dp)	6
How does this buffer resist pH change when small amount of HCl added	M1: H+ (from HCl) react with HCOO- (from salt) to reform HCOOH, shifts equilibrium to LHS (opposes increase in [H+]) M2: this keeps [H+] almost constant (= pH change resisted)	2
Conc of OH- given Ka and initial pH	1.47x10^-7	2
Feasibility of Reaction at what temp (given entropy and enthalpy data table)	M1: Work out ΔH(formation) M2: Convert units of ΔS M3: ΔG = 0 (when reaction becomes feasible) M4: state/rearrange equation M5: Temp = 899K Alternative M2: convert units OF ΔH to match ΔS	5
pv=nRT with LiNO3	24.6g	5
Why can't you use Hcl in titration w MnO4-	Cl- oxidised by MnO4- to Cl(g), which increases the titre, leading to inaccurate titre	1

Draw structure of the metal complex in K3[M(C2O4)3] Include charge State isomerism that this complex shows	 Put -3 charge in [ ] Optical isomerism use M, not Fe (according to Q instructions) - MS will probs allow any 3+ metal ion (= overall charge is 3-)	2 (lowkey i do believe this may be 3 marks: M1 for structure, M2 for charge, M3 for isomerism name)
AgNO3 is added to dilute iron (III) chloride solution, followed by excess of NH3. State observation at end of reaction. State name of silver-containing species, at end of reaction	Brown precipitate (explanation for those confused why it isn't colourless: after AgCl dissolves, the brown ppt of Fe(H2O)3(OH)3 remains) $Ag(NH_3)_2^+$	2
Equations, with state symbols of barium reacting with water	$Ba\ (s) + 2H_2O\ (l) \rightarrow Ba(OH)_2\ (aq) + H_2\ (g)$	1
State trend of Group 2 hydroxide solubility	Increases down G2	1
State observation for when dilute sulfuric acid is added to $Ba(OH)_2$ Give simplest ionic eq for reaction, with state symbols	White ppt Ba2+(aq) +SO4^2- (aq) -> BaSO4 (s)	2
(Q4) Why is it necessary to extrapolate the line graphically rather than measuring the max temp on thermometer	Heat energy lost to surroundings during method (so cooling curve plotted to account for solution cooling during reaction)	1
Identify P3 element that	Na	2

reacts with oxygen, and then forms solution of pH 14 Equation for it	(as NaOH formed) Na2O + H2O -> 2NaOH	
identify P3 element that forms oxide that reacts with HCl and with NaOH solution (flow chart of reactions provided) Equation for both	Al Al2O3 + 6HCl → 2AlCl3 + 3H20 Al2O3 + 2NaOH + 3H2O → 2NaAl(OH)4	3
Characteristic of Al2O3 (that allows it to react in the way it has in Q above)	Amphoteric	1
Select appropriate pH indicator based on titration curve given	Thymol blue (bottom box)	1
Redox titration of manganate (vii) and ethanedioate ions (overall equ given) State oxidation and reduction equations	OX equation: C2O4^2- → 2CO2 + 2e- RED equation: 8H+ + MnO4- + 5e- -> Mn2+ + 4H2O	2